

# Initial Environmental Examination

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## **Kyrgyz Republic: Climate Change and Disaster-Resilient Water Resources Sector Project**

### **Hydroposts construction – rehabilitation works in Jalal-Abad Region**

Prepared by the Water Resources Services under the Ministry of Agriculture of the Kyrgyz Republic for the Asian Development Bank (ADB).

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## CONTENTS

### Table of contents

Executive Summary.....	1
1. INTRODUCTION .....	3
1.1. Overview .....	3
1.2. Identification of project and project proponent.....	3
1.3. Purpose of the report.....	4
1.4. Procedure of sub-project selection.....	4
1.4.1. Conclusions regarding environment in the selection process .....	4
1.5. Boundaries of IEE.....	4
1.6. Scope of IEE .....	4
1.7. IEE information sources and limitations .....	5
1.8. Structure of the report.....	5
2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK .....	5
2.1. National and local legal and institutional framework.....	5
2.1.1. Environmental protection law and policy .....	5
2.1.2. Project status regarding environmental protection.....	10
2.1.3. Other legislation and standards.....	10
2.1.4. Institutional framework .....	12
2.2. International arrangements relevant to the project .....	13
2.3. ADB requirements .....	14
2.3.1. Policy .....	14
2.3.2. Guidance.....	14
2.3.3. Environmental screening categories.....	15
2.4. Organizational roles and responsibilities of departments and structures.....	15
3. DESCRIPTION OF THE PROJECT .....	19
3.1. Overall framework .....	19
3.2. Jalal-Abad Oblast hydro posts .....	20
3.2.1. Shaidan Hydro post.....	20
3.2.2. Kogart- Kanjiga hydro post.....	25
3.2.3. Kara-Alma Hydro post.....	27
3.2.4. Kogart-Mikhailovka hydro post .....	29
3.2.5. Chatkal hydro post .....	29
3.2.6. Gava-Sai hydro post .....	33

3.2.7. Padysha-Ata Hydro post .....	37
3.2.8. Torkent hydro post .....	43
3.2.9. HMC hydro post .....	48
4. DESCRIPTION OF THE ENVIRONMENT .....	49
4.1. Jalal- Abad hydro posts .....	49
4.1.1. Physical environment .....	49
4.1.2. Biological environment .....	68
4.1.3. Human environment.....	70
4.1.4. Protected areas.....	75
5. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES .....	75
5.1. Table 16: Anticipated impacts and proposed measures of Jalal-Abad hydro posts .....	78
5.2. Cumulative impacts .....	89
6. ALTERNATIVES TO THE SELECTED PROJECT .....	89
7. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION .....	89
7.1. Jalal-Abad hydro-posts .....	89
7.1.1. Public participation meeting .....	89
7.1.2. Planned information disclosure measures .....	92
8. GRIEVANCE REDRESS MECHANISM .....	93
8.1. Objectives.....	93
8.2. Grievance redress groups .....	94
8.3. Grievance resolution process .....	95
8.4. Additional mechanism.....	96
8.5. Compliant documentation .....	97
9. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN .....	97
9.1. Environmental management plan (EMP) .....	98
9.1.1. Table 19 Environmental management plan for Jalal-Abad group hydro posts .....	99
9.2. Environmental monitoring and management plan (EMMP) .....	112
9.2.1. Table 20 Environmental monitoring plan for Jalal-Abad hydro posts .....	113
9.3. Coordinate list of sampling locations.....	118
9.4. Environmental safeguard action plan.....	131
9.5. Site specific environmental, health and safety management plan (SSEHSMP) .....	134
9.6. EMMP cost.....	135
10. CONCLUSION AND RECOMMENDATION .....	136
11. REFERENCES .....	137

12. APPENDIXES .....	139
12.1. Calculation of emissions of pollutants into the atmosphere for Shaidan .....	139
12.2. Calculation of emissions of pollutants into the atmosphere for Kogart .....	142
12.3. Calculation of emission of pollutant into the atmosphere for Chatkal .....	145
12.4. Calculation of emission of pollutant into the atmosphere for Gava-Say .....	148
12.5. Calculation of emission of pollutant into the atmosphere for Pasysha-Ata .....	151
12.6. Calculation of emission of pollutant into the atmosphere for Torkent .....	153
12.7. Calculation of emission of pollutant into the atmosphere for HMC .....	156
12.8. Geological Map.....	159
12.9. List of public consultation meeting for Jalal-Abad projects .....	161
12.10. Minute of public hearing for Jalal-Abad projects.....	163
12.11. Grievance acceptance form .....	168
12.12. Grievance registration logbook .....	169
12.13. LAR check lists .....	170

## List of tables

Table 1: Major legislation on environmental protection.....	6
Table 2: Ambient air quality standards (in mg/m <sup>3</sup> except as noted).....	11
Table 3: Norms of exhaust gases emissions of motor vehicles .....	11
Table 4: Surface water quality standards for the most usual parameters.....	12
Table 5: Acceptable noise levels.....	12
Table 6: Roles and responsibilities of departments and structures.....	15
Table 7: BoQ of Shaidan hydro post .....	22
Table 8: BoQ of Chatkal hyrdopost .....	30
Table 9: BoQ of Padysha-Ata.....	39
Table 10: BoQ of Torkent.....	45
Table 11: Jalal-Abad oblast area climate conditions and projected climate changes.....	53
Table 12: Baseline information on the beneficiaries in Jalal Abad .....	71
Table 13: Economical Displays .....	73
Table 14: Jalal-Abad oblast protected areas .....	75
Table 15: Impact screening criteria .....	77
Table 16: Anticipated impacts and proposed mitigation measures of Jalal-Abad hydro-posts ...	78
Table 17: LFP list for Jalal Abad Hydro Posts .....	94
Table 18: Grievance redress procedure .....	95
Table 19: Environmental management plan for Jalal-Abad hydro posts .....	99
Table 20: Environmental monitoring plan for Jalal-Abad hydro posts .....	113
Table 21: Environmental safeguard action plan.....	131
Table 22: Cost of mitigation measures .....	135

## List of figures

Figure 1: Cross section of Shaidan hydro post.....	23
Figure 2: Gauging cable car.....	24
Figure 3: Cross section of Kegart hydro post.....	27
Figure 4: Cross section of Kara-Alma hydro post.....	28
Figure 5: Gauging cable car.....	33
Figure 6:BoQ of Gava-Say hydro post.....	35
Figure 7: Gauging cable car.....	37
Figure 8: Gauging cable car.....	47
Figure 9: Wind rose of Jalal Abad oblast.....	51
Figure 10: Climatic map of Kyrgyzstan Republic.....	52
Figure 11: Topographic map.....	61
Figure 12: Distribution of the population of the Fergana Valley (Denisov, 2005).....	71
Figure 13: Grievance redress procedure.....	96
Figure 14: Shaidan sampling map.....	119
Figure 15: Kogart Kanjiga sampling map.....	120
Figure 16: Kara-Alma sampling map.....	121
Figure 17: Kogart Mihailovka sampling map.....	123
Figure 18: Chatkal sampling map.....	124
Figure 19: Gava-Say sampling map.....	125
Figure 20: Padysha-Ata sampling map.....	127
Figure 21: Torkent sampling map.....	129
Figure 22: HMC sampling map.....	130

**CURRENCY EQUIVALENT**  
(as of 25 July 2022)  
Currency Unit – Kyrgyz Som (KGS)  
US\$1.00 = 79.76 KGS

**Abbreviations**

ADB	Asian Development Bank
ADF	Asian Development Fund
AESI	Assessment of environmental and social impact
A.O.	Aiyl Okmotu (rural council)
CBO	Community-based organization
CD	Capacity or community development (depending on context)
CWRD	Central and West Asia Department
DEE	Department of Ecological Expertise (under the MNRETS)
DRR	Disaster Risk Reduction
EA	Environmental Assessment
EARF	Environmental Assessment and Review Framework
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMMP	Environmental Management and Monitoring Plan
GKR	Government of the Kyrgyz Republic
GOST	Commonwealth of Independent States Standards
GRG	Grievance Redress Group
GRM	Grievance Redress Mechanism
HMS/HMC	Hydrometeorological Station/Center
IEE	Initial Environmental Examination
IUCN	International Union for Conservation of Nature
KHM	Hydrometeorology Agency under MOES of KR (KyrgyzHydromet or Hydromet)
KR	Kyrgyz Republic
LARP	Land Acquisition and Resettlement Plan
LFP	Local Focal Point
LRP	Livelihood Recovery Plan
M&E	Monitoring and evaluation
MNR	Ministry of Natural Resources
MNRETS	Ministry of Natural Resources, Ecology and Technical Supervision
MOA KR	Ministry of Agriculture of the Kyrgyz Republic
MOES	Ministry of Emergency Services
NGO	Non-governmental organizations
NPV	Net present value
NVP	Net value of agricultural production
OCR	Ordinary Capital Resources
OVOS	Russian acronym for “Assessment of Environmental Impacts”
PER	Public Environmental Review
PIO	Project Implementation Office
PIU	Project Implementation Unit
PMO	Project Management Office
POW	Productivity of water
PPTA	Project Preparation Technical Assistance
PSA	Poverty and Social Assessment

PV	Pravaya-Vetka
RCP	Representative Concentration Pathway
RGKR	Resolution of the Government of the Kyrgyz Republic
RP	Resettlement Policy
WRS	Water Resources Services under the Ministry of Agriculture
SEMP	Site-Specific Environmental Management Plan
SER	State Environmental Review
SIEE	Summary Initial Environmental Examination
SPRSS	Summary Poverty Reduction and Social Strategy
SPS	Safeguard Policy Statement
SSEI	Secondary Specialized Educational Institution
TOR	Terms of Reference
UNECE	United Nations Economic Commission for Europe
USAID	United States Agency for International Development
WRSA	Water Resources Services Agency under MOA KR
WUA	Water User Association
WUG	Water User Group

### **Weights and Measures**

kg	Kilogram
mm	Millimeter
m,m <sup>2</sup> ,m <sup>3</sup>	Meter, square meters, cubic meters
km, km <sup>2</sup>	Kilometer, square kilometer
ha	Hectare
dB(A)	Noise measurements taken with an instrument set on the A weighting scale
mg / L	Milligrams per liter

## Executive Summary

1. This Initial Environmental Examination (IEE) forms a part of climate change and disaster-resilient water resources sector project, which are hydro-post structures (project), which will be implemented by the Government of the Kyrgyz Republic (Government) and the Asian Development Bank (ADB). It has been prepared in accordance with ADB's Safeguard Policy Statement of June 2009 (SPS 2009), the Kyrgyz Republic's *Law on Environmental Protection, 1999*, and other relevant laws, regulations and requirements. The objective of the IEE is to identify and assess potential impacts and risks from project implementation on the physical, biological, physical cultural and socio-economic environments of the project area, and recommend measures to avoid, mitigate and provide compensation for adverse impacts, while enhancing positive impacts.

2. The Climate change and disaster-resilient water resources sector project has mainly three outputs which are irrigation infrastructure protected and modernized (output-1), irrigation system and agricultural land management enhanced (output-2) and national disaster risk management (DRM) capacity improved (output-3) respectively.

3. Some other parts of climate change and disaster-resilient water resources sector project are underway and, in this regards, Pravaya Vetka off-farm canal rehabilitation IEE has been approved and disclosed ADB web site in October 2018 <sup>1</sup>. Pravaya Vetka on-farm canals rehabilitation IEE study has still been under review from ADB. Koko-Kaiyr off-canal IEE has been approved and disclosed ADB web site in January 2021 <sup>2</sup>. Saparbaev off-farm canals rehabilitation IEE study has still been under review from ADB.

4. This subproject is classified ADB Environmental Category B. Category B projects require environmental assessment in the form of an initial environmental examination. IEE findings are then used to determine if an environmental impact assessment (EIA) is needed. If it is not, the IEE becomes the final environmental assessment report.

5. Climate change is likely to increase the frequency and magnitude of extreme weather events. Flood, drought and associated water stress may occur more frequently as temperatures increase, precipitation, and snowmelt patterns change adversely, and water availability may decline in the face of growing competing demands. Landslides (including mudflows) and floods may become more frequent due to melting permafrost and more intense precipitation events.

6. Kyrgyz Republic is a country at high risk of impact from the adverse effects of climate change and extreme weather events. The population is vulnerable, as approximately 30% of the population lives below the national poverty line and over 65% live in rural areas dependent on agriculture income. Disasters triggered by natural hazards such as floods and earthquakes are frequent and estimated to cost Kyrgyz Republic approximately 1%–1.5% of the GDP annually. The water resources sector is particularly vulnerable: notable recent water-related disaster events include droughts in northern districts (2009 and 2014), landslides (2003 and 2004), and flooding (2007 and 2012) in southwest districts.

7. The hydro-meteorological capacity for monitoring, analyzing, early warning system and forecasting weather events has suffered during the post-independence period of Soviet Union due to lack of resources. Almost all hydro post stations and early warning systems were dilapidated. The situation is likely to be further aggravated due to growing and competing water demand due to population and economic growth and increased demands among agriculture, domestic water supply, and industrial and energy sectors.

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<sup>1</sup> <https://www.adb.org/projects/documents/kgz-51081-002-iee-0>

<sup>2</sup> <https://www.adb.org/projects/documents/kgz-51081-002-iee-1>

8. Kyrgyz Republic will be the borrower and Ministry of Emergency Situations (MOES) of the Kyrgyz Republic will be executing agency and be responsible for the interventions related to protective infrastructure, monitoring, and analysis (project outputs 3).

9. Consultation with the government and civil society stakeholders have identified improvements to climate change and disaster resilience in the water resources sector as a priority area for climate change adaptation. In this context, ADB launched transactional technical assistance to develop and prepare a proposed investment project to strengthen the resilience of the water resources sector to floods, landslides, and droughts in Kyrgyz Republic. The project was called "Climate Resilience and Disaster Risk Reduction in Water Resources Management". The present Pravaya-Vetka on farm canal subproject is part of this project.

10. Hydro posts are located throughout the country from east to west and north to south. They generally take place in Jalal-Abad oblast, Issyk kul oblast, Osh oblast and Batkent oblast. There are totally 23 hydro posts that were dilapidated and as a result were in need of rehabilitation.

11. A joint Venture between Mott MacDonald and Temelsu (MMTS) submitted a Technical and Financial Proposal on 25th July 2019 to become the Project Implementation Consultant (PIC) for KCCDRP. Through a Quality- and Cost-Based Selection (QCBS) process, the proposals submitted by MMTS were scored the highest marks compared to other bidders. Negotiations took place in November 2019 in Bishkek between the PIU and MMTS. The Agreement was then signed on 10th December 2019 for MMTS to undertake the role of PIC for KCCDRP. Under the Agreement signed on 10<sup>th</sup> December 2019, the PIC will support Water Resources Services Agency under the Ministry of Agriculture (WRSA), Ministry of Emergency Situations (MOES) and the established PIU to manage project implementation.

12. Lands that are already allocated for the hydro post rehabilitation project refer to lands of long-time or permanent allotment. In this context, the fauna and flora in the project area is poor and is represented mainly by species of the so-called "cultural landscape". The habitats of notable species of mammals and birds are located at a safe distance from settlements and agricultural lands.

13. In general, the construction/reconstruction and operation of the Rehabilitation works of hydro post locations will not lead to changes in the species communities and will not affect the general state of the populations. Therefore, there is no threat to biodiversity as a whole. The level/degree of impact is rather low.

14. The environmental consequences of the proposed subproject components will include:

- Low loss of vegetation
- Low risk of damage to floristic ecosystem
- Moderate risk of damage to faunal ecosystem
- Low risk of biodiversity loss;
- Minor impact on landscape;
- Low level nuisances to the neighborhood during the construction period (dust, atmospheric pollution, noise, traffic disturbances, etc.);
- Low greenhouse gas emissions;
- Low risk of exposure to health and safety risks.

15. Positive environmental and social impacts will include:

- Increase the security protection level of local people against possible climatic disaster
- Increase employment of local people;
- Potential reduction in the cost of agricultural products, leading to an improved quality of life;

16. The application of proven, internationally accepted environmentally sound design solutions, good management and construction practices during the project implementation are sufficient measures to avoid, minimize, mitigate and compensate almost all potentially significant adverse effects of the impact on the environment.

## **1. INTRODUCTION**

### **1.1. Overview**

17. Extreme weather conditions are crucial both for public health and productivity of agricultural activities. So, it is extremely important to be able to forecast extreme weather conditions such as flood, pouring, landslide, avalanche etc. especially for such a country as Kyrgyz Republic that is under the risk of impact from the adverse effects of climate change and extreme weather events. Following the collapse of the Soviet Union, Kyrgyz Republic's hydro posts and early warning systems were deteriorated and dilapidated which lead to insufficient protection and resilience to natural hazard events. Consultations with government and civil society stakeholders have identified improvements to climate change and disaster resilience in the water resources sector as a priority area for climate change adaptation. Therefore, ADB launched this project to strengthen the resilience of the whole country as well as water resources sector to floods, landslides, and droughts in Kyrgyz Republic. The project is called "Climate Resilience and Disaster Risk Reduction in Water Resources Management". The present Hydro post buildings rehabilitations and installing early warning systems are parts of this project.

### **1.2. Identification of project and project proponent**

18. The proposed project will strengthen the resilience of the whole country as well as the water resources sector to floods, pouring, landslides avalanche etc. The project interventions are both structural (including civil works and equipment) and non-structural (including capacity building, planning, and training) and is likely to comprise four outputs: (i) irrigation infrastructure modernized; (ii) agricultural and land management practices modernized; (iii) flood protection infrastructure modernized, disaster risk and water resources data collection and analysis improved. The project to be assessed under the flood protection infrastructure modernized category (output3).

19. The Kyrgyz Republic is the borrower and the Water Resources Services Agency (WRSA) under the Ministry of Agriculture of the Kyrgyz Republic is the executing agency. There are two implementing agencies: Water Resources Services under the Ministry of Agriculture, responsible for the interventions related to irrigation systems and agriculture (project outputs 1 and 2); and Ministry of Emergency Situations (MOES) responsible for interventions related to protective infrastructure, monitoring, and analysis (project output 3).

20. The Project will be financed through a concessional Ordinary Capital Resources (OCR) loan and Asian Development Fund (ADF) Disaster Risk Reduction (DRR) Funding (Grant). Its financing amount will be through the loan US\$ 21.80 million and the grant US\$ 16.80 million.

21. The Climate Change and Disaster-Resilient Water Resources Sector Project (CCDRP), has been devised to address the significant threats that might be posed by climate change in The Kyrgyz Republic. The project will strengthen disaster resilience through; modernized and well-maintained hydro post buildings and installing early warning system and allow whole Kyrgyz republic to be informed about approaching possible disasters.

22. There are many hydro-post locations to be rehabilitated throughout the country. In this regard, these hydro-posts are grouped according to oblast/region in which they take place. In this IEE study, Jalal-Abad oblast group hydro posts are assessed.

### **1.3. Purpose of the report**

23. This Initial Environmental Examination (IEE) has been prepared for the hydro-post rehabilitation and early warning systems subproject which serves Kyrgyz people to be informed about possible climatic disasters in advance. This subproject is classified ADB Environmental Category B. Category B projects require environmental assessment in the form of an initial environmental examination. IEE findings are then used to determine if an environmental impact assessment (EIA) is needed. If it is not, the IEE becomes the final environmental assessment report.

24. The required data are collected during the Feasibility Study (FS) at the sub-project eligibility confirmation stage and specific site visit to hydro post locations made by international environmental and social coordinator and hydro-met specialist of PIC a few times in the year of 2020.

25. This IEE study shall be updated in case detailed design of hydro-post locations and early warning system are modified or changed.

### **1.4. Procedure of sub-project selection**

26. The following shows how the selection procedure was performed.

#### **1.4.1. Conclusions regarding environment in the selection process**

27. Environment was one of the screening criteria, as Category A subprojects were not eligible. In other words, were excluded of the list of possible subprojects who were likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented.

28. As a low environmental impact was a prerequisite for the subproject selection, this criterion was not considered afterwards in the multi criteria analysis of the possible subprojects. However, two social criteria were taken into consideration:

- Land acquisition for rehabilitation of hydro post building. This criterion was also used for screening the subprojects. The sub-projects without land acquisition considered eligible.
- Poverty reduction. This criterion was used – among others – to score and rank the eligible sub-projects.

### **1.5. Boundaries of IEE**

29. The boundaries of the IEE study are:

- the basin for larger-scale longer-term environmental baseline description (climate, hydrology, etc.) and impacts;
- the province or district within which the subproject is located for baseline description relying on secondary census data;
- the hydro post locations and early warning system within which the subproject will construct, rehabilitate, and upgrade selected civil works for the remaining environmental baseline description and the IEE public consultation;
- construction site and adjacent areas for assessment and management of construction impacts; and
- potential quarry and/or deposit sites and adjacent areas for assessment and management of quarrying/deposit impacts.

### **1.6. Scope of IEE**

30. The IEE study was prepared for and in coordination with KyrgyzHydromet/MOES from March 2022 to June 2022 by international environment specialist, and Zhanybek Orozaly, national

environment specialist. The environmental assessment was based on field visits, interviews and bibliographical analysis.

31. In the present case of the hydro-post locations and early warning system subprojects, the nature of the project (disaster risk reduction and improvement) clearly shows that environmental benefits can be expected from the project implementation. Besides, two factors contribute to minimize the project negative environmental impacts:

- i. the planned investments mainly deal with rehabilitation and upgrading of the existing hydro-post buildings and early warning systems. Therefore, apart from the construction period, there are very limited new impacts compared to the present situation.
- ii. Realization of this project will prevent climatic disasters such as flood, and prevent negative effects both for people's safety and productivity of agricultural system of Kyrgyz Republic.

### **1.7. IEE information sources and limitations**

32. This IEE incorporates all information available at the time of writing. The list of the main references used for the IEE is shown in Chapter 11 of the present report.

33. Like with all environmental impact assessments, the present IEE is subject to data gaps and uncertainties, but none of them is considered as a limiting factor to the impact assessment of this subproject.

34. The implementation-phase environment specialists will review and revise this IEE and EMP as needed to correspond to the final engineering feasibility studies and designs of the subproject.

### **1.8. Structure of the report**

35. The remainder of this report consists of the following sections:

- (i) Policy, legal, and administrative framework
- (ii) Description of the project
- (iii) Description of the environment (baseline data)
- (iv) Anticipated environmental impacts and mitigation measures
- (v) Analysis of alternatives
- (vi) Information disclosure, consultation and participation
- (vii) Grievance redress mechanism
- (viii) Environmental management and monitoring plan
- (ix) Conclusion and recommendation
- (x) Main bibliographical references

## **2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK**

### **2.1. National and local legal and institutional framework**

#### **2.1.1. Environmental protection law and policy**

36. The legal basis for environmental assessments in the Kyrgyz Republic is formed by the Law on Environmental Protection (1999), Law on Ecological Expertise (State Environmental Review (1999), Instruction on Procedures of State Environmental Expertise for Pre-Project, Project and other Materials in Kyrgyz Republic (1997), and Instruction on Environmental Impact Assessment Performance Procedures in the Kyrgyz Republic (1997) and other normative documents. The Kyrgyz Republic acceded to the Aarhus Convention on Public Participation and the Espoo Convention on EIA in a Trans boundary Context. The relevant environmental legislation of the Kyrgyz Republic is summarized in **Table 1**.

Table 1: Major legislation on environmental protection

	National act	Issue number	Purpose/content
1	Constitution of the Kyrgyz Republic	2021	Recognizes the diversity of forms of ownership, and guarantees equal legal protection of private, state, municipal and other forms of ownership. Land may be in private, municipal and other forms of ownership, with the exception of pastures, which cannot be in private ownership. Property is inviolable. No one may be arbitrarily deprived of his property. Seizure of property by the state against the will of the owner is allowed only by a court decision. Seizure of property for public needs specified in the law may be carried out by a court decision with fair and preliminary provision for compensation for the value of this property and other losses caused as a result of alienation.
2	Civil Code of the Kyrgyz Republic	No. 16 dated May 8, 1996, as amended on May 30, 2013	Determines that a person whose right has been violated may demand full compensation for the losses caused to him, unless otherwise provided by law or an agreement corresponding to the law (Article 14, paragraph 1). The Civil Code defines the following damages that are subject to compensation: expenses that a person whose right has been violated has made or will have to make in order to restore the violated right (Article 14, paragraph 2); loss of or damage to property (Article 14, paragraph 2); unearned income that this person would have received under normal conditions of civil circulation if his right had not been violated (lost profit) (Article 14, paragraph 2); compensation for lost profits, along with other expenses, at least in the amount of this income to the person who loses land, assets or livelihoods.
3	Housing Code of the Kyrgyz Republic	No. 117 dated July 9, 2013	Determines the provision of compensation payments to owners of residential premises that are subject to demolition in connection with the withdrawal of land
4	Land Code of the Kyrgyz Republic	No. 45 of June 2, 1999, as amended on May 26, 2009	It regulates land relations in the Kyrgyz Republic, the grounds for the emergence, the procedure for exercising and terminating rights to land and their registration, and also aims to create land-market relations in the conditions of state, communal and private ownership of land and the rational use of land and its protection. The Land Code is the main document regulating land use
5	Law of the Kyrgyz Republic "On transfer (transformation) of land plots"	No. 145 dated July 15, 2013	The law was developed in accordance with the Land Code of the Kyrgyz Republic, other regulatory legal acts of the Kyrgyz Republic and defines the legal framework, conditions and procedure for the transfer (transformation) of land from one category to another or from one type of land to another.
6	Law "On Highways"	No. 72 dated June 2, 1998	- Article 4, public roads are state-owned, cannot be sold, cannot be transferred to private ownership. - Article 27 determines that, without prior permission from the State Automobile Inspectorate and the Ministry of Transport and Communications of the Kyrgyz Republic, it is prohibited on roads, among other things: vending on the roadside; placement of kiosks, pavilions and similar structures,

	National act	Issue number	Purpose/content
			- Article 23 unauthorized use of road lands by illegal users
7	Asset valuation regulation		Asset valuation is carried out on the basis of the Provisional Rules for the Activities of Appraisers and Appraisal Organizations (Government Decree No. 537 of August 21, 2003), Property Valuation Standards (Government Decree No. 217 of April 03, 2006) and other provisions of national legislation
8	Law "On state registration of rights to real estate and transactions with it"	No. 153 of December 22, 1998, last revised on February 25, 2021	This Law establishes the legal basis and procedure for the functioning of a unified system of state registration of rights to real estate and transactions with it throughout the territory of the Kyrgyz Republic. The purpose of the registration system is the recognition by the state of real rights to real estate and transactions with it and property relations registered in accordance with this Law
Legislation on the protection and use of historical and cultural heritage			
9	Law of the Kyrgyz Republic "On protection and use of historical and cultural heritage"	No. 91 dated July 26, 1999	Establishes legal norms in the field of protection and use of objects of historical and cultural heritage on the territory of the Kyrgyz Republic, which are of unique value to the people. Historical and cultural heritage are historical and cultural monuments associated with historical events in the life of the people, the development of society and the state, spiritual creativity, representing historical, scientific, artistic or other value.
Law on Access to Information			
10	Law "On Access to Information, administered by State Bodies and Local Self-Government Bodies of the Kyrgyz Republic"	No. 213 of December 28, 2006	This law regulates the rights and obligations of state bodies to provide information to the local population in order to achieve transparency in their work.
Law "On the Procedure for Considering Citizens' Appeals"			
11	Law of the Kyrgyz Republic "On Procedure for Considering Citizens' Appeals"	No. 67 dated May 04, 2007	This law regulates and defines the procedures and stages for considering citizens' applications to meet their needs and resolve disputes
Main provisions of the Legislation of the Kyrgyz Republic in the field of environmental protection			
12	Constitution of the Kyrgyz Republic	2021	The earth, its subsoil, airspace, water, forests, flora and fauna, and other natural resources are used, but at the same time they are protected. Everyone is obliged to take care of the natural environment, flora and fauna of the state
13	The concept of environmental safety of the Kyrgyz Republic	No. 506 dated November 23, 2007	Establishes the basic principles of environmental policy and identifies global, national and local environmental issues; priorities in the field of environmental protection at the national level, as well as tools for ensuring environmental safety
14	Law of the Kyrgyz Republic "On	No. 53 of 1999	Establishes the basic principles of environmental protection and provides legal authority to create

	<b>National act</b>	<b>Issue number</b>	<b>Purpose/content</b>
	Environmental Protection"		environmental quality, establish an environmental monitoring and control system Among the environmental quality standards and norms authorized under this law, the following are presented that are relevant to the project: norms for the maximum safe concentration of hazardous substances in the air , water; standards for the use of natural resources; norms of maximum safe levels of noise, vibrations and other hazardous physical impacts. This law establishes the requirements for conducting an environmental assessment in order to prevent possible harmful environmental impacts. It prohibits the financing or implementation of projects related to the use of natural resources without obtaining a positive conclusion from the State Ecological Expertise.
15	Law of the Kyrgyz Republic "On Environmental Expertise"	No. 54 of 1999	It is the main legislation concerning the conduct of environmental assessment. Its tasks include preventing negative impacts on human health and the environment resulting from economic or other activities and ensuring that such activities comply with the environmental requirements of the country.
16	Law of the Kyrgyz Republic "General technical regulations for ensuring environmental safety in the Kyrgyz Republic"	No. 151 of 2009	It is applied for the purpose of environmental protection, defines the main provisions of technical regulation in the field of environmental safety and establishes general requirements for ensuring environmental safety in the design and implementation of activities at economic and other activities for all legal entities and individuals
17	Regulations on the procedure for conducting environmental impact assessment in the Kyrgyz Republic	No. 60 dated February 13, 2015	Establishes the procedure for assessing the impact of the proposed activity on the environment (hereinafter referred to as EIA). The purpose of the EIA is to prevent and/or mitigate the impact of the proposed activity on the environment and related social, economic and other consequences
18	Regulations on water protection zones and strips of water bodies in the Kyrgyz Republic	No. 271 dated 7.07. 1995	Determines the procedure for establishing water protection zones and strips at water bodies of the Kyrgyz Republic, establishes the mode of economic activity and use of lands that are part of water protection zones and strips, as well as responsibility for maintaining them in proper condition
19	Rules for the protection of surface waters in the Kyrgyz Republic	No. 128 dated March 14, 2016	The rules for the protection of surface waters of the Kyrgyz Republic regulate the protection of surface waters from pollution, clogging and depletion, when water users carry out various types of economic activities that have or may have an adverse impact on the state of surface waters, regardless of their organizational and legal form, and also regulate the procedure implementation of measures for the protection of surface waters
20	Law of the Kyrgyz Republic "On Protection of Atmospheric Air"	No. 51 of 1999	Regulates relations on the use and protection of atmospheric air.

	<b>National act</b>	<b>Issue number</b>	<b>Purpose/content</b>
21	Law of the Kyrgyz Republic "On production and consumption waste"	No. 89 of 2001	Determines the state policy in the field of production and consumption waste management and is designed to help prevent the negative impact of production and consumption waste on the environment and human health when handling them, as well as to maximize their involvement in economic circulation as an additional source of raw materials
22	Law of the Kyrgyz Republic "On protection and use of flora"	No. 53 of 2001	Establishes the legal framework for ensuring effective protection, rational use and reproduction of flora resources
23	Law of the Kyrgyz Republic "On Fauna"	No. 59 of 1999	Establishes legal relations in the field of protection, use and reproduction of wildlife objects
24	Law of the Kyrgyz Republic "On Local Self-Government and Local State Administration"	No. 101 of 2011	Establishes the principles of organizing local authorities at the level of administrative-territorial units of the Kyrgyz Republic
25	Water Code of the Kyrgyz Republic	No. 8 dated 12.01.2005	Regulates the use and protection of waters
26	Forest Code of the Kyrgyz Republic	No. 66 of 07/08/1999	Regulates the use and protection of forest resources

37. The Ministry of Natural Resources, Ecology and Technical Supervision is the key authorized institution responsible for the establishment and implementation of environmental policy in Kyrgyz Republic.

38. Other major stakeholders – State and municipal organs, responsible for environmental assessment, are:

- i. Ministry of Health (safety and health, drinking water quality, noise and vibrations);
- ii. Ministry of Emergency Situations (natural hazards), and its subsidiary agency Kyrgyz Hydromet (KHM, or Hydromet), responsible for ambient air and water quality monitoring;
- iii. Ministry of Agriculture (land use of agricultural lands and pastures);
- iv. Rayon State Administrations (RSA) on the issues of resettlement and land acquisition, public hearings, information disclosure etc.);
- v. Organs of Local Self-Governance (OLSG) – Aiyl Okmotu (social issues, allocation of lands for stockpiles, asphalt plants, construction camps, etc.).

39. More information about the institutional framework is provided in section **2.1.4**

40. This EA system in KR is based on two subsystems: (i) OVOS (the Russian acronym for "Assessment of Environmental Impacts"), and (ii) Ecological Expertise (State Environmental Review, SER). A screening procedure based on screening lists identifies whether a project is the subject to environmental assessment. In case it is required, a consultant hired by the Project Proponent conducts the OVOS. After presentation of an Environmental Impact Statement (EIS) for public consultation, the EIS is revised based on feedback from the public. Then the EIS report and a Statement of Environmental Consequences along with other supporting documentation is submitted to a State Expert Commission for the State Environmental Review (SER). The project may be approved, rejected, or sent for re-examination.

41. Public consultation should occur at stage of the OVOS and may be also initiated in parallel to the SER as Public Environmental Review (PER). The implementation of any project is permitted only in case of its approval by the SER. The PER duration depends on the complexity of the project but should not exceed 3 months after submission of all the OVOS documents and making payment to the SER by the Project Proponent. A formal written notification of local authorities and public notification through the media are transmitted at least one month in advance. A quorum is needed to ensure the representativeness of the presidium.

### **2.1.2. Project status regarding environmental protection**

42. The law of 8 May 2009 on environmental protection provides the list of economic activities subject to mandatory environmental assessment. This subproject is subject to environmental assessment with respect to the following items:

- Protection from disaster
- Public health and safety
- Productivity of agriculture activities and forestry;
- Protection of forestry;
- Water management;

43. An Environmental and Social Impact Assessment (ESIA) is a document developed for hydro-post rehabilitation and early warning system sub-project in Nookan District, Jalal-Abad Oblast. The OVOS is still under review by the State Ecological Expertise

44. As per the regulation on the procedure for environmental impact of 13 February 2015, the contents of the Environmental Impact Statement is as follows:

- Requisites of the initiator of the project and the executor of works on environmental impact assessment.
- Rationale for the need to organize the planned activities.
- Description of the characteristics of the proposed activity and possible alternatives.
- Analysis of the claimed technologies for compliance with the best available (available) technologies and technical specific standards.
- Assessment of the existing state of the environment by components, including assessment of the historical, cultural value of the territory and its socio-economic status.
- Assessment of identified impacts.
- Forecast of changes in the environment and socio-economic conditions in the implementation of the planned activities.
- Basic decisions on measures to reduce, mitigate or prevent negative impacts, assess their effectiveness and implement opportunities.
- The results of the comparison of the expected environmental and related social and economic consequences of the alternatives under consideration, including the option to abandon the activities.
- Proposals for the environmental monitoring program.
- Interaction with the public.
- Assessment of the admissibility of the proposed impact.

### **2.1.3. Other legislation and standards**

#### **2.1.3.1. Air quality and vehicle emissions**

45. Air pollution levels in KR are a concern mainly in urban areas. In Bishkek, 90% of all emissions are related to road transport. The air quality at locations away from the towns is expected to be much better. Ambient air quality regulatory responsibility and monitoring of air quality in

Kyrgyzstan rests with the Kyrgyz Hydromet (KHM) under the Ministry of Emergencies. Air quality monitoring stations are largely located in populated areas close to sources of pollution: Bishkek, Osh, Tokmok, Kara- Balta, and Cholpon-Ata.

46. Ambient air quality standards are shown in **Table 2** Impact monitoring for atmospheric pollution is carried out by the Department of Ecological Monitoring under MNRETS

*Table 2: Ambient air quality standards (in mg/m<sup>3</sup> except as noted)*

Pollutant	Maximum permissible concentration	Average daily concentration	Hazard class
Total suspended particulate (TSP)	0,15	0,05	3
Sulfur dioxide (SO <sub>2</sub> )	0,5	0,05	3
Carbon monoxide (CO)	5	3	4
Nitrogen dioxide (NO <sub>2</sub> )	0,085	0,04	2
Nitrogen oxide (NO)	0,40	0,06	3
Tetraethyl lead	0,0001	0,00004	1

Source: Hygiene norms ГН 2.1.6.1338-03 Of the Kyrgyz Republic

47. The norms of emission in exhaust gases of motor vehicles are in **Table 3**

*Table 3: Norms of exhaust gases emissions of motor vehicles*

		MPC for carbons, 1/1.000.000 of volume <sup>-1</sup> for engines (number of cylinders)	
Rpm	MPC for CO content	Less than 4	More than 4
N <sub>min</sub> X.X	1,5	1200	3000
N <sub>incr</sub> X.X 0.8 N <sub>nom</sub> X.X	2,0	600	1000

Source: Instruction for the state control of air emissions of polluting substances by automobile facilities in the Kyrgyz Republic.

48. National standards for emission measurements:

- GOST 17.2.2.03-87 defines the contents of carbon oxide (CO), hydrocarbons in burnt gases of vehicles with gasoline engines, "Safety Requirements."
- GOST 21393-75 covers black smoke of burnt gases of vehicles with diesel engines. Norms and methods of measurements. Safety Requirements.

49. GOST 17.2.2.03-87 determines the content of carbon monoxide (CO) and hydrocarbons in the exhaust gases of vehicles with gasoline engines, and GOST 21393-75 –the opacity of exhaust gases of diesel cars.

### 2.1.3.2. Water quality

50. Surface water quality standards for the most usual parameters are shown in **Table 4** based on the Kyrgyz Water Law of 1994. Let us note that the admissible values for more than 1,200 parameters are specified in this law.

Table 4: Surface water quality standards for the most usual parameters

Parameter	Admissible values
pH	6-9
Dissolved oxygen (DO mg/l)	> 4
Sulfate (S mg/l)	< 250
Ammonium nitrogen (NH <sub>4</sub> -NO <sub>3</sub> mg/l)	< 3.3
Oil and grease	< 0.05

51. For the rivers of the subproject study area, there do not exist any specific norms of water quality based on the requirements to protect the indicator species. In this regard, it does not seem feasible to design mitigation measures specific to subproject by using the approach MPC measurements or aggregate pollutants load.

### 2.1.3.3. Noise

52. The levels of acceptable noise levels are consistent with ADB guidelines. Kyrgyz noise standards are in **Table 5**

Table 5: Acceptable noise levels

Description of activity / category	Leq.	L <sub>max</sub>
Areas immediately adjacent to hospitals and sanatoriums	Day=45 Night= 35	Day=60 Night= 50
Areas immediately adjacent to dwellings, dispensaries, rest home, holiday hotels, library, schools etc.	Day=55 Night= 45	Day=70 Night= 60
Areas immediately adjacent to hotels and dormitories	Day=60 Night= 50	Day=75 Night= 65
Recreational areas in hospitals and sanatoriums	35	50
Rest areas at the territories of micro-district and building estates, rest houses, sanatoriums, schools, homes for the aged, etc.	45	60

### 2.1.4. Institutional framework

53. The main agencies involved in the management of natural resources and environment protection in the KR are listed here. The main source used in the present section is “Kyrgyz Republic Analysis for Biodiversity” (USAID, 2013).

a. Ministry of Natural Resources, Ecology and Technical Supervision

54. Ministry of Natural Resources, Ecology and Technical Supervision is the principal agency involved in environment protection in the KR. Ministry of Natural Resources, Ecology and Technical Supervision is responsible for the environment protection policy, regulation and coordination, expertise and issuance of licenses and permits. It has territorial agencies distributed over the country territory. Its functions are:

- i. Administrative activity, coordination of subordinated structures – regional and territorial offices;
- ii. Ecological policy drafting and its implementation;
- iii. Services on ecological information;

- iv. Drafting policy to develop forestry and gaming activity;
  - v. Environmental monitoring;
  - vi. State environmental expertise;
  - vii. Issuance of ecological licenses;
  - viii. International cooperation.
- b. Ministry of emergency services

55. This ministry has the mandate for providing government policy in case of emergency situations. This MOE will be in charge of project realization output-3 MOES.

c. District Level Authorities

56. The KR is divided into 7 oblasts (provinces), which encompass 40 rayons (districts). Each rayon has its own government administration and is responsible for creating development plans for its area. Due to the economic and social situation in the country, all development plans are focused on social and economic aspects, and only rarely mention ecological aspects that might be related to environment protection.

d. Self- Governance Authorities

57. In KR, the smallest administrative unit is Aiy! Okmotu (village self-governance). KR has 459 Aiy! Okmotu, and only a few of them that are located in natural areas, depend on natural resources, and have a plan for environment protection. Although many other of the Aiy! Okmotu may mention environmental issues in their plan, these are not acted upon.

## 2.2. International arrangements relevant to the project

58. The Kyrgyz Republic is getting more actively involved in world community activity aimed at restraining global environmental threats including the process of the unification efforts of states. The country has ratified the following international Conventions related to environmental management:

- i. Basel Conventions on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal, 1996
- ii. Convention of Biological Diversity (CBD), 1996
- iii. Convention of Long-Range Transboundary Air Pollution, 2000
- iv. UN framework Convention on Climate change (UNFCCC), 2000
- v. Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, 2000
- vi. Vienna Convention of the Protection of Ozone Layer, 2000.
- vii. Montreal Protocol on Ozone Depleting Substances, 2000
- viii. Stockholm Convention on Persistent Organic Pollutants, 2002
- ix. UNECE Convention on Environmental Impact Assessment in a Transboundary Context, 2001
- x. Ramsar Convention on Wetlands of International Importance especially as waterfowl Habitat, 2003
- xi. The UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, Kyrgyzstan joined in 2001
- xii. United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, acceded in 1999
- xiii. Convention on International Trade in Endangered Species of Wild Fauna and Flora, acceded in 2006.
- xiv. The Cartagena Protocol on Biosafety, Kyrgyzstan joined in 2005
- xv. Convention Concerning the Protection of World Cultural and Natural Heritage,

acceded in 1995.

## **2.3. ADB requirements**

### **2.3.1. Policy**

59. Safeguard Policy Statement (2009). SPS 2009 is ADB's current main safeguards policy document. It describes the common objectives and policy principles of ADB's safeguards and outlines the delivery process for ADB's safeguard policy. It promotes sustainability through protection of people and the environment from the adverse impacts of projects, and by supporting the strengthening of country safeguard systems. It presents a consistent, consolidated framework for environment, resettlement, and indigenous people safeguards.

60. ADB Operations Manual, Safeguard Policy Statement, Section F1/BP [Bank policies] & Safeguard Review Procedures, Section F1/OP [operational procedures] (2013). These documents operationalize SPS 2009. The policy sets forth the scope of SPS 2009 applicability to ADB operations, and the procedures describes the safeguards process and outputs, including consultation and disclosure requirements, through the various stages of project preparation.

61. Public Communications Policy (2011ca) guides ADB's efforts to be transparent and accountable to the people it serves, which it recognizes are essential to development effectiveness. The policy recognizes the right of people to seek, access, and impart information about ADB's operations, and it aims to enhance stakeholders' trust in and ability to engage with ADB, through proactive disclosure, presumption in favor of disclosure, and recognition of the right to access and impart information and ideas, country ownership, limited exceptions, and the right to appeal.

### **2.3.2. Guidance**

62. Environmentally Responsible Procurement (2007). provides guidance to ADB staff, consultants, and executing agencies on ERP, defined as "a systematic approach to the purchase of goods and services that are thought to be less damaging to the environment than other goods and services that serve the same purpose," specifically, products that "reduce waste, improve energy efficiency, limit toxic by-products, contain recycled content or are reusable, and are produced with the least environmental impact...[and] services...that help improve the environment, are rendered with minimum environmental and social impacts, and use resources and energy efficiently.

63. Complaint Handling in Development Projects - Grievance Mechanisms: A Critical Component of Project Management (2010). This document presents definitions, concepts, rationale, and history relevant to the ADB project grievance redress mechanism.

64. Complaint Handling in Development Projects - Building Capacity for Grievance Redress Mechanisms (2010). This document presents a framework and practical suggestions for building the capacity of an organization to manage an effective grievance redress mechanism.

65. Environment Safeguards, A Good Practice Sourcebook (2012). This draft working document aims to add clarity, provide technical guidance, and recommend good practices in SPS (ADB 2009) implementation. It updates the Environmental Assessment Guidelines (ADB 2003).

66. Selected References for Good Practice in Environmental Safeguards Implementation (2014). This internal Central and West Asia Department (CWRD) document presents internet hyperlinks to exemplary environmental safeguards documents (IEEs, EIAs, EARFs, etc.) prepared for CWRD country projects.

### 2.3.3. Environmental screening categories

67. ADB water resources projects and associated subprojects are screened using a rapid environmental assessment checklist for sub-projects of that. This checklist captures the type, location, sensitivity, scale, nature, and magnitude of potential environmental impacts; and availability of cost-effective mitigation measures. Based on the checklist findings, the project or subproject is assigned to one of the following ADB environmental categories:

- Category A – likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA), including an environmental management plan (EMP), is required.
- Category B – potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE), including an EMP, is required.
- Category C – A proposed project is likely to have minimal or no adverse environmental impacts. An EIA or IEE is not required, although environmental implications need to be reviewed.

68. The category of a project is defined as category B.

69. Sub-projects assigned to Category A are excluded from Project financing.

### 2.4. Organizational roles and responsibilities of departments and structures

70. This chapter briefly describes the role, powers and responsibilities of state bodies, departments and structures involved in the preparation and implementation of this Project. Roles and responsibilities of departments and structures can be seen in

71. **Table 6.**

*Table 6: Roles and responsibilities of departments and structures*

No.	Departments	Role, powers, responsibility
1.	Asian Development Bank	Project implementation support. Guidelines for the preparation of an EIA/EMP. EIA/EMP approval. Disclosure of EIA/EMP information in publications and the Bank's website. Issuance of a letter of no objection to start construction work.
2.	Government of the Kyrgyz Republic	The Government of the Kyrgyz Republic approves the composition of the delegation for negotiations between the Kyrgyz Republic and the donor, with the determination of the timing, place of negotiations and issues of their financing. It also carries out the necessary internal procedures for the approval of the draft agreement and its further ratification by the Jogorku Kenesh of the Kyrgyz Republic. Issues a resolution on the transformation of state lands for the implementation of the project.
3.	Jogorku Kenesh of the Kyrgyz Republic	The agreed draft resolution of the Government of the Kyrgyz Republic is sent to the relevant committees of the Jogorku Kenesh together with other documents on the draft for ratification. The Jogorku Kenesh of the Kyrgyz Republic is

No.	Departments	Role, powers, responsibility
		carrying out the procedure for its ratification in accordance with the "On International Treaties of the Kyrgyz Republic".
4.	Ministry of Finance of the Kyrgyz Republic	Budget allocation. The Ministry of Finance is the responsible government agency for coordination with the bank and other donors.
5.	Ministry of Emergency Service (MOES)	The ministry of emergency service is the responsible government agency for coordination, organization and mobilization of Kyrgyz Republic in case of emergency situations.
6.	Ministry of Agriculture of the KR (MoA)	<p>Project initiation and preparation. Responsible for project implementation plans, timely disbursement of project funds. Coordinates and controls the progress of the project. Organization of regular meetings with donors to discuss project implementation issues. Management and support of the procurement process within the framework of the project. Implementation of the necessary procedures in accordance with the legislation of the Kyrgyz Republic related to the allocation of land for construction.</p> <p>Responsible for ensuring interagency coordination and communication with relevant government departments involved in project implementation.</p> <p>Overall responsibility for the implementation of the EIA/EMP.</p>
7.	Project Implementation Unit (PIU)	<p>The main objectives of the PIU are to provide assistance (MAR KR) in the preparation and implementation of the project, as well as technical cooperation projects in the field of road infrastructure development, funded by international financial institutions.</p> <p>PIU is entrusted with the coordination of the project, as well as the responsibility for administering activities for: financial management, reporting, environmental and social aspects management, procurement and contract management for all components, etc.</p> <p>PIU, under the direct control of the MAR KR, is responsible for project implementation, as well as procedures related to the transformation of state lands, environmental and social assessment, social impact assessment and mitigation measures during project implementation. The ongoing oversight and monitoring of the project is the responsibility of the PIU staff, in particular the safeguards specialists (sociologist/safeguards specialist and ecologist/environmental specialist).</p> <p>Responsible for consultations with the local population in the project area. Provides assistance to the Consultant in the</p>

No.	Departments	Role, powers, responsibility
		<p>preparation of the EIA/EMP and in the disclosure of information on the EIA/EMP and the implementation of the EIA/EMP. Preparation of a progress report on the implementation of the EIA/EMP and a completion report.</p> <p>Further, after the completion of construction and acceptance of the object on its balance sheet, the DVH will be responsible for ensuring the safety of the object, which includes a set of measures to prevent premature destruction and wear of the materiel, artificial structures and arrangement</p>
8.	Ministry of Natural Resources, Ecology and Technical Supervision	<p>Responsible body for environmental policy and coordination of environmental activities in the implementation of the project. Its functions include:</p> <ol style="list-style-type: none"> <li>1) development of environmental policy and its implementation;</li> <li>2) carrying out the state ecological expertise;</li> <li>3) issuance of environmental licenses;</li> <li>4) environmental monitoring;</li> <li>5) provision of environmental information services. Approval of project documentation.</li> </ol>
9.	Ministry of Culture, Information, Sports and Youth Policy	Responsible body for the implementation of state policy in the field of culture, information and tourism (in particular - archeology and OOIKN).
10.	Local self-government bodies (regional state administration, district state administration, aiyl okmotu)	<p>Issuance of resolutions on consent to the transfer (transformation) of land from one category to another for the implementation of the project. Preparation of relevant documents for the state institution "Cadaster".</p> <p>Representatives of local authorities will be involved in the project implementation process. Successful implementation of the project will require close coordination between the PIU and the local authorities, who will assist the PIU in the following:</p> <ul style="list-style-type: none"> <li>dissemination of information regarding the EIA/EMP;</li> <li>participation in the resolution of complaints and assistance in resolving complaints;</li> <li>obtaining information regarding any unforeseen impacts</li> </ul>
11.	State Institution "Cadaster"	Considers the land management case and develops a draft resolution of the Cabinet of Ministers of the Kyrgyz Republic on the transformation of land from one category to another
12.	Grievance Redress Group (GRG)	Timely consideration and resolution of complaints during project implementation. Registration of all incoming complaints and appeals. Compliance with the grievance redress procedures and their monitoring

<b>No.</b>	<b>Departments</b>	<b>Role, powers, responsibility</b>
13.	WRS	WRS will be involved in the following matters: quarry locations; cultivation, dumps, etc. It will also take on the following subjects. reinforced concrete products, pipes, fences, road signs, etc.
14.	EIA/EMP preparation consultant	EIA/EMP Consultant performs studies regarding environmental and social impacts in the project area and mitigation measures during construction works to be implemented by the Contractors. Implementation of the Contractor's mitigation measures will be monitored by the Construction Supervision Consultant throughout the construction period. PIU assists in the preparation of the Environmental Impact Assessment (EIA) document.
15.	PIC	PIC assist PIU in monitoring and evaluation of environmental safeguards in accordance with their TOR including the following
16.	The Contractor	The construction contractor will be required to employ an Environment, Occupational Health and Safety (EHS) supervisor to ensure implementation of SSEHSMP during contract duration. The EHS supervisor may be employed on intermittent basis and should have higher technical education The Contractor needs to carry out all environmental mitigation and monitoring measures outlined in their contract. The contractor will be required to submit to PIU, for review and approval, a site-specific environmental, health and safety management plan (SSEHSMP) including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved SSEHSMP; (iii) monitoring program as per SSEHSMP. No works can commence prior to approval of SSEHSMP and deployment of an EHS supervisor by the contractor. The contractor will be required to undertake day to day monitoring of implementation and report to the PIU/PIC and WRS unit.

### 3. DESCRIPTION OF THE PROJECT

#### 3.1. Overall framework

72. Kyrgyz Republic is a country at high risk of impact from the adverse effects of climate change and extreme weather events. The population is vulnerable, as approximately 30% of the population lives below the national poverty line and over 65% live in rural areas dependent on agriculture income. Disasters triggered by natural hazards such as floods and earthquakes are frequent and estimated to cost Kyrgyz Republic approximately 1%–1.5% of the GDP annually. The water resources sector is particularly vulnerable: notable recent water-related disaster events include droughts in northern districts (2009 and 2014), landslides (2003 and 2004), and flooding (2007 and 2012) in southwest districts.

73. Climate change is likely to increase the frequency and magnitude of extreme weather events. Drought and associated water stress may occur more frequently as temperatures increase, precipitation, and snowmelt patterns change adversely which will cause sudden flood disasters, and water availability may decline in the face of growing competing demands. Landslides (including mudflows) and floods may become more frequent due to melting permafrost and more intense precipitation events.

74. The hydro-meteorological capacity for monitoring, analyzing, early warning system and forecasting weather events has suffered during the post-independence period of Soviet Union due to lack of resources. Almost all hydro post stations and early warning systems were dilapidated. The situation is likely to be further aggravated due to growing and competing water demand due to population and economic growth and increased demands among agriculture, domestic water supply, and industrial and energy sectors.

75. Consultation with government and civil society stakeholders have identified improvements to climate change and disaster resilience in the water resources sector as a priority area for climate change adaptation. To mitigate future climate and disaster impacts to the livelihoods of vulnerable communities:

- i. water access should be made more resilient to future disruptions, variability, and change;
- ii. resilience to extreme weather events such as floods and landslides should be improved; and
- iii. Institutional capacity for climate and disaster risk monitoring, management, and response should be strengthened.

76. To meet these challenges, ADB launched a project to strengthen the resilience of the water resources sector to floods, landslides, and droughts in Kyrgyz Republic. The project was called “Climate Resilience and Disaster Risk Reduction in Water Resources Management”.

77. The project interventions are both structural (including civil works and equipment) and non-structural (including capacity building, planning, and training). It comprises three outputs:

- i. irrigation infrastructure modernized;
- ii. agricultural and land management practices modernized;
- iii. flood protection infrastructure modernized; and disaster risk and water resources data collection and analysis improved.

78. The project outcome is expected to be climate change and disaster resilience of each type that may be occurring because of lack of hydro post locations and early warning system.

79. The present hydro post and early warning system sub-project is a part of this project. Other subprojects will be identified later on during the project implementation process (it is expected that in total the project will include a total of 3-4 sites, including PVIS, located on the lower Syr Darya basin and Chuy basin).

## 3.2. Jalal-Abad Oblast hydro posts

### 3.2.1. Shaidan Hydro post

80. The facility under design is located in Nookan district, Jalal-Abad region of the Kyrgyz Republic. The hydrological post on the Shaidan-Sai River operated from 1966 to 1997. The existing location of the gauging site is eroded by floods and a dam less water intake is arranged in the site, the existing wells are silted up and broken by nanopowders. In this regard, it was necessary to select a new gauging site upstream about 3 km with the installation of a level gauge with a radar sensor installed on the existing road bridge. A meteorological station and a residential building will be built in the area of the existing gauging station. Discharge measurements will be made using a cradle. A Surface Velocity Sensor and Acoustic Doppler Current Profiler (ADP) attached to the bridge will transmit data to the main station via an RM modem.

81. The project was developed on the basis of the task of the contract No. MOES-C-CQS-1, ADB Loan 3746-KGS / Grant 0632-KGS "Increasing the resilience of water resources to climate change and natural disasters", and the contractor LLC "NUR SZhB" (Suu Zhashoo Bulagy) in August 2021, a survey was carried out at the site of the hydrological post across the Shaidan-Sai River. According to the Terms of Reference, it is necessary to develop design and estimate documentation for the working project "Development of design and estimate documentation for the construction of a hydrological post on the Shaidan-Sai River (Shaidan village) and an office and residential building near the meteorological site in the Shaidan village of Nookan district, Jalal-Abad region."

82. The main goal of the project is the organization of hydrological observations based on the use of modern hydrometric equipment and instruments installed at the meteorological station and at the hydrological post.

83. The starting materials for determining the indicated parameters of the gauging cable are the topographic plan of the site selected for construction and the longitudinal profile along the axis with engineering and geological data applied on it, in particular, the position of the groundwater level, as well as the minimum and maximum levels in the river.

84. There is an existing house in the project area who supply his potable water from the river directly. During construction, this situation should be considered, and this family's potable water should be supplied from upstream of construction activities.

85. This family uses an access bridge (**Photo 1**) to get to their home. During construction activities, in no circumstance, this bridge should be affected from construction activities.

86. Planned storage area of contraction materials is across the river. The transportation vehicles should not cross the river directly in order not to affect aquatic habitat. They should use existing bridges by means of consolidating that.

*Photo 1: Access Bridge of family*



### **3.2.1.1. Works to be done**

87. The work on the object is recommended to begin with preparatory work on the construction of the production base of the construction site, preparation of the necessary earthmoving and construction mechanisms, removal and creation of a geodetic foundation for structures.

Description of the works:

- Layout of the temporary access road and construction site;
- Removal of stone from the river floodplain;
- temporary protective jumper;
- the main hydrological post with the device on the left bank of a gauge well with a service ladder made of monolithic reinforced concrete;
- cradle crossing for measuring water flow with a turntable;
- gauge house;
- sloping post (with an upper and lower well with a service ladder);
- construction of a residential building;
- utility buildings;
- fencing of the meteorological station and territory.

88. Natural soils on the left bank are represented by pebble (rubble) with sand filler - R0 = 600 kPa (6 kgf/cm<sup>2</sup>). Manual excavation group (according to SNiP 4.02-91) - 1(9A). Height above sea level from 1500-3500 m.

### **3.2.1.2. Bill of quantity**

89. The bill of quantity that is foreseen for Shaidan hydropost is as follows;

Table 7: BoQ of Shaidan hydro post

No	Name of work	Quantity
1.	Excavation	424,6 m <sup>3</sup>
2.	Back filling	203,2 m <sup>3</sup>
3.	Layout	463,6 m <sup>2</sup>
4.	Monolithic concrete	34,6 m <sup>3</sup>
5.	Metal structures	1,33 ton
6.	Apron attachment	44,9 m <sup>3</sup>
7.	Rubble concrete	38,9 m <sup>3</sup>

### 3.2.1.3. Construction materials

90. To provide the facility with building materials, it is necessary to use gravel and pebble material from the Shaidan-Sai riverbed, located 1-2 km downstream of the cradle crossing. Useful material is represented by pebble soil with sandy aggregate 25%, with the inclusion of boulders up to 10%, boulder size up to 300 mm. Manual excavation group - 3 (6B). Soil reserves are sufficient for the construction of a new hydrometric cradle in the surveyed area.

### 3.2.1.4. Equipment needed

91. In order to fulfill the scope of work envisaged by the project, the following mechanisms are envisaged:

- Single- bucket excavator with bucket capacity 0,65 m<sup>3</sup> – 1 piece;
- Bulldozer with power up to 1300 kW– 1 piece;
- Automobile crane with a lifting capacity of up to 10 tons – 1 piece;
- Car water carrier with a capacity of 1-2 m<sup>3</sup> – 1 piece;
- Dump trucks with a carrying capacity of up to 10 tons – 1 piece;
- Concrete mixer 0,5 m<sup>3</sup> – 1 piece;
- Cars onboard with a carrying capacity of up to 10 tons – 1 piece.

### 3.2.1.5. Meteorological station

92. A meteorological station is located so that its observations illuminate the meteorological conditions of the area adjacent to the station, so that they are characteristic of the largest possible surrounding area. The site should be located in an open and level place, there should not be any objects near it that affect the readings of the instruments.

93. The meteorological site has the shape of a rectangle, the sides of which should be directed from north to south and from west to east. The size of the site depends on the number of installations on it, Standard sites are 26x26 m, sites with a smaller amount of work - 16x16 m.

94. The site selected for the site is leveled and fenced with a metal mesh or picket fence. On the north side, a gate is made to enter the site.

95. Instruments at the meteorological site are installed in a certain order. So that they do not shade each other and do not interfere with the free exchange of air, the distance between the devices and from the fence to the devices should be 4-6 m.

96. On the north side of the site, higher installations are placed: a weather vane with a light board, a weather vane with a heavy board and an ice machine. In the southern part of the site, an area with natural cover and bare for soil thermometers is allocated. On a site with a natural cover, a permafrost meter and a snow gauge are installed. In the middle part of the site, a psychometric booth, a booth for recorder instruments, a precipitation gauge, and a pluviograph are placed.

97. Actinometrical instruments are installed in the southern part of the site. All other instruments

and installations are placed in free places, preferably on the north side of the site.

98. Barometers barographs and recording parts of automatic instruments are installed in the service building of the meteorological station.

99. A cross section of the Shaidan hydro post building is presented in **Figure 1**

*Figure 1: Cross section of Shaidan hydro post*



### 3.2.1.6. Selection of location and type of water metering station

100. The location of the water metering station is preliminarily outlined according to the available large-scale maps. In this case, they are guided by the following technical conditions:

- The site of the river at the location of the gauging station along the threefold width of the channel must be straight, open, accessible for observation;
- The channel should be stable (not eroded and not silted);
- Post should be located at a distance of at least five times the width of the river from the mouth of the nearest tributaries and outside the sphere of influence of backwater from ice jams and hydraulic structures;
- Gauging should be arranged near settlements;
- The angle of inclination of the coastline to the horizon should be within 20-40°. Very steep and very gently sloping banks are inconvenient both for the construction of the post and for its operation.

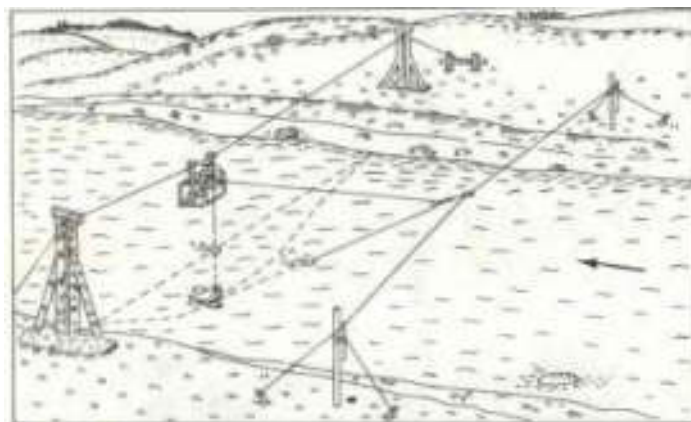
101. The choice of the type and design of the post is determined by the nature of the channel, floodplain and the state of the banks.

102. At hydrometric sites, the flow rate of water and sediments is measured; when choosing a site, they are guided by the following:

- The flow of water should be parallel to the stream, without creeks, oblique and reverse currents and rapids;
- The bottom of the river should not have significant protrusions that interfere with the measurement of depths and velocities, otherwise the stones remove the forest - the bushes are cut down;
- The longitudinal slope, width and depth of the river should be as uniform as possible, and the transverse profiles should be regular, trough-shaped;
- The boundaries of the survey are determined by the width of the river and the marks of the highest water level. The width of the survey area is taken with the calculation of exceeding the boundaries of the survey above the highest water mark by 1 m. The length of the section  $L$  is taken depending on the width of the channel. With a width  $b$  less than 100 m,  $L=5b$ , but not less than 100 m; when  $b$  is more than 100 m,  $L = (2-3) b$ , but not less than the floodplain width.

103. The gauging cable car (**Figure 2**) is an auxiliary gauging structure, consisting of a building part (foundation, anchor) and cradle crossing equipment installed in the gauging section or near it, and intended for delivery from the shore to a given point above the watercourse, in a cradle suspended on load-bearing cables, and moving along them, people, instruments and equipment, with the aim of carrying out hydrometric work from this cradle, sampling water and bottom sediments at any point in the water section of the watercourse.

*Figure 2: Gauging cable car*



### **3.2.1.7. Channel regulation structure**

104. Under the channel regulation structures, it is understood coastal fortifications (protective dams), which, at a certain relative position in terms of the plan, form regulated and fixed channels, guide spurs, etc. structures located in the river channel or in its zone of influence and designed to concentrate and direct the flow, create it has a certain structure, as well as to protect the coast and other structures from erosion by the river.

105. The location and length of coastal fortifications (protective dams) in case of protection against erosion is determined in each specific case according to the general plan, depending on the possible location of the riverbed, protected structures and objects. With a significant length of protective measures, the type of regulatory structure is selected - a longitudinal dam with continuous fastening along the length or a longitudinal dam with partial fastening.

106. The design of fastening of dams of regulated channels and coastal fortifications can be

different and depends on the availability of local building materials and the conditions of work. In our case, it was decided to design the fastening of the upper slope of protective dams made of rubble concrete with a deepening to the bottom of the apron and with its construction from cobblestone, since there is no quarry of torn stone in the immediate vicinity of the object.

### **3.2.2. Kogart- Kanjiga hydro post**

107. The projected construction "meteorological station and residential" house is in Suzak district, Jalal-Abad region of the Kyrgyz Republic, 80 km north-east of Jalal-Abad.

108. The project was developed based on the contract assignment № MOES-C-CQS-1, ADB Loan 3746-KGZ/GRANT 0632- KG "Improving the resilience of water resources to climate change and natural disasters", and the contractor LLC "NUR SZhB" (Suu Zhashoo Bulagy) in August 2021, survey was carried out at the site of the future meteorological station in the village of Kanjiga. The terms of reference provide for the development of design and estimate documentation for the working draft "Development of design and estimate documentation for the construction of service and residential building for a hydro post of the Kogart River - the village of Kanjiga (Kuldanbes) near the meteorological site in the village of Kuldanbes, Suzak district, Jalal-Abad region.»

109. The main goal of the project is the organization of meteorological observations based on the use of modern meteorological equipment and instruments installed at the meteorological station.

#### **3.2.2.1. Works to be done**

110. It is recommended to begin the work on the object with preparatory work on the construction of the production base of the construction site, preparation of the necessary earthmoving and construction mechanisms, removal and creation of a geodetic foundation for structures. Description of the works:

- layout of the temporary access road and construction site;
- construction of a residential building;
- utility buildings
- fencing of the territory and meteorological station.

111. Concrete work on structures is recommended to be carried out during a frost-free period, due to climatic conditions in winter. The supply of concrete mixture to the structure of structures is carried out by a crane with a lifting capacity of 10 tons. Taking into account that the facilities at the facility do not have concentrated volumes of concrete work, the project recommends that concrete work be carried out at a positive outside temperature.

112. The concrete mixture used in the construction of structures must meet the requirements of GOST 26633-4-91 "heavy and fine-grained concrete". When performing concrete, reinforcing, insulating and other works, safety precautions must be strictly observed in accordance with SNIP III-4-80.

#### **3.2.2.2. Construction materials**

113. To provide the facility with building materials, the project provides for the use of gravel and pebble material from the bed of the Kogart River, located 2-3 km downstream of the bridge. Useful material is represented by pebble soil with sandy aggregate 25%, with the inclusion of boulders up to 10%, boulder size up to 300 mm. Manual excavation group - 3 (6B). Soil reserves are sufficient for the construction of a new hydrometric cradle in the surveyed area.

114. Water for technical needs is taken from the Kogart river.

115. Local construction inert materials are expected to be delivered by road from quarries in accordance with the transport scheme approved by the Gosstroï of the Kyrgyz Republic or from

local deposits in agreement with local authorities.

### 3.2.2.3. Equipment needed

116. In order to fulfill the scope of work envisaged by the project, the following mechanisms are envisaged:

- Single-bucket excavator with bucket capacity 0,65 m<sup>3</sup> – 1 piece;
- Bulldozer with power up to 130 kW - 1 piece;
- Automobile crane with a lifting capacity of up to 10 tons - 1 piece;
- Car water carrier with a capacity of 1-2 m<sup>3</sup> - 1 piece;
- Dump trucks with a carrying capacity of up to 10 tons - 1 piece;
- Concrete mixer 0.5 m<sup>3</sup> - 1 piece;
- Cars onboard with a carrying capacity of up to 10 tons - 1 piece.

### 3.2.2.4. Meteorological station

117. A meteorological station is located so that its observations illuminate the meteorological conditions of the area adjacent to the station so that they are characteristic of the largest possible surrounding area. The site should be located in an open and level place, there should not be any objects near it that affect the instrument readings.

118. The meteorological site has the shape of a rectangle, the sides of which should be directed from north to south and from west to east. The dimensions of the site depend on the number of installations on it, Standard sites are 26x26 m, sites with a smaller amount of work - 16x16 m.

119. The site selected for the site is leveled and fenced with a metal mesh or picket fence. On the north side, a gate is made to enter the site.

120. Instruments at the meteorological site are installed in a certain order. So that they do not shade each other and do not interfere with the free exchange of air, the distance between the devices and from the fence to the devices should be 4-6 m.

121. On the north side of the site, higher installations are placed: weathervane with a light board, weathervane with a heavy board and an ice machine. In the southern part of the site, an area with natural cover and bare for soil thermometers is allocated. On site with a natural cover, permafrost meter and snow gauge are installed. In the middle part of the site, a psychometric booth, a booth for chart recorders, a precipitation gauge, and a pluviograph are placed.

122. Actinometrical instruments are installed in the southern part of the site. All other instruments and installations are placed in free places, preferably on the north side of the site.

123. Barometers barographs and recording parts of automatic instruments are installed in the service building of the meteorological station.

Selection of location

124. A cross section of the Kogart hydro post building is presented in **Figure 3**

Figure 3: Cross section of Kegart hydro post



### 3.2.3. Kara-Alma Hydro post

125. The projected meteorological station facility is located in Suzak district, Jalal-Abad region of the Kyrgyz Republic, 60 km north-east of Jalal-Abad.

126. The project was developed on the basis of the contract assignment № MOES-C-CQS-1, ADB Loan 3746-KGZ/GRANT 0632- KGS “Increasing the resilience of water resources to climate change and natural disasters”, and the contractor LLC “NUR SZhB” in August 2021 conducted a survey at the site of the future meteorological station in the village of Kanzhiga. The terms of reference provide for the development of design and estimate documentation for the working draft “Rehabilitation of the fence of the meteorological site of the AMS of the Kara-Alma River, Kara-Alma village, Suzak district, Jalal-Abad region»:

127. The main goal of the project is the organization of meteorological observations based on the use of modern meteorological equipment and instruments installed at the meteorological station.

#### 3.2.3.1. Works to be done

128. Works on the object is recommended to begin with preparatory work on the construction of the production base, callouts and creation of a geodetic basis for structures. Description of the works:

- Layout of the temporary access road and construction site;
- Meteorological station

129. Concrete work on the fence is recommended to be carried out during a frost-free period, due to climatic conditions in winter. The project recommends that concrete work be carried out at a positive outside temperature.

130. The concrete mixture used in the construction of structures must meet the requirements of GOST 26633-4-91 "heavy and fine-grained concrete". When performing concrete, reinforcing, insulating and other works, safety precautions must be strictly observed in accordance with SNIP III-4-80.

#### 3.2.3.2. Construction materials

131. To provide the facility with building materials, the project provides for the use of gravel and

pebble material from the bed of the Kara-Alma River.

132. Water for technical needs to take water supply.

133. Local construction inert materials are expected to be delivered by road from quarries in accordance with the transport scheme approved by the Gosstroi of the Kyrgyz Republic or from local deposits in agreement with local authorities.

### 3.2.3.3. Meteorological station

134. A meteorological station is located so that its observations illuminate the meteorological conditions of the area adjacent to the station, so that they are characteristic of the largest possible surrounding area. The site should be located in an open and level place, there should not be any objects near it that affect the readings of the instruments.

135. The meteorological site has the shape of a rectangle, the sides of which should be directed from north to south and from west to east. The dimensions of the site depend on the number of installations on it, Standard sites are 26x26 m, sites with a smaller amount of work - 16x16 m.

136. The site selected for the site is leveled and fenced with a metal mesh or picket fence. On the north side, a gate is made to enter the site.

137. Instruments at the meteorological site are installed in a certain order. So that they do not shade each other and do not interfere with the free exchange of air, the distance between the devices and from the fence to the devices should be 4-6 m.

138. On the north side of the site, higher installations are placed: a weathervane with a light board, a weather vane with a heavy board and an ice machine. In the southern part of the site, an area with natural cover and bare for soil thermometers is allocated. On a site with a natural cover, a permafrost meter and a snow gauge are installed. In the middle part of the site, a psychometric booth, a booth for chart recorders, a precipitation gauge, and a pluviograph are placed.

139. Actinometrical instruments are installed in the southern part of the site. All other instruments and installations are placed in free places, preferably on the north side of the site.

140. Barometers, barographs and recording parts of automatic instruments are installed in the service building of the meteorological station.

141. A cross section of the Kara-Alma hydro post building is presented in **Figure 4**

*Figure 4: Cross section of Kara-Alma hydro post*



### **3.2.4. Kogart-Mikhailovka hydro post**

142. The projected meteorological station facility is located in Suzak district, Jalal-Abad region of the Kyrgyz Republic, 40 km north-east of Jalal-Abad.

143. The project was developed on the basis of the contract assignment № MOES-C-CQS-1, ADB Loan 3746-KGZ/GRANT 0632- KGS “Increasing the resilience of water resources to climate change and natural disasters”, and the contractor LLC "NUR SZHB" in August 2021, a survey was carried out at the site of the future fencing of the station in the village of Mikhailovka. The terms of reference provide for the development of design and estimate documentation for the working draft “Rehabilitation of the fence of the meteorological platform AMS on the Kogart river, Mikhailovka village, Suzak district, Jalal-Abad region».

144. The main goal of the project is the organization of meteorological observations based on the use of modern meteorological equipment and instruments installed at the meteorological station.

#### **3.2.4.1. Works to be done**

145. Works on the object are recommended to begin with preparatory work on the construction of the production base, callouts and creation of a geodetic basis for structures. Description of the works,

- Layout of the temporary access road and construction site
- Territory fencing

146. Concrete work on the fence is recommended to be carried out during a frost-free period, due to climatic conditions in winter. The project recommends that concrete work be carried out at a positive outside temperature.

147. The concrete mixture used in the construction of structures must meet the requirements of GOST 26633-4-91 "heavy and fine-grained concrete". When performing concrete, reinforcing, insulating and other works, safety precautions must be strictly observed in accordance with SNIP III-4-80.

#### **3.2.4.2. Construction materials**

148. To provide the facility with building materials, the project provides for the use of gravel and pebble material from the Kogart riverbed.

149. Water for technical needs is taken from the Kogart River

150. Local construction inert materials are expected to be delivered by road from quarries in accordance with the transport scheme approved by the Gosstroi of the Kyrgyz Republic or from local deposits in agreement with local authorities.

### **3.2.5. Chatkal hydro post**

151. The facility under design is located in the Chatkal district, Jalal-Abad region of the Kyrgyz Republic. Chatkal station on the Chatkal River operated from 1915 to 1993.

152. The existing location of the gauging station was completely destroyed by floods and the river bed was washed away, in connection with which branches appeared. In this regard, it was necessary to choose a new location for the hydrometric site 6 km upstream near the bridge where a level gauge with a radar sensor could be installed. The flow measurement will be carried out using a hydrometric gauging cable car mounted below the bridge along the river. The Surface Velocity Sensor and Acoustic Doppler Current Profiler (ADP) attached to the bridge will transmit data to the main station via the RM modem.

153. The project was developed on the basis of the task of the contract No. MOES-C-CQS-1,

ADB Loan 3746-KGS / Grant 0632-KGS “Increasing the resilience of water resources to climate change and natural disasters”, and the contractor LLC “NUR SZHB” in August 2021, a survey was carried out at the site of the hydrological post across the Torkent River. According to the Terms of Reference, it was necessary to develop design and estimate documentation for the working project «Development of design estimates for the construction of a hydrological post on the Chatkal River - the mouth of the Ters River (village Ak-Tash) and service residential building near the meteorological site in the village of Ak-Tash, Chatkal district, Jalal-Abad region»:

154. The main goal of the project is the organization of hydrological observations based on the use of modern hydrometric equipment and instruments installed at the meteorological station and at the hydrological post.

155. Using the results of engineering study, when developing design estimates, among other parameters of the gauging cable car, it is necessary to determine: the span of the gauging cable car, the height position of the bottom of the gauging car, the height of the supports.

### 3.2.5.1. Works to be done

156. Work on the object is recommended to begin with preparatory work on the construction of the production base of the construction site, preparation of the necessary earthmoving and construction mechanisms, removal and creation of a geodetic foundation for structures.

Description of works:

- Layout of the temporary access road and construction site;
- Removal of stone from the river floodplain;
- temporary protective jumper;
- the main hydrological post with the device on the left bank of a gauge well with a service ladder made of monolithic reinforced concrete;
- cradle crossing for measuring water flow with a turntable;
- gauge house;
- sloping post (with an upper and lower well with a service ladder);
- construction of a residential building;
- utility buildings;
- fencing of the meteorological station.

### 3.2.5.2. Bill of quantity

157. The bill of quantity that is foreseen for Chatkal hydropost is as follows.

*Table 8: BoQ of Chatkal hydropost*

No	Name of work	Quantity
1.	Pit	702,5 m3
2.	backfilling	216 m3
3.	layout	1209 m2
4.	Monolithic concrete and reinforced concrete	60,4 m3
5.	Metal structures	1,33 ton
6.	Apron fastening	111,4 m3
7.	Rubble concrete	115,5 m3

### 3.2.5.3. Construction materials

158. To provide the facility with building materials, the project provides for the use of gravel and pebble material from the Chatkal riverbed, located 1-2 km downstream of the gauging cable car. Useful material is represented by pebble soil with sandy aggregate 25%, with the inclusion of boulders up to 10%, boulder size up to 300 mm. Manual excavation group - 3 (6B). Soil reserves

are sufficient for the construction of a new hydrometric cradle in the surveyed area.

159. Water for technical needs is taken from the Chatkal River.

#### **3.2.5.4. Equipment needed**

160. In order to fulfill the scope of work envisaged by the project, the following mechanisms are envisaged:

- Single- bucket excavator with bucket capacity 0,65 m<sup>3</sup> – 1 piece;
- Bulldozer with power up to 1300 kW– 1 piece;
- Automobile crane with a lifting capacity of up to 10 tons – 1 piece;
- Car water carrier with a capacity of 1-2 m<sup>3</sup> – 1 piece;
- Dump trucks with a carrying capacity of up to 10 tons – 1 piece;
- Concrete mixer 0,5 m<sup>3</sup> – 1 piece;
- Cars onboard with a carrying capacity of up to 10 tons – 1 piece.

#### **3.2.5.5. Meteorological station**

161. A meteorological station is located so that its observations illuminate the meteorological conditions of the area adjacent to the station, so that they are characteristic of the largest possible surrounding area. The site should be located in an open and level place, there should not be any objects near it that affect the readings of the instruments.

162. The meteorological site has the shape of a rectangle, the sides of which should be directed from north to south and from west to east. The size of the site depends on the number of installations on it, Standard sites are 26x26 m, sites with a smaller amount of work - 16x16 m.

163. The site selected for the site is leveled and fenced with a metal mesh or picket fence. On the north side, a gate is made to enter the site.

164. Instruments at the meteorological site are installed in a certain order. So that they do not shade each other and do not interfere with the free exchange of air, the distance between the devices and from the fence to the devices should be 4-6 m.

165. On the north side of the site, higher installations are placed: a weathervane with a light board, a weather vane with a heavy board and an ice machine. In the southern part of the site, an area with natural cover and bare for soil thermometers is allocated. On a site with a natural cover, a permafrost meter and a snow gauge are installed. In the middle part of the site, a psychometric booth, a booth for recorder instruments, a precipitation gauge, and a pluviograph are placed.

166. Actinometrical instruments are installed in the southern part of the site. All other instruments and installations are placed in free places, preferably on the north side of the site.

167. Barometers, barographs and recording parts of automatic instruments are installed in the service building of the meteorological station.

#### **3.2.5.6. Selection of location and type water metering station**

168. The location of the water metering station is preliminarily outlined according to the available large-scale maps. In this case, they are guided by the following technical conditions:

- The site of the river at the location of the gauging station along the threefold width of the channel must be straight, open, accessible for observation;
- The channel should be stable (not eroded and not silted);

- The post should be located at a distance of at least five times the width of the river from the mouth of the nearest tributaries and outside the sphere of influence of backwater from ice jams and hydraulic structures;
- Fasting should be arranged near settlements;
- The angle of inclination of the coastline to the horizon should be within 20-40°. Very steep and very gently sloping banks are inconvenient both for the construction of the post and for its operation.

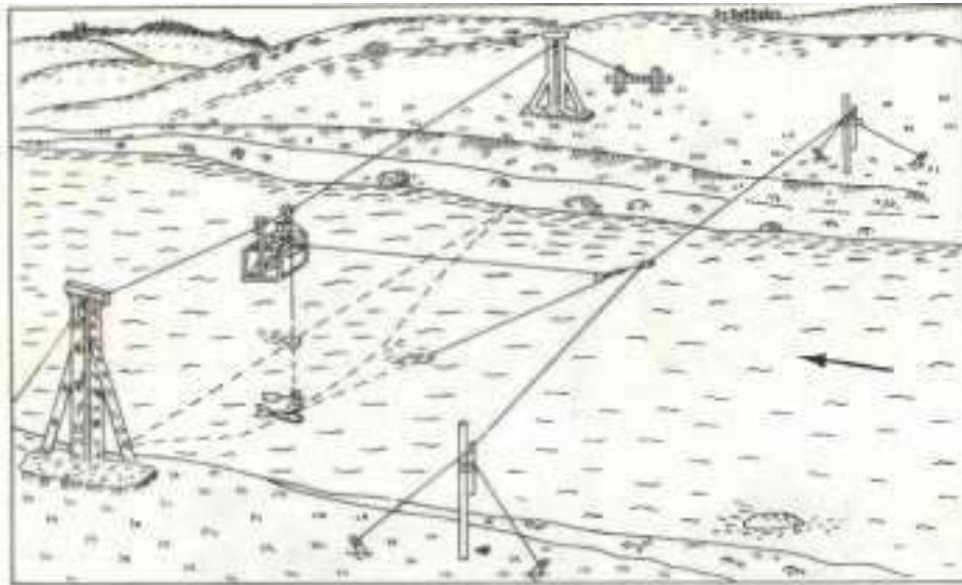
169. The choice of the type and design of the post is determined by the nature of the channel, floodplain and the state of the banks.

170. At hydrometric sites, the flow rate of water and sediments is measured; when choosing a site, they are guided by the following:

- The flow of water should be parallel to the stream, without creeks, oblique and reverse currents and rapids;
- The bottom of the river should not have significant protrusions that interfere with the measurement of depths and velocities, otherwise the stones remove the forest - the bushes are cut down;
- the longitudinal slope, width and depth of the river should be as uniform as possible, and the transverse profiles should be regular, trough-shaped;
- The boundaries of the survey are determined by the width of the river and the marks of the highest water level. The width of the survey area is taken with the calculation of exceeding the boundaries of the survey above the highest water mark by 1 m. The length of the section  $L$  is taken depending on the width of the channel. With a width  $b$  less than 100 m,  $L=5b$ , but not less than 100 m; when  $b$  is more than 100 m,  $L= (2-3) b$ , but not less than the floodplain width.

171. The gauging cable car (**Figure 5**) is an auxiliary gauging structure, consisting of a building part (foundation, anchor) and cradle crossing equipment installed in the gauging section or near it, and intended for delivery from the shore to a given point above the watercourse, in a cradle suspended on load-bearing cables, and moving along them, people, instruments and equipment, with the aim of carrying out hydrometric work from this cradle, sampling water and bottom sediments at any point in the water section of the watercourse.

Figure 5: Gauging cable car



### 3.2.5.7. Channel regulation structure

172. Under the channel regulation structures, they understand coastal fortifications (protective dams), which, at a certain relative position in terms of the plan, form regulated and fixed channels, guide spurs, etc. structures located in the river channel or in its zone of influence and designed to concentrate and direct the flow, create it has a certain structure, as well as to protect the coast and other structures from erosion by the river.

173. The location and length of coastal fortifications (protective dams) in case of protection against erosion is determined in each specific case according to the general plan, depending on the possible location of the riverbed, protected structures and objects. With a significant length of protective measures, the type of regulatory structure is selected - a longitudinal dam with continuous fastening along the length or a longitudinal dam with partial fastening.

174. The design of fastening of dams of regulated channels and coastal fortifications can be different and depends on the availability of local building materials and the conditions of work. In our case, it was decided to design the fastening of the upper slope of protective dams made of rubble concrete with a deepening to the bottom of the apron and with its construction from cobblestone, since there is no quarry of torn stone in the immediate vicinity of the object.

### 3.2.6. Gava-Sai hydro post

175. The projected construction is located in Ala-Buka district, Jalal-Abad region of the Kyrgyz Republic.

176. Hydrological post on the river Gava-Sai-mouth of the river Ters Worked from 1932 to 1996.

177. The existing location of the gauging was completely destroyed by floods and the riverbed was washed away, the existing wells are silted and broken by sediment. In this regard, it is necessary to restore the hydrometric target at the existing location with the installation of a level gauge with a radar sensor. A meteorological station and a residential building will be built nearby upstream about 3 km. Flow measurement will be carried out using a gauging cable car with acoustic Doppler current profiler (ADCP) attached on the riverbank will transmit data to the main

station via modem RM.

178. The project was developed on the basis of the contract assignment № MOES-C-CQS-1, ADB Loan 3746-KGZ/GRANT 0632- KGZ “Improving the resilience of water resources to climate change and natural disasters”, and the contractor LLC «NUR SZHB» in August 2021, a survey was carried out at the site of the hydrological post on the Gava-Sai river - the mouth of the Ters river. The terms of reference provide for the development of design and estimate documentation for the working draft « Development of design estimates for the construction of hydrometrical post on the Gava-Sai river - the mouth of the Ters river and an office building near the meteorological site in the village of Kok-Tash, Ala-Buka district, Jalal-Abad region».

179. The main goal of the project is the organization of hydrological observations based on the use of modern hydrometric equipment and instruments that are installed at the meteorological station and at the hydrological post.

180. Using the results of engineering surveys in the development of design estimates, among other parameters, a gauging cable car it is necessary to define.

### **3.2.6.1. Works to be done**

181. Work on the object is recommended to begin with preparatory work on the construction of the production base of the construction site, preparation of the necessary earthmoving and construction mechanisms, removal and creation of a geodetic foundation for structures.

Description of works;

- Layout of the temporary access road and construction site;
- Removal of stone from the river floodplain;
- temporary protective jumper;
- the main hydrological post with the device on the left bank of a gauge well with a service ladder made of monolithic reinforced concrete;
- gauging cable car for measuring water flow with a turntable;
- gauge house;
- sloping post (with an upper and lower well with a service ladder);
- construction of a residential building;
- utility buildings;
- fencing of the territory and meteorological station.
- 

182. Concrete work on structures is recommended to be carried out during a frost-free period, due to climatic conditions in winter. The supply of concrete mixture to the structure of structures is carried out by a crane with a lifting capacity of 10 tons. Taking into account that the facilities at the facility do not have concentrated volumes of concrete work, the project recommends that concrete work be carried out at a positive outside temperature.

183. The concrete mixture used in the construction of structures must meet the requirements of GOST 26633-4-91 "heavy and fine-grained concrete". When performing concrete, reinforcing, insulating and other works, safety precautions must be strictly observed in accordance with SNIP III-4-80.

### **3.2.6.2. Bill of quantity**

184. The bill of quantity that is foreseen for Gava-Say hydropost is as follows.

Figure 6:BoQ of Gava-Say hydropost

No	Name of work	Quantity
1.	Pit	453,6 m3
2.	Backfilling	224,1 m3
3.	Layout	411,3 m2
4.	Monolithic concrete and reinforced concrete	34,6 m3
5.	Metal structures	1,33 ton
6.	Apron fastening	44,9 m3
7.	Rubble concrete	38,9 m3

### 3.2.6.3. Construction materials

185. To provide the facility with building materials, the project provides for the use of gravel and pebble material from the bed of the Gava-Sai River, located 1-2 km downstream of the gauging cable car. Useful material is represented by pebble soil with sandy aggregate 25%, with the inclusion of boulders up to 10%, boulder size up to 300 mm. Manual excavation group - 3 (6B). Soil reserves are sufficient for the construction of a new hydrometric cradle in the surveyed area.

186. Water for technical needs is taken from the river Gava-Sai-mouth of the river Ters.

187. Location construction inert materials are expected to be delivered by road from quarries in accordance with the transport scheme approved by the Gosstroi of the Kyrgyz Republic or from local deposits in agreement with local authorities.

### 3.2.6.4. Equipment needed

188. In order to fulfill the scope of work envisaged by the project, the following mechanisms are envisaged:

- Single- bucket excavator with bucket capacity 0,65 m<sup>3</sup> – 1piece;
- Bulldozer with power up to 130 kW - 1 piece;
- Automobile crane with a lifting capacity of up to 10 tons - 1 piece;
- Car water carrier with a capacity of 1-2 m3 - 1 piece;
- Dump trucks with a carrying capacity of up to 10 tons - 1 piece;
- Concrete mixer 0.5 m3 - 1 piece;
- Cars onboard with a carrying capacity of up to 10 tons - 1 piece.

### 3.2.6.5. Meteorological station

189. A meteorological station is located so that its observations illuminate the meteorological conditions of the area adjacent to the station so that they are characteristic of the largest possible surrounding area. The site should be located on an open and level place, there should not be any objects near it that affect the instrument readings.

190. The meteorological site has the shape of a rectangle, the sides of which should be directed from north to south and from west to east. The dimensions of the site depend on the number of installations on it, Standard sites are 26x26 m, sites with a smaller amount of work - 16x16 m.

191. The site selected for the site is leveled and fenced with a metal mesh or picket fence. On the north side, a gate is made to enter the site.

192. Instruments at the meteorological site are installed in a certain order. So that they do not shade each other and do not interfere with the free exchange of air, the distance between the devices and from the fence to the devices should be 4-6 m.

193. On the north side of the site, higher installations are placed: a weathervane with a light board, a weather vane with a heavy board and an ice machine. In the southern part of the site, an area with natural cover and bare for soil thermometers is allocated. On a site with a natural cover, a permafrost meter and a snow gauge are installed. In the middle part of the site, a psychometric booth, a booth for chart recorders, a precipitation gauge, and a pluviograph are placed.

194. Actinometrical instruments are installed in the southern part of the site. All other instruments and installations are placed in free places, preferably on the north side of the site.

195. Barometers, barographs and recording parts of automatic instruments are installed in the service building of the meteorological station.

### **3.2.6.6. Selection of location and type of water metering station**

196. The location of the water metering station is preliminarily outlined according to the available large-scale maps. In doing so, they are guided by the following specifications:

- The section of the river at the location of the water gauge of at least three times the width of the channel must be straight, open, accessible for observation;
- The channel must be stable (do not erode or silt);
- the post should be located at a distance of at least five times the width of the river from the mouth of the nearest tributaries and outside the sphere of influence of backwater from ice jams and hydraulic structures;
- post should be arranged near settlements;
- the angle of inclination of the coastline to the horizon should be within 20-40°.

197. Very steep and very gently sloping banks are inconvenient both for the construction of the post and for its operation.

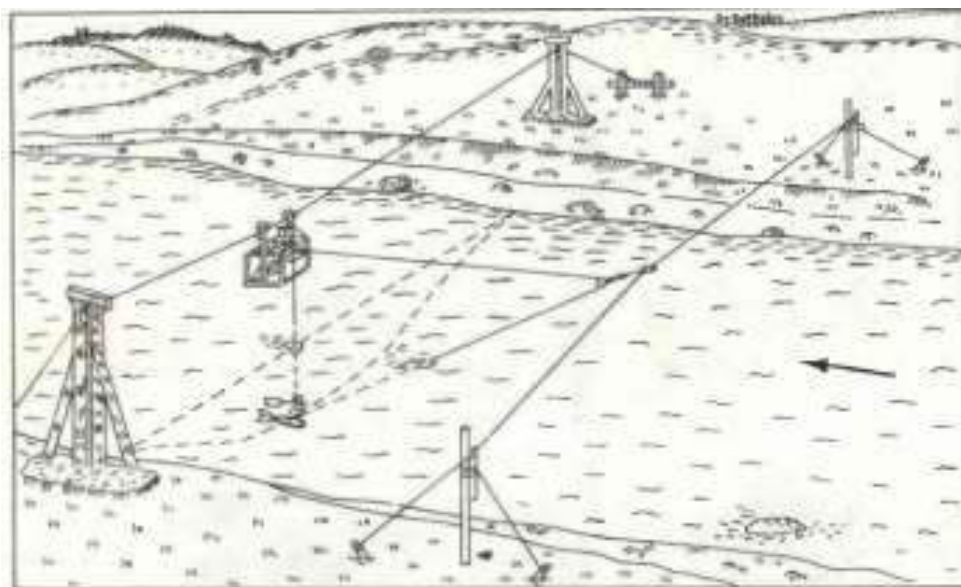
198. The choice of the type and design of the post is determined by the nature of the channel, floodplain and the state of the banks.

199. At hydrometric sites, the flow rate of water and sediments is measured; when choosing a target, they are guided by the following:

- The flow of water should be parallel to the stream, without creeks, oblique and reverse currents and rapids;
- The bottom of the river should not have significant protrusions that interfere with the measurement of depths and velocities, otherwise the stones remove the forest - the bushes are cut down;
- the longitudinal slope, width and depth of the river should be as uniform as possible, and the transverse profiles should be regular, trough-shaped;
- The boundaries of the survey are determined by the width of the river and the marks of the highest water level. The width of the survey area is taken with the calculation of exceeding the boundaries of the survey above the highest water level by 1 m. The length of the section L is taken depending on the width of the channel. With a width b less than 100 m,  $L=5b$ , but not less than 100 m; when b is more than 100 m,  $L= (2-3) b$ , but not less than the floodplain width.

200. The gauging stream crossing troy is an auxiliary gauging structure, consisting of a building part (foundation, anchor) and stream crossing troy equipment installed in the gauging range or near it, and intended for delivery from the shore to a given point above the watercourse, in a cradle suspended on load-bearing cables, and moving along them, people, instruments and equipment, in order to perform hydrometric work from this cradle, sampling water and bottom sediments at any point in the water section of the watercourse.

*Figure 7: Gauging cable car*



### **3.2.6.7. Channel regulation structure**

201. Under the channel regulation structures, they understand coastal fortifications (protective dams), which, at a certain relative position in terms of the plan, form regulated and fixed channels, guide spurs, etc. structures located in the river channel or in its zone of influence and designed to concentrate and direct the flow, create it has a certain structure, as well as to protect the coast and other structures from erosion by the river.

202. The location and length of coastal fortifications (protective dams) in case of protection against erosion is determined in each specific case according to the general plan, depending on the possible location of the riverbed, protected structures and objects. With a significant length of protective measures, the type of regulatory structure is selected - a longitudinal dam with continuous fastening along the length or a longitudinal dam with partial fixing.

203. The design of fastening of dams of regulated channels and coastal fortifications can be different and depends on the availability of local building materials and the conditions installation of work. In our case, it was decided to design the fixing of the upper slope of protective dams made of rubble concrete with a deepening to the bottom of the apron and with its construction from cobblestone, since there is no quarry of torn stone in the immediate vicinity of the object.

### **3.2.7. Padysha-Ata Hydro post**

204. The facility under design is located in the Aksy district, Jalal-Abad region of the Kyrgyz Republic.

205. The hydrological post on the Padysha-Ata River - the mouth of the Tostu River is not working.

206. The existing location of the gauging station was completely destroyed by floods and the riverbed was washed away, the main stilling well is silted up and broken by nano powders. In this regard, it is necessary to restore the hydrometric target at the existing location with the installation of a level gauge with a radar sensor. A meteorological station and a residential building will be built nearby. The flow measurement will be made using the existing gauging bridge, which is to be reconstructed. The Surface Velocity Sensor and Acoustic Doppler Current Profiler (ADCP) attached on the river bank will transmit data to the main station via modem RM.

207. The project was developed on the basis of the contract assignment № MOES-C-CQS-1, ADB Loan 3746-KGZ/GRANT 0632- KGZ "Improving the resilience of water resources to climate change and natural disasters", and the contractor LLC «NUR SZHB» in August 2021, a survey was carried out at the site of the hydrological post on the Padysha-Ata river - the mouth of the Tostu river. The terms of reference provide for the development of design and estimate documentation for the working draft «Development of design and estimate documentation for the construction of a hydrological post of the Padysha-Ata river - the mouth of the Tostu river and an office and residential building near the meteorological site in the village of Kashka-Suu, Aksy district, Jalal-Abad region».

208. The main goal of the project is the organization of hydrological observations based on the use of modern hydrometric equipment and instruments installed at the meteorological station and at the hydrological post.

209. Using the results of engineering surveys, when developing design estimates, among other parameters of the gauging section, it is necessary to determine: the span of the gauging bridge, the height position of the supports.

### **3.2.7.1. Works to be done**

210. Work on the object is recommended to begin with preparatory work on the construction of the production base of the construction site, preparation of the necessary earthmoving and construction mechanisms, removal and creation of a geodetic foundation for structures. Description of works

- Layout of temporary access road and construction site;
- Dismantling of monolithic concrete;
- Temporary protective jumper to skip construction costs;
- The main hydrological post with the installation on the left bank of a gauge well with a service ladder made of monolithic reinforced concrete;
- Hydrometric bridge for measuring water flow with a turntable;
- Gauge house;
- Sloping post (with an upper and lower well with a service ladder);
- Construction of a residential building;
- Utility buildings;
- Fencing of the territory and meteorological station.

211. Concrete work on structures is recommended to be carried out during a frost-free period, due to climatic conditions in winter. The supply of concrete mixture to the structure of structures is carried out by a crane with a lifting capacity of 10 tons. Taking into account that the facilities at the facility do not have concentrated volumes of concrete work, the project recommends that concrete work be carried out at a positive outside temperature.

212. The concrete mixture used in the construction of structures must meet the requirements of GOST 26633-4-91 "heavy and fine-grained concrete". When performing concrete, reinforcing,

insulating and other works, safety precautions must be strictly observed in accordance with SNIP III-4-80.

### 3.2.7.2. Bill of Quantity

213. The bill of quantity that is foreseen for Padysha-Ata hydro post is as follows.

*Table 9: BoQ of Padysha-Ata*

No	Name of work	Quantity
1.	Pit	446,2 m3
2.	Backfilling	232 m3
3.	Layout	1195 m2
4.	Monolithic concrete and reinforced concrete	321 m3
5.	Fittings	22,8 ton
6.	Apron fastening	116,5 m3
7.	Dismantling of monolithic reinforced concrete	162 m3

### 3.2.7.3. Construction materials

214. To provide the facility with building materials, the project provides for the use of gravel and pebble material from the bed of the Padysha-Ata River, located 1-2 km downstream of the gauging cable car. Useful material is represented by pebble soil with sandy aggregate 25%, with the inclusion of boulders up to 10%, boulder size up to 300 mm. Manual excavation group - 3 (6B). Soil reserves are sufficient for the construction of a new hydrometric cradle in the surveyed area.

215. Water for technical needs should be taken from the Padysha-Ata River - the mouth of the Tostu River.

### 3.2.7.4. Equipment needed

216. In order to fulfill the scope of work envisaged by the project, the following mechanisms are envisaged:

- Single- bucket excavator with bucket capacity 0,65 m<sup>3</sup> – 1pcs;
- Bulldozer with power up to 130 kW - 1 piece;
- Automobile crane with a lifting capacity of up to 10 tons - 1 piece;
- Car water carrier with a capacity of 1-2 m3 - 1 piece;
- Dump trucks with a carrying capacity of up to 10 tons - 1 piece;
- Concrete mixer 0.5 m3 - 1 piece;
- Cars onboard with a carrying capacity of up to 10 tons - 1 piece.

### 3.2.7.5. Meteorological station

217. A meteorological station is located so that its observations illuminate the meteorological conditions of the area adjacent to the station so that they are characteristic of the largest possible surrounding area. The site should be located in an open and level place, there should not be any objects near it that affect the instrument readings.

218. The meteorological site has the shape of a rectangle, the sides of which should be directed from north to south and from west to east. The dimensions of the site depend on the number of installations on it, Standard sites are 26x26 m, sites with a smaller amount of work - 16x16 m

219. The site selected for the site is leveled and fenced with a metal mesh or picket fence. On the north side, a gate is made to enter the site.

220. Instruments at the meteorological site are installed in a certain order. So that they do not shade each other and do not interfere with the free exchange of air, the distance between the devices and from the fence to the devices should be 4-6 m.

221. On the north side of the site, higher installations are placed: a weathervane with a light board, a weather vane with a heavy board and an ice machine. In the southern part of the site, an area with natural cover and bare for soil thermometers is allocated. On a site with a natural cover, a permafrost meter and a snow gauge are installed. In the middle part of the site, a psychometric booth, a booth for chart recorders, a precipitation gauge, and a pluviograph are placed.

222. Actinometric instruments are installed in the southern part of the site. All other instruments and installations are placed in free places, preferably on the north side of the site.

223. Barometers, barographs and recording parts of automatic instruments are installed in the service building of the meteorological station.

#### **3.2.7.6. Selection of location and type of water metering station**

224. The location of the water metering station is preliminarily outlined according to the available large-scale maps. In doing so, they are guided by the following technical conditions:

- The section of the river at the location of the water-measuring station for three times the width of the channel must be straight, open, accessible for observation;
- The channel must be stable (not eroded or silted);
- The post should be located at a distance of at least five times the width of the river from the mouth of the nearest tributaries and outside the sphere of influence of backwaters from ice jams and hydraulic structures;
- Fasting should be arranged near settlements;
- The angle of inclination of the coastline to the horizon should be within 20-400. Very steep and very gently sloping banks are inconvenient both for setting up a post and for its operation.

225. At hydrometric sites, the flow rate of water and sediments is measured; when choosing a target, they are guided by the following:

- The flow of water must be parallel jet, without creeks, oblique and reverse currents and rapids;
- The bottom of the river should not have significant protrusions that interfere with the measurement of depths and velocities, otherwise the stones remove the forest - the bushes are cut down;
- 3) the longitudinal slope, width and depth of the river should be as uniform as possible, and the transverse profiles should be regular, trough-shaped;
- 4) the boundaries of the survey are determined by the width of the river and the marks of the highest water level. The width of the survey area is taken with the calculation of exceeding the boundaries of the survey above the highest water mark by 1 m. The length

of the section L is taken depending on the width of the channel. With a width b less than 100 m,  $L=5b$ , but not less than 100 m; when b is more than 100 m,  $L= (2-3) b$ , but not less than the floodplain width.

### **3.2.7.7. Channel regulation structure**

226. Under the channel regulation structures, they understand coastal fortifications (protective dams), which, at a certain relative position in terms of the plan, form regulated and fixed channels, guide spurs, etc. structures located in the river channel or in its zone of influence and designed to concentrate and direct the flow, create it has a certain structure, as well as to protect the coast and other structures from erosion by the river.

227. The location and length of coastal fortifications (protective dams) in the case of protection against erosion is determined in each specific case according to the general plan, depending on the possible location of the riverbed, protected structures and objects. With a significant length of protective measures, the type of regulatory structure is selected - a longitudinal dam with continuous fastening along the length or a longitudinal dam with partial fastening.

### **3.2.7.8. Hydrometric bridge**

#### **3.2.7.8.1. Appointment of bridge and condition for their use**

228. In this project, a standard design developed by the Laboratory of Hydrometric Structures at the Hydrological Institute of Leningrad was used.

229. The metal lattice gauging bridges developed in this atlas are designed to equip gauging points in populated areas or in their immediate vicinity. They are designed to be used by the local population as stationary footbridges, for communication between the banks.

230. The bridges are suitable for performing hydrometric work using a rod and foot rod. To perform hydrometric work with cables, a modification of these bridges with the appropriate mechanical equipment has been developed.

231. They are placed in a special atlas.

232. Lightweight structures of this type of gauging bridges have been developed to equip gauging points located far from populated areas. They allow their use for communication between the shores when loaded only by individual pedestrians (see atlas, lightweight metal lattice hydrometric bridges).

233. The bridges developed in this atlas should be used on rivers with a maximum width of the water table from 10.0 to 24.0 m. At the same time, within spans from 10.0 to 12.0 m, a truss with spans of 12.0 m is used; from 12.0 to 16.0m, farm-16.0m; from 16.0 to 20.0 m - truss - 20.0 m and from 20.0 to 24.0 m, truss - 24.0 m, respectively, from the edges of the banks of the support. The overspending of metal, at the same time, turns out to be insignificant and is compensated for by savings on project documentation.

234. All bridge structures are developed at the stage of working drawings. Changing the size of spans of trusses and their geometric lattice is not recommended.

#### **3.2.7.8.2. Structural features of the superstructure**

235. The span structure of the bridges consists of two flat metal single-diagonal trusses (decreasing braces) - purlins with parallel belts, spaced from each other at a distance of 10 m. The distance between trusses - purlins (bridge width), for all - spans, is taken equal to 10 m from the conditions for ensuring sufficient transverse rigidity of bridges in the horizontal plane and the convenience of hydrometric work. Trusses simultaneously perform two functions - girders and railings.

236. At the level of the lower chords, they are interconnected by a system of transverse girders and braces forming a flat truss, providing the necessary rigidity to the span structure of the bridge in the horizontal plane.

237. All structural elements of trusses and ties are made of grade-3 angle isosceles steel. On the lower links of the trusses, bars were fixed to carry a boardwalk made of boards 4 cm thick.

238. In this atlas, span structures are developed for spans 12.0; 16.0; 20.0 and 24.0m.

239. It is assumed that the structures of the superstructure are manufactured in the RWP or at the factory and delivered to the hydrometric sites for installation in finished form. For the convenience of delivery, the superstructure is made in the form of separate sections (bridge with a span of 12.0 m from two sections of 6.0 m each; bridge-16.0 m 2x5.4 m and 5.2 m; bridge-20.0 m 2x4.9 m and 2x5.1 m; bridge-24.0m, 4x6.0m).

240. Each section consists of two sides - bearing trusses and a horizontal connection truss in the plane of the lower chords of the latter. At the installation site, the sections are bolted together with the help of overlays and scarves.

241. The depth of the bridges (distance from the top of the railing to the flooring), for structural reasons, is taken equal to 0.784 - 0.890 m. Such a depth ensures the safety of those working on the bridge and at the same time does not complicate the production of hydrometric works. The height of the trusses is determined from the conditions of longitudinal stiffness and is equal to 0.9 m for trusses - 12.0 m and 16.0 m; 1.2m for a farm - 20.0m; 1.4m for a farm - 24.0m. At the bridge with a span of 24.0 m between girders, additional transverse braces were introduced to reduce its depth. In order to ensure the upper belt of the bridges is buckling stability of the truss plane. External struts are installed against each vertical rack with their lower ends:

242. Connected with crossbars, g top with uprights.

243. The selection of geometric lattices of bridge trusses, developed in this atlas, was made on the basis of technical and economic considerations from the condition of the minimum metal consumption per 1 linear meter. span structure and minimum labor intensity for their manufacture, as well as from the conditions for providing amenities for the production of hydrometric work.

244. Metal consumption per 1 running meter bridges for a span of 12.0m - 44.5kg, 16.0 - 49.5kg, 20.0m - 54.5kg, 24.0m - 69.0kg.

### **3.2.7.8.3. Estimated load. Calculation of strength and stability**

245. The calculation of the strength of the elements of the superstructure of bridges is made according to the allowable stresses. Estimated truss deflections are taken equal to 1/500 of the span. When calculating the strength to stability of girders, the own weight and temporary standard load of 100 kg per 1 running meter were taken as loads. bridge length. This load takes into account the weight of possible hydrometric equipment and personnel working with it. When calculating, an overload coefficient equal to 1.6 was introduced, which took into account the possibility of shifting the payload of the superstructure from its longitudinal axis of symmetry towards one of the runs. Thus, the calculated payload per truss was - 80.0 kg per linear meter. its length. A distributed load is applied at the truss nodes, with the load intensity multiplied by the panel length.

246. The forces in the truss rods are determined by constructing the Cremona diagram. The calculation of the central tensioned elements was made according to the strength condition according to the formula  $F=N/[O]$ .

247. The calculation of all compressed elements was carried out according to the condition of buckling stability according to the formula  $F=N/[G]y$

- Where N is the design force in the rod in kg.

- F is the cross-sectional area of the lattice element in cm.
- [G] - allowable stress for steel St - 3 [G] \u003d 1600 kg / cm.
- $\gamma$  - Coefficient of stress reduction during buckling, determined according to the table / cm. SNiP II - B3-62, depending on the flexibility of the element  $L = l_0 / r$ ,
- $l_0$  - the estimated length of the element in m, depending on the conditions of its fastening.
- L - geometric length of elements in m.
- $L_1$  – distance between nodes secured against displacement from the plane of the truss.
- R – the smallest radius of inertia of the element being calculated.

248. For chords, support braces and truss struts transmitting support reactions, the flexibility was assumed to be no more than 120, for other compressed elements no more than 150.

249. Flexibility of tensile elements was assumed to be no more than 250 for chords and braces of trusses, and no more than 350 for other elements.

#### **3.2.7.8.4. Bridge support**

250. In the atlas, at the stage of working drawings, 5 types of supports were made: metal, monolithic, reinforced concrete welded, reinforced concrete monolithic on a pile reamer of metal pipes and intermediate metal ones.

251. Bridge supports are designed for the following types of soils: rocky, sandy, clayey, loamy subsidence loess, peat, muddy and quicksand.

252. The conditions for the use of each type of support are specified in the drawings.

253. All types of supports, except for the intermediate ones, are installed on the shore at a certain distance from the edges. The value of this distance is determined locally, in accordance with the degree of stability of the coast.

254. Intermediate metal supports-trusses are installed on concrete foundations at the water edges corresponding to the high-water horizon. They are used when installing bridges on rivers with gentle banks. In this case, to connect the bridge with the banks, it is necessary to install light overhead bridges manufactured locally.

#### **3.2.8. Torkent hydro post**

255. The facility under design is located in Toktogul district, Jalal-Abad region of the Kyrgyz Republic.

256. The Torkent station on the Torkent River operated from 1966 to 1997.

257. The existing location of the gauging station was completely destroyed by floods and the river bed was washed away, which resulted in the appearance of branches. In this regard, it was necessary to choose a new location for the hydrometric site downstream, next to the bridge, where a level gauge with a radar sensor could be installed. A meteorological station will be installed near this area. Flow measurement will be carried out using a hydrometric gauging cable car mounted downstream of the bridge. The Surface Velocity Sensor and Acoustic Doppler Current Profiler (ADP) attached to the bridge will transmit data to the main station via the RM modem.

258. The project was developed on the basis of the task of the contract No. MOES-C-CQS-1, ADB Loan 3746-KGS / Grant 0632-KGS "Increasing the resilience of water resources to climate change and natural disasters", and the contractor LLC "NUR SZHB" in August 2021, a survey was carried out at the site of the hydrological post across the Torkent river. According to the

Terms of Reference, it was necessary to develop design and estimate documentation for the working project "Development of design and estimate documentation for the construction of a hydrometric post on the Torkent River - the village of Torkent and an office building near the meteorological site in the village of Torkent, Toktogul district, Jalal-Abad region".

259. The main goal of the project is the organization of hydrological observations based on the use of modern hydrometric equipment and instruments installed at the meteorological station and at the hydrological post.

260. Using the results of engineering study, when developing design estimates, among other parameters of the gauging cable car, it is necessary to determine: the span of the gauging cable car, the height position of the bottom of the gauging car, the height of the supports.

### **3.2.8.1. Works to be done**

261. Work on the object is recommended to begin with preparatory work on the construction of the production base of the construction site, preparation of the necessary earthmoving and construction mechanisms, removal and creation of a geodetic foundation for structures. Description of works;

- Layout of the temporary access road and construction site;
- Removal of stone from the river floodplain;
- temporary protective jumper;
- the main hydrological post with the device on the left bank of a gauge well with a service ladder made of monolithic reinforced concrete;
- gauging cable car for measuring water flow with a turntable;
- gauge house;
- sloping post (with an upper and lower well with a service ladder);
- construction of a residential building;
- utility buildings;
- fencing of the meteorological station.

262. Concrete work on structures is recommended to be carried out during a frost-free period, due to climatic conditions in winter. The supply of concrete mixture to the structure of structures is carried out by a crane with a lifting capacity of 10 tons. Taking into account that the facilities at the facility do not have concentrated volumes of concrete work, the project recommends that concrete work be carried out at a positive outside temperature.

263. The concrete mixture used in the construction of structures must meet the requirements of GOST 26633-4-91 "heavy and fine-grained concrete". When performing concrete, reinforcing, insulating and other works, safety precautions must be strictly observed in accordance with SNIP III-4-80.

### **3.2.8.2. Bill of Quantity**

264. The bill of quantity that is foreseen for Torkent hydropost is as follows

Table 10: BoQ of Torkent

No	Name of work	Quantity
1.	Pit	475 m3
2.	backfilling	276 m3
3.	layout	809,6 m2
4.	Monolithic concrete and reinforced concrete	25,4 m3
5.	Metal structures	1,33 ton
6.	Apron fastening	83 m3
7.	Rubble concrete	55,7 m3

### 3.2.8.3. Construction materials

265. To provide the facility with building materials, the project provides for the use of gravel and pebble material from the bed of the Torkent River, located 1-2 km downstream of the gauging cable car. Useful material is represented by pebble soil with sandy aggregate 25%, with the inclusion of boulders up to 10%, boulder size up to 300 mm. Manual excavation group - 3 (6B). Soil reserves are sufficient for the construction of a new hydrometric cradle in the surveyed area.

266. Water for technical needs is taken from the Torkent River.

267. Local construction inert materials are expected to be delivered by road from quarries in accordance with the transport scheme approved by the Gosstroj of the Kyrgyz Republic or from local deposits in agreement with local authorities.

### 3.2.8.4. Equipment needed

268. In order to fulfill the scope of work envisaged by the project, the following mechanisms are envisaged:

- Single- bucket excavator with bucket capacity 0,65 m<sup>3</sup> – 1 piece
- Bulldozer with power up to 130 kW - 1 piece;
- Automobile crane with a lifting capacity of up to 10 tons - 1 piece;
- Car water carrier with a capacity of 1-2 m3 - 1 piece;
- Dump trucks with a carrying capacity of up to 10 tons - 1 piece;
- Concrete mixer 0.5 m3 - 1 piece.
- Cars onboard with a carrying capacity of up to 10 tons - 1 piece.

### 3.2.8.5. Meteorological station

269. A meteorological station is located so that its observations illuminate the meteorological conditions of the area adjacent to the station, so that they are characteristic of the largest possible surrounding area. The site should be located in an open and level place, there should not be any objects near it that affect the readings of the instruments.

270. The meteorological site has the shape of a rectangle, the sides of which should be directed from north to south and from west to east. The size of the site depends on the number of installations on it, Standard sites are 26x26 m, sites with a smaller amount of work - 16x16 m.

271. The site selected for the site is leveled and fenced with a metal mesh or picket fence. On the north side, a gate is made to enter the site.

272. Instruments at the meteorological site are installed in a certain order. So that they do not shade each other and do not interfere with the free exchange of air, the distance between the devices and from the fence to the devices should be 4-6 m.

273. On the north side of the site, higher installations are placed: a weathervane with a light board, a weather vane with a heavy board and an ice machine. In the southern part of the site, an area with natural cover and bare for soil thermometers is allocated. On a site with a natural cover, a permafrost meter and a snow gauge are installed. In the middle part of the site, a psychometric booth, a booth for recorder instruments, a precipitation gauge, and a pluviograph are placed.

274. Actinometric instruments are installed in the southern part of the site. All other instruments and installations are placed in free places, preferably on the north side of the site.

275. Barometers, barographs and recording parts of automatic instruments are installed in the service building of the meteorological station.

### **3.2.8.6. Selection of location and type of water metering station**

276. The location of the water metering station is preliminarily outlined according to the available large-scale maps. In this case, they are guided by the following technical conditions:

- The site of the river at the location of the gauging station along the threefold width of the channel must be straight, open, accessible for observation;
- The channel should be stable (not eroded and not silted);
- the post should be located at a distance of at least five times the width of the river from the mouth of the nearest tributaries and outside the sphere of influence of backwater from ice jams and hydraulic structures;
- fasting should be arranged near settlements;
- the angle of inclination of the coastline to the horizon should be within 20-40°. Very steep and very gently sloping banks are inconvenient both for the construction of the post and for its operation.

277. The choice of the type and design of the post is determined by the nature of the channel, floodplain and the state of the banks.

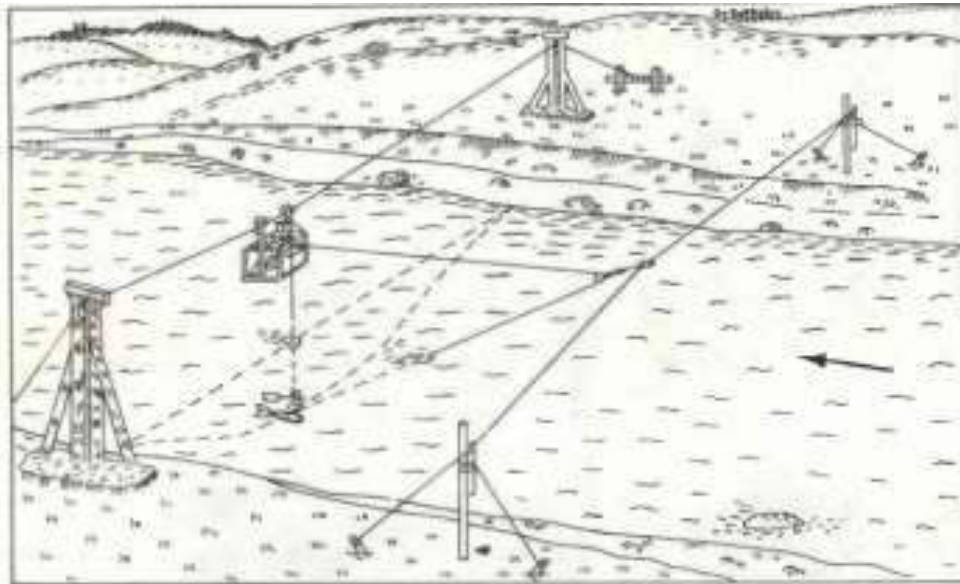
278. At hydrometric sites, the flow rate of water and sediments is measured; when choosing a site, they are guided by the following:

- The flow of water should be parallel to the stream, without creeks, oblique and reverse currents and rapids;
- The bottom of the river should not have significant protrusions that interfere with the measurement of depths and velocities, otherwise the stones remove the forest - the bushes are cut down;
- the longitudinal slope, width and depth of the river should be as uniform as possible, and the transverse profiles should be regular, trough-shaped;
- The boundaries of the survey are determined by the width of the river and the marks of the highest water level. The width of the survey area is taken with the calculation of exceeding the boundaries of the survey above the highest water mark by 1 m. The length

of the section L is taken depending on the width of the channel. With a width  $b$  less than 100 m,  $L=5b$ , but not less than 100 m; when  $b$  is more than 100 m,  $L= (2-3) b$ , but not less than the floodplain width.

279. Gauging cable car (**Figure 8**) equipment is a complete technical device that includes cables, supports, a gauging cable car, accessories and a safety cable, all components of which perform interconnected technological functions. The gauging cable moves along the carrying cables by means of a traction winch with a manual drive and a traction cable.

*Figure 8: Gauging cable car*



### **3.2.8.7. Channel regulation**

280. Under the channel regulation structures, they understand coastal fortifications (protective dams), which, at a certain relative position in terms of the plan, form regulated and fixed channels, guide spurs, etc. structures located in the river channel or in its zone of influence and designed to concentrate and direct the flow, create it has a certain structure, as well as to protect the coast and other structures from erosion by the river.

281. The location and length of coastal fortifications (protective dams) in case of protection against erosion is determined in each specific case according to the general plan, depending on the possible location of the riverbed, protected structures and objects. With a significant length of protective measures, the type of regulatory structure is selected - a longitudinal dam with continuous fastening along the length or a longitudinal dam with partial fastening.

282. The design of fastening of dams of regulated channels and coastal fortifications can be different and depends on the availability of local building materials and the conditions of work. In our case, it was decided to design the fastening of the upper slope of protective dams made of rubble concrete with a deepening to the bottom of the apron and with its construction from cobblestone, since there is no quarry of torn stone in the immediate vicinity of the object.

### **3.2.9. HMC hydro post**

283. The projected object meteorological station and residential building is located in the city of Jalal-Abad, Jalal-Abad region of the Kyrgyz Republic.

284. The project was developed on the basis of the assignment of the contract No. MOES-C-CQS-1, ADB Loan 3746-KGS / Grant 0632-KGS "Improving the resilience of water resources to climate change and natural disasters", and the contractor LLC "NUR SZHB" in August 2021, a survey was carried out on the site of a future residential building with utility buildings in the city of Jalal-Abad. The terms of reference provide for the development of design and estimate documentation for the working draft "Development of design and estimate documentation for the construction of a service and residential building of the Jalal-Abad Hydrometeorology Center in Jalal-Abad":

285. The main goal of the project is the organization of meteorological observations based on the use of modern meteorological equipment and instruments installed at the meteorological station.

#### **3.2.9.1. Works to be done**

286. Work on the object is recommended to begin with preparatory work on the construction of the production base of the construction site, preparation of the necessary earthmoving and construction mechanisms, removal and creation of a geodetic foundation for structures. Description of the works;

- Layout of the temporary access road and construction site;
- Construction of a residential building;
- Utility buildings
- Fencing of the territory

287. Concrete work on structures is recommended to be carried out during a frost-free period, due to climatic conditions in winter. The supply of concrete mixture to the structure of structures is carried out by a crane with a lifting capacity of 10 tons. Taking into account that the facilities at the facility do not have concentrated volumes of concrete work, the project recommends that concrete work be carried out at a positive outside temperature.

288. The concrete mixture used in the construction of structures must meet the requirements of GOST 26633-4-91 "heavy and fine-grained concrete". When performing concrete, reinforcing, insulating and other works, safety precautions must be strictly observed in accordance with SNIP III-4-80.

#### **3.2.9.2. Construction materials**

289. To provide the object with building materials, the project provides for the use of the nearest factory.

#### **3.2.9.3. Equipment needed**

290. In order to fulfill the scope of work envisaged by the project, the following mechanisms are envisaged:

- Single- bucket excavator with bucket capacity 0,25 m<sup>3</sup> – 1 piece;
- Bulldozer with power up to 130 kW - 1 piece;
- Automobile crane with a lifting capacity of up to 10 tons - 1 piece;

- Car water carrier with a capacity of 1-2 m<sup>3</sup> - 1 piece;
- Dump trucks with a carrying capacity of up to 10 tons - 1 piece;
- Concrete mixer 0.5 m<sup>3</sup> - 1 piece;
- Cars onboard with a carrying capacity of up to 10 tons - 1 piece.

#### **3.2.9.4. Meteorological station**

291. A meteorological station is located so that its observations illuminate the meteorological conditions of the area adjacent to the station so that they are characteristic of the largest possible surrounding area. The site should be located on an open and level place, there should not be any objects near it that affect the instrument readings.

292. The meteorological site has the shape of a rectangle, the sides of which should be directed from north to south and from west to east. The dimensions of the site depend on the number of installations on it, Standard sites are 26x26 m, sites with a smaller amount of work - 16x16 m.

293. The site selected for the site is leveled and fenced with a metal mesh or picket fence. On the north side, a gate is made to enter the site.

294. Instruments at the meteorological site are installed in a certain order. So that they do not shade each other and do not interfere with the free exchange of air, the distance between the devices and from the fence to the devices should be 4-6 m.

295. On the north side of the site, higher installations are placed: a weathervane with a light board, a weather vane with a heavy board and an ice machine. In the southern part of the site, an area with natural cover and bare for soil thermometers is allocated. On a site with a natural cover, a permafrost meter and a snow gauge are installed. In the middle part of the site, a psychometric booth, a booth for chart recorders, a precipitation gauge, and a pluviograph are placed.

296. Actinometrical instruments are installed in the southern part of the site. All other instruments and installations are placed in free places, preferably on the north side of the site.

297. Barometers, barographs and recording parts of automatic instruments are installed in the service building of the meteorological station.

### **4. DESCRIPTION OF THE ENVIRONMENT**

298. As mentioned in section 1.2, the project will be realized throughout the country, this is why all hydro post locations are grouped.

#### **4.1. Jalal- Abad hydro posts**

##### **4.1.1. Physical environment**

###### **4.1.1.1. Climate**

299. The climatic conditions of the Fergana Valley are determined by its geographic location at low latitudes and remoteness from the ocean, which causes a sharp continentality and aridity of the climate. The characteristic climatic features of the region are high intensity of solar radiation, aridity, low clouds, increased solar radiation, and sudden fluctuations in daily and daytime temperatures. The peculiar orographic position of the Fergana Valley and the neighborhood with the eastern margins of the desert Kyzyl-Kum determined here the presence of distinct/clearly expressed vertical zoning of the climate. When there is a decrease in absolute altitudes, the climate varies from a cold mountainous to a semi-desert in the western valley and to a hot, sharply continental, desert in the central part.

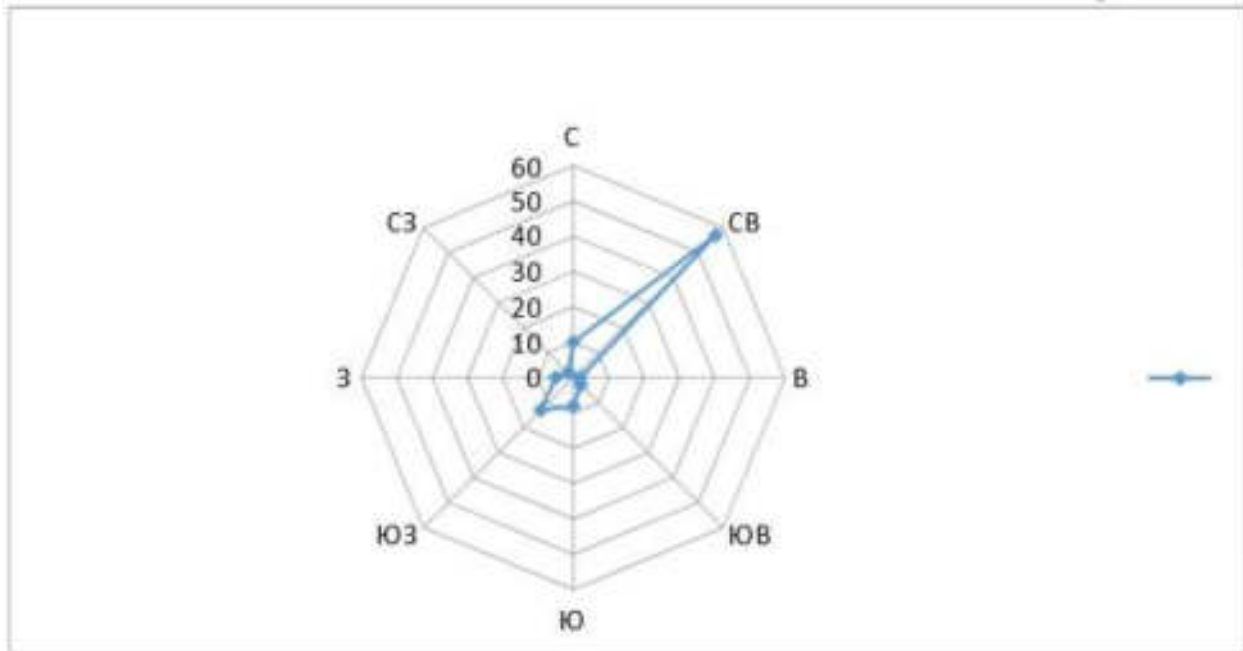
300. The average annual solar radiation on a horizontal surface during clear sky is 240 kcal/cm<sup>2</sup>,

i.e., not less than in the tropics. The large sum of warmth is explained, first of all, by the high midday solstice above the horizon and by insignificant cloudiness in the warm period of the year (Maskudov, 1979).

301. The air temperature in the foothills and mountains differs significantly from the temperature in the plain zone. In January, the average monthly, average daily air temperatures are below-freezing point throughout the Fergana Valley. However, in the middle of January, even in the foothills up to 1000-1500 m high, they are above-zero. In February, monthly mean air temperatures above-zero are observed throughout the plains and in the foothills of the Turkestan range. In March, to an altitude of 2000-2,200 m, the average daily temperatures reach 2-8 °, daytime 3-11 ° C (Mavlyanov, 1972). In April, the zero-degree isotherm passes at an altitude of 3000 m with some deviations, depending on the exposure of the slopes. During this period, the melting of the main snow reserves in the mountains begins, therefore, on most of the rivers there is a rapid increase in flooding. In May-June, the overall increase in air temperature continues. In July-August, temperatures reach their maximum. The average daily temperature is positive/above-zero even at the highest ridges of the mountains. In September-October, a sudden decrease in temperatures occurs in the mountains. In November and December at an altitude of more than 2000-2400 m, subzero temperatures are observed. In the foothills, average daily temperatures in November are 1-6 ° C, and in December, they are below-zero everywhere (Mavlyanov, 1972). The sum of temperatures above-zero (more than 10 ° C) in the range 4500-4700 °, the frost-free period lasts 196-230 days (Maskudov, 1979). In the cold season over the Fergana Valley is the polar front. Weather conditions are formed under the influence of dry and cold air coming from the Siberian anticyclone, and moist warm air coming as cyclones from the Atlantic side.

302. One of the important factors of climate is the wind. Strong winds occasionally occur here. They wind/weave soils and mobile/drift sands, form dust storms, which complicate the work of transport, industrial enterprises, tear electricity and communication lines. In addition, during strong winds fields, populated areas, canals, roads, and small irrigation networks are covered with sand. The average annual wind velocities in different areas are not the same. The zone of increased/raised velocities (more than 2 m/sec, and stretches along the Syr-Darya River to the Taldyk River.) In narrower sections, the average wind velocities exceed 4 m/s. For a considerable time, stronger winds are also observed (more than 15m/sec). The average annual number of days with a strong wind reaching in valley mouth is 65. Another area of strong winds is the area of the town of Kokand where the wind speed can reach 16-30 m/sec (Maskudov, 1979). As shown below, the prevailing wind directions are north-east, south-west and north. Wind rose of Jalal Abad oblast can be seen in **Figure 9**

Figure 9: Wind rose of Jalal Abad oblast



303. The peculiar geographical position of the valley with a diverse orientation of the mountainous structures that form it causes an uneven distribution of precipitation. The annual amount of precipitation in different areas varies from 55 to 1300 mm. The smallest amount (100 mm) falls on the western half of the plain part of the depression near the city of Kokand. To the east and northeast, the amount of precipitation gradually increases, reaching 200-300 mm in the foothill part and from 900 to 1300 mm in the mountains. In the annual precipitation regime, two maxima are observed (at the end of summer and in winter). In the lowland part (plain), as well as in the foothills of the Chatkal and Kuramin ranges, the rainiest is March (14-17% of the annual precipitation), and the other parts of the valley are April, May or June. The least rainy is August or early September (up to 4-5% of the annual sum of precipitation). In the central lowland and low foothills, the largest part occurs as rain; only from an altitude of 1400-1700 m the proportion of precipitation occurring as snow is greatly increased (Mavlyanov, 1972). A stable snow cover is set only on mountain slopes exceeding 1400- 1800 m, for 20-40 days. In the lower zone, at an altitude of 1000-1400 m, the snow cover is unstable and does not reach high height/depth. The maximum daily precipitation observed in the subproject area (Shaidan river basin) is 73.0 mm.

304. A distinctive feature of the climate is high evaporation, which reaches 1,200-1,500 mm/year. Due to relatively high winter temperatures, even in the middle of winter, evaporation is about 10 mm per month (January). As early as March it reaches 60 mm, in the future evaporation rapidly increases and in the summer months (July-August) is 230-250 mm. (Maskudov, 1979). Since September, due to a sharp drop in temperature, evaporation decreases, reaching 30-40 mm in November. **Table 11** shows the climate current conditions in the Jalal Abad oblast and the expected climate changes by 2050.

305. General climatic map of the Kyrgyz Republic is presented in **Figure 10**

Figure 10: Climatic map of Kyrgyzstan Republic

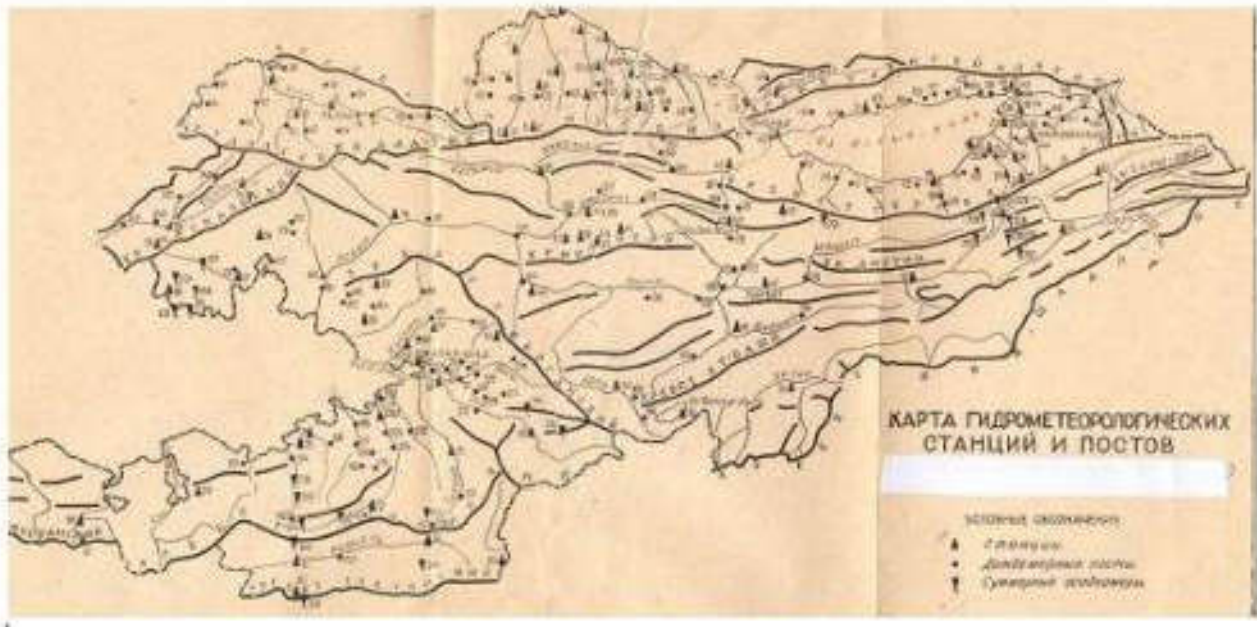


Table 11: Jalal-Abad oblast area climate conditions and projected climate changes

<b>Selected climate variable</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>September</b>	<b>October</b>	<b>November</b>	<b>December</b>
Maximum Temperature, C <sup>0</sup>	-3,4	-1,6	5,7	14,5	19,5	24,6	27,4	26,2	21,3	13,4	5,3	-0,7
Minimum Temperature, C <sup>0</sup>	-13,1	-11,3	-4,3	3,0	6,9	10,5	12,6	11,0	6,1	0,4	-5,3	-9,7
Precipitation (mm/month)	36,6	41,2	62,5	74,0	67,0	36,0	16,2	7,0	9,0	45,0	42,3	37,0
Number of wet days	12	13	17	18	19	15	8	2	0	10	12	12
Projected change in temperature	4,0 (1,2)	4,1 (0,7)	4,2 (0,1)	3,7 (1,0)	3,7 (0,8)	3,8 (0,1)	4,2 (0,8)	5,0 (2,3)	4,9 (1,9)	4,0 (1,2)	3,5 (0,2)	4,2 (0,7)
Projected change in precipitation (%)	40% (76%)	8% (44%)	56% (34%)	7% (33%)	-6% (14%)	-5% (22%)	-10% (27%)	1% (77%)	13% (16%)	-4% (24%)	61% (61%)	42% (63%)
Change in hot days	1 (1)	1 (1)	2 (1)	1 (1)	1 (1)	1 (1)	1 (1)	2 (2)	1 (1)	1 (1)	2 (1)	1 (1)
Change in dry days	2 (0)	3 (0)	1 (0)	1 (0)	3 (1)	2 (0)	2 (1)	0 (1)	0 (0)	3 (2)	2 (0)	2 (-1)
Change in frost days	-3 (-2)	-6 (-3)	-10 (-7)	-1 (-1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	-2 (-2)	-9 (-8)	-9 (-6)
Change in peak precipitation intensity (%)	6% (10%)	10% (32%)	30% (-2%)	5% (-11%)	21% (36%)	26% (17%)	55% (18%)	-34% (-21%)	-12% (16%)	83% (68%)	52% (50%)	8% (20%)
Change in number of wet days	1 (3)	0 (2)	2 (3)	0 (2)	-1 (1)	-1 (2)	0 (2)	0 (0)	0 (0)	0 (1)	1 (3)	1 (4)

#### 4.1.1.1.1. Climate of Shaidan hydro post zone

306. A brief climatic characteristic of the region is given in the reference book on the climate of the USSR, issue 32, according to the Shaidan weather station. This station is the nearest station with identical physical and geographical conditions of the study area.

- average annual air temperature + 7,6 °C;
- absolute minimum air temperature – 23 °C;
- absolute maximum air temperature + 32 °C;
- average maximum temperature of the hottest month + 37 °C;
- the temperature of the coldest five-day period with a supply of 0,98 – 15 °C;
- the temperature of the coldest day with a supply of 0,98 – 17 °C;
- the average temperature of the coldest period is – 5,1 °C;
- average rainfall for the period:
  - November-March 46 mm;
  - April-October 230 mm;
- The normative depth of seasonal freezing of soils under the open surface of a horizontal platform bare from snow is as follows:
  - For loams and clays – 52;
  - - sandy loam, fine and dusty sands – 63;
  - - gravel sands, large and medium size – 68cm;
  - - coarse soils – 77cm

#### 4.1.1.1.2. Climate of Kogart-Mikhailovka hydro post zone

307. A brief climatic characteristic of the region is given in the reference book on the climate of the USSR, issue 32, according to the meteorological station "Kogart River @ Mikhailovka village". This station is the nearest station with identical physical and geographical conditions of the study area.

- Average annual air temperature + 7,9 °C;
- Absolute minimum air temperature – 28 °C;
- absolute maximum air temperature + 37 °C;
- average maximum temperature of the hottest month + 37 °C;
- temperature of the coldest five-day security period 0,98 – 16 °C;
- temperature of the coldest day 0,98 – 19 °C;
- average temperature of the coldest period – 8 °C;
- average rainfall for the period:
  - November -march 261 mm;

- April -October 486 mm;
- The normative depth of seasonal freezing of soils under the open surface of a horizontal platform bare from snow is as follows:
  - For loams and clays – 68 cm;
  - Sandy loam, fine and dusty sands – 83 cm;
  - - gravel sands, large and medium size – 89 cm;
  - - coarse-grained soils – 1,01 cm.

#### **4.1.1.1.3. Climate of Kara-Alma hydro post zone**

308. A brief climatic characteristic of the region is given in the reference book on the climate of the USSR, issue 32, according to the meteorological station "Kogart River @ Mikhailovka village". This station is the nearest station with identical physical and geographical conditions of the study area.

- Average annual air temperature + 7,9 0C;
- absolute minimum air temperature - 28 0C;
- absolute maximum air temperature + 37 0C;
- average maximum temperature of the hottest month + 37 0C;
- temperature of the coldest five-day security period 0,98 - 16 0C;
- temperature of the coldest day 0,98 - 19 0C;
- average temperature of the coldest period - 8 0C;
- average rainfall for the period:
  - November-march 261 mm
  - April-October 486 mm;
- The normative depth of seasonal freezing of soils under the open surface of a horizontal platform bare from snow is as follows:
  - For loams and clays – 68 cm;
  - Sandy loam, fine and dusty sands – 83 cm;
  - Gravel sands, large and medium size – 89 cm;
  - Coarse-grained soils – 1,01cm.

#### **4.1.1.1.4. Climate of Kogart-Mikhailovka hydro post zone**

309. A brief climatic characteristic of the region is given in the reference book on the climate of the USSR, issue 32, according to the meteorological station "Kogart River @ Mikhailovka village". This station is the nearest station with identical physical and geographical conditions of the study area.

- Average annual air temperature + 7,9 0C
- Absolute minimum air temperature - 28 0C;

- absolute maximum air temperature + 37 0C;
- average maximum temperature of the hottest month + 37 0C;
- temperature of the coldest five-day security period 0,98 - 16 0C;
- temperature of the coldest day 0,98 - 19 0C;
- average temperature of the coldest period - 8 0C;
- average rainfall for the period
  - November- march 261 mm;
  - April- October 486 mm;
- The normative depth of seasonal freezing of soils under the open surface of a horizontal platform bare from snow is as follows:
  - For loams and clays – 68 cm;
  - sandy loam, fine and dusty sands – 83 cm;
  - gravel sands, large and medium size – 89 cm;
  - coarse-grained soils – 1,01cm.

#### **4.1.1.1.5. Climate of Chatkal hydro post zone**

310. A brief climatic characteristic of the region is given in the reference book on the climate of the USSR, issue 32, according to the Chatkal meteorological station. This station is the nearest station with identical physical and geographical conditions of the study area:

- Average annual air temperature + 7.9 0C;
- Absolute minimum air temperature - 28 0C;
- absolute maximum air temperature + 37 0C;
- average maximum temperature of the hottest month + 37 0C;
- the temperature of the coldest five-day period with a supply of 0.98 - 16 0C;
- the temperature of the coldest day with a supply of 0.98 - 19 0C;
- the average temperature of the coldest period is 8 0C;
- average rainfall for the period:
  - November-March 261 mm;
  - April - October 486 mm;
- The normative depth of seasonal freezing of soils under the open surface of a horizontal platform bare from snow is as follows:
  - For loams and clays - 68 cm;
  - Sandy loam, fine and dusty sands - 83cm;
  - Gravel sands, large and medium size - 89cm;
  - Coarse soils - 1.01 cm.

#### **4.1.1.1.6. Climate of Gava-Say hydro post zone**

311. A brief climatic characteristic of the region is given in the reference book on the climate of the USSR, issue 32, according to the Tamga weather station. This station is the nearest station with identical physical and geographical conditions of the study area.

- Average annual air temperature + 7,6 °C;
- Absolute minimum air temperature – 23 °C;
- absolute maximum air temperature + 32 °C;
- average maximum temperature of the hottest month + 37 °C;
- temperature of the coldest five-day security period 0,98 – 15 °C;
- temperature of the coldest day 0,98 – 17 °C;
- average temperature of the coldest period – 5,1 °C;
- average rainfall for the period:
  - November - march 46 mm;
  - April - October 230 mm;
- The normative depth of seasonal freezing of soils under the open surface of a horizontal platform bare from snow is as follows:
  - For loams and clays – 52;
  - Sandy loam, fine and dusty sands – 63;
  - - gravel sands, large and medium size – 68cm;
  - - coarse-grained soils – 77cm.

#### **4.1.1.1.7. Climate of Padysha-Ata hydro post zone**

312. A brief climatic characteristic of the area is given in accordance with SNiP KR 23-02-00 "Construction climatology" and the reference book on the climate of the USSR, issue 32 for the weather station "Padysha-Ata". This station is the nearest station with identical physical and geographical conditions of the study area. The absolute elevation of the weather station is 1550 m.

- Average annual air temperature + 7,9 °C;
- Absolute minimum air temperature - 19 °C;
- absolute maximum air temperature + 31 °C;
- average maximum temperature of the hottest month + 22,6 °C;
- temperature of the coldest five-day security period 0,98 – 10 °C;
- temperature of the coldest day 0,92 - 8 °C;
- average temperature of the coldest period – -2 °C;

- maximum penetration depth of zero isotherm 122 cm.
- snow cover density according to snow surveys 20kg/m<sup>3</sup>
- average rainfall for the period:
  - November- march 60 mm;
  - April-October 210 mm;
- The normative depth of seasonal freezing of soils under the open surface of a horizontal platform bare from snow is as follows:
  - For loams and clays – 45 cm;
  - Sandy loam, fine and dusty sands – 56 cm;
  - - gravel sands, large and medium size – 59 cm;
  - - coarse-grained soils – 68 cm.

#### **4.1.1.1.8. Climate of Torkent hydro post zone**

313. A brief climatic characteristic of the area is given in accordance with SNIIP KR 23-02-00 "Construction climatology" and the USSR reference book, issue 32, according to long-term observations at the Totkent meteorological station, the absolute elevation is 950 m:

- Average annual air temperature is + 3,8 °C;
- Absolute minimum air temperature is - 35 °C;
- absolute maximum air temperature is + 32 °C;
- average maximum temperature of the hottest month is + 37 °C;
- the temperature of the coldest five-day period with a security of 0.98 - 23 °C; 0,98 – 23 °C;
- the temperature of the coldest day with a security of 0.98 - 19 °C;
- the average temperature of the coldest period is - 9 °C;
- average amount of precipitation for the period:
  - November- March 413 mm;
  - April- October 536 mm;
- The normative depth of seasonal freezing of soils under the open surface of a horizontal platform bare from snow is as follows:
  - For loams and clays - 110 cm;
  - Sandy loam, fine and dusty sands - 133 cm;
  - - gravel sands, large and medium size - 143;
  - - coarse-grained soils - 162 cm.

#### **4.1.1.1.9. Climate of HMC hydro post zone**

314. A brief climatic characteristic of the region is given in the reference book on the climate of the USSR, issue 32, according to the meteorological station "river Kugart, village of Mikhailovka". This station is the nearest station with identical physical and geographical

conditions of the study area.

315. The average long-term monthly air temperature according to Jalal-Abad HMC. is +12.10, the minimum is -4.40 in January and the maximum is +26.30 in July. The annual temperature amplitude is 30.70, which corresponds to a sharply continental climate,

316. The average monthly maximum air temperature, the highest 26.3 ° C, is observed in the month of July, the absolute maximum is  $T_{\max} = 42.0$  ° C

#### **4.1.1.2. Air Quality**

317. Observations of air pollution in cities of the Kyrgyz Republic are carried out by the Agency for Hydrometeorology under the Ministry of Emergency Situations (KyrgyzHydromet). Monitoring of the quality of air is conducted in 5 cities of the Kyrgyz Republic, where about 64% of the urban population reside. Monitoring is carried out at 14 stationary posts/sites of Air Pollution Observation Station: Bishkek – at 7, Kara-Balta – at 2, Osh – at 1, Tokmok – at 2, Cholpon-Ata –at 2.

318. There is no air quality record in the Jalal-Abad oblast, and the surveys implemented in Jalalabad city are not representative of this study. Given that there are no stationary sources of pollution in the study area and limited road traffic, it is assumed that the air quality is good, except in close vicinity of the main roads. Phytosanitary products are probably the main cause of atmospheric pollution in the area.

##### **4.1.1.2.1. Shaidan hydro post**

319. Shaidan hydro post location calculation of emission of pollutant into the atmosphere is presented in **appendix 12.1**

##### **4.1.1.2.2. Kogart hydro post**

320. Kogart hydro post location calculation of emission of pollutant into the atmosphere is presented in **appendix 12.2**

##### **4.1.1.2.3. Chatkal hydro post**

321. Chatkal hydro post location calculation of emission of pollutant into the atmosphere is presented in **appendix 12.3**

##### **4.1.1.2.4. Gava-Say hydro post**

322. Gava-Say hydro post location calculation of emission of pollutant into the atmosphere is presented in **appendix 12.4**

##### **4.1.1.2.5. Padysha-Ata hydro post**

323. Padysha-Ata hydro post location calculation of emission of pollutant into the atmosphere is presented in **appendix 12.5**

##### **4.1.1.2.6. Torkent hydro post**

324. Torkent hydro post location calculation of emission of pollutant into the atmosphere is presented in **appendix 12.6**

##### **4.1.1.2.7. HMC hydro post**

325. HMC hydro post location calculation of emission of pollutant into the atmosphere is presented in **appendix 12.7**

#### 4.1.1.3. Topography, geology soil

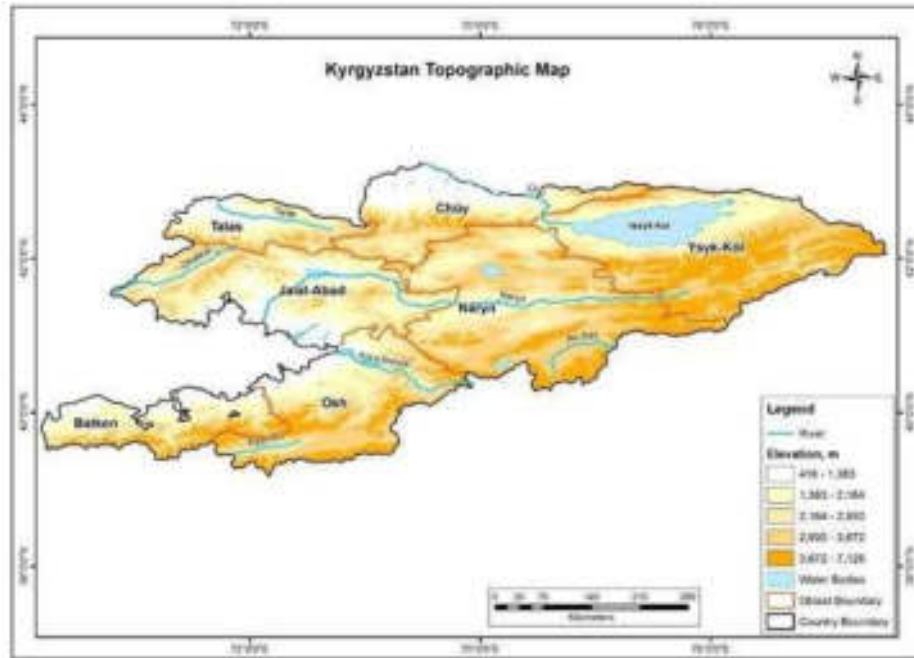
326. Kyrgyzstan is a very mountainous country. The Jalal Abad oblast lies at the foothill of the Fergana range, in the northeastern part of the Fergana valley. Its altitude varies between 830 m at the main canal water intake and 600 m at the downstream part of the irrigation system. Kyrgyzstan topographic map can be seen in **Figure 11**.

327. The composition of rocks that form the Fergana Valley is complex and diverse, it has a mosaic character in the form of various spots and stripes of rocks. The geological structure of the Fergana depression involves sediments of all ages (from Paleozoic to modern Quaternary). The most ancient Paleozoic formations appear in the highlands and high foothills; with a decrease in altitude, the change of ancient rocks to younger ones is observed. Cretaceous/chalk deposits are found in all foothills. Genesis distinguishes two types: continental formations (lower, up to 1000 m thick), consisting mainly of red-sandstone and conglomerates, and marine (upper, thickness up to 500 m), composed of limestones, marls and sandstones.

328. In addition to the various rocks that create a layered nature/feature of the geological structure of the Fergana Valley, the intrusive magmatic formations of the Carboniferous and Permian are widely distributed in the form of large massifs in the Mogoltau, Kuramin, Alai and partly Turkestan ranges. Granitoid intrusions are strongly disturbed by tectonic cracks. The effusive rocks are formed on the most part of the Kuraminskii, Chatkalskii, Alaiskii and Turkestanskii ranges and the Mogoltau Mountains. The cleavage/rock jointing in them is poorly developed (Mavlyanov, 1972). Effusive and intrusive rocks are now exposed to strong weathering and are destroyed. As a result, formations of eluvial and deluvial trails are formed. The younger sediments - Cretaceous, Paleogene and Neogene, were the main base for the formation of Loess and other fine-grained Quaternary rocks. The role of red-brown clay chalk and Neogene clay in the emergence of modern landslides, which are widely evolved on the slopes of river valleys, is especially great.

329. In intermountain spaces of the Fergana Valley, landscapes of alluvial-proluvial plains are formed, composed of loams, gravel-pebble deposits, with ephemeroïd-absinthial vegetation on typical sierozem (gray soil). Because of irrigation and reclamation and a decrease in the quality of the initial properties of soils/soil characteristic, the transformation of natural landscapes into natural- anthropogenic landscapes of irrigated agriculture has occurred.

Figure 11: Topographic map



#### 4.1.1.3.1. Topography, Geology and Soils of Shaidan hydro post zone

330. The geological and lithological structure of the study area down to the investigated depth (2.0 m) includes alluvial-proluvial deposits, represented by large-clastic and silty-argillaceous soils of modern-Upper Quaternary age (ap QIII-IV), covered from the surface by a soil-vegetative layer.

331. According to amendments No. 1 to the "Map of seismic zoning of the territory of the Kyrgyz Republic", approved by order No. 27 of the State Construction and Regional Development of April 2, 2012, SNiP KR 20-02-2009, Appendix B, taking into account the changes put into effect by order No. 27.

332. State Agency for Construction and Regional Development under the Government of the Kyrgyz Republic, the initial seismicity score of the projected construction area is 8 points.

333. Maintain-valley light-chestnut soils are common in the study area. The thickness of the soil-vegetative layer is 0.1-0.2 m. Predominantly meadow herbs and thickets of shrubs are developed here. Shrubs, trees (sea buckthorn, willows), as well as agricultural crops, are developed along the banks of the river.

#### 4.1.1.3.2. Topography, Geology and Soils of Kogart Hydro post zone

334. In geomorphological terms, the surveyed area has a complex structure, the amplitude of elevations varies from 1500 to 3200 m. Between the adyrs and the spurs of the mountains there are intramountain depressions. The middle mountains are represented by both individual mountain ranges and continuous mountain ranges. The geological structure of the region

335. The geological and lithological structure of the study area down to the investigated depth (2.0 m) includes alluvial-proluvial deposits, represented by large-clastic and silty-argillaceous

soils of modern-Upper Quaternary age (ap QIII-IV), covered from the surface by a soil-vegetative layer.

336. According to amendments No. 1 to the "Map of seismic zoning of the territory of the Kyrgyz Republic", approved by order No. 27 of the State Construction and Regional Development dated 2 April 2012, SNiP KR 20-02-2009, Annex B, taking into account the changes put into effect by order No. 27

337. State Agency for Construction and Regional Development under the Government of the Kyrgyz Republic, the initial seismicity score of the projected construction area is 8 points.

338. Mountain -valley light-chestnut soils are common in the study area. The thickness of the soil-vegetative layer is 0.1-0.2 m. Predominantly meadow herbs and thickets of shrubs are developed here.

#### **4.1.1.3.3. Topography, Geology and Soils of Chatkal**

339. In geomorphological terms, the surveyed area has a complex structure, the amplitude of elevations varies from 500 to 4500 m. Slightly sloping piedmont plains, adyrs, intramountain depressions, medium-altitude and high-mountain ridges stand out in the relief. Between the adyrs and the spurs of the mountains there are intramountain depressions. The middle mountains are represented by both individual mountain ranges and continuous mountain ranges. In the north-west, the region includes the Chandalash Range, the south-eastern slopes of the Chatkal Range.

340. The geological and lithological structure of the study area down to the investigated depth (2.0 m) includes alluvial-proluvial deposits, represented by large-clastic and silty-argillaceous soils of modern-Upper Quaternary age (ap QIII-IV), covered from the surface by a soil-vegetative layer.

341. According to amendments No. 1 to the "Map of seismic zoning of the territory of the Kyrgyz Republic", approved by order No. 27 of the State Construction and Regional Development of April 2, 2012, SNiP KR 20-02-2009, Appendix B, taking into account the changes put into effect by order No. 27

342. State Agency for Construction and Regional Development under the Government of the Kyrgyz Republic, the initial seismicity score of the projected construction area is 8 points.

343. Mountain -valley light-chestnut soils are common in the study area. The thickness of the soil-vegetative layer is 0.1-0.2 m. Predominantly meadow herbs and thickets of shrubs are developed here. Shrubs, trees (sea buckthorn, willows), as well as agricultural crops, are developed along the banks of the river.

#### **4.1.1.3.4. Topography, Geology and Soils of Gava-Say**

344. In geomorphological terms, the surveyed area has a complex structure, the amplitude of elevations varies from 1500 to 3200 m. Slightly sloping piedmont plains, adyrs, intramountain depressions, medium-altitude and high-mountain ridges stand out in the relief. Between the adyrs and the spurs of the mountains there are intramountain depressions. The middle mountains are represented by both individual mountain ranges and continuous mountain ranges. In the northwest, the area includes the Chatkal Range, the southeastern slopes of the Ken-Alay Range.

345. The geological and lithological structure of the study area up to the investigated depth (2.0 m) includes alluvial-proluvial deposits, represented by large-clastic and silty-argillaceous soils of modern-Upper Quaternary age. (ap QIII-IV), covered from the surface with a soil-vegetative layer.

346. According to amendments No. 1 to the "Map of seismic zoning of the territory of the Kyrgyz Republic", approved by order No. 27 of the State Construction and Regional Development dated

2 April 2012, SNiP KR 20-02-2009, Annex B, taking into account the changes put into effect by order No. 27

347. State Agency for Construction and Regional Development under the Government of the Kyrgyz Republic, the initial seismicity score of the projected construction area is 8 points.

348. Mountain-valley light-chestnut soils are common in the study area. The thickness of the soil-vegetative layer is 0.1-0.2 m. Predominantly meadow herbs and thickets of shrubs are developed here. Shrubs, trees (sea buckthorn, willows), as well as agricultural crops are developed along the banks of the river.

#### **4.1.1.3.5. Topography, Geology and Soils of Padysha-Ata**

349. In geomorphological terms, the surveyed area has a complex structure, the amplitude of elevations varies from 2000 to 4060 m. Between the adyrs and the spurs of the mountains there are intramountain depressions. The middle mountains are represented by both individual mountain ranges and continuous mountain ranges. The Padysha-Ata River originates from the Chatkal Range.

350. In the geological structure, the foothills of the ridge are composed of Late Ordovician deposits, dissected by say, ravines and river valleys. The coastal zone extends with alluvial cones of rivers, sometimes interrupted, giving way to foothill ridges. Within the surveyed area, they are represented by slope formations: deluvial, colluvial (scree) deposits and sediments of water flows - temporary (proluvial formations of alluvial fans) and permanent (alluvial accumulations of the Chon-Ak-Suu River). Lithologically, they are predominantly represented by pebble and rubble soils with sandy, sandy loamy, less often loamy filler.

351. According to amendments No. 1 to the "Map of seismic zoning of the territory of the Kyrgyz Republic", approved by order No. 27 of the State Construction and Regional Development dated 2 April 2012, SNiP KR 20-02-2009, Annex B, taking into account the changes put into effect by order No. 27

352. State Agency for Construction and Regional Development under the Government of the Kyrgyz Republic, the initial seismicity score of the projected construction area is 9 points.

353. In the survey area, mountain brown-chestnut, mountain-meadow-steppe subalpine soils with a thickness of 0.15-0.25 m are developed. Manual excavation group – 2(9 Б ). Manual excavation group given according to SNiP 4.02-91, Table 1-1.

354. Dark coniferous spruce forests are predominantly developed here in combination with meadows and steppes, thickets of shrubs. Shrubs and trees (sea buckthorn, willows, juniper) are developed along the river along the banks.

#### **4.1.1.3.6. Topography, Geology and Soils of Torkent**

355. In geomorphological terms, the surveyed area has a complex structure, the amplitude of elevations varies from 800 to 2600 m. Slightly sloping piedmont plains, adyrs, intramountain depressions, medium-altitude and high-mountain ridges stand out in the relief. Between the adyrs and the spurs of the mountains there are intramountain depressions. The middle mountains are represented by both individual mountain ranges and continuous mountain ranges. In the north-west, the region includes the Suusamyр Range, the south-eastern slopes of the Taktalyk Range.

356. The geological and lithological structure of the study area down to the investigated depth (2.0 m) includes alluvial-proluvial deposits, represented by large-clastic and silty-argillaceous soils of modern-Upper Quaternary age (ap QIII-IV), covered from the surface by a soil-vegetative

layer.

357. According to amendments No. 1 to the "Map of seismic zoning of the territory of the Kyrgyz Republic", approved by order No. 27 of the State Construction and Regional Development of 04/02/2012, SNIIP KR 20-02-2009, Appendix B, taking into account the changes put into effect by order No. 27 of the State Agency for Construction and Regional Development under the Government of the Kyrgyz Republic, the initial seismicity score of the projected construction area is 8 points.

358. Mountain- valley light-chestnut soils are common in the study area. The thickness of the soil-vegetative layer is 0.1-0.2 m. Predominantly meadow herbs and thickets of shrubs are developed here. Shrubs, trees (sea buckthorn, willows), as well as agricultural crops, are developed along the banks of the river.

#### **4.1.1.3.7. Topography, Geology and Soils of HMC**

359. The most ancient rocks in the surveyed area are limestones, gypsums, clays, sandstones of the Jurassic system of the upper section and the Cretaceous system of the lower and upper sections.

360. Within the surveyed area, Middle Quaternary deposits are represented. Lithologically, they are represented mainly by rocky, pebbly and rubble soils with sandy, sandy loamy, less often loamy filler.

361. According to amendments No. 1 to the "Map of seismic zoning of the territory of the Kyrgyz Republic", approved by order No. 27 of the State Construction and Regional Development dated 2 April 2012, SNIIP KR 20-02-2009, Annex B, taking into account the changes put into effect by order No. 27

362. State Agency for Construction and Regional Development under the Government of the Kyrgyz Republic, the initial seismicity score of the projected construction area is 9 points.

363. In the surveyed area, dark ordinary and mountain brown serozems are most widespread. The thickness of the soil is small 0.1-0.25m. The soil layer is rocky. Group of manual excavation - 2 (9V).

364. Predominantly meadow herbs and bushes are developed here. Shrubs, trees (sea buckthorn, willows), as well as agricultural crops, are developed along the banks of the river.

#### **4.1.1.4. Surface water**

365. Kara-Suu Lake is located about 40 km from the city of Kara-Kul, located on the Bishkek-Osh highway. Kara-Suu is a long, shaped lake and located nearby the Toktogul water reservoir close to Taktalyk at altitude of 2022 m. The lake has been formed in ancient times as a result of the collapse of a part of massif to the basin. The area of the lake is 15 square kilometers and average depth is about 90 meters. A river with the same name runs down from the lake into the Naryn river. The place where a part of massif came off and fell down is still clearly visible at the point where the river from Kara-Suu flows down. On the shores of the Kara-Suu Lake. West from the lake starting straight from the shoreline, one of the peaks of the Fergana Range – Alampas rises to an altitude of 3.754 meters. There is another small lake called Kapka Tash which is also rockfall dammed lake at the altitude of 2.303 m formed in the riverbed of Kara-Suu.

366. Naryn river rises in Tian Shan mountains in Kyrgyzstan, flowing west through the Fergana Valley into Uzbekistan. Here it merges with the Kara Darya (near Namangan) to form the Syr Darya. It is 807 km long (together with its upper course Chong-Naryn) and its basin area is 59.100 square kilometers. It has an annual flow of 13,7 cubic kilometers. The river contains many

reservoirs which are important in the generation of hydroelectricity. The largest of those is the Toktogul reservoir in Kyrgyzstan containing 19,9 cubic kilometers of water. Dams downstream of the Toktogul in Kyrgyzstan include Kurpsay, Task-Komur, Shamaldy-Say and Uch-Korgon. Upstream of Toktogul in Kyrgyzstan is the Kambar-Ata-2 and At-Bashy Dams.

367. The Kara-Unkur-Sai River basin. This transboundary river with Uzbekistan has a catchment area of 4,130 km<sup>2</sup> for a total length of 126 km. It is a tributary of the Kara-Darya River. It belongs to a group of rivers fed by glacier and snow, which is supplemented by numerous tributaries of spring-and-saz (marshy, moist) origin. Such rivers are characterized by the predominance/prevalence of low water temperatures, oxygen supersaturation, the enormous mechanical power of the flow, the mobility/plasticity of the ground of the bottom/bed, sharp fluctuations in the volume of seasonal, annual and daily runoff. The velocity of the flow/stream is usually considerable, it decreases in open valley and often the water is saturated with solid suspended sediments.

368. A small tributary of the Kara-Unkur-Sai River, the Shaidan River. The river is of snow-glacier supply. Its water head begins from the north-western range of Babash-Ata. The total length is 30 km, the total area of the basin is 131 km<sup>2</sup>, with an average elevation of 2,070 m above sea level. It has about 10 small inflows. The hydrological situation on the Shaidan River is relatively well known, but there are no observations of solid runoff, mineralization, chemical composition of waters, etc. The river belongs to the category of snow-glacial feeding, the main source of which is the thawed waters of seasonal snows and glaciers. In the annual river runoff, three main phase-homogeneous periods can be distinguished:

- Snow flood, formed mainly by meltwater seasonal snow lower and middle tiers of the mountains, the volume of high water is well correlated with the amount of precipitation in the previous autumn-winter period. The beginning of the flood is determined by the onset of stable positive air temperatures. The time limits of the snow flood are March-June. During this period, the maximum water consumption is also noted, the average monthly flow rate of the snow flood period reaches  $Q=3.81 -7.0$  m<sup>3</sup>/s and above. The rise of the flood wave is intense and takes a shorter period compared to the wave of decline of the flood.
- Snow-glacial flood, formed mainly by melt waters of high-mountain snow, snowfields and glaciers. This period falls on the hottest period of the year, falls on July-August and is much weaker than the period of snow flood, because there are no glaciers in the pool.
- Autumn-winter lowland, when the river is fed by waters accumulated by the active surface of the catchment, i.e., groundwater, flow rates vary from  $Q=0.71$  m<sup>3</sup>/s and below. This period is characterized by low flows, which gradually decrease by the beginning of the flood period, and the absence of daily fluctuations in flow. The autumn-winter low-water period lasts from September to February.

#### **4.1.1.4.1. Surface water of Shaidan**

369. The main river of the region is the Kara-Korum River. The type of river feeding is snow-rain. The Shaidan-Sai River originates from the northern slopes of the Babash-Ata ridge, forms from small tributaries, flows from north to south and becomes the main left tributary of the Kara-Unkur River.

370. The water in the Shaidan-Sai River is fresh, hydrocarbonate-magnesium-sodium in composition, slightly aggressive in terms of pH value of pH to W4 grade concrete in terms of water resistance.

#### **4.1.1.4.2. Surface water of Chatkal hydro post**

371. The main rivers of the region are the Chandalash River, the Chanach River, the Taldy-Bulak River, the mouth of the Ters River, which flow into the Chatkal River. The type of river feeding is snow-rain. The Chatkal River originates from the northern slopes of the Chandalash Range, is formed from large and small tributaries, flows from west to east and flows into the Charvan reservoir of the Uzbek Republic.

372. The water in the Chatkal River at the mouth of the Ters River is fresh, hydrocarbonate-magnesium-sodium in composition, slightly aggressive in terms of pH pH to W4 grade concrete in terms of water resistance.

373. The river basin area Chatkal is 4290 km<sup>2</sup>. Vegetation forests, woodlands and shrubs. Lithological rock complexes are carbonate and hydrochemical origin of the Paleozoic age, the type of water impermeability is fissured-karst. In the valleys of the southeastern slopes of the Chatkal Range in the middle zone, the height of snow cover in some years is 105–110 cm, and more often 80–90 cm. day. In a mountainous region, the wind regime is formed mainly under the influence of the general circulation of the atmosphere in interaction with air currents inside a mountainous country, where local winds are predominant.

374. The Chatkal River, fed by snow and rain, drains the lowest zones of the mountains; the weighted average height of the watersheds is about 2000 m and below. High water on the river begins in February or early March, ends mostly in June-July and less often in May. The largest annual expenses are in April, May and even March. The total duration of the flood is about 100-140 days, i.e., much shorter than on other types of rivers. During the flood, 60-80% of the annual runoff flows down. The high water passes in the form of a single wave, against which very high short-term peaks are often noted. The increase in water consumption is due to rains and thaws, the increased costs are kept until the main flood. The river passes into a low water state in June-July, while sometimes the low water continues until the beginning of the next year's flood without significant fluctuations in flow.

375. The Gava-Sai River of snow and rain nutrition is this river, which drains the lowest zones of the mountains; average height of watersheds is about 2000 m and below. The high water on the river begins in February or early March, ends mostly in June-July and less often in May. The largest annual expenses are in April, May and even March. The total duration of the flood is about 100-140 days, i.e., much shorter than on other types of rivers. During the flood, 60-80% of the annual runoff flows. The flood passes in the form of a single wave, against which very high short-term peaks are often noted. The increase in water consumption is due to rains and thaws, increased costs are kept until the main flood. The river goes into a low water state in June-July, while sometimes the low water continues until the beginning of the next year's flood without significant fluctuations in flow.

#### **4.1.1.4.3. Surface water of Gava-Say hydro post**

376. The main rivers of the region are the rivers Teres, Kok-Terek and Kasan-Sai. The type of river feeding is snow-rain. The Gava-Sai River originates from the northern slopes of the Chatkal Range, is formed from small tributaries, flows from north to south and becomes the main left tributary of the Syr-Darya River of the Uzbek Republic.

377. The water in the Gava-Sai River is fresh, hydrocarbonate-magnesium-sodium in composition, slightly aggressive in terms of pH pH to W4 grade concrete in terms of water resistance.

378. River basin area Gava-Sai-mouth of the river Ters is 361 km<sup>2</sup>. Forest vegetation, woodlands

and shrubs. Lithological rock complexes of carbonate and hydrochemical origin of Paleozoic age, fissure-karst type of water impermeability. In the valleys of the southeastern slopes of the Chatkal Range in the middle zone, the height of snow cover in some years is 105-110 cm, and more often 80-90 cm. On the slopes of the Chatkal Range, the duration of snowmelt varies mainly from 15 to 30 days, the intensity is 4-9 mm per day. In the mountainous region, the wind regime is formed mainly under the influence of the general circulation of the atmosphere in interaction with air currents inside the mountainous country, where local winds are predominant.

#### **4.1.1.4.4. Surface water of Padysha hydro post**

379. The Padysha-Ata River originates in the high-mountainous part of the Chatkal ridge, its western slopes and eastern slopes of the ridge, has numerous lateral tributaries, the Chym-Bulak River, the Karagay-Bulak River. The river is fed by the melting of glaciers and snow and atmospheric precipitation.

380. The water in the Padysha-Ata River is fresh, hydrocarbonate-magnesium-sodium in composition, slightly aggressive in terms of pH pH to W4 grade concrete in terms of water resistance.

381. Padysha-Ata River basin area at the estuary of the Tostu River is 366 km<sup>2</sup>. Vegetation forests, woodlands and shrubs. Lithological rock complexes of carbonate and hydrochemical origin of Paleozoic age, fissure-karst type of impermeability. In the valleys of the southeastern slopes of the Chatkal Range in the middle zone, the height of snow cover in some years is 105-110 cm, and more often 80-90 cm. On the slopes of the Chatkal Range, the duration of snowmelt varies mainly from 15 to 30 days, the intensity is 4-9 mm per day. In a mountainous region, the wind regime is formed mainly under the influence of the general circulation of the atmosphere in interaction with air currents inside a mountainous country, where local winds are predominant.

382. The Padysha-Ata River of glacier-snow-rain supply is the river that drains the lowest zones of the mountains; the weighted average height of the watersheds is about 2500 m and below. The high water on the river begins in February or early March, ends mostly in June-July and less often in May. The largest annual expenses are in April, May and even March. The total duration of the flood is about 80-115 days, i.e., much shorter than on other types of rivers. During the flood, 50-70% of the annual runoff flows down. The high water passes in the form of a single wave, against which very high short-term peaks are often noted. The increase in water consumption is due to rains and thaws, the increased costs are kept until the main flood. The river goes into a low water state in June-July, while sometimes the low water continues until the beginning of the next year's flood without significant fluctuations in flow.

#### **4.1.1.4.5. Surface water of Torkent hydro post**

383. The main rivers of the region are the river. Bala-Chichkan, r. Torkent, r. Tuzduu-Suu. The type of river feeding is snow-rain. The Torkent River originates from the southern slopes of the Suusamyр Range, is formed from small tributaries, flows from west to east and becomes the main right tributary of the river Naryn of the Toktogul reservoir.

384. The water in the Torkent River is fresh, hydrocarbonate-magnesium-sodium in composition, slightly aggressive in terms of pH PH to W4 grade concrete in terms of water resistance.

385. River basin area Torkent is 664 km<sup>2</sup>. Vegetation forests, woodlands and shrubs. Lithological rock complexes of carbonate and hydrochemical origin of Paleozoic age, fissure-karst type of water impermeability. In the valleys of the southeastern slopes of the Suusamyр Range in the middle zone, the height of snow cover in some years is 105-110 cm, and more often 30-50 cm. On the slopes of the Suusamyр Range, the duration of snowmelt varies mainly from 20 to 40 days,

the intensity is 4-9 mm per day. In a mountainous region, the wind regime is formed mainly under the influence of the general circulation of the atmosphere in interaction with air currents inside a mountainous country, where local winds are predominant.

386. The Torkent River is fed by snow and rain, this river drains the lowest zones of the mountains; the weighted average height of the watersheds is about 2500 m and below. The high water on the river begins in February or early March, ends mostly in June-July and less often in May. The largest annual expenses are in April, May and even March. The total duration of the flood is about 100-140 days, i.e., much shorter than on other types of rivers. During the flood, 60-80% of the annual runoff flows down. The high water passes in the form of a single wave, against which very high short-term peaks are often noted. The increase in water consumption is due to rains and thaws, the increased costs are kept until the main flood. The river passes into a low water state in June-July, while sometimes low water continues until the beginning of the next year's flood without significant fluctuations in flow.

#### **4.1.1.5. Groundwater**

387. Groundwater plays an important role in the formation of physical and geographical processes within the valley. Groundwater and surface water draining/flowing from mountain ridges, atmospheric precipitation, condensation water of the air, water from deep horizons/levels of the ground, infiltration waters from fields and canals serve as sources of groundwater feeding/nourishment. The short rivers of the Turkestan and Alai ranges, which do not carry their waters to the Syr-Darya, replenish the reserves of groundwater. The ground flow from the mountains to the Fergana Valley is estimated at about 3 cubic km / year (Kritsky, Menckel, 1961).

388. Groundwater is the main factor of salt accumulation in soils and undersoil of low-drainage and drainless depressions. The spread of salinization processes in territories classified as second type, where water scarcity is not observed, can occur because of the following factors:

- Low efficiency of collector-drainage systems: the lack of significant investments in maintaining the existing collector-drainage network and the associated ineffective draining lead to activation of salinity, especially in irrigated landscapes of cones of alluvial fan and ancient alluvial plains in areas of difficult outflow of groundwater.
- Excessive water consumption in the fields during its ineffective redistribution: the violation of irrigation and irrigation norms, the values of which exceed the actual needs of the territory in irrigation, leads to an increase in the level of groundwater not drained from the fields, which causes under-flooding and activates the processes of salinization.

#### **4.1.2. Biological environment**

##### **4.1.2.1. Flora**

389. Due to regional differences in climatic, geomorphological and hydrological conditions within the Fergana Valley, peculiar high altitudinal zonation of types of plant formations is found. The central part of the Fergana Valley is occupied by desert vegetation (psammophytic-shrub, halophytic, tugai, meadow-bog). On the slopes of the mountains, the desert type is replaced by a mountain semi- desert, which is changed to dry grassland/forb steppes. Approximately at an altitude of 1800-2000 m, tree-shrub vegetation is formed. Subalpine meadows and alpine heaths/wastelands follow (Arikhvanova, 1967).

390. In the different ridges surrounding the Fergana Valley, due to the heterogeneity of their geological history, climatic conditions and soils, significant differences are being observed. In the Kuraminskii ridge, xerophytic, semi-shrub and steppe-type vegetation are widespread. The

foothills of the Fergana Range are very different from the foothills of the Kuraminskii and Chatkalskii ranges; the Maylissai, Uzgen and Jalalabad adyrs (related to central Asian relief/terrain) are characterized by the lush development of ephemeral and wormwood vegetation with an admixture of cherry on stone ledges and rare pistachio bushes (Arikhvanova, 1967). The Fergana Range is characterized by a wide spread of adyrs in the upper belt of steppe associations, the basis of which is a bulbous barley. At an altitude of 1200-2500 m, meadows consisting of tall grasses/forbs and broad-leaved (walnut- fruit) forests are formed. Above, the subalpine geranium and onion meadows predominate.

391. Tugai forests on the plain/even land of the plain and the mountain forests of the Alai and Turkestan ranges are almost completely destroyed. The local population uses wood as a fuel, as well as for construction. Intensive deforestation leads to land degradation and increased aridity of the climate.

392. In the floodplains of rivers, in the conditions of high summer temperatures, great dryness of air and abundant ground moistening a tugai-type vegetation is formed. The main components of tugai are constant for all river valleys of Central Asia. They have a long vegetation cycle, do not have a summer dormancy/rest and are characterized by peculiar signs of adaptation to temporary flooding and clogging of the soil surface (Arikhvanova, 1967). Tugai types of vegetation are very volatile and changeable. This depends on the frequent changes in the riverbed and the deposition of new debris; on change of level, and with it on the depth of groundwater occurrence; and on human impact expressed in water discharges to unutilized areas. These debris are gradually overgrown with pioneer phytocenosis from cereals of various species (reed, foxtail/alopecurus, cattail, sugar cane). Simultaneously with the above-mentioned cereals, black poplar, willow, dzhida/oleaster/jujube and yulgun settle. If this area is constantly flooded during high floods, then develops a forest stand, consisting of turanga (Asiatic poplar), oleaster and willow. In general, wood tugai (riparian forest) are mixed, sometimes there are also pure thickets consisting of dzhida/oleaster/jujube, willow or turanga (Asiatic poplar). Usually, the latter occupies small areas, being located by narrow strips along the riverbanks.

393. If the deposit is flooded during small flood, and the water stagnates for a long time, then common meadow-marsh vegetation (reeds) develops in these areas, in this case the tree/woody species do not settle.

#### **4.1.2.2. Fauna**

394. Terrestrial fauna is relatively scarce. The eared hedgehog, central Asian tortoise, lizards, rodents are common. The wolf, fox, wild boar, badger, or porcupine are rare. Among the birds are eagles, hawks, rose-colored starling, hoopoes, larks, nightingales, orioles, turtledoves, bee-eaters, in the floodplain of the river - various species of ducks, pheasant, on the slopes of mountains - mountain partridges. From invertebrates there are scorpions, phalanges, tarantulas, karakurt spiders (black widow spiders).

395. Most of the listed species refer to the so-called common species, which are adapted to anthropogenic zone, and have stable populations. High density of population, intensive farming and poaching do not leave any integral habitats and chances for reproduction of animals, existing populations are strongly oppressed and in need of protection.

396. Of the animals of economic importance, there are species related to hunting game - stone partridge, Syr-Darya pheasant, wild ducks (primarily mallards).

### **4.1.3. Human environment**

#### **4.1.3.1. Population**

397. According to the census of the population (2009), the Kyrgyz people make up 81,192 people out of 117,055 residents of the Nookan district (or 69.4%), Uzbeks - 32 702 people or 27.9%, Uyghurs - 1181 people or 1.0%, Tajiks - 456 people or 0.4 %, Russians - 375 people or 0.3%, Tatars - 313 people or 0.3%, Turks - 309 people or 0.3%.

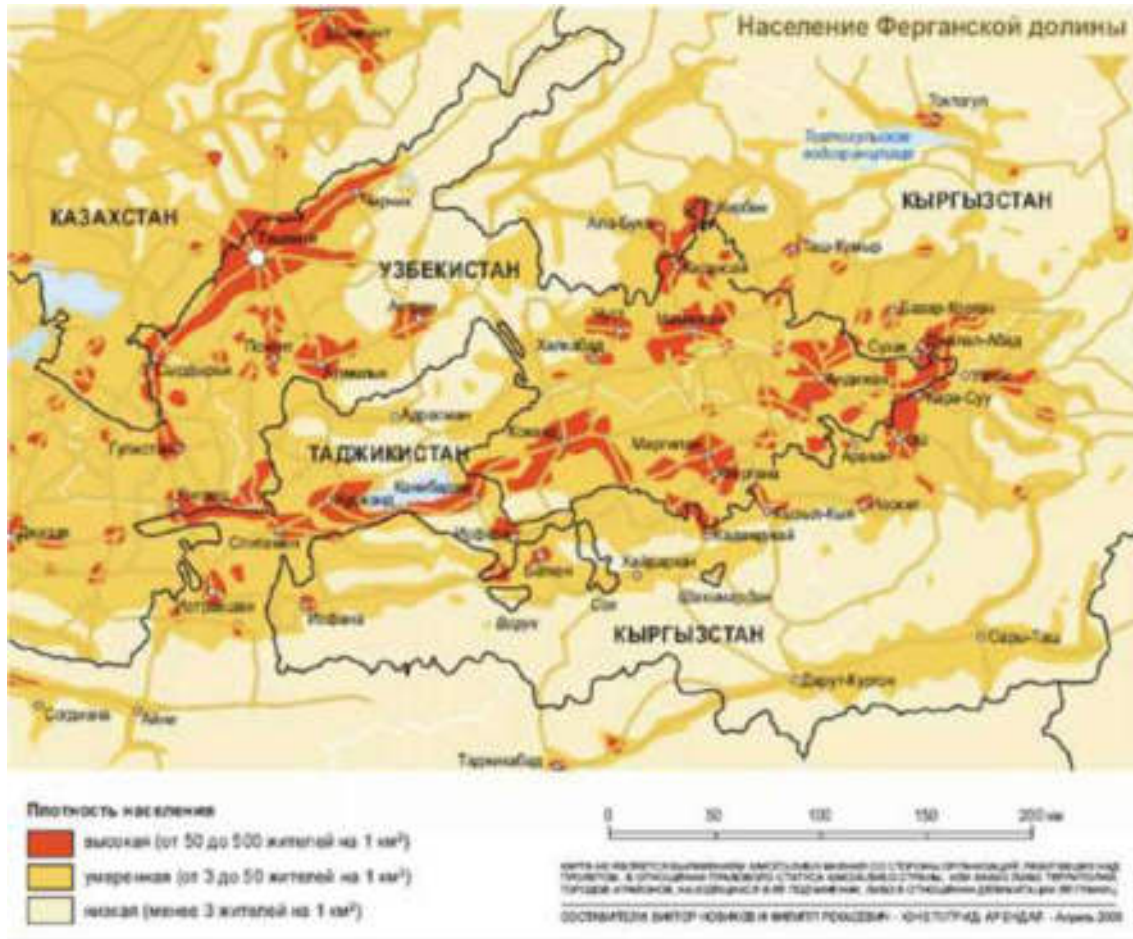
398. Because of the high population density, the Fergana Valley is raising critical questions about lack of resources, primarily land and water resources. The demographic issue is one of the main reasons for the instability in Fergana. A large population when combined with a shortage of jobs and a lack of economic prospects leads to migration of people from disadvantaged areas (often arid, mountainous or irrigated areas with a high population density) to large urban centers and less populated rural areas. Migrants from the villages flock to Osh and Jalal-Abad (the largest industrial centers) and the surrounding areas. Overcrowding leads to a reduction in the area of fertile agricultural land per capita and further depletion of mountain areas, which directly affects the standard of living.

399. Jalal Abad region is located in the south-west of the republic, in the south and south-west it borders with the Republic of Uzbekistan, in the north with the Talas Region, in the east with the Naryn Region, in the southeast with the Osh Region.

400. Total area of the region is 33,7 km<sup>2</sup>. The regional center is the Jalal-Abad City. According to the data obtained at the end of 2021, population is 1.260.617, with 21,6% urban and 78,4% rural inhabitants.

401. Administrative territorial structure composed of 8 cities, 8 districts and 68 aiyl aimaks (AA). The territory is divided into 8 administrative territorial districts which are respectively Aksy, Ala-Bukinsky, Bazar-Korgon, Nookan, Suzak, Toguz-Toro, Toktogul, Chatkal.

Figure 12: Distribution of the population of the Fergana Valley (Denisov, 2005)



402. The sociological profile of the beneficiaries of a few Aiyl Okmotu in Jalal-Abad Oblast is shown in the **Table 12** below.

Table 12: Baseline information on the beneficiaries in Jalal Abad

Indicator	January June 2020	January June 2021	in percent to the relevant period	Deviation (+;-) percentage points
Average monthly salary (one employee, KG SOM)	17.580	18.609	105	+5
The ratio of the average monthly wage and the subsistence	%300	%200	-	-

level of the able-bodied population, %				
Official unemployment rate, %	<b>11</b>	<b>No data</b>	-	<a href="http://www.stat.kg/ru/opendata/category/113/">http://www.stat.kg/ru/opendata/category/113/</a>
Poverty level, %	<b>37,2</b>	<b>43,2</b>	-	<a href="http://www.stat.kg/ru/opendata/category/120/">http://www.stat.kg/ru/opendata/category/120/</a>
Proportion of the population with access to safe sources drinking water, %	<b>88,7</b>	<b>87,0</b>	-	<a href="http://www.stat.kg/ru/opendata/category/124/">http://www.stat.kg/ru/opendata/category/124/</a>
Infant mortality (per 1000 births alive)	<b>12,1</b>	<b>No data</b>	-	<a href="http://stat.kg/ru/opendata/category/143/">http://stat.kg/ru/opendata/category/143/</a>
Maternal mortality (number of women who died from complications of pregnancy, childbirth and the postpartum period) per 100 thousand live births	<b>53,2</b>	<b>No data</b>	-	<a href="http://www.stat.kg/ru/opendata/category/142/">http://www.stat.kg/ru/opendata/category/142/</a>
Number of Family Medicine Centers	<b>113</b>	<b>113</b>	-	<a href="http://www.stat.kg/ru/dzhalal-abadskaya-oblast/">http://www.stat.kg/ru/dzhalal-abadskaya-oblast/</a>
Number of medical and obstetric points	<b>211</b>	<b>211</b>	-	<a href="http://www.stat.kg/ru/dzhalal-abadskaya-oblast/">http://www.stat.kg/ru/dzhalal-abadskaya-oblast/</a>
Number of schools	<b>474</b>	<b>476</b>	<b>100,4</b>	<a href="http://www.stat.kg/ru/dzhalal-abadskaya-oblast/">http://www.stat.kg/ru/dzhalal-abadskaya-oblast/</a>

#### 4.1.3.2. Economy and employment

403. The economically active population of Jalal-Abad Region in 2009 was 440,804, of which 401,328 employed and 39,476 (9.0%) unemployed.

404. Wheat, fruit, vegetables, maize, nuts, tobacco, and silkworm cocoons are grown in the region. The region also has a few textile plants and hydroelectric stations. Minerals, natural gas, coal, metals, and oil can be found here, notably around the town of Kochkor-Ata, which is home to small scale oil industry. Most of the extraction of minerals, natural gas, coal, metals, and oil of the Soviet era has ceased.

405. A pearl of the region is the Sary-Chelek Biosphere Reserve with Lake Sary-Chelek, surrounded by wild fruit orchards and snow-covered peaks.

406. A few Soviet-era resorts offer mineral water treatment programs for people with various chronic diseases. A number of companies have succeeded in trading bottled mineral water around the country and abroad.

407. Except for the small fringes of the Fergana Valley, Jalal-Abad Region is a land of mountains. There are unlimited trekking possibilities in the area, but the lack of infrastructure, except at Arslanbob, poses problems to visitors; a biodiversity conservation program supported by the government and the Global Environment Facility (GEF) is working to protect these natural resources and promote soft tourism.

408. Economical displays are presented in **Table 13**

*Table 13: Economical Displays*

Gross regional product (GRP), million KG SOM	66 971,7	71 943,1	103,1	-
GRP per capita (in current prices), thous. KG SOM	59,2	62,3	3,1	-
The volume of industrial production, mln. KG SOM	13 890,8	16 263,4	982	-
Gross output of agriculture, forestry and fisheries, mln. KG SOM	12 377,8	14 407,0	102,72	-
The volume of gross output of construction, mln. KG SOM	4 483,2	5 062,6	112,0	38,8
Volume of market services, mln. KG SOM	18 626,8	23 164,1	107,7	-
Investments in fixed capital, mln. KG SOM	4 976,8	6 772,1	134,9	54,4
The volume of foreign trade turnover, mln. US dollars	124663,5	120050,95	96,3	
Export	95197,2	49049,4	51,5	
Import	29466,4	70953,6	240,8	

#### **4.1.3.3. Historical, archeological and cultural areas**

409. The Jalal-Abad Oblast is located on one of the historical Silk Roads, showing the Cultural Landscape of Safed-Bulan. This site is located on the northeastern end of Safed-Bulan village (Ak- Korgon administration of Ala-Buka district of Jalal-Abad oblast), on the border with the Namangan area of Uzbekistan, at the foot of Archa-Mazar Mountain. It is connected with the branch of the Silk Road serving the northeast of Fergana in antiquity and the Middle Ages. It includes sacral complex consisting of constructions of various chronological periods standing on a medieval Mazar site, natural sacral components and rich intangible heritage in the form of legends, rituals and practice of sacrifices. In the Jalal-Abad oblast there are 2 specified in section 4.1.4. below

#### **4.1.3.4. Power sources and transmission**

410. Jalal-Abad oblast is the region most provided with fuel and energy resources; coal, oil, gas deposits and the main hydro potential of the water resources are concentrated here. Despite this, an additional 84 settlements and 78 thousand households are planned to be gasified in the oblast in all areas starting from Jalal-Abad city and to the remote 37 villages of Aksy and Toktogul regions. For this purpose, 266 km of the gas distribution grids with the additional supply of 56.9 million cubic meters of the gas will be additionally built. In this case, it will be possible to substitute 102 thousand tons of coal.

411. In Jalal-Abad oblast, according to the results of river channel surveys, the possibility to build minor HPPs with the total capacity of 33.5 MW and SPPs with the total capacity of 25 MW has been revealed. Construction of the biogas plants in the settlements remote from the centralized power supply is also relevant here. It shall be particularly noted that in order to ensure the agriculture development in the Toktogul region, there is the possibility and the necessity to build minor HPPs with the total capacity of 40-50 MW generating 200 million kWh for irrigation of 8,000 hectares of Uch-Terek ayl okmotu lands while constructing a take-out channel through the Kargysh pass to transfer the Kara-Suu River to the Sary-Jaiyk site according to the research results of the Research Institute for Energy and Economy under the State Committee of Industry, Energy and Subsoil Use of the Kyrgyz Republic. It is also possible to build mini TPPs with the capacity of 50 MW and to produce coal briquettes based on and in the vicinity of Tegene and Tash-Komur deposits to improve the reliability of the power supply to the population of the Aksy district in Tash- Komur City.

412. In order to implement the Small Hydropower Development Concept of the Kyrgyz Republic until 2017 /19/ approved by Resolution No. 507 of the Kyrgyz Government as of July 20, 2015, 63 channels of small rivers were examined, and priority minor hydropower plants were proposed for construction. The assessment of the small rivers' potential revealed the possibility to build HPPs with the total capacity of 333 MW and the production of 1.7 billion kWh; out of them for the period of 2017-2030 it is technically possible to build 42 minor HPPs with the installed capacity of 157 MW and a gradual increase in production to 774 million kWh, including: in Chui oblast - 71.8 MW, in Issyk-Kul oblast - 7 MW, in Talas oblast – 1.6 MW, in Osh oblast - 6.2 MW, in Naryn oblast - 7.38 MW, in Jalal-Abad oblast - 33.5 MW, in Batken oblast - 13 MW. However, USD 314 million will be required with a relative capital investment of USD 2,000 per 1 MW of the capacity.

413. In Jalal-Abad oblast, the fuel supply is planned due to an increase in the coal production at the existing Tash-Komur and Tegene mines from 140 thousand tons to 180 thousand tons by 2030.

#### 4.1.4. Protected areas

414. There are two protected areas in the Jalal-Abad oblast whose list can be seen in the **Table 14** below.

*Table 14: Jalal-Abad oblast protected areas*

Name	Act and date of establishment	Location	The objective and focus of core activity	Area, ha
Dashmanskii	Resolution of the Government of the Kyrgyz Republic of 12 July 2012	Jalal-Abad oblast, rayon (district) Bazar-Korgon	Conservation of biodiversity and unique relict/old-growth forests	7958,1
Padyshatinskii	Resolution of the Government of the KR of 03 July 2003 No. 405	Jalal-Abad oblast, rayon (district) Aksy	Preservation of the population of Semenov fir and archa (juniper) forest of the Western Tien Shan	30560

Source: Ministry of Natural Resources, Ecology and Technical Supervision

## 5. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

415. As the hydro post and early warning system subproject mainly deals with the rehabilitation and renewing of existing hydro posts, most of the impacts will be limited to the construction period. They will be therefore mainly temporary (a-few months on each site) and will be mitigated through prescriptions to be included within the Contractor's technical specifications.

416. The impacts and mitigation measures are generally presented, for all sites to include hydro –post rehabilitation works that are subject to construction works. For each site, the impacts and mitigation measures are differentiated depending on the subproject component nature and implementation stage:

- **Pre-Construction impacts:** Arising in the pre-construction phase typically involve land acquisition and resettlement of people displaced as a result of arising in the pre-construction phase typically involve land acquisition and resettlement of people displaced as a result of infrastructure siting decisions. Although conventional land acquisition or resettlement will not be required for this project as the hydro posts are to be located on the same sites and to be re-constructed. Other components to be installed outside the boundaries of the existing hydro post building areas, will be installed either on governmental lands or in existing public rights-of-way. The pre-construction section of the EMP also includes several line items for impacts for which mitigation measures are prescribed. These are impacts likely to arise during the construction and operation phases, but for which pre-emptive mitigation action is appropriate in the pre-construction phase, especially during detailed design work. Similarly, mitigation of most construction

period impacts appropriately begins with incorporation of preventive measures into the Contractor Site Specific Environmental, Health and Safety Management Plan (SSEHSMP) during construction planning infrastructure siting decisions.

- **Construction impacts:** Phase impacts are related to the effects of specific construction practices on elements of the biophysical environment and on people. Some of these can be severe and long-term, e.g., soil erosion, surface water contamination, and worker exposure to dust, if preventive action is not taken. Most construction impacts, such as noise, disruption of community life, and dust and emissions, are temporary, and can generally be addressed through relatively simple interventions like good maintenance and being a responsible contractor. All construction period impacts identified in the EMP are generally minimized through implementation of mitigation measures prescribed in the EMP as (good site practices), and none are likely to be permanent or long-term, provided they are addressed as identified.
- **Operational impacts:** the structure operation may induce new or increased impacts. These impacts are direct or indirect and may change depending on the operational processes. With potential to be experienced in the operating phase of the Project are varied and include health and safety impact for people living around the hydro post locations and early warning systems problem that will directly affect the people's health working in that area or security of structures. Mitigation of such impacts will often require an experimental or adaptive management approach. Many operating period impacts can be effectively prevented or minimized through mitigation actions implemented during the pre-construction phase, especially during detailed design.

417. Then, information on the expected benefits of the hydro-post and early warning system management in the framework of the subproject is provided. The cumulative impacts resulting from the implementation of all the subproject components, either positive or negative, are discussed in the Environmental Management Plan section. If all the mitigation measures mentioned below are actually enforced, the residual negative impacts of the project will be very low, and quite environmentally and socially acceptable.

418. If the subproject design changes as part of the detailed design in a way that the assessment would be affected, then the assessment should be updated.

419. The evaluation criteria for hydro-posts and early warning system sub-project have been in the **Table 15**. Environmental impacts and mitigation measures caused by the construction activities carried out at these zones have been briefly discussed for the pre-construction, construction, post-construction and operation period.

420. Anticipated environmental impacts and proposed mitigation measure of Jalal-Abad Group hydro posts is presented in **Table 16**.

Table 15: Impact screening criteria

<b>Significance of Impact</b>	<b>Screening Criteria</b>
<b>High</b>	The resource/receptor would likely experience a large magnitude impact that would endure for a long time, extend over a large area, exceed national/international standards, endangers public health and safety, threatens a species or habitat of national or international significance, and/or exceeds a community's resilience and ability to adapt to change. The Project may have difficulty in complying with the applicable ADB's SPS (2009) requirement, and significant mitigation would likely be required.
<b>Substantial</b>	The resource/receptor would experience a clearly evident change from baseline conditions and would approach but not exceed applicable standards. The Project would comply with the applicable ADB's SPS (2009) requirement, but mitigation would be required.
<b>Moderate</b>	The resource/receptor would experience a noticeable effect, but the magnitude of the impact is sufficiently small (with or without mitigation) that the overall effect would remain well within applicable standards. The Project would comply with the applicable ADB's SPS (2009) requirement, but mitigation may be required.
<b>Low</b>	The resource/receptor will either not be affected, or the likely effect would be imperceptible or indistinguishable from natural background variation. The Project would comply with the applicable ADB's SPS (2009) requirement and mitigation would typically not be required.

### 5.1. Table 16: Anticipated impacts and proposed measures of Jalal-Abad hydro posts

Table 16: Anticipated impacts and proposed mitigation measures of Jalal-Abad hydro-posts

Definition of risks and impacts	Significance of impacts	Rationale	Proposed mitigation measures	Significance of residual risk/impact
<b>Pre-construction period</b>				
Location of construction material handling sites, construction camp sites, erosion and loss of vegetation	Moderate	Location of the borrowing sites, concrete batch plants, construction camps and other construction facilities might create problem on physical/biological environment or to social community.	<ul style="list-style-type: none"> <li>To obtain permission for location of concrete batch plants, construction camps and other construction facilities prior to commencement of construction works.</li> <li>To remove and store topsoil prior to establishment of any facility, camp area.</li> <li>Preparation of erosion control plan with bioengineering and reinforcement structures</li> </ul>	Low
Construction permits	Moderate	No permits gotten from the relevant authorities might lead to considerable loss of resources and loss of time at the project implementation.	<ul style="list-style-type: none"> <li>To obtain approval/permit from relevant governmental agencies for design, environmental impacts assessments (EIA/OVOS), and construction permit prior to commencement of construction works.</li> </ul>	Low
Implementation of Environmental Management Plan (EMP)	High	If EMP plan prepared in the scope of IEE has not been integrated and adopted physical, biological and social environment will be adversely affected.	<ul style="list-style-type: none"> <li>To include IEE, EMP requirements into the bidding documents</li> <li>Preparation and approval of Site Specific Environmental, Health and Safety Management Plan (SSEHSMP) by the construction contractor prior to the commencement of construction works</li> <li>Strict observation on the construction contractor by PIU and PIC</li> </ul>	Moderate
Public awareness and capacity building	High	If construction works at the site starts without informing public some social problems might be faced. Adaptation of PIO and Environment, Health	<ul style="list-style-type: none"> <li>To aware the public living around the project construction site prior to the construction by means of community leaders, pamphlets, web</li> </ul>	Low

		and Safety supervisor, working staff, local stakeholders to preparation and implementation of SEMP will increase the efficiency of environmental measures considered.	<ul style="list-style-type: none"> <li>• casting, etc.</li> <li>• To train and increase the capacity of GRG members and LFP will be performed by PIC prior to the commencement of construction works.</li> <li>• To train and increase the capacity of MOES Units and Environment, Health and Safety supervisors of the construction contractors prior to the preparation of SSEHSMP</li> <li>• To train the construction contractors staff on general site adaptation, on environmental and social mitigation measures, health and safety issues</li> </ul>	
Definition of utilities at site	Substantial	During the construction some of the public and community utilities might be damaged due to construction activities, need to be repaired, rehabilitated, or reconstructed.	<ul style="list-style-type: none"> <li>• To make pre-works photo documentation for all construction sites, camping area, construction facility locations prior to the commencement of construction works</li> </ul>	Low

Definition of risks and impacts	Significance of impacts	Rationale	Proposed mitigation measures	Significance of residual risk/impact
<b>Construction period</b>				
Water pollution caused by domestic effluents generated in camps site and construction sites.	Moderate	Minor impacts have been expected due to the low discharge amount of domestic effluent	<ul style="list-style-type: none"> <li>• Package waste water treatment plant to be installed (WWTP)</li> <li>• If WWTP cannot be installed, a septic tank to be put to store wastewater generated in camp site and construction sites and transferred by the licensed firms to the safe disposal or treatment site.</li> <li>• Mobile toilets to be put for workers in</li> </ul>	Low

			<p>construction sites</p> <ul style="list-style-type: none"> <li>• To develop a water quality management plan</li> <li>• To increase awareness of local communities and construction workers</li> </ul>	
<p>Air pollution to be resulted from exhaust gases and dusts during the construction, transport and storage of construction materials</p>	<p>Moderate</p>	<p>Approximately a few houses are located within direct impact zone. The ambient air quality in the vicinity of the construction site will not be disturbed by</p>	<ul style="list-style-type: none"> <li>• The construction contractor shall take all necessary precautions to prevent the occurrence of exhaust and dust emissions from the site including the concrete batch plant, silos. In particular, the concrete batch plant and silo shall be well maintained, and measures taken so as not to be left running unnecessarily for long periods when not directly in use. The construction contractor shall not burn any waste or construction materials at the site.</li> <li>• To reduce dusting, a dust suppression system is provided that is moistening materials to optimal humidity, and in connection with the application of these measures aimed at reducing emissions into the atmosphere, the effect on atmospheric air can be estimated as minimal to average. The construction, spoil and excavation material shall be transported into or from the site by trucks covered with tarpaulin.</li> <li>• Dust suppression by water tankers with sprinkling systems are to be deployed along regularly trafficked routes and dusty-unpaved roads and populated areas</li> <li>• To achieve improvements in fuel efficiency and realize the associated reductions in Green House Gas emissions, contractor is expected to make changes ranging from reducing equipment idling time and improving</li> </ul>	<p>Low</p>

			maintenance to replacing or repowering equipment.	
Noise and vibration affect caused by trucks and construction machinery.	Low	Approximately a few houses are located within direct impact zone. Construction works will require transportation in the zones that are generally away from settlement areas. This will not significantly increase the traffic noise and vibration in the urban areas used by the trucks.	<ul style="list-style-type: none"> <li>Contractor shall consider noise as an environmental constraint, which must be addressed in the planning and execution of the works. He shall take all reasonable measures to reduce noise to a minimum. The construction works will be limited to daytime (07 am to 19 pm) and will be prohibited at the weekends. The Contractor shall take all necessary measures to ensure that the operation of all mechanical equipment and construction processes, on or off site, shall not cause any unnecessary and excessive noise which may disturb any occupant of nearby dwellings, schools, hospitals, or premises with similar sensitivity to noise. The contractor will monitor the noise and vibration level regularly at the construction site.</li> </ul>	Low
Solid wastes generated during the construction activities	Low	Solid wastes of the construction activity are mainly domestic wastes. As the excavated materials are harmless for the environment it may be disposed of relevant municipalities dumping area.	<ul style="list-style-type: none"> <li>Re-use alternatives for spoils, sediments generated by excavations will be searched by the contractor, the remaining ones will be safely disposed of in the nearby dumping area of relevant municipality. The deposits will be levelled so that it will not form hills and/or depressions. The necessary measures related to flooding and drainage will be taken by the contractor.</li> <li>The process of classifying waste types, stockpiling of waste at site, transportation and disposal of waste shall be subject to the approval/review of the WRS. The domestic solid waste will be sorted and deposited in camp site, disposed by the licensed firms and</li> </ul>	Low

			record will be kept. Disposal of fly-tipping shall not be permitted. Deposition shall be carried out in accordance with the requirements of Local Authorities. To prove the correct depositing of excavated material and to prevent the occurrence of fly-tipping, daily logs of all spoil and domestic solid waste removed from site by lorry shall be kept and kept available both on site and at the authorized tips deposition for inspection by the relevant authorities.	
Hazardous wastes generated during construction activities including Asbestos Containing Materials (ACM)	Substantial	Hazardous waste might be generated at sites of construction, demolition. Asbestos Containing Material (ACM) has not been observed at the construction site. General construction waste (concrete, wooden pallets, steel cuttings/filings, packaging paper or plastic, wood, metals) will be generated. A small proportion of the waste generated during construction phase will be hazardous and may include used oil, hydraulic fluids, waste fuel, grease and waste oil containing rags. If improperly managed, these wastes could create impacts on land or surface water sources.	<ul style="list-style-type: none"> <li>• Hazardous Materials Management Plan (including method statement on the safe removal, storage and disposal of asbestos, if ACM found during the demolition)</li> <li>• The process of classifying hazardous wastes (including ACM), depositing of them in proper containers and site, transportation and disposal of them by the licensed firms and record will be kept.</li> <li>• Training of the staff for identification, separation, and management of hazardous waste.</li> </ul>	Low
Construction materials extracted from borrow pits or quarries.	High	The environmental impacts related to the obtaining of construction material from the borrow pits shall be dust, noise, vibration, health and safety issues	<ul style="list-style-type: none"> <li>• The contractor shall obtain the construction material either from the licensed borrowing pits or quarries or they will be licensed and operated by the Contractor. In each case the Contractor is expected to prepare a detailed Borrow Pit and Quarry Management Plan. The measures and responsibilities of the Contractor will be specified at the Borrow Pit and Quarry Management Plan such as, topsoil</li> </ul>	Moderate

			management, stockpiling of the aggregates, leveling landscaping, drainage of surface water, health and safety issues etc. If the contractor uses its own borrow pit and quarry the Borrow Pit and Quarry Management Plan is required to be approved by WRS	
Effects on fauna	Substantial	Construction activities have a direct impact on the natural behavior of wildlife.	<ul style="list-style-type: none"> <li>• The fauna species that are likely to be affected from realization of the project are.....</li> <li>• The workers will be informed about poaching, to avoid damage and hunting ban</li> <li>• Enforcement and control of anti-poaching regulations</li> <li>• Awareness campaigns among workforce</li> </ul>	Low
Disturbance of agricultural activities by means of access restriction, soil compaction, trenching, dust emissions.	Low	Some minor affects will be observed due to existing trees covered by dust emissions, diversion of access to the agricultural area, the agricultural soils will not be affected from the construction activities.	<ul style="list-style-type: none"> <li>• The construction works shall be carried out after the agricultural season. Dust suppression measures will be applied by the Contractor. The Contractor shall avoid the use of the agricultural fields during the construction activities. If the public access to the agricultural areas has been limited due to the construction activities the Contractor will provide alternative passages, routes, roads to the public.</li> </ul>	Low
Aesthetic impacts	Low	The visual quality is usually poor, because of material stockpiles, waste depots, prefabricated offices and construction machines. This temporary impact is considered to be minor due to mitigation measures taken.	<ul style="list-style-type: none"> <li>• The Contractor shall keep the site clean, reasonably free from all unnecessary obstructions and shall safely store the construction materials and dispose the spoils and solid waste from the construction site. After the completion of the works, the Contractor shall immediately clear the work site from all materials, dust and rubbish.</li> </ul>	Low
Increase in traffic	Substantial	Roads in the settlement area will be exposed	<ul style="list-style-type: none"> <li>• A traffic management plan will be provided by</li> </ul>	Moderate

<p>volume due to the construction activities.</p>		<p>to trips of trucks time to time. The existing roads in the direct impact zone is adequate to cover this additional capacity. The necessary safety measures for the public will be taken during the construction period.</p>	<p>the construction contractor including the routes of transportation; speed arrangements; locations of the sensitive areas like markets, schools, hospitals and traffic sign boards, etc. If any damage is given by the construction contractor to the public roads or bridges located on the routes the construction contractor shall repair, recover or compensate it.</p>	
<p>Occupational health and safety risks</p>	<p>High</p>	<p>Health and safety risks are always high in construction works regardless of volume of work. Especially during mobilization and demobilization periods should be paid maximum attention</p>	<ul style="list-style-type: none"> <li>• The construction contractor shall adhere to take all necessary procedures and precautions specified in Environmental Management Plan (EMP) of this IEE study.</li> <li>• The construction contractor shall bear the full responsibility in the case that an accident happens resulted in fatality, amputation or serious damage because of his negligence</li> </ul>	<p>Moderate</p>
<p>Community health and safety risks</p>	<p>High</p>	<p>Community health and safety risks are always high in construction works regardless of volume of work. The construction contractor should pay maximum attention to that throughout project realization</p>	<ul style="list-style-type: none"> <li>• To Implement the Labor Management Procedures developed by the project.</li> <li>• Community awareness and sensitization with emphasis to women</li> <li>• To promote health seeking behaviors.</li> <li>• To adopt worker code of conduct that establishes how workers should interact with local communities.</li> <li>• To adopt a Grievance Redress Mechanism to allow residents to file complaints.</li> <li>• To Strengthen and collaboration with the local health facility and onsite primary health care facility or surveillances</li> <li>• Preparation of waste management plan</li> </ul>	<p>Moderate</p>

			<ul style="list-style-type: none"> <li>The construction contractor shall bear the full responsibility in the case that an accident happens resulted in fatality, amputation or serious damage because of his negligence</li> </ul>	
Removal of vegetation	Low	During realization of the project, there will be trees which are planted or naturally grown up will be removed	<ul style="list-style-type: none"> <li>During the construction activities, the Contractor will remove only reeds and vegetation including trees which are planted or naturally grown up, where cutting of tree is required, if necessary, the permission will be obtained from the local competent authorities. Compensation measure might include the plantation of new trees to the location defined by the local environmental authorities including the replanting with a ratio 1 to 2.</li> </ul>	Low
Land use change	Low	It is not foreseen any change on land use as there is no additional land acquisition requisition and resettlement needs.	<ul style="list-style-type: none"> <li>The construction contractor to inform the client, PIU and PIC in case they need extra land or any change on land use.</li> </ul>	Low
Impacts on tangible and intangible heritages	Low	Assessment of field studies confirmed that no tangible/ intangible archeologically important heritage will be impacted.	<ul style="list-style-type: none"> <li>The construction contractor apply chance find procedure in case found any heritage in the course of construction works</li> </ul>	Low
Communicable diseases: as elsewhere, where worker's housing areas are established near residential households and communities, there will be short-terms risks of the spread of communicable	Moderate	The construction contractor shall recruit his workforce locally insofar as possible only white-collar personnel who requires high level qualification shall be imported.	<ul style="list-style-type: none"> <li>To mitigate the risk, the construction contractors contracts must show a clause on occupational health and safety measures to be guaranteed, and include a paragraph, saying e.g.: "The Contractor is obliged to ensure awareness raising information to his employees on how to protect oneself and others (local sex-workers, spouses, and other) from contamination by STI/HIV/AIDS and other communicable diseases and how to practice "safe sex", personal hygiene, and protect oneself against T.B, Rabies, Hepatitis" etc." . It</li> </ul>	Low

diseases from the 'imported' workers to local women or men and vice versa			should also be required that construction contractors distribute or request that the local health officer distribute information material / awareness campaigns and free condoms to immigrant workers and the local sex-workers. Also, contractors shall maximize the number of local, residential workers, to minimize the risk to the local communities from imported labor.	
Working conditions	Moderate	The construction contractor to ensure that all working conditions comply with international and national standards	<ul style="list-style-type: none"> <li>• To require compliance with ADB guidance on worker's accommodations for contracted workers.</li> <li>• To comply with national and international labor regulations on worker's accommodation for contracted workers.</li> <li>• To establish Labor Management Procedure (LMP)</li> <li>• To establish Grievance Redress Mechanism (GRM)</li> <li>• To provide workers transportation to and from the project sites.</li> <li>• To implement "Zero harm" policy at the project sites.</li> </ul>	Low
Child and forced labor	Low	The construction contractor to ensure that child workforce and forced labor are strictly forbidden as per international and national standards	<ul style="list-style-type: none"> <li>• Provision in contract document, prohibiting child labor in compliance with the international and national regulations related to children</li> <li>• To establish Labor Management Procedure (LMP)</li> <li>• Information dissemination on avoidance of child and forced laborers</li> </ul>	Low
Cut off irrigation	Moderate	Farmers using the irrigation water will not be	<ul style="list-style-type: none"> <li>• The contractor will not divert the river</li> </ul>	Low

water		affected.		
Potential opportunity for local unemployed people to work as unskilled day labor, temporary during the civil works.	Beneficial impact			
The local communities and households nearest to the construction sites could provide services during the construction periods: catering, cleaning, laundry, transportation, housing, etc.	Beneficial impact			

Definition of risks and impacts	Significance of impacts	Rationale	Proposed mitigation measures	Significance of residual risk/impact
<b>Post-construction period</b>				
Removal and reinstatement of site	Moderate	If project facility sites, borrow areas, construction sites, camping areas without cleaning, and reinstatement, landscaping, aesthetic, and physical environmental and social complaints will be faced.	<ul style="list-style-type: none"> <li>• To clean and remove all object located at the construction facilities, camping area and to reinstate these areas after laying stored topsoil</li> <li>• To reinstate camp site, plant and the borrow areas as defined in the permission</li> <li>• To remove fences and other physical barriers formed.</li> </ul>	Low

Public and community utilities at site	<b>Substantial</b>	During the construction some of the public and community utilities might be damaged due to construction activities, need to be repaired, rehabilitated, or reconstructed.	<ul style="list-style-type: none"> <li>• To repair, rehabilitate, or reconstruct all public and community utilities damaged during construction.</li> </ul>	Low
Early warning system will be useful for protection of local people against natural disaster such as flood etc	Beneficial impact			

## **5.2. Cumulative impacts**

421. In the previous sections, the environmental impacts of the project investment components were analyzed separately, for clarification and comprehensiveness. However, this approach does not allow identifying potential cumulative impacts. Cumulative impacts can be of two types: i) same impacts occurring at different places; ii) impacts of different project components occurring at the same place. The cumulative impacts can concern the construction period, the physical characteristics of the project components (e.g., surface area), or the operational period.

422. With respect to the hydro-post and early warning system subproject, cumulative impacts first apply to the operational period, as it is the global effect of all the planned investments, which will improve the physical situation of hydro-post buildings and early warning systems which will serve to reduce natural disaster risk in the country.

423. Cumulative impacts also apply to environmental negative impacts. In the framework of the present project, they mainly concern the construction period:

- If the work of the project are carried out at the same time, nuisances like noise, dust, air pollution, visual intrusion would cumulate. However, as the construction sites are far from the dwelling areas, the impacts would remain low.
- If all the project components were constructed at the same time, significant nuisances (noise, air pollution, traffic safety) would arise because of the high traffic levels on local roads. However, it is more likely that the different construction works will spread out over a year.

## **6. ALTERNATIVES TO THE SELECTED PROJECT**

424. A “No Action Alternative” would not be to undertake the proposed subproject. This alternative would result in the continued risk of not being able to forecast climatic disasters such as flood, etc. All positive benefits would be foregone. The relatively minor environmental impacts and inconveniences would be avoided in the short term. In the long term.

425. As the selected hydro-post rehabilitation and early warning system subproject mainly deals with the rehabilitation of an irrigation system, there is no real alternative in terms of site, technology, design, and operation. However, during the feasibility study, no other alternatives have been discussed with WRS than rehabilitation of existing on-farm canal as it is supposed that this option will have the minimum negative affect in every respect.

## **7. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION**

426. During the project pre-studies, Public was informed by miscellaneous means. One of these methods was to arrange public consultation meetings in which they were informed about the projects in a detailed manner.

427. In this regard, PIU and PIC arranged many meetings where the projects will be realized. In aforementioned oblasts.

### **7.1. Jalal-Abad hydro-posts**

#### **7.1.1. Public participation meeting**

428. The process undertaken during the Jalal-Abad group hydro-posts rehabilitation and early warning subproject design and preparation for informing and engaging the stakeholders first started by a four day field visit of the environment and social development specialists, and

arranging public consultation meetings from Monday 12nd July to 15<sup>th</sup> July, 2021. The activities undertaken during this field mission were:

- Site visits of the proposed sub-project;
- Public consultation meetings with Kenesh Suu WUA member on 12nd of 2021, Aikol Suu WUA member on 13th of July 2021, Murat-Murap WUA member on 14<sup>th</sup> of July 2021 and Shaidan Kara Unkur WUA member on 15<sup>th</sup> of July 2021
- Total number of attendees was 67 persons 39 of whom are zonal representative of WUA in the meeting arranged in Kenesh Suu WUA,
- Total number of attendees was 37 persons 20 of whom are zonal representative of WUA in the meeting arranged in Aikol Suu WUA,
- Total number of attendees was 49 persons 32 of whom are zonal representative of WUA in the meeting arranged in Murat-Murap WUA,
- Total number of attendees was 24 persons 18 of whom are zonal representative of WUA in the meeting arranged in Shaidan Kara Unkur WUA.

429. Interviews and meetings were an opportunity for project information disclosure and consultation with affected people and other stakeholders. The list of people met during this field visit is presented in Appendix **12.9**

*Photo 2: A view from Aikol Suu WUA meeting*



*Photo 3: A view from Kenesh Suu WUA meeting*



*Photo 4: A view from Murat-Murap WUA meeting*



*Photo 5: A view from Shaidan kara unkur WUA meeting*



430. During the meeting PIU and PIC engineer/safeguards answered the attendee's questions and concerns. The minutes of the meeting kept after the meeting is presented in Appendix 12.10. There was no single question asked about the environmental or social issues.

#### **7.1.2. Planned information disclosure measures**

431. Information disclosure and public consultations for the Jalal-Abad Group hydro-post rehabilitation subproject is carried out in accordance with the ADB' Public Communications Policy 2011, as discussed below. This meeting was held all in one as per local regulations, which means a respective public hearing meetings were not held for each output of climate change and disaster-resilient water resources sector project. Only one meeting was arranged and all formations were conveyed to local people regarding each output of this project.

432. Core- sub-project stakeholders / beneficiaries (definition)

- Primary stakeholders: MOES, Water Resources Services under the Ministry of Agriculture of the Kyrgyz Republic
- Secondary stakeholders: WUA and WUA clients /irrigation-farmers, individual households

433. Objectives

- Collection of stakeholders' opinion, advice and questions about the core-sub- project and environmental and Land Acquisition scoping assessment process;
- Collection of stakeholders' comments and recommendations to the environmental assessment (IEE) report and Land Acquisition screening/scoping assessment report.

434. Schedule

- Presentation of the project, based on the elements available at this time
- Presentation of the IEE results.

435. General prescriptions

- Relevant and adequate information (in Kyrgyz or Russian) about the project and IEE process/results has to be provided to interested parties together with the invitations to the meeting, at least one week before the meeting.
- The consultation process must be pro-poor, gender inclusive and responsive, and discussions must be addressing the needs of all interested parties, local people, farmers etc., including women and disadvantaged and vulnerable groups/ poor farmers.
- Land Acquisition and resettlement and other potential adverse impacts and issues should be discussed during the meeting;
- Leaders or members of interested parties should be present in the meeting.

## **8. GRIEVANCE REDRESS MECHANISM**

### **8.1. Objectives**

436. The Grievance Redress Mechanism (GRM) is a process and forum through which the affected people need a trusted way to voice and resolve concerns about LAR and the project also finds an effective way to address affected people's concerns. For this project, A GRM will be established. In this regard Local Focal Points are appointed for each administrative territorial

437. APs and local people have the right to file complaints and/or queries on any aspect of the project, including LAR, environmental and other safeguard issues. Under the GRM, people may appeal any decision, practice or activity related to the project. All possible avenues will be made available to the affected persons and others to voice their grievances. The PIU will ensure that grievances and complaints on any aspect of the project are addressed in a timely and effective manner.

438. Objectives of the GRM are:

- To reach mutually agreed solutions satisfactory to both the project and the APs, and to resolve any grievances locally, in consultation with the aggrieved party;
- To facilitate the smooth implementation of the LARP, particularly to cut down on lengthy litigation processes and prevent delays in project implementation; and
- To facilitate the development process at the local level, while maintaining transparency as well as to establish accountability to the affected people.

439. The mechanism consists of grievance resolution of two levels, the local and central levels. At each level, grievance redress groups (GRG) were established. The role and responsibility of the GRGs is to accept claim and complaints, assess its validity, determine the scope of eventual impacts, and timely resolve the issue, including the claims regarding the compensation and maintain GRM as flexible and efficient to address and resolve the claims as raised during LARP and project implementation.

440. The GRM covers issues related to social, environmental and other safeguard issues under the ADB safeguard covenants and legislation of the Kyrgyz Republic.

441. Local Focal Points/Persons are appointed across the sub-projects. Local focal points are presented in **Table 17**.

Table 17: LFP list for Jalal Abad Hydro Posts

No	Name of Hydropost	Name of AA/AO	Number of GRG members	Chairman of the GRG/LFP	Contact number/тел	Order
1.	Kokart	Bagysh	5	Jolborsov U.T	0773-508-096	#101 28.06.2022
2.	Kara-Alma	Kara-Alma	3	Nazanov A	0221-216-121	#104b 01.07.2022
3.	Michailovka	Lenin	3	Temirov E	03748-1-01	#173 28.06.2022
4.	Padysh-Ata	Kashka-Suu	3	Kamshibek.U.Sch	0778-500-154	#119b 08.06.2022
5.	Gava-Say	Kok-Tash	7	Nishanov B	0773-380-225	#87b 21.06.2022
6.	Chatkal	Chatkal	3	Abduvaliev M	03749-60193	#232 13.06.2022
7.	Torkent	A.Suerkulov	3	Tokoev U.T	0705-459-051	#130 21.06.2022
8.	Schaidan	Schaidan	3	Maksudov T	0220-185-872	#118 24.06.2022
9.	Jalal-Abad	Jalal-Abad Town	3	Mamytov U.M	0556-620-481	# 171 28.06.2022

## 8.2. Grievance redress groups

442. The Grievance Redress Groups (GRGs) will be established at both local and central levels. The GRGs will function for the duration of both LARP and project implementation. The local GRGs include one in each village in which the hydro-post rehabilitation works there is. The central GRG is set in MOES in Bishkek.

443. The contact information of GRGs will be included in the Resettlement Information Brochure that will be distributed among affected households prior to LARP implementation.

444. At each level of appeal, the GRG will be assisted as needed by the professional capacity to solve specific case. They include:

- Ministry of emergency
- Rural administrations of ministry of emergency
- Ministry of state property
- Representatives of state rayon administration
- Representatives of the rayon branch of the state agency for architecture and construction
- State registration services of the rayon
- Water resources services under the ministry of agriculture of the Kyrgyz republic

### 8.3. Grievance resolution process

445. The complaints and grievances from the affected households will be addressed through the procedure described in **Table 18** and **Figure 13** further illustrates it.

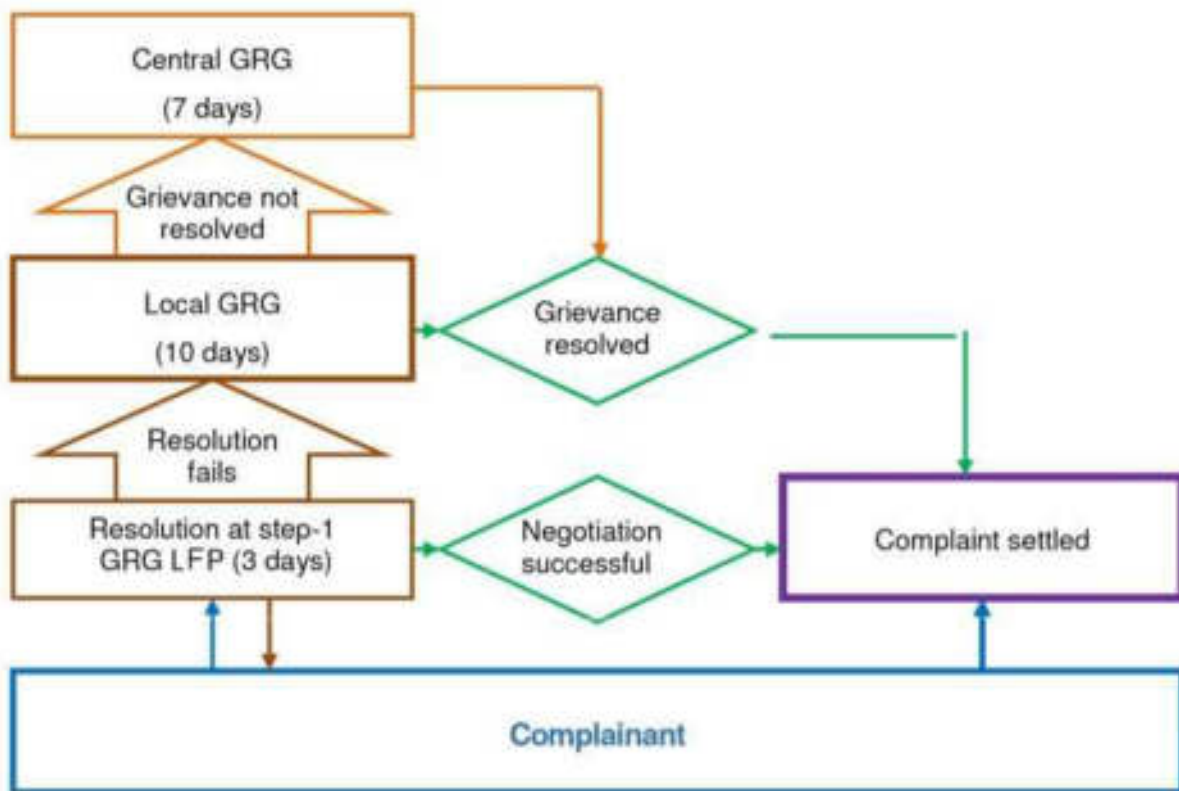
446. The grievance acceptance form is presented in **appendix 12.11** and in this regard the grievance registration logbook to be kept by PIC staff is presented in **appendix 12.12**.

*Table 18: Grievance redress procedure*

Step	Action Level	Process	Timeline
1	Resolution by Local Focal Point (LFP)	At initial stage, the LFP will give hearing to the aggrieved person and try to give acceptable solutions. If an aggrieved person is not satisfied with the solutions, then she/he will lodge grievances in written to the local GRG within 3 days.	3 days
2	Resolution at local level	After receiving written complaint, the LFP will review and prepare a Case File for GRG hearing and resolution. A formal hearing will be held with the GRG on a date fixed by the LFP in consultation with the aggrieved person. On the date of hearing, the aggrieved person will appear before the GRG and present proofs in support of his/her claim. The LFP will note down the statements of the complainant and document all proofs. The decision from majority of the members will be considered final from the GRG and will be issued by the LFP and signed by other members of the GRG. The case record will be updated and the decision will be communicated to the aggrieved person by the LFP within 10 days. If aggrieved person is not satisfied with the solution, the LFP will lodge grievance in written to the central GRG at MOES with conclusion and supporting documents prepared at local level.	10 days
3	Resolution at central level	After receiving written complaint, the central GRG Chairperson will review and prepare a Case File for GRG hearing and resolution. A formal hearing will be held on a date fixed by the GRG Chairperson and the aggrieved person. GRG members will contact the complainant and visit his/her village. The safeguard specialist/sociologist of PIU will note down the statements of the complainant and document all proofs. The decisions from majority of the members will be considered final from the central GRG and will be issued by the Chairperson and signed by other members. The case record will be updated and the decision will be communicated to the aggrieved person by the	7 days

		safeguard specialist/sociologist of PIU within 7 days of submission.	
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Figure 13: Grievance redress procedure



#### 8.4. Additional mechanism

447. Any physical and legal person, any appellant, can communicate his/her concern to the court at any stage of grievance redress. The GRGs will not restrict or influence the affected persons from applying to court for legal remedies. If the complaint is found invalid, the GRG will formulate a response and send a written letter to the complainant, explaining the reasons of rejection.

448. In addition, ADB has its Accountability Mechanism Policy (2012) (see

<https://www.adb.org/site/accountability-mechanism/main>) that is to be accountable to people for ADB-assisted projects as a last resort mechanism. The accountability mechanism provides a forum where people adversely affected by ADB-assisted projects can voice and seek solutions to their problems and report alleged noncompliance of ADB's operational policies and procedures.

449. The complainant, if not satisfied with GRG's decision or even the court's decision, can appeal the case to Office of the Special Office Facilitator of ADB (see [www.adb.org/site/accountability-mechanism/contacts](https://www.adb.org/site/accountability-mechanism/contacts)). The GRGs will not in any way impede APs' access to the ADB Accountability Mechanism.

## **8.5. Compliant documentation**

450. The PIU of the MOES will document all grievances in both written and electronic forms.

## **9. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN**

451. The Environment Management and Monitoring Plan (EMMP) is aimed at contributing to sustainable development and minimizing any negative environmental impacts. Through this document, the contractor is committed to continuous improvement of environmental performance, implementation of appropriate environmental management systems, fulfilment of all relevant statutory obligations, and cooperation with the appropriate authorities. The main objectives of the EMMP are:

- To comply with the ADB's prescriptions and Kyrgyz legislation relevant to the project,
- To take all the necessary precautions to protect the surroundings from any pollution that may arise from the construction processes,
- To reduce the effect of noise, dust, disturbance, emissions and inconvenience from operational activities,
- To develop, publish and monitor formal policy, establishing formal organizational arrangements for environmental management,
- To nominate an Environmental Officer with specific responsibility for environmental matters,
- To develop a framework for continued environmental improvement through the progressive implementation of an environmental management system, which will ensure that the environmental impacts of the project are evaluated,
- To prepare plans and management procedures for the prevention of pollution,
- To produce action plans, which set realistic and achievable targets, and monitoring, reviewing and updating these plans according to the activities,
- To work closely with MOES, PIU, partners, consultants, suppliers, subcontractors and, where appropriate, members of the community to develop good environmental practices and solutions,
- Actively involve employees and ensure that appropriate training is given to raise awareness and appreciation of environmental issues.

452. The Environmental Management and Monitoring Plan includes the following key components (with the level of detail commensurate with the project's impacts and risks): mitigation, monitoring, implementation arrangements, performance indicators.

### **9.1. Environmental management plan (EMP)**

453. One EMP is provided for each subproject component, divided into pre-construction period, construction and operation periods (if relevant), under the form of a table with the following headings: potential issues / impacts, mitigation / management measures, impact/ performance indicators, implementation responsibilities.

454. In the following tables, possible environmental impact, proposed mitigation measures for these possible impacts, impact performance indicator and responsible to take action are specified in **Table 19**

### 9.1.1. Table 19 Environmental management plan for Jalal-Abad group hydro posts

Table 19: Environmental management plan for Jalal-Abad hydro posts

Environmental issues and possible impacts	Mitigation management measures	Impact performance indicator	Implementation responsibilities
<b>Pre-Construction / Design period</b>			
Protection of historical / cultural areas	A preliminary investigation to be carried out on the ground. A Chance find procedure to be includes provision for ceasing work and notifying the Engineer should artifacts of cultural or historical importance be unearthed implemented in case of discovering evidence of possible scientific. A provisional sum to be identified in the Contract document to cover the costs of engaging a national archaeological specialist to determine the status of the findings and remedial works needed.	Historic and/or cultural assets protected	Action by the construction contractor Supervision by safeguard specialists of PIC, PIU and the Client
Permits and clearance	To obtain approval and all other necessary permits from relevant government agencies for design, environmental impacts assessments (EIA/OVOS), and construction prior to commencement of construction works.	All permits obtained and declared to PIC and PIU	Action by the construction contractor Supervision by management of PIC, PIU and the Client
Protection of sensitive natural areas	Identify potential environmentally, nationally or internationally sensitive / protected areas. Locate optional construction sites/activities away from them. If the proposed construction passes close to these areas, include temporary fences to restrict machines and activities from encroaching in the area. Ensure construction personnel are aware of locations of sensitive/protected areas.	Numbers of detected protected areas	Action by the construction contractor Supervision by safeguard specialists of PIC, PIU
Minimize damage to personal and community property	Ensure projected impacts and proposed measures have been discussed in advance with the affected community.	Detecting all project affected people and properties	Action by the construction contractor Supervision by safeguard

	<p>Work with local government officers and non-governmental organizations.</p> <p>Conduct surveys before activities commence to identify all members of affected populations.</p>		specialists of PIC, PIU
Implementation of Environmental Management Plan	<p>Include Initial Environmental Examination (IEE) and Environmental Management Plan (EMP) requirements into the bidding documents</p> <p>Preparation and approval of The Contractor's Site Specific Environmental, Health and Safety Management Plan (SSEHSMP) prior to the commencement of construction works, including all components defined at bidding documents.</p>	<p>Bidding documents including IEE and EMP</p> <p>SSEHSMP approved by the Client / PIU</p>	<p>Action by the construction contractor</p> <p>Supervision by safeguard specialists of PIC, PIU</p>
Definition of Public and Community Utilities at Site	<p>To make visual and printed records of all construction sites, camping area, construction facility locations prior to the commencement of construction site.</p>	<p>Visual and printed record prepared</p>	<p>Action by the construction contractor</p> <p>Supervision by safeguard specialists of PIC,</p>
Public awareness and capacity building	<p>To aware the public living around the project construction site prior to the construction by means of community leaders, pamphlets, web casting, etc.</p> <p>To train and increase the capacity of Grievance Redress Groups (GRG) members and Local Focal Point (LFP) will be performed by PIC prior to the commencement of construction works.</p> <p>To train and increase the capacity of the Contractor's Environment, Social and Health and Safety supervisors prior to the preparation of SSEHSMP as needed</p>	<p>Pamphlets prepared; web casting performed, training records etc.</p>	<p>Safeguard specialists of PIC</p> <p>Public awareness trainings to be conducted by the Construction contractor and supervised by PIC and PIU safeguard specialists</p> <p>GRG and LFP trainings to be conducted by PIC safeguard specialists and supervised by PIU safeguard specialists.</p> <p>Pamphlets, brochures etc. to be prepared by the construction contractor and supervised by PIC and PIU safeguard specialists</p>
Removal of topsoil	<p>To remove and stockpile topsoil prior to establishment</p>	<p>Location and amount of topsoil</p>	<p>Action by the construction</p>

	of any facility, camp area etc.	stockpiled	contractor Supervision by safeguard specialists of PIC, PIU
Construction camp site	The construction campsites will preferable be located away from any local human settlement areas. The campsites will be provided with adequate water supply, sanitation and all requisite infrastructure facilities. This will minimize dependence on outside resources, presently being used by local populace and minimize undesirable social friction. Ensure that camp site enclosed with fences at appropriate height, securing 7/24 with guards and camera systems	Visual inspection	Action by the construction contractor Supervision by safeguard specialists of PIC, PIU
Erosion or mass wasting resulted from site preparation	Erosion control plan with bioengineering and reinforcement structures will be implemented and monitored. Proper restoration of affected landscape.	Visual control of affected areas	Action by the construction contractor Supervision by safeguard specialists of PIC, PIU
Landscape aesthetic	Develop a spoil disposal management plan and stockpiling plan to minimize the impact during construction and rehabilitate landscape after construction as per prepared plans.	Spoil disposal management plan and stockpiling plan approved by the Client / PIU	Action by the construction contractor Supervision by safeguard specialists of PIC, PIU

<b>Environmental issues and possible impacts</b>	<b>Mitigation management measures</b>	<b>Impact performance indicator</b>	<b>Implementation responsibilities</b>
<b>Construction period</b>			
Detection of historical and cultural heritage  Archeological artifacts to be found during excavations	Chance Finds Procedure as part of the EMP for the construction phase to be applied including the following measures The construction contractor shall stop the work immediately in the area of any find and erect barriers to prevent casual access. PIU to be informed and PIU shall inform ministry of culture of Kyrgyz Republic	Historical and cultural heritages funds	Action by the construction contractor Supervision by safeguard specialists of PIC, PIU

	<p>No work will proceed until the Ministry of Culture of the Kyrgyz Republic issues in writing that it is safe to proceed.</p> <p>The findings should be reported to ADB as unanticipated impact together with the actions by PIU and the construction contractors.</p>		
<p>Minimization of social disturbance and community benefit from the project</p>	<p>Advise the local community of project plans in advance of construction, and involve them in planning, as necessary.</p> <p>Avoid or minimize disturbances near living areas, schools, hospitals, etc.</p> <p>Abide by the laws of the Kyrgyz Republic relating to employment and use of labor.</p> <p>Maintain liaison with community representatives and arrange for the involvement of community groups where practicable.</p> <p>Control runoff and manage sediments near cultivated areas.</p> <p>Develop plan for local recruitment of workers for project - train as required.</p> <p>Employ at least 30% of workforce from the vicinity of construction works if possible</p>	<p>Number of grievances received from local people or workers.</p> <p>Number of local people employed</p>	<p>Action by the construction contractor</p> <p>Supervision by safeguard specialists of PIC, PIU</p>
<p>Communicable diseases</p> <p>There will be short-terms risks of the spread of communicable diseases from the 'imported' workers to local women or men and vice versa (STI/HIV/AIDS, and other diseases</p>	<p>To mitigate the risk, the contract of the construction contractors must show a clause on occupational health and safety measures to be guaranteed, and include a paragraph, saying e.g.: "The Contractor is obliged to ensure awareness raising information to his employees on how to protect oneself and others (local sex-workers, spouses, and other) from contamination by STI/HIV/AIDS and other communicable diseases and how to practice "safe sex", personal hygiene, and protect oneself". It should also be required that construction contractors distribute information material / awareness campaigns and free condoms to immigrant workers</p>	<p>Number of infections detected.</p> <p>Number of grievances received from local people</p>	<p>Action by the construction contractor</p> <p>Supervision by safeguard specialists of PIC, PIU</p>

	and the local sex-workers. Also, contractors shall maximize the number of local, residential workers, to minimize the risk to the local communities from imported labor.		
Damages to utilities by excavation and temporary access restriction to properties.	The construction contractors to carry out a utility survey before construction and take action during construction to minimize impact on utilities. The Contractor shall bear the sole responsibility of any damages that may occur during the work execution for the adjacent properties and buildings of the work site. Provide temporary access during construction, if required. Relocate utilities in advance of construction, if required Keep in contact with stakeholder of the project	Number of utilities detected or relocated. Number of grievances received from local people	Action by the construction contractor Supervision by safeguard specialists of PIC, PIU
Ambient air pollution	To maintain all fossil fuel burning equipment in accordance with manufacturers recommendations To use good quality equipment, with minimum emissions and avoid using old equipment and vehicles. Concrete batch plant, silos, crushing plant to be in good condition and conveyors of crushing plant to be covered. A dust suppression and moistening system to be provided for material stockpile areas to prevent dust generation. No equipment shall be left idling if not in use. Burning waste is strictly forbidden. Construction traffic speed limit when passing through populated areas to avoid dust generation. Dust suppression by water tankers with sprinkling systems are to be deployed along regularly trafficked routes and dusty-unpaved roads and populated	Baseline and monitoring measurement results of ambient air quality parameters Number of grievances received from local people	Action by the construction contractor Supervision by safeguard specialists of PIC, PIU

	<p>areas.</p> <p>The vehicles deployed for material transportation will be spill-proof to avoid or minimize the spillage of the material during transportation.</p> <p>Transportation routes to be inspected daily to clear accidental spillage, if any</p> <p>Dry materials to be covered to avoid dust generation during transportation.</p> <p>Ambient air quality baseline environmental measurements to be conducted for the SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>2.5</sub> and PM<sub>10</sub> parameters as well as the parameters specified in the Kyrgyz Republic regulations in advance of commencement of the work</p>		
Noise and vibration generation	<p>Arrange awareness program for local residents prior to commencement of works.</p> <p>Limitation of working hours for normal construction activities near to settlements areas</p> <p>Avoid using older vehicles and machinery, with significant noise.</p> <p>No idling of equipment when not in use</p> <p>Cease activity producing significant noise at night (19pm-07am), at the weekend &amp; Public Holidays.</p> <p>Ensure that no noise above 70 dB(A) is audible for significant periods within 50 m of any construction site and no noise above 55 dB(A) near settlement areas.</p> <p>Noise baseline to be measured at the locations defined by the Client, PIU and PIC in advance of commencement of the work</p>	<p>Baseline and monitoring measurement results of ambient air quality parameters</p> <p>Number of grievances received from local people</p>	<p>Action by the construction contractor</p> <p>Supervision by safeguard specialists of PIC, PIU</p>
Hazardous waste generation including ACM	<p>All hazardous wastes to be segregated and containers clearly labelled specifying which type of wastes are contained.</p> <p>All containers to be in good conditions.</p> <p>All hazardous wastes are deposited in temporary</p>	<p>Log of hazardous wastes and receipt letters</p> <p>Number of grievances received from local people and workers</p>	<p>Action by the construction contractor</p> <p>Supervision by safeguard specialists of PIC, PIU</p>

	<p>storage areas established at site and delivered to licensed disposal companies with a receipt letter</p> <p>Temporary stockpiling area to be constructed on a concrete and impermeable ground, closed top against rainwater, and fenced and kept locked.</p> <p>A waste collection log to be kept for all hazardous wastes generated at site and delivered for disposal.</p> <p>The construction contractor to put in place measures to minimize hazardous waste generation, i.e. reuse, recycling etc.</p> <p>It is strictly forbidden to bury and burning of hazardous waste on-site, roadside dumping and illegal land filling.</p> <p>The workforce to be trained about waste management plan, especially for segregation, storage and handling.</p> <p>Asbestos management plan to be prepared if ACM found during demolition.</p>		
<p>Domestic, recyclable and inert waste generations</p>	<p>All waste to be segregated and containers clearly labelled specifying which type of wastes are contained.</p> <p>All containers to be in good conditions.</p> <p>All recyclable waste to be delivered a licensed recycling companies with a receipt letter and a log to be kept for that.</p> <p>All domestic wastes and inert wastes to be disposed in relevant municipality's dumping area after signing a contract with municipality. A log to be kept for those.</p> <p>Good housekeeping practice on site</p> <p>The workforce to be trained about waste management plan, especially for segregation, storage and handling.</p> <p>Induction and regular tool box talks to make all staff</p>	<p>Log of each kind of wastes and receipt letters</p> <p>Number of grievances received from local people and workers</p>	<p>Action by the construction contractor</p> <p>Supervision by safeguard specialists of PIC, PIU</p>

	<p>aware of zero waste discharge to environment Zero tolerance of waste dumped in water course or flood plain areas. Put in place measures to minimize waste, e.g. procure materials with less packaging, refrain from ordering excess materials, and make arrangement with suppliers to return surplus, unused materials. It is strictly forbidden to bury and burning or fly-tipping of these wastes on-site, roadside dumping and illegal land filling.</p>		
Surface water protection	<p>Conduct a specific risk assessment on all activities near to water courses and apply appropriate control measures. No refueling of vehicles or equipment to take place within river beds or within 25 meters of the edge of the water course. If possible, wastewater treatment plant to be installed in camp site and treated waste water to be discharged to the water body. pH, BOD, COD, total nitrogen, total phosphorus, oil and grease, total suspended solid and total coliform bacteria as well as the parameters specified in the Kyrgyz Republic regulations to be measured in outlet water sample If WWTP is not possible, a Septic tank to be put in place. Septic tank will not be close to water body and accumulated wastewater effluent to be vacuumed by municipality vacuuming truck. A log to be kept for that. Mobile toilet shall be available at site for workers</p>	<p>Measurement results of WWTP outlet sample Logs of wastewater effluent vacuumed by municipality Number of grievances received from local people and workers</p>	<p>Action by the construction contractor Supervision by safeguard specialists of PIC, PIU</p>
Soil and ground water pollution	<p>Fuels and oils should be stored in good quality above-ground tanks placed on an impervious surface with a spill containment bund capable of containing 110% of the tank capacity. Top of fuels and oil storage areas should be closed against rainwater.</p>	<p>Number of contaminations Number of grievances received from local people and workers</p>	<p>Action by the construction contractor Supervision by safeguard specialists of PIC, PIU</p>

	<p>No onsite refueling within or adjacent to water courses.</p> <p>Maintenance of vehicles and heavy machinery to be made in workshop.</p> <p>On-site refueling equipment and vehicles shall utilize a drip tray to prevent unexpected spillages to the ground.</p> <p>Top-soil should be stripped from site and stockpiled to spread later. Stock piles of top soils should be no higher than 1.5 meters and shall be protected from erosion either by seeding with quick growing noninvasive grass mix or being covered</p> <p>Soils shall be protected from water and wind erosion.</p> <p>Removal of vegetation shall be minimized</p>		
Occupational health and safety	<p>Prepare a risk assessment for each activity to be carried out respectively.</p> <p>Prepare OHS plan and related procedures</p> <p>Prepare an emergency response plan, forming emergency response teams and conducting their specific trainings</p> <p>Ensure to comply with all international and national OHS related laws, regulations and standards</p> <p>Provision health and safety induction training for all staffs, and specific training for staff working on work sites.</p> <p>Provision to workers of protective clothing including hard hats, and protective footwear and any kind of personnel protective equipment</p> <p>Provision of hazard warning signs around construction sites</p> <p>Ensuring plant and vehicle operators are properly licensed and trained.</p> <p>Assign a competent OHS specialist recognized in front of the laws as a responsible person for the duration of the project.</p>	<p>Accident frequency rates</p> <p>Accident severity rates</p> <p>Accident general frequency rates</p>	<p>Action by the construction contractor</p> <p>Supervision by safeguard specialists of PIC, PIU</p>

	<p>Arranging for the provision of first aid facilities, readily available trained paramedical personnel, and emergency transport to the nearest hospital with accident and emergency facilities, and allocation of responsibility for ensuring that these arrangements are continually in place.</p> <p>Arranging for regular safety checks of vehicles, workplaces, equipment and materials, and allocation of responsibility for this.</p> <p>The construction contractor shall bear the full responsibility in the case that an accident happens resulted in fatality, amputation or serious damage because of his negligence</p> <p>Keep a log for accidents and incidents</p>		
Covid 19	<p>Clause on occupational health and safety measures for emergency response plan (including detailed section with measures and algorithm on COVID-19), health and safety management plan (including a detailed section on COVID-19) to be included in SSEMP. COVID measures will cover at least temperature measurement in access to working or camping site, social distancing in camping and working facilities where applicable, use of face masks, enhanced cleaning procedures, education and training, action procedures for suspected or actual COVID-19 cases, following the national regulations and circulars, etc.</p>	Number of positive cases detected	Action by the construction contractor Supervision by safeguard specialists of PIC, PIU
Traffic management	<p>Prepare a traffic management plan including transportations and travelling routes, traffic sign boards, speed limits, location of sensitive areas like school, hospital etc.</p> <p>Actively enforce speed limits for project vehicles.</p> <p>Zero tolerance policy for drug and alcohol use amongst all workforce</p> <p>Minimize the number of vehicle movements' as</p>	Number of traffic accident Number of occupational accidents	Action by the construction contractor Supervision by safeguard specialists of PIC, PIU

	<p>much as practicable, maximizing capacity of vehicles.</p> <p>Limiting for maximum allowable working hours to avoid overtiredness.</p> <p>Ensure all drivers/operators have a valid license and trained well</p> <p>Awareness program for local population prior to commencement of work, including visits to local schools</p> <p>In case the construction contractor damages any property, he shall compensate that</p>		
Borrow pits, quarries and river beds	<p>The construction contractor shall obtain a permission from relevant authority to operate borrow pit, quarry or river bed</p> <p>Prepare a borrow pit and quarry management plan including how to deal with top soil management, blasting, stockpiling of materials, refilling, levelling, landscaping, drainage of surface water, transportation routes etc.</p> <p>In the case he obtains materials from a third-party supplier, he shall ensure that borrow pit, quarry or river bed are permitted by relevant authority and aforementioned management plant is prepared</p>	<p>Permission of borrow pit, quarry or river bed</p> <p>Approved borrow pit and quarry management plan</p>	<p>Action by the construction contractor</p> <p>Supervision by safeguard specialists of PIC, PIU</p>
Disturbance of agricultural activities, access restrictions	<p>The construction works shall be carried out after the agricultural season.</p> <p>The Contractor shall avoid the use of the agricultural fields during the construction activities.</p> <p>If the public access to the agricultural areas has been limited due to the construction activities the Contractor will provide alternative passages, routes, roads to the public</p>	<p>Number of grievances received from local people</p>	<p>Action by the construction contractor</p> <p>Supervision by safeguard specialists of PIC,</p>

Biodiversity	<p>Develop a tree protection plan as part of the SSEHSMP.</p> <p>Prior to any clearing of vegetation, make a species inventory of the area to be cleared. Use vegetation inventory to identify appropriate local plant species to be used for revegetation.</p> <p>Avoid tree removal unless absolutely necessary based on engineering, safety, and environmental justifications</p> <p>No tree cutting for fuel to be allowed</p> <p>Compensation measure might include the plantation of new trees to the location defined by the local environmental authorities including the replanting with a ratio 1 to 2</p> <p>Worker awareness training to include protection of trees</p> <p>Do not make vegetation clearance during breeding season of species present</p> <p>Monitor nesting activity during noisy construction procedures near to nesting habitats</p> <p>Detect protected areas by IUCN, IUCN green list, and protected species by IUCN red list</p> <p>Hunting is strictly forbidden</p>	<p>Number of trees cut</p> <p>Number of detections of IUCN protected areas</p> <p>Number of detections of IUCN red list species</p>	<p>Action by the construction contractor</p> <p>Supervision by safeguard specialists of PIC, PIU</p>
Aesthetic impacts	<p>The Contractor shall keep the site clean, reasonably free from all unnecessary obstructions and shall safely stockpile the construction materials and dispose the spoils and all wastes from the construction site. After the completion of the works, the Contractor shall immediately clear the work site from all materials, dust and rubbish.</p>	Visual inspection	<p>Action by the construction contractor</p> <p>Supervision by safeguard specialists of PIC, PIU</p>

Reporting	The construction contractor to report to PIC on a monthly basis including constructing activities, environmental, health and safety and social activities carried out during the relevant month and accordingly PIC to report to PIU so that PIU reports to ADB	Number of reports	Action by the construction contractor Supervision by safeguard specialists of PIC, PIU
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Environmental issues and possible impacts	Mitigation management measures	Impact performance indicator	Implementation responsibilities
<b>Post Construction period</b>			
Removal and reinstatement of site	To clean and remove all object located at the construction facilities, camping area and to reinstate these areas after laying stockpiled topsoil. To reinstate and plant the borrow pits and quarries as defined in the permission To remove fences and other physical barriers formed	Visual inspection	Action by the construction contractor Supervision by safeguard specialists of PIC, PIU
Public and Community Utilities at Site	To repair rehabilitate, or reconstruct all public and community utilities damaged during construction	Visual inspection Number of grievances received from local people	Action by the construction contractor Supervision by safeguard specialists of PIC, PIU

Environmental issues and possible impacts	Mitigation management measures	Impact performance indicator	Implementation responsibilities
<b>Operational period</b>			
Air pollution	All machineries will be managed and maintained well to avoid air pollution resulted from machineries	Maintenance of machineries	Relevant authority

## 9.2. Environmental monitoring and management plan (EMMP)

455. Environmental monitoring must provide information about key environmental aspects of the subprojects, particularly the project environmental impacts and the effectiveness of taken mitigation measures. Such information enables an evaluation of the success of mitigation as part of project supervision and allows corrective action(s) to be implemented, when needed. In this regard the EMMP identifies monitoring objectives and specifies the type of monitoring, and their link to impacts and mitigation measures.

456. **Table 20** presented below show for each subproject component the monitoring prescriptions regarding the anticipated impacts and mitigation measures performances. What the impact/performance indicators in the environmental management plans were, here become the monitoring parameters of the environmental monitoring plan.

### 9.2.1. Table 20 Environmental monitoring plan for Jalal-Abad hydro posts

Table 20: Environmental monitoring plan for Jalal-Abad hydro posts

Environmental issues and possible impacts	Parameters to be monitored	Impact performance indicator	Implementation responsibilities
Pre-Construction / Design period			
Pre-works photograph documentation for the basis of re-instatement study to be performed during the post-construction period	<ul style="list-style-type: none"> <li>Existing conditions</li> <li>Conditions of existing private properties</li> <li>Conditions of existing utilities</li> </ul>	<ul style="list-style-type: none"> <li>Approval of The Client/PIU</li> </ul>	<ul style="list-style-type: none"> <li>Action by the construction contractor</li> <li>Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>
Ambient air pollution	<ul style="list-style-type: none"> <li>Ambient air quality baseline environmental measurements to be conducted for the SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>2.5</sub> and PM<sub>10</sub> parameters as well as the parameters specified in the Kyrgyz Republic regulations. These measurements to be conducted at the locations specified by the Client, PIU and PIC in advance of commencement of the work</li> </ul>	<ul style="list-style-type: none"> <li>Measurement results of ambient air quality parameters, which will be baseline</li> </ul>	<ul style="list-style-type: none"> <li>Action by the construction contractor</li> <li>Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>
Noise generation	<ul style="list-style-type: none"> <li>Baseline noise level to be measured at the locations specified by the Client, PIU and PIC in advance of commencement of the work</li> </ul>	<ul style="list-style-type: none"> <li>Measurement results of noise level, which will be baseline</li> </ul>	<ul style="list-style-type: none"> <li>Action by the construction contractor</li> <li>Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>
Vibration generation	<ul style="list-style-type: none"> <li>Baseline structural vibration level to be measured at the locations specified by the Client, PIU and PIC in advance of commencement of the work (if transportation routes to pass by sensitive areas)</li> </ul>	<ul style="list-style-type: none"> <li>Measurement results of vibration level, which will be baseline</li> </ul>	<ul style="list-style-type: none"> <li>Action by the construction contractor</li> <li>Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>
Surface water quality	<ul style="list-style-type: none"> <li>Surface water quality baseline environmental measurements to be conducted for the temperature, total suspended solid, BOD, COD, Dissolved oxygen and Ammonia (NH<sub>3</sub>-N) parameters as well as the parameters specified in the Kyrgyz Republic regulations. These</li> </ul>	<ul style="list-style-type: none"> <li>Measurement results of surface water quality parameters, which will be baseline</li> </ul>	<ul style="list-style-type: none"> <li>Action by the construction contractor</li> <li>Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>

	measurements to be conducted at the locations specified by the Client, PIU and PIC in advance of commencement of the work		
Soil pollution	<ul style="list-style-type: none"> <li>• Soil quality baseline environmental measurements to be conducted for the parameters specified in the Kyrgyz Republic regulations. These measurements to be conducted at the locations specified by the Client, PIU and PIC in advance of commencement of the work</li> </ul>	<ul style="list-style-type: none"> <li>• Measurement results of soil quality parameters, which will be baseline</li> </ul>	<ul style="list-style-type: none"> <li>• Action by the construction contractor</li> <li>• Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>
All administrative permits to be taken from local authorities	<ul style="list-style-type: none"> <li>• Permit to be taken are the following but not limited to: <ul style="list-style-type: none"> <li>✓ Construction permit</li> <li>✓ Environmental Impact Assessment</li> <li>✓ Quarry permit</li> <li>✓ Borrow pit permit</li> <li>✓ River bed permit</li> <li>✓ Land use permit</li> <li>✓ Etc.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• All obtained permits to be declared to the Client / PIU and PIC in advance of commencement of the work</li> </ul>	<ul style="list-style-type: none"> <li>• Action by the construction contractor</li> <li>• Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>

Environmental issues and possible impacts	Parameters to be monitored	Impact performance indicator	Implementation responsibilities
Construction period			
Ambient air pollution	<ul style="list-style-type: none"> <li>• Ambient air quality monitoring measurements to be conducted for the SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>2.5</sub> and PM<sub>10</sub> parameters as well as the parameters specified in the Kyrgyz Republic regulations. These measurements to be conducted at the same locations as baseline measurements.</li> </ul>	<ul style="list-style-type: none"> <li>• Measurement results of ambient air quality parameters, which will be monitoring results and are compared to baseline results during the construction period</li> </ul>	<ul style="list-style-type: none"> <li>• Action by the construction contractor</li> <li>• Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>
Noise generation	<ul style="list-style-type: none"> <li>• Monitoring noise level to be measured at the same locations as baseline measurements</li> </ul>	<ul style="list-style-type: none"> <li>• Measurement results of noise level, which will be monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Action by the construction contractor</li> </ul>

		results and are compared to baseline results during the construction period	<ul style="list-style-type: none"> <li>Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>
Vibration generation	<ul style="list-style-type: none"> <li>Monitoring structural vibration level to be measured at the same locations as baseline measurements (if transportation routes to pass by sensitive areas)</li> </ul>	<ul style="list-style-type: none"> <li>Measurement results of vibration level, which will be monitoring results and are compared to baseline results during the construction period</li> </ul>	<ul style="list-style-type: none"> <li>Action by the construction contractor</li> <li>Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>
Surface water quality	<ul style="list-style-type: none"> <li>Surface water quality monitoring measurements to be conducted for the temperature, total suspended solid BOD, COD, Dissolved oxygen and Ammonia (NH<sub>3</sub>-N) parameters as well as the parameters specified in the Kyrgyz Republic regulations These measurements to be conducted at the same locations as baseline measurements.</li> </ul>	<ul style="list-style-type: none"> <li>Measurement results of surface water quality parameters, which will be monitoring results and are compared to baseline results during the construction period</li> </ul>	<ul style="list-style-type: none"> <li>Action by the construction contractor</li> <li>Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>
Soil pollution	<ul style="list-style-type: none"> <li>Soil quality monitoring measurements to be conducted for the parameters specified in the Kyrgyz Republic regulations. These measurements to be conducted at the same locations as baseline measurements.</li> </ul>	<ul style="list-style-type: none"> <li>Measurement results of soil quality parameters, which will be monitoring results and are compared to baseline results during the construction period</li> </ul>	<ul style="list-style-type: none"> <li>Action by the construction contractor</li> <li>Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>
Waste water generation	<ul style="list-style-type: none"> <li>In case there is a package wastewater treatment plant, pH, BOD, COD, total nitrogen, total phosphorus, oil &amp; grease, total suspended solid and total coliform bacteria as well as the parameters specified in the Kyrgyz Republic regulations to be measured in outlet water sample</li> </ul>	<ul style="list-style-type: none"> <li>Measurement results of treated wastewater are compared to international standards or the Kyrgyz Republic standards</li> </ul>	<ul style="list-style-type: none"> <li>Action by the construction contractor</li> <li>Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>
Site Specific Environmental, Health and Safety Management Plan (SSEHSMP)	<ul style="list-style-type: none"> <li>Preparation of SSEHSMP by the construction contractor</li> <li>The construction contractor to keep all documents available at site all the time <ul style="list-style-type: none"> <li>✓ Occupational health and safety risk assessment</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Approval by the Client/PIU</li> </ul>	<ul style="list-style-type: none"> <li>Action by the construction contractor</li> <li>Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>

	<ul style="list-style-type: none"> <li>✓ Community health and safety risk assessment</li> <li>✓ Environmental risk assessment</li> <li>✓ Emergency response plan</li> </ul>		
Waste depositing in camp site	<ul style="list-style-type: none"> <li>• The construction contractor to deposit all wastes as defined in Environmental Management Plan (EMP)</li> </ul>	<ul style="list-style-type: none"> <li>• Visual inspections</li> </ul>	<ul style="list-style-type: none"> <li>• Action by the construction contractor</li> <li>• Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>
Waste disposal contracts	<ul style="list-style-type: none"> <li>• The construction contractor to sign contracts with accredited companies for disposal of those <ul style="list-style-type: none"> <li>✓ Domestic waste disposal (with municipality)</li> <li>✓ Domestic wastewater disposal (with municipality if no package WWTP)</li> <li>✓ Medical waste contract</li> <li>✓ Waste oil contract</li> <li>✓ Vegetative waste oil contract</li> <li>✓ Waste battery-accumulator contract</li> <li>✓ Recyclable waste contract</li> </ul> </li> <li>• The construction contractor to keep all contracts available at site all the time</li> </ul>	<ul style="list-style-type: none"> <li>• Declaration to the Client / PIU and PIC</li> </ul>	<ul style="list-style-type: none"> <li>• Action by the construction contractor</li> <li>• Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>
Training records	<ul style="list-style-type: none"> <li>• The construction contractor to conduct trainings to his workforce in the following subjects, but not limited to; <ul style="list-style-type: none"> <li>✓ Basic occupational health and safety training</li> <li>✓ Occupational health and safety trainings on technical subjects</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Percentage of trained workforce</li> </ul>	<ul style="list-style-type: none"> <li>• Action by the construction contractor</li> <li>• Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>

	<ul style="list-style-type: none"> <li>✓ Basic environmental trainings</li> <li>✓ Basic social awareness training</li> <li>✓ ADB SPS requirements trainings</li> </ul> <ul style="list-style-type: none"> <li>• The construction contractor to keep all training record available at site all the time</li> </ul>		
Recruitment policy	<ul style="list-style-type: none"> <li>• Number of local employees and its percentage to total workforce</li> <li>• Number of women employees and its percentage to total workforce</li> </ul>	<ul style="list-style-type: none"> <li>• Percentage of local workforce</li> <li>• Percentage of women workforce</li> </ul>	<ul style="list-style-type: none"> <li>• Action by the construction contractor</li> <li>• Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>

Environmental issues and possible impacts	Parameters to be monitored	Impact performance indicator	Implementation responsibilities
Post-Construction period			
Application of re-instatement plan	<ul style="list-style-type: none"> <li>• Camp site, quarry and borrow pits to be reinstated by the construction contractor after completion of construction works</li> </ul>	<ul style="list-style-type: none"> <li>• Visual inspection</li> </ul>	<ul style="list-style-type: none"> <li>• Action by the construction contractor</li> <li>• Supervision by safeguard specialists of PIC, PIU and the Client</li> </ul>

### 9.3. Coordinate list of sampling locations

Location	Point	Longitude	Latitude
Shaidan	W1	72,747079	41,224990
	W2	72,716410	41,157291
Kogart Kanjiga	W1	73,609862	41,134504
	W2	73,550124	41,130319
Kara-Alma	W1	73,220539	41,162442
	W2	73,179505	41,155730
Kogart Mihailovka	W1	73,219717	41,162566
	W2	73,180875	41,156582
Chatkal	W1	70,767734	41,665526
	W2	70,681998	41,690969
Gava-Say	W1	70,864224	41,255089
	W2	70,894631	41,211478
Padysha-Ata	W1	71,646427	41,623235
	W2	71,667377	41,587528
Torkent	W1	73,178041	41,844887
	W2	73,148347	41,809646
HMC	W1	72,968812	40,963582
	W2	72,937561	40,929398

\*All sampling locations are proposal points. It may vary depending on due diligence studies. Locations are selected according to closest areas and water source that are likely to be affected. W: Surface water sampling point

Figure 14: Shaidan sampling map

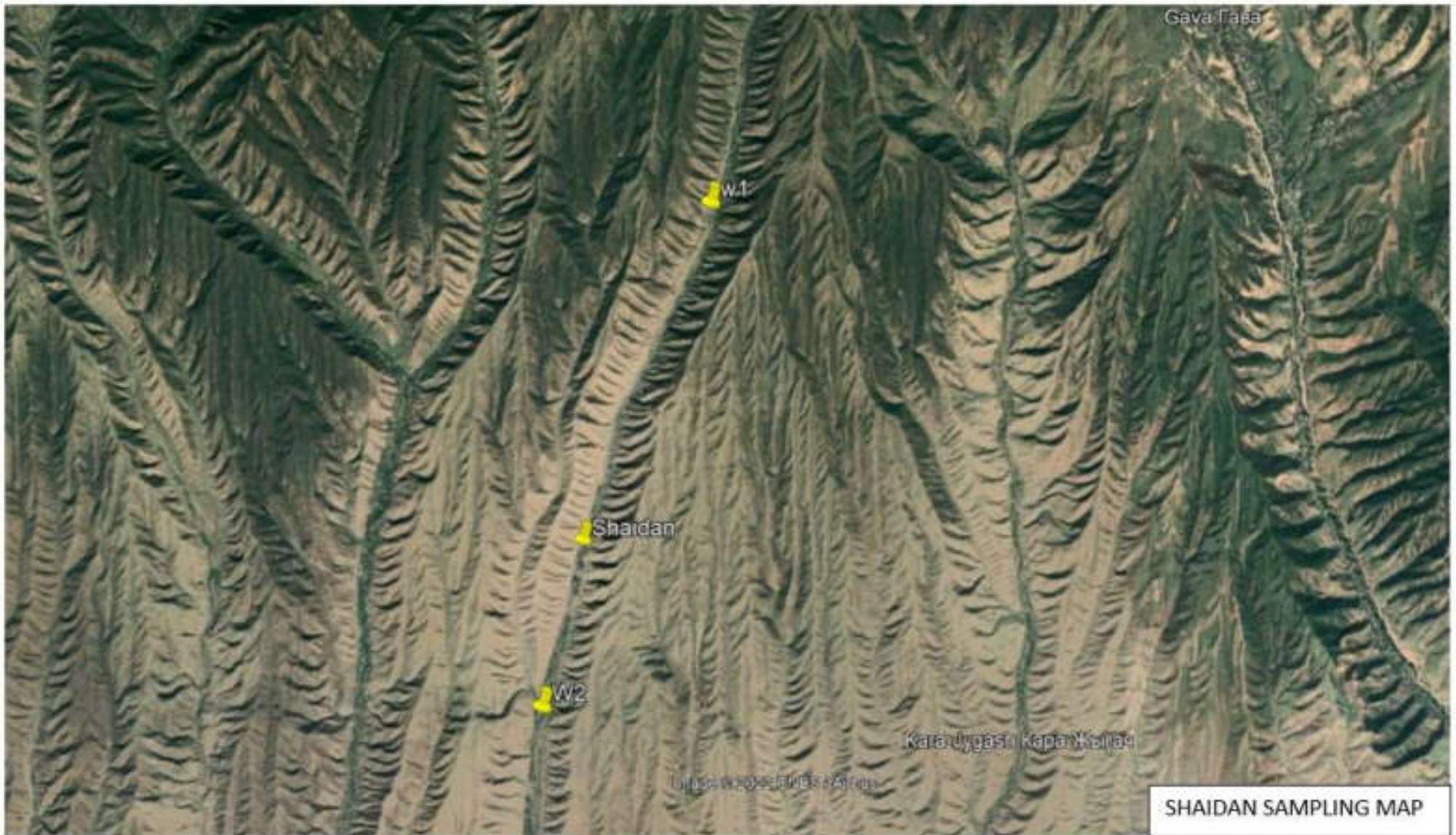


Figure 15: Kogart Kanjiga sampling map



*Figure 16: Kara-Alma sampling map*



Figure 17: Kogart Mihailovka sampling map



Figure 18: Chatkal sampling map

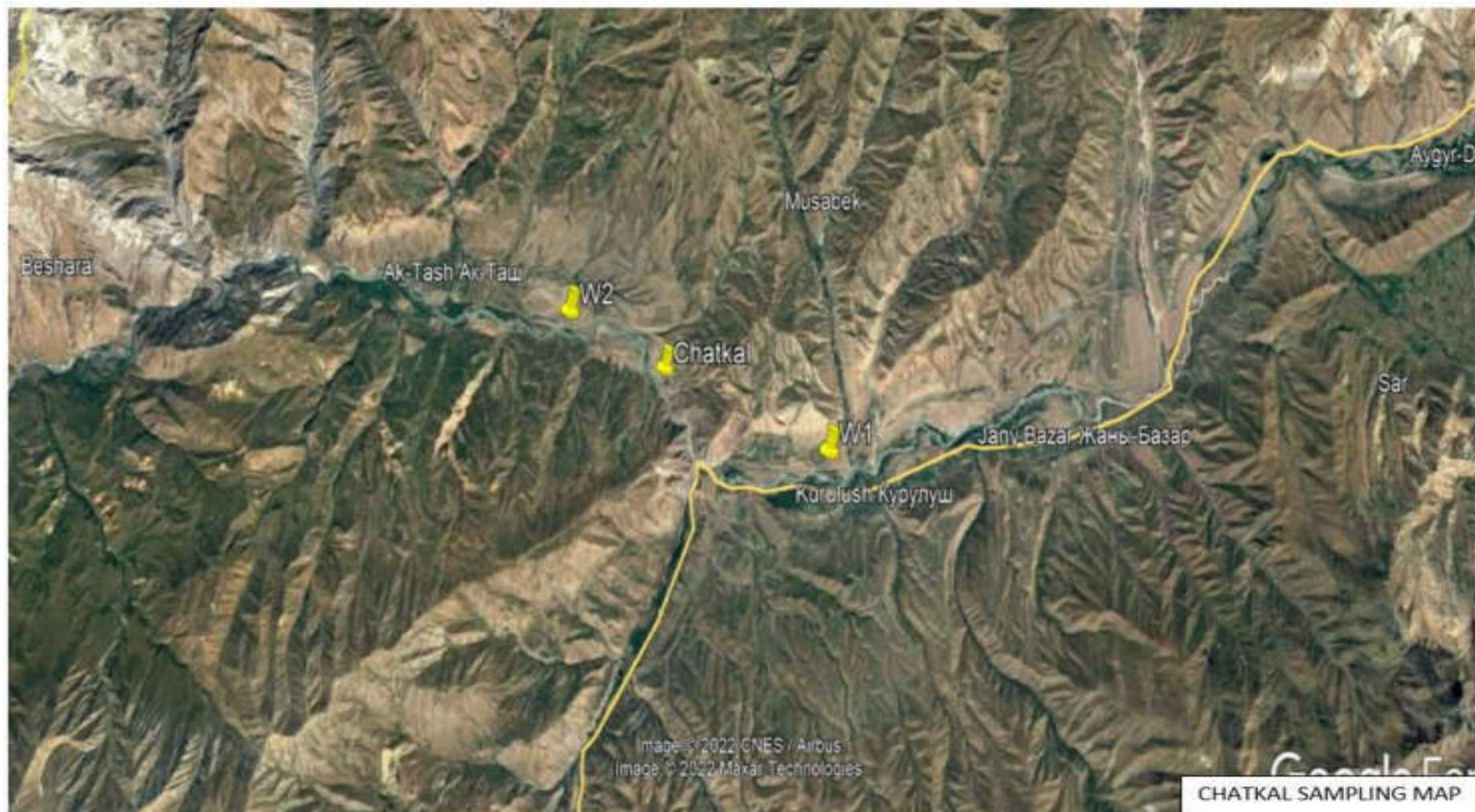


Figure 19: Gava-Say sampling map

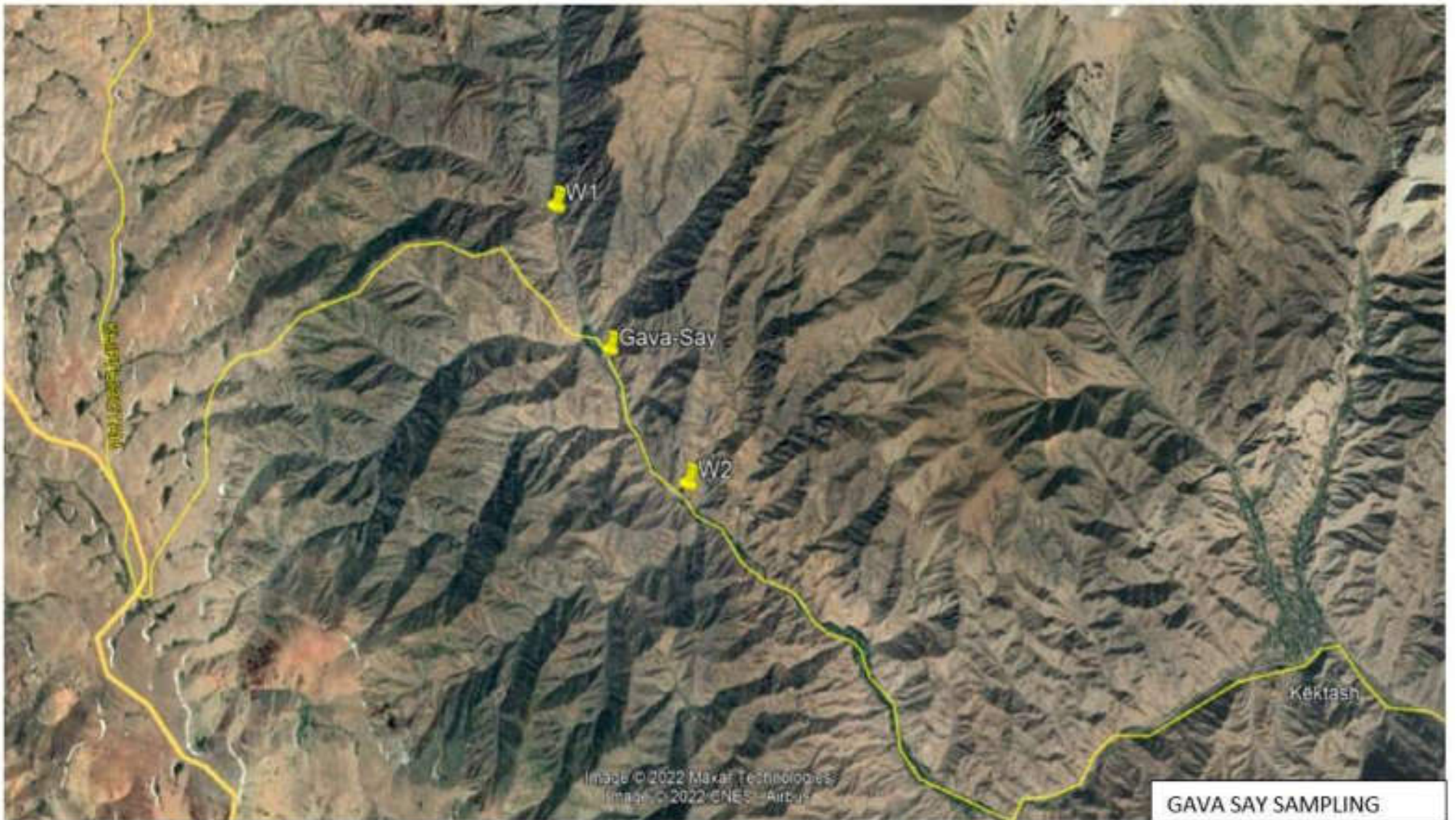




Figure 20: Padysha-Ata sampling map

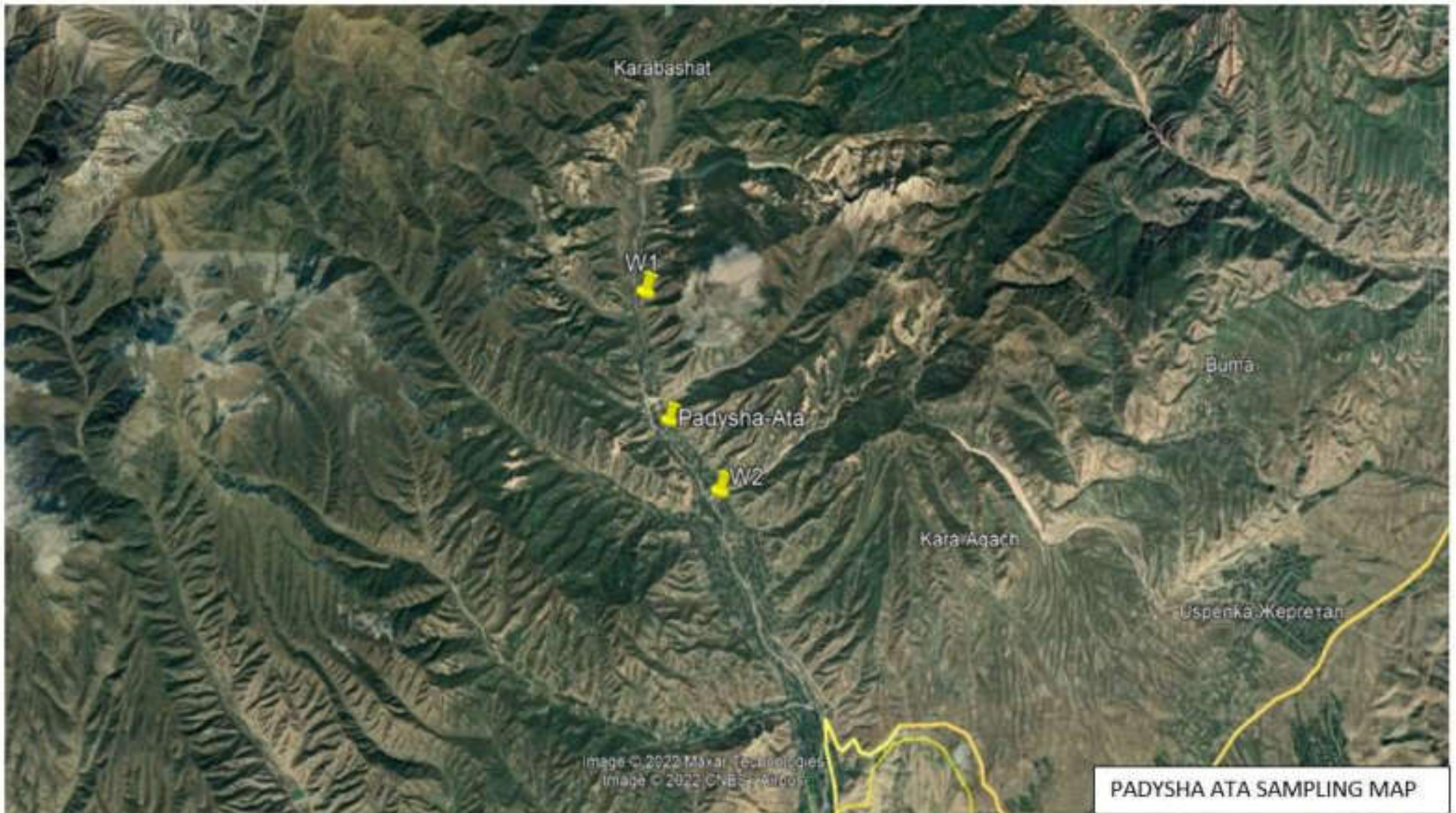




Figure 21: Torkent sampling map

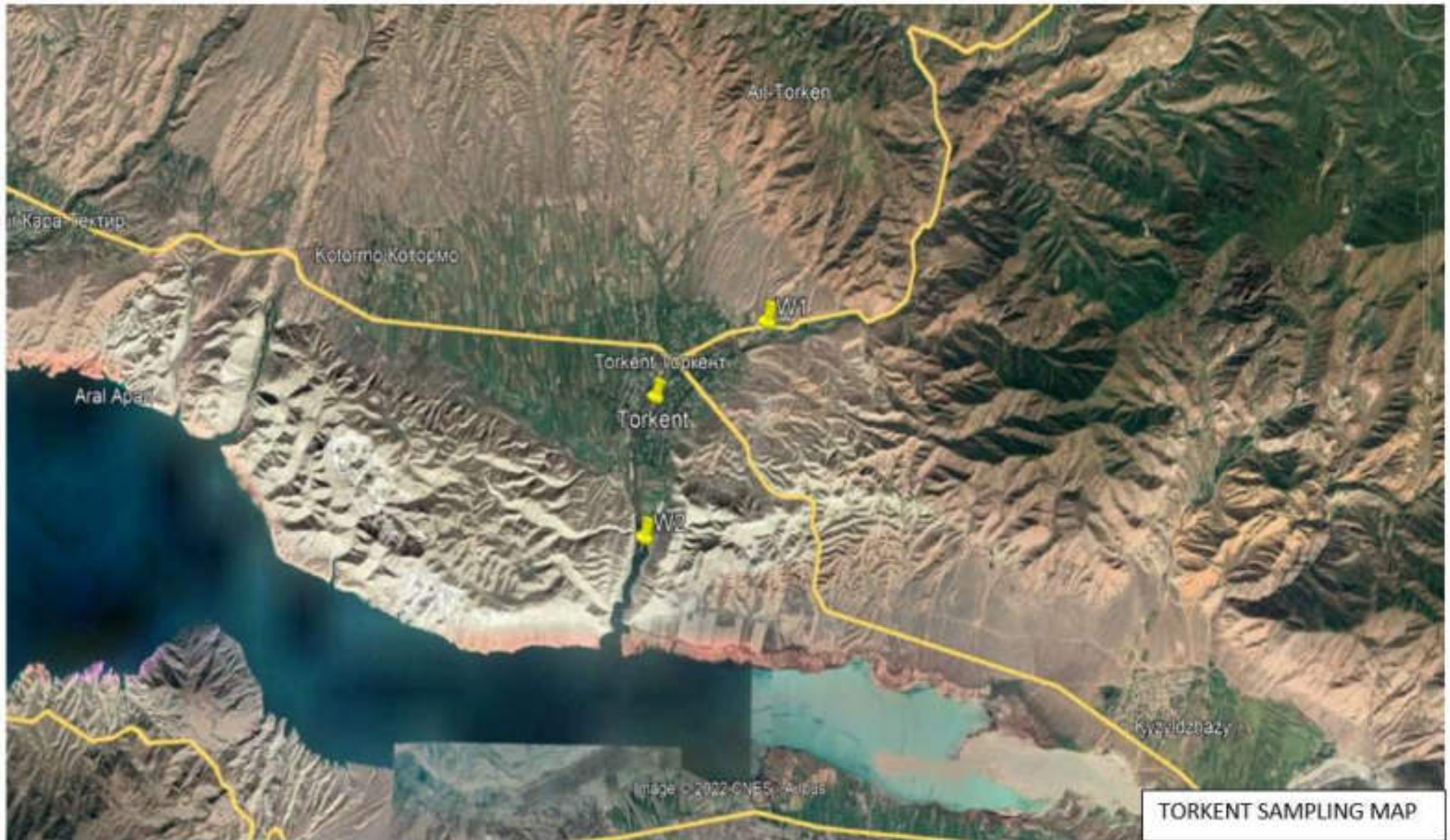
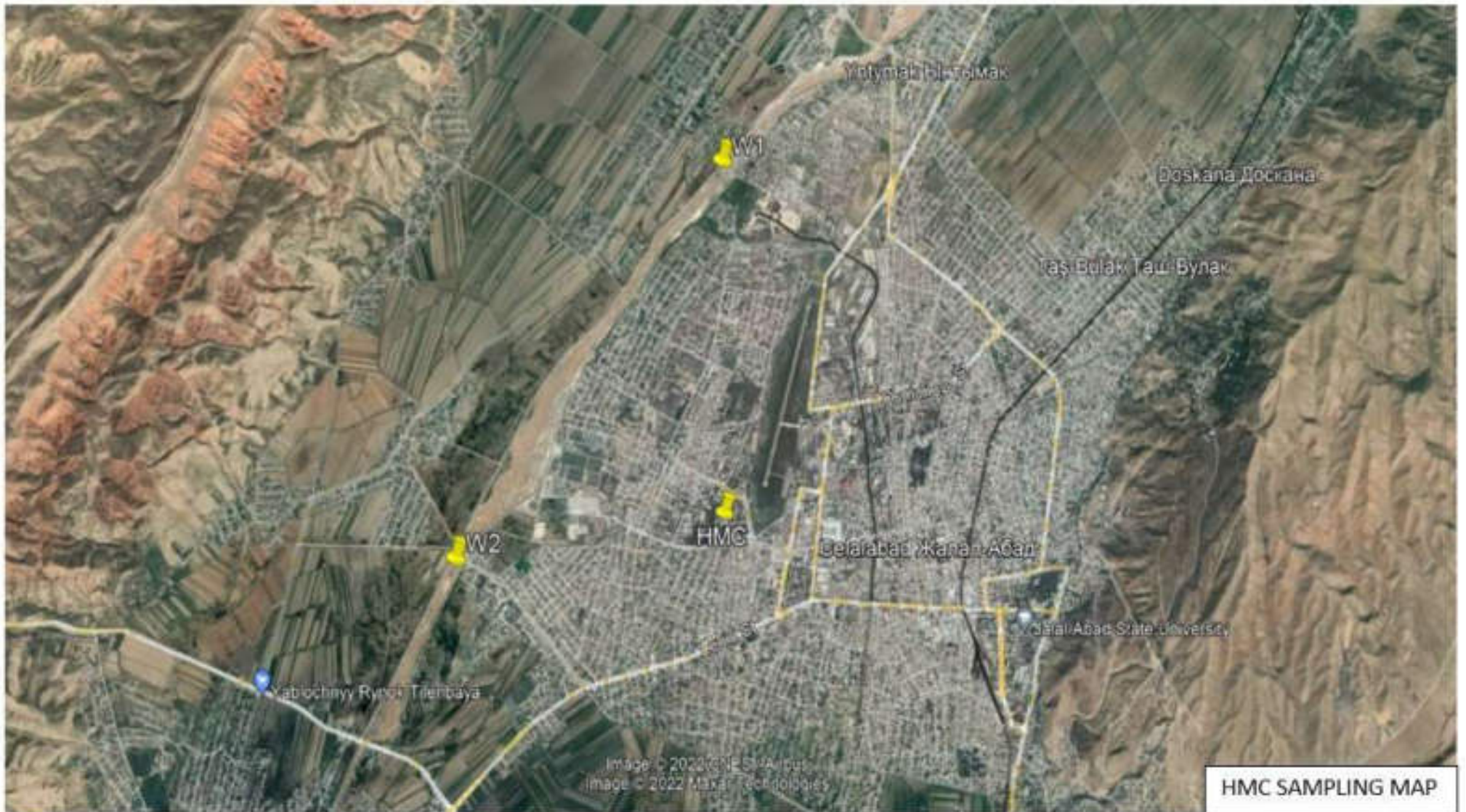


Figure 22: HMC sampling map



## 9.4. Environmental safeguard action plan

Table 21: Environmental safeguard action plan

<b>Construction phase</b>	<b>Action to be taken</b>	<b>Responsible</b>	<b>Timeframe</b>	<b>Supervision</b>	<b>Output</b>
• Pre-construction	• Making pre-work photo documentation of work places	• The Contractor	• In advance of starting to construction works	• PIU/PIC	• Ensure compliance with international/national standards and ADB requirements
• Pre-construction	• All statutory permit and clearance to be taken <ul style="list-style-type: none"> <li>✓ Land agreement</li> <li>✓ Construction permit</li> <li>✓ Borrow pit</li> <li>✓ River bed</li> <li>✓ OVOS positive</li> </ul>	• The Contractor	• In advance of starting to construction works	• PIU/PIC	• Ensure compliance with international/national standards and ADB requirements
• Pre-construction	• Field Survey to find out historical monuments or protected areas	• The Contractor	• In advance of starting to construction works	• PIU/PIC	• Ensure compliance with international/national standards and ADB requirements
• Pre-construction	• Detection of public utilities that are likely to be damaged	• The Contractor	• In advance of starting to construction works	• PIU/PIC	• Ensure compliance with international/national standards and ADB requirements

<b>Construction phase</b>	<b>Action to be taken</b>	<b>Responsible</b>	<b>Timeframe</b>	<b>Supervision</b>	<b>Output</b>
• Pre-construction	• Preparation of Site Specific Environmental, Health and Safety Management Plan	• The Contractor	• In advance of starting to construction works	• PIU/PIC	• Ensure compliance with international/national standards and ADB requirements
• Pre-construction	• Preparation of all health and safety related documents ✓ HS plan ✓ All HS instructions ✓ Emergency response plan ✓ Risk assessment	• The Contractor	• In advance of starting to construction works	• PIU/PIC	• Ensure compliance with international/national standards and ADB requirements
• Pre-construction	• Environmental baseline measurements	• The Contractor	• In advance of starting to construction works	• PIU/PIC	• Ensure compliance with international/national standards and ADB requirements
• Pre-construction	• Removal of top soil	• The Contractor	• In advance of starting to construction works	• PIU/PIC	• Ensure compliance with international/national standards and ADB requirements
• Construction	• Environmental monitoring measurements	• The Contractor	• In a frequency as indicated by PIU/PIC	• PIU/PIC	• Ensure compliance with international/national standards and ADB requirements

<b>Construction phase</b>	<b>Action to be taken</b>	<b>Responsible</b>	<b>Timeframe</b>	<b>Supervision</b>	<b>Output</b>
<ul style="list-style-type: none"> <li>• Construction</li> </ul>	<ul style="list-style-type: none"> <li>• Agreements signed with accredited disposal companies               <ul style="list-style-type: none"> <li>✓ Wastewater</li> <li>✓ Used tires</li> <li>✓ Batteries</li> <li>✓ Domestic waste</li> <li>✓ Hazardous wastes</li> <li>✓ Medical waste</li> <li>✓ Waste oil</li> <li>✓ Vegetative waste oil</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• The Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• As/when needed</li> </ul>	<ul style="list-style-type: none"> <li>• PIU/PIC</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure compliance with international/national standards and ADB requirements</li> </ul>
<ul style="list-style-type: none"> <li>• Post construction</li> </ul>	<ul style="list-style-type: none"> <li>• Re-instatement plan</li> </ul>	<ul style="list-style-type: none"> <li>• The Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• In advance of final payment</li> </ul>	<ul style="list-style-type: none"> <li>• PIU/PIC</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure compliance with international/national standards and ADB requirements</li> </ul>

## 9.5. Site specific environmental, health and safety management plan (SSEHSMP)

457. SSEHSMP will be developed by the construction contractors during the detailed design phase and will be implemented prior to the start of the construction works. They will contain procedures and plans to ensure that the mitigation measures and monitoring requirements are implemented during the construction period.

458. The list of SSEHSMPs to be required by the contractor is as follows:

- Waste Management Plan and Procedure (waste categories, handling and intermediate storage and transport, waste reuse and recycling, disposal);
- Surface Water Management Plan and Spill Emergency Procedure (spill categories, small spill intervention, large spill emergencies, spill kit materials, procedures for containment and clean- up, personnel training);
- Soil Management Plan and Spill Emergency Procedure (spill categories, small spill intervention, large spill emergencies, spill kit materials, procedures for containment and clean- up, personnel training);
- Noise and Vibration Management Plan (by category of vehicle/machinery/plant, procedures for limitation, personnel training);
- Atmospheric Emissions and Dust Management Plan (by category of vehicle/machinery/plant, procedures for limitation, personnel training);
- Visual and Cleanliness Management Plan (organization of the construction site, material and waste management procedures, personnel training)
- Health and Safety Management Plan (incident/accident categories, emergency kit material, procedures for risk reduction, personnel training).

459. The SSEHSMPs will include the monitoring requirements specified in **Table 20** presented above.

460. The SSEHSMPs implementation will require the following implementation arrangements: the Contractor's Site Manager is responsible for the implementation of the SSEHSMP at the construction site, based on legal requirements and IEE. To achieve this task, he mainly relies on the company's Environmental Officer. The Contractor's Site Manager must:

- Request the necessary Licenses and Authorizations that correspond to the environmental matter that will be affected by the Project.
- Carry out the control of the corresponding Licenses and Authorizations.
- Contract the necessary services to withdraw the waste generated by the Project (handling, haulage, dump, etc.)
- Control of the waste quality.
- Comply with the legal and environmental requirements that apply to the project.
- Assess everyday compliance with the requirements.
- Sign the Operation Control Sheets, in case of anomaly.
- Identify and Register any Non-Conformity that could happen regarding the environmental plan and implement the appropriate action when an incident occurs.
- Verify the implementation and efficiency of the implemented action.
- Act in case of emergency.
- Identify and register the external communications.

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461. The PIU safeguard specialists and PIC safeguard specialists will be responsible for

monitoring environmental impacts and proper implementation of the various preventive actions and mitigation measures required by the SSEHSMPs. This will entail regular site visits to verify that environmental impacts are under control and appropriate preventive actions and/or mitigation measures have been implemented.

**9.6. EMMP cost**

462. The contractor has to take fully account of the SSEHSMP specifications and shall bear all the costs for its implementation in the framework of that. As such, he shall make a provision in its financial proposal for all costs incurred by the necessary measures to avoid, reduce or compensate all environmental impacts related to the subproject construction works.

463. The monitoring costs are included in the PIU staff costs.

464. The EMMP costs referred to in the present section are those likely to increase the initial costs estimated in the feasibility study report. Please see **Table 22** below.

*Table 22: Cost of mitigation measures*

Item	Unit	Quantity	Unit Cost	Total	Remarks
<b>A. STAFF</b>					
International Environmental Specialist of PIC	man month				Included in PIC Cost
Local Environmental Specialist Of PIC	man month				Included in PIC Cost
Local Social Specialist Of PIC	man month				Included in PIC Cost
EHS Supervisor Officer of Construction Contractor	man month	18	2500	45000	Included in Construction Contractor Cost
<b>B. EMP Implementation</b>					
Trainings delivered by PIC	lump sum				Included in PIC Cost
Trainings delivered by Construction Contractor	lump sum				Included in the contractor's cost
Pamphlets, brochures used for public awareness	lump sum	1	600	600	Included in Construction Contractor Cost
Safety labels and other traffic arrangement signs	lump sum	1	2000	2000	Included in Construction Contractor Cost
Safety barriers, band used during the construction	lump sum	1	750	750	Included in Construction Contractor Cost
PPE, fire extinguishers, etc.	lump sum	1	3000	3000	Included in Construction Contractor Cost
COVID-19 protection kits, masks, etc.	lump sum	1	2000	2000	Included in Construction Contractor Cost
Dust Suppression	per truck	100	20	2000	Included in Construction Contractor Cost

Item	Unit	Quantity	Unit Cost	Total	Remarks
Domestic solid waste disposal	per transport	50	50	2500	Included in Construction Contractor Cost
Sewerage disposal	per transport	50	50	2500	Included in Construction Contractor Cost
Hazardous waste disposal	per transport	30	50	1500	Included in Construction Contractor Cost
Drinking water supply	per day	500	10	5000	Included in Construction Contractor Cost
Water quality monitoring (BOD, SS, pH, NH3-N, total P, oil)	per analysis	16	13	208	Included in Construction Contractor Cost
<b>Total</b>				<b>67058</b>	

## 10. CONCLUSION AND RECOMMENDATION

465. Rehabilitation of hydro-post and especially establishing early warning systems are of vital importance both for ensuring security of local people that are likely to be affected by any possible climatic disaster that may be occurring because of lack of these mentioned systems and for sustainability of agricultural activities and in parallel, its inputs to local people.

466. Generally, all rehabilitation works to be executed by means of re-constructing existing old buildings after demolishing of those. This is why it may be deemed that this sub-project will not require any land acquisition which will possibly cause negative social effects on local people. Please see **appendix 12.13** for LAR check lists.

467. The fauna and flora in vicinity of project realization areas are not very rich. Hydro post building rehabilitation works to be performed in a very limited construction areas which already have got very poor floristic ecosystem. Therefore, the level/degree of impact is rather low and there is no threat to biodiversity as a whole. Generally, all existing hydro-post buildings are by the surface water bodies. So, during the construction period, special attention should be paid to surface water protection procedure.

468. Although the environmental survey of this sub-project has identified a few potential impacts associated with the construction period, the use of good construction practices and simple and affordable mitigation measures will ensure that these impacts are not significant and do not affect the feasibility of the proposed project.

469. The environmental consequences of the proposed subproject components will include:

- Low loss of vegetation
- Low risk of damage to floristic ecosystem
- Moderate risk of damage to faunal ecosystem
- Low risk of biodiversity loss;
- Minor impact on landscape;
- Low level nuisances to the neighborhood during the construction period (dust, atmospheric pollution, noise, traffic disturbances, etc.);
- Low greenhouse gas emissions;

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- Low risk of exposure to health and safety risks.

470. Positive environmental and social impacts will include:

- Increase the security protection level of local people against possible climatic disaster
- Increase employment of local people;
- Potential reduction in the cost of agricultural products, leading to an improved quality of life;

471. The application of proven, internationally accepted environmentally sound design solutions, good management and construction practices during the project implementation are sufficient measures to avoid, minimize, mitigate and compensate almost all potentially significant adverse effects of the impact on the environment.

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## 12. APPENDIXES

### 12.1. Calculation of emissions of pollutants into the atmosphere for Shaidan

#### 7.1. Calculations of emissions of pollutants into the atmosphere

This section shows the calculations of emissions of pollutants into the atmosphere, performed in accordance with the following instructions, conditions and methods:

Emissions into the atmosphere: the source documents were: "Collection of Methods for Calculating Air Emissions of Pollutants by Various Industries". L., Gidrometeoizdat, 1986; "Methodological guide for calculating emissions from fugitive sources in the building materials industry". Novosibirsk, 1989; "Instructions for determining the payment for the emissions of pollutants by vehicles. Ministry of Environmental Protection. Approved by the Resolution of the Board of the Ministry of Environmental Protection of the Kyrgyz Republic No. 4 dated September 17, 1999.

Operating time: operating time of BSU (concrete mixing unit), electric arc welding, painting, excavation and loading and transport works, diesel fuel consumption are taken according to the calculation of the duration of the construction work of the projected object.

Consumables: the consumption of electrodes, paint and other materials are taken in accordance with the list of harmful substances emitted into the atmosphere is compiled in accordance with the Hygienic Standards GN 2.1.6.1338-03 "Maximum Permissible Concentrations (MPC) of pollutants in the atmospheric air of populated areas". Approved by the Decree of the Chief State Sanitary Doctor of the Kyrgyz Republic No. 20 dated May 28, 2004. Registered by the Ministry of Justice of the Kyrgyz Republic (reg. No. 64-04 dated 10.06.2004); Hygienic standards GN 2.1.6.1339-03 "Safe reference levels of impact-SRLI of pollutants in the atmospheric air of populated areas". Approved by the Decree of the Chief State Sanitary Doctor of the Kyrgyz Republic No. 20 dated May 28, 2004. Registered by the Ministry of Justice of the Kyrgyz Republic (reg. No. 64-04 dated 10.06.2004).

The list contains MPCs of harmful substances in the atmospheric air: maximum one-time, average daily, SRLI, as well as the total annual emissions for each substance.

Damage: the calculation of damage was carried out in accordance with the Guidelines for determining fees for environmental pollution in the Kyrgyz Republic, approved by the Decree of the Government of the Kyrgyz Republic dated November 10, 2004 No. 823.

Below are tables for calculating emissions of pollutants into the atmosphere generated during construction work:

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986
Name of the source	BSU (concrete mixing unit)
Main formula: $M = q \times T \times 3600 \times 10^{-6}, \tau / \rho \times \alpha$	
q - specific emission of a pollutant, g/s	1,0
T- working time per year, hour	822
Name of pollutant	Dust containing $SiO_2$ 20-70%
M, t/year	2,939

### 7.2 Calculation of emissions of pollutants from welding

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986		
Name of the source	Electric arc welding machine		
Main formula: $M = q \times \Pi \times 10^{-6}, \tau/\text{rod}$			
q - specific pollutant emission, g/kg			
Π - annual consumption of electrodes, kg	40		
Brand of electrodes	MP-3		
Operating time, hour/year	179		
Pollutants			
	Welding spray	Manganese oxides	Hydrogen fluoride
g/kg	9,7	1,8	0,4
M, t/year	0,0004	0,0001	0,00002
M, g/s	0,0003	0,0001	0,00001

### 7.3 Calculation of emissions of pollutants into the atmosphere from the cement silo

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986	
Name of the source	Silo Cement warehouse	
Specific dust emission, g/s	2,6	
Injection time, hour/year	104	
Dust emission into the atmosphere, t/year	0,969	

### 7.4 Calculation of dust emissions into the atmosphere during excavation and loading operations

Used methods of calculations	Guidelines for calculating emissions from fugitive sources in the building materials industry. Sovuzstremekologiya, 1989	
Name of the source	Excavation and loading works	
Main formula: $Q = P_1 \times P_2 \times P_3 \times P_4 \times P_5 \times P_6 \times G \times B_1 \times 10^6 / 3600, \tau/c$		
$P_1$ - proportion of dust fraction in the rock	0,04	
$P_2$ - proportion of dust that turns into aerosol	0,02	
$P_3$ - coefficient taking into account the wind speed in the area of equipment operation	1,2	
$P_4$ - coefficient taking into account the wind speed in the area of equipment operation	0,8	
$P_5$ - coefficient taking into account the fineness of the material	0,6	
$P_6$ - coefficient taking into account local conditions	1	
G - the amount of rock processed by the excavator, th	170	

$E_1$ – coefficient taking into account the height of the overflow	0,5
Emissions, g/s	10,9
Emissions, t/year	143,7

### 7.5 Calculation of pollutant emissions from the spray gun

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries L., Gidrometeoizdat, 1986		
Name of the source	Spray gun		
Enamel PF-115 (consumption kg/year)	148		
Fluorescent spray method	Spray gun, brush		
Operating time, hour/year	38		
Pollutants: specific emission	Emission of pollutant (%)	t/year	g/s
1. xylene	22,5	0,033	0,245
2. White Spirit	22,5	0,033	0,245

### 7.6 Calculation of emissions of pollutants from vehicles

Diesel fuel is used in the construction of vehicles. Annual consumption of diesel fuel - 32.7 tons.

Substance name	Release of matter, t/year	
	Specific emission	t/year
1	4	5
1. Carbon monoxide	0,047	1,54
2. Nitric oxide	0,033	1,08
3. Hydrocarbons	0,019	0,62
4. Soot	0,0092	0,30
5. Sulphur dioxide	0,002	0,07
Total		3,60

### 7.7 List of pollutants emitted into the atmosphere

No.	The name of the substance	MPC one- year mg/m <sup>3</sup>	MPC 24-hour mg/m <sup>3</sup>	SRLI mg/m <sup>3</sup>	Substance release t/year
1	2	3	4	5	7
1	Dust containing SiO <sub>2</sub> 20-70%	0,5	0,1	-	148,828
2	Welding spray	0,01	0,001	-	0,0004
3	Manganese oxides	0,01	0,001	-	0,0001
4	Hydrogen fluoride	0,02	0,005	-	0,00002
5	Xylene	0,2	0,2	-	0,033

6	White Spirit	-	-	1,0	0,033
7	Carbon monoxide	5,0	3,0	-	1,537
8	Nitrogen monoxide	0,085	0,04	-	1,079
9	Hydrocarbons	-	-	1,0	0,621
10	Soot	0,15	0,05	-	0,301
11	Sulphur dioxide	0,5	0,05	-	0,065
	Total				152,50

## 12.2. Calculation of emissions of pollutants into the atmosphere for Kogart

Below are tables for calculating emissions of pollutants into the atmosphere generated during construction work.

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986
Name of the source	BSU (concrete mixing unit)
Main formula: $M = q \times T \times 3600 \times 10^{-6}, m/год$	
$q$ - specific emission of a pollutant, g/s	1,0
$T$ - working time per year, hour	822
Name of pollutant	Dust containing SiO <sub>2</sub> 20-70%
$M$ , t/year	2,959

### 5.2 Calculation of emissions of pollutants from welding

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986.		
Name of the source	Electric arc welding machine		
Main formula: $M = q \times \Pi \times 10^{-6}, m/год$			
$q$ - specific emission of a pollutant, g/s			
$\Pi$ - annual consumption of electrodes, kg	40		
Brand of electrodes	MP-3		
Operating time, hour/year	379		
Pollutants			
	Welding spray	Manganese oxides	Hydrogen fluoride
$g/kg$	9,7	1,8	0,4
$M$ , t/year	0,0004	0,0001	0,00002
$M$ , g/s	0,0003	0,0001	0,00001

### 5.3 Calculation of emissions of pollutants into the atmosphere from the cement silo

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986	
Name of the source	Warehouse Silo Cement	
Specific dust emission, g/s	2,6	
Injection time, hour/year	104	
Dust emission into the atmosphere, t/year	0,969	

### 5.4 Calculation of dust emissions into the atmosphere during excavation and loading operations

Used methods of calculations	Guidelines for calculating emissions from fugitive sources in the building materials industry. Soyuzstromeкологиya, 1989	
Name of the source	Excavation and loading works	
Main formula: $Q = P_1 \times P_2 \times P_3 \times P_4 \times P_5 \times P_6 \times G \times B_1 \times 10^6 / 3600 \cdot \tau / c$		
$P_1$ – proportion of dust fraction in the rock	0,04	
$P_2$ – proportion of dust that turns into aerosol	0,02	
$P_3$ – coefficient taking into account the wind speed in the area of equipment operation	1,2	
$P_4$ – coefficient taking into account the moisture content of the material	0,8	
$P_5$ – coefficient taking into account the fineness of the material	0,6	
$P_6$ – coefficient taking into account local conditions	1	
$G$ – the amount of rock processed by the excavator, t/h	170	
$B_1$ – coefficient taking into account the height of the overflow	0,5	
Emissions, g/s	10,9	
Emissions, t/year	143,7	

### 5.5 Calculation of pollutant emissions from the spray gun

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986		
Name of the source	Spray gun		
Enamel PF-115 (consumption kg/year)	148		
Fluorescent spray method	Spray gun, brush		
Operating time, hour/year	38		
Pollutants: specific emission	Emission of pollutant (%)	tn/year	g/s
1.Xylene	22,5	0,033	0,245
2.White Spirit	22,5	0,033	0,245

### 5.6 Calculation of emissions of pollutants from vehicles

Diesel fuel is used in the construction of vehicles. Annual consumption of diesel fuel - 32.7 tons.

Substance name	Release of matter, t/year	
	Specific emission	tp/year
1	4	5
1. Carbon monoxide	0,047	1,54
2. Nitric oxide	0,033	1,08
3. Hydrocarbons	0,019	0,62
4. Soot	0,0092	0,30
5. Sulfur dioxide	0,002	0,07
Total		3,60

### 5.7 List of pollutants emitted into the atmosphere

№	The name of the substance	MPC one-time mg/m <sup>3</sup>	SRLI mg/m <sup>3</sup>	SRLI mg/m <sup>3</sup>	Substance release t/year
1	2	3	4	5	7
1	Dust containing SiO <sub>2</sub> 20-70%	0,3	0,1	-	148,828
2	Welding spray	0,01	0,001	-	0,0004
3	Manganese oxides	0,01	0,001	-	0,0001
4	Hydrogen fluoride	0,02	0,005	-	0,00002
5	Xylene	0,2	0,2	-	0,033
6	White Spirit	-	-	1,0	0,033
7	Carbon monoxide	5,0	3,0	-	1,537
8	Nitrogen monoxide	0,085	0,04	-	1,079
9	Hydrocarbons	-	-	1,0	0,621
10	Soot	0,15	0,05	-	0,301
11	Sulfur dioxide	0,5	0,05	-	0,065
	Total				152,50

### 12.3. Calculation of emission of pollutant into the atmosphere for Chatkal

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986
Name of the source	BSU (concrete mixing unit)
Main formula: $M = q \times T \times 3600 \times 10^{-6}, \tau/\text{year}$	
$q$ - specific emission of a pollutant, g/s	1,0
T- working time per year, hour	822
Name of pollutant	Dust containing SiO <sub>2</sub> 20-70%
M, t/year	2,959

#### 7.2 Calculation of emissions of pollutants from welding

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986
Name of the source	Electric arc welding machine
Main formula: $M = q \times \Pi \times 10^{-6}, \tau/\text{year}$	
$q$ - specific pollutant emission, g/kg	
$\Pi$ - annual consumption of electrodes, kg	40
Brand of electrodes	MP-3
Operating time, hour/year	379
Pollutants	

	Welding spray	Manganese oxides	Hydrogen fluoride
g/kg	9,7	1,8	0,4
M, t/year	0,0004	0,0001	0,00002
M, g/s	0,0003	0,0001	0,00001

### 7.3 Calculation of emissions of pollutants into the atmosphere from the cement silo

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986
Name of the source	Silo Cement warehouse
Specific dust emission, g/s	2,6
Injection time, hour/year	104
Dust emission into the atmosphere, t/year	0,969

### 7.4 Calculation of dust emissions into the atmosphere during excavation and loading operations

Used methods of calculations	Guidelines for calculating emissions from fugitive sources in the building materials industry. Soyuzstremekologiya, 1989
Name of the source	Excavation and loading works
Main formula: $Q = P_1 \times P_2 \times P_3 \times P_4 \times P_5 \times P_6 \times G \times B_1 \times 10^6 / 3600, r/c$	
$P_1$ – proportion of dust fraction in the rock	0,04
$P_2$ – proportion of dust that turns into aerosol	0,02
$P_3$ – coefficient taking into account the wind speed in the area of equipment operation	1,2
$P_4$ – coefficient taking into account the wind speed in the area of equipment operation	0,8
$P_5$ – coefficient taking into account the fineness of the material	0,6
$P_6$ – coefficient taking into account local conditions	1
$G$ – the amount of rock processed by the excavator, t/h	170
$B_1$ – coefficient taking into account the height of the overflow	0,5
Emissions, g/s	10,9
Emissions, t/year	143,7

### 7.5 Calculation of pollutant emissions from the spray gun

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986
Name of the source	Spray gun
Examel PF-115 (consumption kg/year)	148
Fluorescent spray method	Spray gun, brush
Operating time, hour/year	38

Pollutants: specific emission	Emission of pollutant (%)	t/year	g/s
1.Xylene	22.5	0,033	0,245
2.White Spirit	22.5	0,033	0,245

#### 7.6 Calculation of emissions of pollutants from vehicles

Diesel fuel is used in the construction of vehicles. Annual consumption of diesel fuel - 32,7 tons.

Substance name	Release of matter, t/year	
	Specific emission	t/year
1	4	5
1. Carbon monoxide	0,047	1,54
2. Nitric oxide	0,033	1,08
3. Hydrocarbons	0,019	0,62
4. Soot	0,0092	0,30
5. Sulfur dioxide	0,002	0,07
Total		3,60

#### 7.7 List of pollutants emitted into the atmosphere

No.	The name of the substance	MPC one-time	100% / 1000000	SRLI	Substance release
		mg/m <sup>3</sup>	mg/m <sup>3</sup>	mg/m <sup>3</sup>	t/year
1	2	3	4	5	7
1	Dust containing SiO <sub>2</sub> 20-70%	0,3	0,1	-	148,828
2	Welding spray	0,01	0,001	-	0,0004
3	Manganese oxides	0,01	0,001	-	0,0001
4	Hydrogen fluoride	0,02	0,005	-	0,00002
5	Xylene	0,2	0,2	-	0,033
6	White Spirit	-	-	1,0	0,033
7	Carbon monoxide	5,0	3,0	-	1,537
8	Nitrogen monoxide	0,085	0,04	-	1,079
9	Hydrocarbons	-	-	1,0	0,621
10	Soot	0,15	0,05	-	0,301
11	Sulphur dioxide	0,5	0,05	-	0,065
	Total				152,50

## 12.4. Calculation of emission of pollutant into the atmosphere for Gava-Say

Below are tables for calculating emissions of pollutants into the atmosphere generated during construction work.

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986
Name of the source	BSU (concrete mixing unit)
Main formula: $M = q \times T \times 3600 \times 10^{-6}, \tau/\text{год}$	
$q$ - specific emission of a pollutant, g/s	1,0
T- working time per year, hour	822
Name of pollutant	Dust containing SiO <sub>2</sub> 20-70%
M, , t/year	2,959

### 7.2 Calculation of emissions of pollutants from welding

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986.
Name of the source	Electric arc welding machine
Main formula: $M = q \times \Pi \times 10^{-6}, \tau/\text{год}$	
$q$ - specific emission of a pollutant, g/s	
$\Pi$ - annual consumption of electrodes, kg	40
Brand of electrodes	MP-3

Operating time, hour/year	379		
	Pollutants		
	Welding spray	Manganese oxides	Hydrogen fluoride
g/kg	9,7	1,8	0,4
M, t/year	0,0004	0,0001	0,00002
M, g/s	0,0003	0,0001	0,00001

**7.3 Calculation of emissions of pollutants into the atmosphere from the cement silo**

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986
Name of the source	Warehouse Silo Cement
Specific dust emission, g/s	2,6
Injection time, hour/year	104
Dust emission into the atmosphere, t/year	0,969

**7.4 Calculation of dust emissions into the atmosphere during excavation and loading operations**

Used methods of calculations	Guidelines for calculating emissions from fugitive sources in the building materials industry. Soyuzstrooskologiya, 1989
Name of the source	Excavation and loading works
Main formula: $Q = P_1 \times P_2 \times P_3 \times P_4 \times P_5 \times P_6 \times G \times B_1 \times 10^3 / 3600, \text{t/c}$	
$P_1$ – proportion of dust fraction in the rock	0,04
$P_2$ – proportion of dust that turns into aerosol	0,02
$P_3$ – coefficient taking into account the wind speed in the area of equipment operation	1,2
$P_4$ – coefficient taking into account the moisture content of the material	0,8
$P_5$ – coefficient taking into account the fineness of the material	0,6
$P_6$ – coefficient taking into account local conditions	1
$G$ – the amount of rock processed by the excavator, t/h	170
$B_1$ – coefficient taking into account the height of the overflow	0,5
Emissions, g/s	10,9
Emissions, t/year	143,7

**7.5 Calculation of pollutant emissions from the spray gun**

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986
Name of the source	Spray gun

Enamel PF-115 (consumption kg/year)	148		
Fluorescent spray method	Spray gun, brush		
Operating time, hour/year	38		
Pollutants: specific emission	Emission of pollutant (%)	tn/year	g/s)
1.Xylene	22,5	0,033	22,5
2.White Spirit	22,5	0,033	22,5

#### 7.6 Calculation of emissions of pollutants from vehicles

Diesel fuel is used in the construction of vehicles. Annual consumption of diesel fuel - 32.7 tons.

Substance name	Release of matter, t/year	
	Specific emission	tn/year
1	4	1
1. Carbon monoxide	0,047	1. Carbon monoxide
2. Nitric oxide	0,033	2. Nitric oxide
3. Hydrocarbons	0,019	3. Hydrocarbons
4. Soot	0,0092	4. Soot
5. Sulfur dioxide	0,002	5. Sulfur dioxide
Total		Total

#### 7.7 List of pollutants emitted into the atmosphere

№	The name of the substance	MPC one- stage	MPC <del>one-stage</del>	SRLI	Substance release t/year
		mg/m <sup>3</sup>	mg/m <sup>3</sup>	mg/m <sup>3</sup>	
1	2	3	4	5	7
1	Dust containing SiO <sub>2</sub> : 20-70%	0,3	0,1	-	148,828
2	Welding spray	0,01	0,001	-	0,0004
3	Manganese oxides	0,01	0,001	-	0,0001
4	Hydrogen fluoride	0,02	0,005	-	0,00002
5	Xylene	0,2	0,2	-	0,033
6	White Spirit	-	-	1,0	0,033
7	Carbon monoxide	5,0	3,0	-	1,537
8	Nitrogen monoxide	0,085	0,04	-	1,079
9	Hydrocarbons	-	-	1,0	0,621
10	Soot	0,15	0,05	-	0,301
11	Sulfur dioxide	0,5	0,05	-	0,065
	Total				152,50

## 12.5. Calculation of emission of pollutant into the atmosphere for Pasysha-Ata

Below are tables for calculating emissions of pollutants into the atmosphere generated during construction work.

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986
Name of the source	BSU (concrete mixing unit)
Main formula: $M = q \times T \times 3600 \times 10^{-6}, \tau/\text{год}$	
q - specific emission of a pollutant, g/s	1,0
T- working time per year, hour	822
Name of pollutant	Dust containing SiO <sub>2</sub> 20-70%

M, t/year	2,959
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### 7.2 Calculation of emissions of pollutants from welding

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986.		
Name of the source	Electric arc welding machine		
Main formula: $M = q \times \Pi \times 10^{-6}, \tau/\text{year}$			
q - specific emission of a pollutant, g/s			
Π - annual consumption of electrodes, kg	40		
Brand of electrodes	MP-3		
Operating time, hour/year	379		
Pollutants			
	Welding spray		Welding spray
g/kg	9,7	g/kg	9,7
M, t/year	0,0004	M, t/year	0,0004
M, g/s	0,0003	M, g/s	0,0003

### 7.3 Calculation of emissions of pollutants into the atmosphere from the cement silo

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986
Name of the source	Warehouse Silo Cement
Specific dust emission, g/s	2,6
Injection time, hour/year	104
Dust emission into the atmosphere, t/year	0,969

### 7.4 Calculation of dust emissions into the atmosphere during excavation and loading operations

Used methods of calculations	Guidelines for calculating emissions from fugitive sources in the building materials industry. Soyuztransmekhlogiya, 1989
Name of the source	Excavation and loading works
Main formula: $Q = P_1 \times P_2 \times P_3 \times P_4 \times P_5 \times P_6 \times G \times B_1 \times 10^6 / 3600, \tau/\text{c}$	
$P_1$ - proportion of dust fraction in the rock	0,04
$P_2$ - proportion of dust that turn into aerosol	0,02
$P_3$ - coefficient taking into account the wind speed in the area of equipment operation	1,2
$P_4$ - coefficient taking into account the moisture content of the material	0,3
$P_5$ - coefficient taking into account the fineness of the material	0,6
$P_6$ - coefficient taking into account local conditions	1

G – the amount of rock processed by the excavator, t/h	170
B <sub>1</sub> – coefficient taking into account the height of the overflow	0.5
Emissions, g/s	10.9
Emissions, t/year	143.7

#### 7.5 Calculation of pollutant emissions from the spray gun

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L. Gidematsovidat, 1986		
Name of the source	Spray gun		
Enamel PF-115 (consumption kg/year)	148		
Fluorescent spray method	Spray gun, brush		
Operating time, hour/year	38		
Pollutants: specific emission	Emission of pollutant (%)	ts/year	g/s
1.Xylene	22.5	0.033	22.5
2.White Spirit	22.5	0.033	22.5

#### 7.6 Calculation of emissions of pollutants from vehicles

Diesel fuel is used in the construction of vehicles. Annual consumption of diesel fuel – 32.7 tons.

Substance name	Release of matter, tn/year	
	Specific emission	tn/year
1	4	5
1. Carbon monoxide	0.047	1.54
2. Nitric oxide	0.033	1.08
3. Hydrocarbons	0.019	0.62
4. Soot	0.0092	0.30
5. Sulfur dioxide	0.002	0.07
Total		3.60

#### 7.7 List of pollutants emitted into the atmosphere

№	The name of the substance	MPC one- stage	MPC two- stage	SRLI	Substance release t/year
		mg/m <sup>3</sup>	mg/m <sup>3</sup>	mg/m <sup>3</sup>	
1	2	3	4	5	7
1	Dust containing SiO <sub>2</sub> 20-70%	0.3	0.1	-	148.828
2	Welding spray	0.01	0.001	-	0.0004
3	Manganese oxides	0.01	0.001	-	0.0001
4	Hydrogen fluoride	0.02	0.005	-	0.00002

5	Xylene	0.2	0.2	-	0.033
6	White Spirit	-	-	1.0	0.033
7	Carbon monoxide	3.0	3.0	-	1.537
8	Nitrogen monoxide	0.085	0.04	-	1.079
9	Hydrocarbons	-	-	1.0	0.621
10	Soot	0.15	0.05	-	0.301
11	Sulfur dioxide	0.5	0.05	-	0.065
	Total				152.40

## 12.6. Calculation of emission of pollutant into the atmosphere for Torkent

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986
Name of the source	BSU (concrete mixing unit)
Main formula: $M = q \times T \times 3600 \times 10^{-6}, \tau/\text{year}$	
$q$ - specific emission of a pollutant, g/s	1,0
T- working time per year, hour	822
Name of pollutant	Dust containing SiO <sub>2</sub> 20-70%
M, t/year	2,959

### 7.2 Calculation of emissions of pollutants from welding

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986
Name of the source	Electric arc welding machine
Main formula: $M = q \times \Pi \times 10^{-6}, \tau/\text{year}$	
$q$ - specific emission of a pollutant вещества, g/s	
$\Pi$ - annual consumption of electrodes, kg	40
Brand of electrodes	MP-3
Operating time, hour/year	379

	Pollutants		
	Welding spray	Manganese oxides	Hydrogen fluoride
g/kg	9,7	1,8	0,4
M, t/year	0,0004	0,0001	0,00002
M, g/s	0,0003	0,0001	0,00001

7.3 Calculation of emissions of pollutants into the atmosphere from the cement silo

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986	
Name of the source	Silo Cement warehouse	
Specific dust emission, g/s		2,6
Injection time, hour/year		104
Dust emission into the atmosphere, t/year		0,969

7.4 Calculation of dust emissions into the atmosphere during excavation and loading operations

Used methods of calculations	Guidelines for calculating emissions from fugitive sources in the building materials industry. Soyuzstromeekologiya, 1989	
Name of the source	Excavation and loading works	
Main formula: $Q = P_1 \times P_2 \times P_3 \times P_4 \times P_5 \times P_6 \times G \times B_1 \times 10^6 / 3600 . r/c$		
$P_1$ – proportion of dust fraction in the rock		0,04
$P_2$ – proportion of dust that turns into aerosol		0,02
$P_3$ – coefficient taking into account the wind speed in the area of equipment operation		1,2
$P_4$ – coefficient taking into account the moisture content of the material		0,8
$P_5$ – coefficient taking into account the fineness of the material		0,6
$P_6$ – coefficient taking into account local conditions		1
$G$ – the amount of rock processed by the excavator, t/h		170
$B_1$ – coefficient taking into account the height of the overflow		0,5
Emissions, g/s		10,9
Emissions, t/year		143,7

7.5 Calculation of pollutant emissions from the spray gun

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986	
Name of the source	Spray gun	
Enamel PF-115 (consumption kg/year)		148
Fluorescent spray method		Spray gun, brush

Operating time, hour/year	38		
Pollutants: specific emission	Emission of pollutant (%)	t/year	g/s
1.xylene	22,5	0,033	0,245
2.White Spirit	22,5	0,033	0,245

#### 7.6 Calculation of emissions of pollutants from vehicles

Diesel fuel is used in the construction of vehicles. Annual consumption of diesel fuel - 32,7 tons.

Substance name	Release of matter, t/year	
	Specific emission	t/year
1	4	5
1. Carbon monoxide	0,047	1,54
2. Nitric oxide	0,033	1,08
3. Hydrocarbons	0,019	0,62
4. Soot	0,0092	0,30
5. Sulfur dioxide	0,002	0,07
Total		3,60

#### 7.7 List of pollutants emitted into the atmosphere

No	The name of the substance	MPC one-time mg/m <sup>3</sup>	SPV mg/m <sup>3</sup>	SRLI mg/m <sup>3</sup>	Substance release t/year
1	2	3	4	5	7
1	Dust containing SiO <sub>2</sub> 20-70%	0,3	0,1	-	148,828
2	Welding spray	0,01	0,001	-	0,0004
3	Manganese oxides	0,01	0,001	-	0,0001
4	Hydrogen fluoride	0,02	0,005	-	0,00002
5	xylene	0,2	0,2	-	0,033
6	White Spirit	-	-	1,0	0,033
7	carbon monoxide	5,0	3,0	-	1,537
8	Nitrogen monoxide	0,085	0,04	-	1,079
9	Hydrocarbons	-	-	1,0	0,621
10	Soot	0,15	0,05	-	0,301
11	sulphur dioxide	0,5	0,05	-	0,065
	Total				152,50

## 12.7. Calculation of emission of pollutant into the atmosphere for HMC

Below are tables for calculating emissions of pollutants into the atmosphere generated during construction work:

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986	
Name of the source	BSU (concrete mixing unit)	
Main formula: $M = q \times T \times 3600 \times 10^{-6}, m / \text{год}$		
$q$ - specific emission of a pollutant, g/s	1,0	
$T$ - working time per year, hour	822	
Name of pollutant	Dust containing SiO <sub>2</sub> 20-70%	
$M_{\text{air}}$ , t/year	2,959	

### 5.2 Calculation of emissions of pollutants from welding

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986.		
Name of the source	Electric arc welding machine		
Main formula: $M = q \times \Pi \times 10^{-6}, m / \text{год}$			
$q$ - specific emission of a pollutant, g/s			
$\Pi$ - annual consumption of electrodes, kg	40		
Brand of electrodes	MP-3		
Operating time, hour/year	379		
Pollutants			
	Welding spray	Manganese oxides	Hydrogen fluoride
$g / \text{kg}$	9,7	1,8	0,4
$M$ , t/year	0,0004	0,0001	0,00002
$M$ , g/s	0,0003	0,0001	0,00001

### 5.3 Calculation of emissions of pollutants into the atmosphere from the cement silo

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986	
Name of the source	Warehouse Silo Cement	
Specific dust emission, g/s	2,6	
Injection time, hour/year	104	
Dust emission into the atmosphere, t/year	0,969	

**5.4 Calculation of dust emissions into the atmosphere during excavation and loading operations**

Used methods of calculations	Guidelines for calculating emissions from fugitive sources in the building materials industry. Soyuzstromeekologiya, 1989	
Name of the source	Excavation and loading works	
Main formula: $Q = P_1 \times P_2 \times P_3 \times P_4 \times P_5 \times P_6 \times G \times B_1 \times 10^6 / 3600, r/c$		
$P_1$ – proportion of dust fraction in the rock		0,04
$P_2$ – proportion of dust that turns into aerosol		0,02
$P_3$ – coefficient taking into account the wind speed in the area of equipment operation		1,2
$P_4$ – coefficient taking into account the moisture content of the material		0,8
$P_5$ – coefficient taking into account the fineness of the material		0,6
$P_6$ – coefficient taking into account local conditions		1
$G$ – the amount of rock processed by the excavator, t/h		170
$B_1$ – coefficient taking into account the height of the overflow		0,5
Emissions, g/s		10,9
Emissions, t/year		143,7

**5.5 Calculation of pollutant emissions from the spray gun**

Used methods of calculations	Collection of methods for calculating emissions of pollutants into the atmosphere by various industries. L., Gidrometeoizdat, 1986		
Name of the source	Spray gun		
Enamel PF-115 (consumption kg/year)	148		
Fluorescent spray method	Spray gun, brush		
Operating time, hour/year	38		
Pollutants: specific emission	Emission of pollutant (%)	tn/year	g/s
1.Xylene	22,5	0,033	0,245
2.White Spirit	22,5	0,033	0,245

**5.6 Calculation of emissions of pollutants from vehicles**

Diesel fuel is used in the construction of vehicles. Annual consumption of diesel fuel - 32.7 tons.

Substance name	Release of matter, t/year	
	Specific emission	tn/year
1	4	5
1. Carbon monoxide	0,047	1,54
2. Nitric oxide	0,033	1,08

3.Hydrocarbons	0,019	0,62
4.Soot	0,0092	0,30
5.Sulfur dioxide	0,002	0,07
Total		3,60

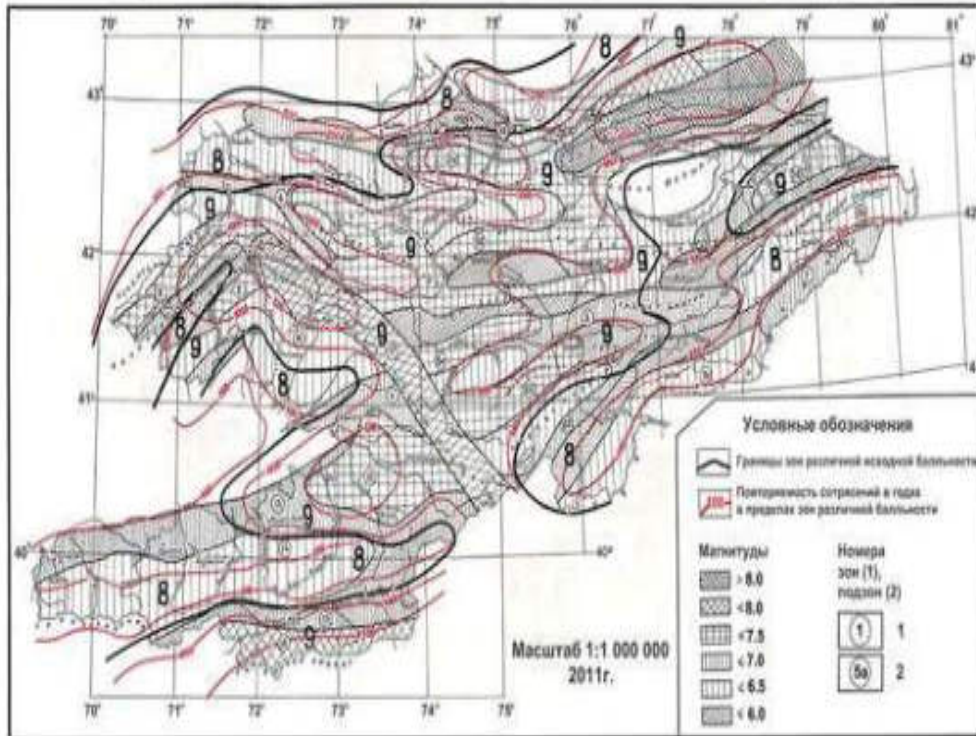
**5.7 List of pollutants emitted into the atmosphere**

Nº	The name of the substance	MPC one- yume mg/m3	MPV mg/m3	SRLI mg/m3	Substance release t/year
1	2	3	4	5	7
1	Dust containing SiO <sub>2</sub> 20-70%	0,3	0,1	-	148,828
2	Welding spray	0,01	0,001	-	0,0004
3	Manganese oxides	0,01	0,001	-	0,0001
4	Hydrogen fluoride	0,02	0,005	-	0,00002
5	Xylene	0,2	0,2	-	0,033
6	White Spirit	-	-	1,0	0,033
7	Carbon monoxide	3,0	3,0	-	1,537
8	Nitrogen monoxide	0,085	0,04	-	1,079
9	Hydrocarbons	-	-	1,0	0,621
10	Soot	0,15	0,05	-	0,301
11	Sulfur dioxide	0,5	0,05	-	0,065
	Total				152,50

## 12.8. Geological Map



Составители: К.Е.Абдрахматов, К.Д.Джанузиков, А.Г.Фролова, В.Н.Погребной  
 при участии: А.Т.Турдукулова, М.О.Омуралиева, А.В. Берзиной, Н.Х.Багмаповой, А.Б.Джумабаевой,  
 А.М.Корженкова, К.Нурманбетова, В.В. Гребениковой, Е.Л.Миркина, Е.В.Першиной, Р.Шукуровой



## 12.9. List of public consultation meeting for Jalal-Abad projects

### SUBPROJECT COORDINATION COMMITTEE "PRAVAYA VETKA"

#### MINUTES OF MEETING No 2

Masy village

July 09, 2021

#### Introduction:

Deputy Chairperson: K. Kudaiberdiev – Head of Nooken RWMD

Secretary: T. Ozgonov – CDT Specialist

#### Attendees:

1. I.A. Dzholdoshaliyev – PIU
2. R. Masalbekov – PIU Specialist
3. K. Kudaiberdiev – Head of Nooken RWMD
4. B. Raimzhan u. – Chief Engineer of Jalal-Abad BWMD
5. I. Bakirov – Lead Specialist of Nooken RDS&D of WUA
6. Z. Akmatov – Head of Bazar-Korgon RWMD
7. A. Turdumatov - Specialist of Nooken RDS&D of WUA
8. M. Nazirbaev – Taimonku WUA Director
9. K. Akmataliev – Sakaldu-Suu WUA Director
10. N. Muratov – Nooken-K WUA Director
11. M. Kadyrbekov – Aral-Sai WUA Director
12. A. Manapov – Murat-Murap WUA Director
13. Ch. Abdyrakhmanov – Aikol-Suu WUA Director
14. T. Ablasanov – Shaidan-Kara-Unkur WUA Director
15. T. Ergeshev – Kenesh-Suu WUA Director
16. U. Saipov – Deputy Head of Kenesh AO
17. A. Akhmedzhanov – Lead Specialist on land issues of Aral AO
18. K. Tashiev – Deputy Head of Shaidan AO
19. M. Sulaimanov – Deputy Head of Masy AO
20. K. Payazov – Deputy Head of Nooken AO
21. M. Orozaliyev – Deputy Head of Sakaldu AO

#### Agenda:

1. On rehabilitation of on-farm irrigation system.
2. On allotment of funds between WUAs in "Climate Change and Disaster-Resilient Water Resources Sector Project" financed by ADB.

Dear colleagues, before starting the discussion of issues in Agenda, due to the absence of SCC Secretary, it is offered to elect for a time Secretary among participants. I suggest to elect T.

Ozgonov and if everyone agrees let us start the discussion of issues.

1. On the first issue, Irrigation Consultant of RAS JA, A. Tashtanov spoke, who informed attendees on the following information: As you know, there are 8 WUAs under Pravaya Vetka canal. Up to date, the condition of on-farm network is poor despite the fact that 7 WUAs among 8 had rehabilitation under the projects of the World Bank and other donors. Because the coverage by these donors was about 30% from all the irrigation network of WUAs, another part requires rehabilitation and repair. The rehabilitation of the whole on-farm network requires a plenty of financial assets. Under the "Climate Change and Disaster-Resilient Water Resources Sector Project" financed by ADB, for rehabilitation of secondary

and tertiary canals placed under Pravaya Vetka canal USD 1 million were allocated. Following that, the question raised – how to allot this finances between WUAs? Financing conditions are simplified in comparison to the projects of the World Bank, there is no reimbursement after construction, there is a participation of WUAs, i.e. labor contribution of water users during construction in the volume of 5% on cost of construction work. This issue will be agreed in each WUA separately during General Meetings or Meeting of Representatives. Each WUA will decide itself whether they participate in this Project or no.

2. On the second issue, Head of Nooken RWMD, K. Kudaiberdiev spoke – Indeed, this money is not enough to resolve all problems of on-farm network. Therefore, I suggest to divide this funds equally between all WUAs in order to avoid grievances. Then, WUAs can use this money for resolution of the network issues efficiently. Each WUA will decide for which canals and facilities they will use these financial assets on a commission base in order to repair the most necessary canals and facilities. At the same time, they will prepare Defect Acts together with CDT specialists.

Decision:

1. Take into consideration the presented information.
2. Financial assets, allotted from "Climate Change and Disaster-Resilient Water Resources Sector Project" financed by Asian Development Bank for rehabilitation of WUAs' on-farm network placed under Pravaya Vetka canal, divide equally between 8 WUAs.

Deputy SCC Chairperson:

K. Kudaiberdiev

SCC Secretary:

T. Ozgonov

## 12.10. Minute of public hearing for Jalal-Abad projects

### "Aikol Suu" Water Users Association

Birdik village

July 13, 2021

#### Representatives Meeting Minute

Total number of WUA zonal representatives: 26

Attendees: Total 37 persons, among them 20 are zonal representatives and WUA members – 17 persons according to Annex #1.

1. **Nurbek Torobekov** – WUA Council Chairperson
2. **Myrza Razakov** – Meeting Secretary

#### Invited:

3. **Turdumatoev Abzhapar** – Head of Community Development Team (CDT)
4. **Kubat Isakov – Temelsu** Engineer
5. **Rahman-Ali Masalbekov** – ADB PIU Agriculture Specialist
6. **Tyoyshbek Ozgonov** – Project Coordinator

#### AGENDA

1. Agreement on cost reimbursement of design and survey works project.
2. Grant consent for payment (reimbursement) of design and survey works total cost.
3. Grant consent for signing Agreement on construction works financing.
4. Authorize WUA representative for signing Agreement on cost reimbursement of design and survey works.

#### On the first issue:

##### Speakers:

**Nurbek Torobekov**, WUA Council Chairperson told that it was necessary to rehabilitate on-farm canals "PK-00", "PK-24", "PK-29", "PK-33", "**Besh-Jygazh**" and "PK-170". To rehabilitate canals, it is necessary to define scope of works and cost. Due to lack of qualified specialists in WUA, WUA's Executives asked "Climate Change and Disaster-Resilience Water Resources" Project Implementation Unit under the State Agency of Water Resources under the Ministry of Agriculture, Water management and Regional Development of the Kyrgyz Republic to help them. Upon preliminary agreement, specialists prepared Agreement on cost reimbursement of design and survey works. WUA members after the discussions should make a decision on consent with the agreement or its rejection.

**Rahman-Ali Masalbekov**, Agriculture Specialist informed that in February 2021 executives of "**Kelesh-Suu**" WUA addressed to "Climate Change and Disaster-Resilience Water Resources" Project Implementation Unit. Specified works can be performed under the Project. In order to identify preliminary cost of rehabilitation works scope it is necessary to prepare design estimate documentation under the implementation of design and survey works. These works will be performed by project organization and their results will be paid from Project funds. If after the design estimation documentation is prepared by project organization and WUA will refuse further rehabilitation of canal/on-farm network, WUA should recompense to PIU costs for development of design estimation documentation. If WUA agrees to conduct rehabilitation works, in this case WUA will not recompense to PIU costs for development of design estimation documentation. These costs will be reimbursed by "Climate Change and Disaster-Resilience Water Resources" Project.

This conditions are specified in proposed draft Agreement. If WUA General Meeting agrees with draft Agreement conditions, it should authorize WUA Council Chairperson for its signing.

Chairperson of the meeting posed the issue on granting consent with draft Agreement on design and survey works cost reimbursement.

Agree: 37 persons

Against: none

Abstention: none

#### On the second issue:

**Nurbek Torobekov**, WUA Council Chairperson asked about approximate cost of design and survey works and implementation schedule.

**Rakhman-Ali Masalbekov**, PIU Agriculture Specialist replied that the cost of such works can be from 3% to 5% from rehabilitation works cost and expected terms of development – 8 months.

**Nurbek Torobekov**, WUA Council Chairperson told that specified amount is minor and can be paid from WUA's budget. He paid attention that irrigation system of WUA needs rehabilitation and hoped that WUA members will not refuse to conduct canal rehabilitation after design and survey works completion knowing all benefits.

**Abzhanar Turdumatov**, CDT Head clarified that refusal of repayment of conducted design and survey works cost to "Climate Change and Disaster-Resilience Water Resources" Project Implementation Unit can be expressed by letter from WUA on such refusal or procrastination of signing by authorized "Aikol-Suu" WUA representative the Agreement on financing construction works in "Aikol-Suu" WUA under the "Climate Change and Disaster-Resilience Water Resources" Project due to justified or insignificant reason.

**Rakhman-Ali Masalbekov**, PIU Agriculture Specialist explained that in order to guarantee that the Water Users Association will return the funds spent on the design and survey work of the Aikol-Suu WUA, it is necessary to provide a surety agreement signed by all WUA members and certified by a notary. The amount of the state fee for the notarization of such an agreement will be only 1000 soms.

The chairman of the meeting put to a vote the issue of giving consent to the return of the full cost of design and survey work in case of refusal or signing of an agreement for financing construction work in WUA Aikol-Suu.

Agree: 37 persons

Against: none

Abstention: none

#### On the third issue:

**Kubat Isakov**, Temelsu Engineer, said that PIU specialists proposed a draft Agreement for financing construction works, which should be signed by the Ministry of Economy and Finance, SAWR and WUA. According to the draft Agreement, the WUA is obliged to perform part of the construction work in the amount of 5% of the total cost of construction work. This work should be carried out by the WUA, that is, by the farmers themselves. If these works are not carried out or are not carried out in full or in a timely manner, the Ministry of Economy and Finance (the lender) will have the right to suspend the financing of construction work carried out by the contractor.

If the WUA is unable to complete 5% of the volume of construction work, then the WUA must pay 5% of the cost of construction work to the Contractor in order the contractor to take the money to carry out the work of the WUA. This work of the WUA will be controlled by the Coordination Committee of the subproject with the drafting of acts.

The chairman of the meeting put the issue to a vote on signing the Agreement for financing construction work in the Aikol-Suu WUA.

Agree: 37 persons

Against: none

Abstention: none

**On the fourth issue:**

**Nurbek Torobekov**, WUA Council Chairperson said that in view of the fact that the majority of the members present at the meeting expressed their agreement with the proposed draft Agreement on the return of the cost of design and survey work, as well as with an approximate amount of compensation in case the WUA refuses in the future to rehabilitate the irrigation system of the Sheidan-Kars-Linku WUA and the draft Agreement of construction work financing in the WUA, it is necessary to elect a candidate for their signing. According to the legislation and the WUA Charter, contracts on behalf of the WUA are signed by the Council Chairperson, but the general meeting has the right to authorize another representative of the WUA, for example, the director of the WUA.

**Myrza Bazakoy**, WUA member proposed the candidacy of WUA Director Chono Abdurakhmanov for authorization to sign the Agreement on the return of the cost of design and survey work and the Agreement on financing construction work in the WUA, motivating this by the fact that he will be able to solve organizational and financial issues related to the implementation of the Agreement when considering the budget of the WUA.

The chairman of the meeting put to a vote the issue of giving consent to the candidacy of the WUA director for authorization to sign the Agreement on the return of the cost of design and survey work and the Agreement on financing construction work in the WUA.

Agree: 37 persons

Against: none

Abstention: none

Having considered all the issues on the agenda, the Meeting of Representatives of the Aikol-Suu WUA decided:

1. Agree with the proposed draft Agreement on the return of the cost of design and survey work;
2. Agree to return the full cost of design and survey work in the amount of not more than 500,000 (five hundred thousand) сом in case Keneah Suu WUA refuses to rehabilitate the irrigation network of Aikol-Suu WUA by refusing to sign the Contract for financing construction work in Aikol-Suu WUA within the framework of the project "Increasing the resilience of water resources to climate change and natural disasters".
3. Agree with the draft Contract for financing construction work in the Aikol-Suu WUA;
4. To authorize the director of the WUA Chono Abdurakhmanov on behalf of the Aikol-Suu WUA to sign an Agreement on the refund of the cost of design and survey works and to sign an Agreement for financing construction work in the Aikol-Suu WUA.

~~Aikol-Suu~~ WUA General Meeting Chairperson

~~Aikol-Suu~~ WUA Council Chairperson

General Meeting Secretary

N. ~~Torobekov~~

M. ~~Bazakov~~

Our ref #: 3 dated 13.07.2021

To: PIU Director, Mr. Nurlan Nohiev

Water Users Association Aikol-Suu of Nookan District of Jalal-Abad Oblast kindly asks you to include in the list of rehabilitated WUAs conducted within the framework of the project "Climate Change and Disaster-Resilience Water Resources" funded by ADB, as well as, due to the lack of design specialists, we ask you to carry out all the design works at the expense of this project.

Sincerely yours,

Aikol-Suu WUA Chairperson: N. Tarobekov

Aikol-Suu WUA Director: G. Abdrakhmatty

## 12.11. Grievance acceptance form

Name of Person Raising Grievance: (information is optional and always treated as confidential) Gender: <input type="checkbox"/> Male <input type="checkbox"/> Female				
Address or contact information for Person Raising Grievance: (information is optional and confidential) E-mail: Phone: Address:				
Location where grievance/problem occurred (write in)				
Oblast:		Rayon:		Village/ Mahalla
Category of Grievance:				
<input type="checkbox"/> Inclusion in LARP	<input type="checkbox"/> Compensation Rate	<input type="checkbox"/> Restriction or loss of access	<input type="checkbox"/> Crop Compensation	<input type="checkbox"/> Loss of business
<input type="checkbox"/> Registration / Ownership Status	<input type="checkbox"/> Disturbance: Noise / Vibration / Dust	<input type="checkbox"/> Damage to Infrastructure / Assets	<input type="checkbox"/> Utilities Relocation	<input type="checkbox"/> HSE Concerns
<input type="checkbox"/> Recruitment / Employment	<input type="checkbox"/> Canal Upgrading	<input type="checkbox"/> Appreciation	<input type="checkbox"/> Suggestions	<input type="checkbox"/> Other
Brief Description of Grievance or Inquiry: (provide as much detail and facts as possible)				
Please include any other information that you consider relevant, other matters or facts, including supporting documents:				
Do you request that identity be kept confidential? <input type="checkbox"/> Yes <input type="checkbox"/> No				
2. Previous Efforts to Resolve the Complaint				
3. Information on Authorized Representative (If Authorized Representatives are not complainants themselves, their names will be disclosed as needed, in order to ensure transparency).				
Name	Positions/Organizations	Addresses	Contact numbers	E-mail addresses
Gender: <input type="checkbox"/> Male <input type="checkbox"/> Female				
Please provide evidence of the authority to represent the complainant which must include the complainant's signature.				
Do you request that identity be kept confidential? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Name of the person who completed this form:		Please send the complaint to:		
Signature:		By letter post: Grievance Redress Mechanism		
Date:		Attention to: Climate Change and Disaster Resilient Water Resources Sector Project, Project Implementation Unit		
		4 A Toktonaliev str		
		720055, Bishkek, Kyrgyzstan		
		Email : <a href="mailto:ccd-rwrsp@water.gov.kg">ccd-rwrsp@water.gov.kg</a>		
		Phone line: +996 (312) 561 637		

## 12.12. Grievance registration logbook

PU COMPLAINTS LOG 2020-Present

None

#	Project	Reception	Date Received	Name & Contact of Complainant	Complaint Category	Complaint Description	Resolution Description	Resolution Status	Substantiated	Open	Out open	Comment
1	CCARF KP	AP										
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
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24												
25												
26												
27												

PU Log Report & Update Settings

## 12.13. LAR check lists

Проект L3745IG0632-KGZ: «Повышение устойчивости водных ресурсов к изменению климата и стихийным бедствиям»

Компонент Проекта: «Повышение потенциала по управлению рисками стихийных бедствий на национальном уровне»

Подпроект/объект: Гидропост р.Торсай-с.Торсай

Местоположение (пункт, контурназвание участка): с. Торсай

Дата проведения скрининга: 21. сентября 2020г.

Понятие «Изъятие земли и переселение» независимо от правового статуса в данном контексте, включает в себя: физическое переселение (перемещение, утрата жилья) земельной собственности или права и экономического переселения (утрата земельной собственности, имущества, доступа к имуществу, источникам дохода или средств и осуществление) в результате (i) принудительного приобретения земли, или (ii) наложения принудительного ограничения на использование земли или доступ и установленным законом паркам и другим охраняемым зонам, вне зависимости от того, являются ли такие потери или принудительные ограничения постоянными или временными.

Контрольный список вопросов по воздействию на вынужденное переселение

№	Возможные последствия вынужденного переселения	Да		Не известно	Примечания
		Нет	Да		
<b>Вынужденное изъятие земли</b>					
1.	Будет ли изъята земля?		<input checked="" type="checkbox"/>		
2.	Известны ли места изъятия земли?		<input checked="" type="checkbox"/>		
3.	Известен ли статус собственности и текущее использование земли для изъятия?		<input checked="" type="checkbox"/>		AD
4.	Будет ли потеря жилья и жилой земли из-за изъятия земли?		<input checked="" type="checkbox"/>		
5.	Будет ли потеряно сельскохозяйственное и другое производственное имущество из-за изъятия земли?		<input checked="" type="checkbox"/>		
6.	Будут ли потеряны уронен, поврежденные и основные средства из-за изъятия земли?		<input checked="" type="checkbox"/>		
7.	Будут ли потеряны бизнесы в связи с изъятием земли?		<input checked="" type="checkbox"/>		
8.	Будет ли потеря источника дохода и средств и существенно из-за изъятия земли?		<input checked="" type="checkbox"/>		
9.	Будет ли физическое перемещение ПП? <input type="checkbox"/> Нет <input checked="" type="checkbox"/> Да Если да, примерно сколько ПП?		<input checked="" type="checkbox"/>		
<b>Непредвиденные ограничения на землепользование или доступ к законным паркам и охраняемым территориям</b>					
10.	Потеряют ли люди доступ к природным ресурсам, общественным объектам и услугам?		<input checked="" type="checkbox"/>		
11.	Если изменится землепользование, окажет ли оно негативное влияние на социально-экономическую деятельность?		<input checked="" type="checkbox"/>		
12.	Будет ли ограничен доступ к земле и ресурсам, принадлежащим общественности или государству?		<input checked="" type="checkbox"/>		
<b>Количественная оценка земли, подлежащей изъятию</b>					
	Предварительный расчет площади земли, которая потребуется для Проекта?		<input type="checkbox"/> Нет <input checked="" type="checkbox"/> Да		
	Если да, примерно сколько? <u>0,25</u> гектар				
<b>Информация о перемещаемых лицах:</b>					
	Сколько число домохозяйств, которые будут перемещены Проектом?		<input type="checkbox"/> Нет <input checked="" type="checkbox"/> Да		
	Если да, примерно сколько?				
	Являются ли кто-либо из них бедными, конкретными главными домохозяйства или подвержены риску бедности?		<input type="checkbox"/> Нет <input checked="" type="checkbox"/> Да		
	Если да, примерно сколько?				
	Оносятся ли кто-либо из перемещаемых лиц к группе коренных народов или этнических меньшинств?		<input type="checkbox"/> Нет <input checked="" type="checkbox"/> Да		
	Если да, примерно сколько?				

Специалист ОРТ по вопросам защитным мерам К.Жумобе

Специалист по вопросам защитным мерам И.Кайсаров

Главный инженер по вопросам защитным мерам Аманбаев Н.Б.

Главный специалист по вопросам защитным мерам Н.Умарбаев

Представитель органа местного самоуправления М.Мамедбаев

Фото участков, которые потенциально могут быть подвержены воздействию (местоположения/название объекта)

1

Проект L3746/G0632-KGZ: «Повышение устойчивости водных ресурсов к изменению климата и стихийным бедствиям»

Компонент Проекта: «Повышение потенциала по управлению рисками стихийных бедствий на национальном уровне»  
 Подпроект/объект: Гидролог. р. Самгал - устье р. Тарс  
 Местоположение (лимит, контур/название участка): с. Н.-Таш  
 Дата проведения скрининга: 21.09.2020г.

Понятие «Изъятие земли и переселение» независимо от правового статуса в данном контексте включает в себя физическое переселение (перемещение, утрата жилой земельной собственности или крова) и экономического переселения (утрата земельной собственности, имущества, доступа к имуществу, источника дохода или средств к существованию) в результате (i) принудительного приобретения земли, или (ii) наличия принудительного ограничения на использование земли или доступ к установленным законом парковым и другим охраняемым зонам, вне зависимости от того, являются ли такие потери или принудительные ограничения полными или частичными, постоянными или временными.

Контрольный список вопросов по воздействию на вынужденное переселение

№	Возможные последствия вынужденного переселения	Да	Нет	Не известно	Примечания
<b>Вынужденное изъятие земли</b>					
1.	Будет ли изъятие земли?		<input checked="" type="checkbox"/>		
2.	Известны ли места изъятия земли?		<input checked="" type="checkbox"/>		
3.	Известен ли статус собственности и текущее использование земли для изъятия?		<input checked="" type="checkbox"/>		Копия карт, фото участка
4.	Будут ли потеряны жилье и жилой земли из-за изъятия земли?		<input checked="" type="checkbox"/>		
5.	Будет ли потеряно сельскохозяйственное и другое производственное имущество из-за изъятия земли?		<input checked="" type="checkbox"/>		
6.	Будут ли потеряны урожаи, деревья и основные средства из-за изъятия земли?		<input checked="" type="checkbox"/>		
7.	Будут ли потеряны бизнес в связи с изъятием земли?		<input checked="" type="checkbox"/>		
8.	Будет ли потеря источников дохода и средств к существованию из-за изъятия земли?		<input checked="" type="checkbox"/>		
9.	Будет ли физическое перемещение ПП? <input checked="" type="checkbox"/> Нет <input type="checkbox"/> Да Если да, примерно сколько (ПД/ПГ)?		<input checked="" type="checkbox"/>		
<b>Непреднамеренные ограничения на землепользование или доступ к законным паркам и охраняемым территориям</b>					
10.	Потеряет ли люди доступ к природным ресурсам, общественным объектам и услугам?		<input checked="" type="checkbox"/>		
11.	Если изменится землепользование, окажет ли оно негативное влияние на социально-экономическую деятельность?		<input checked="" type="checkbox"/>		
12.	Будет ли ограничен доступ к земле и ресурсам, принадлежащим обществу или государству?		<input checked="" type="checkbox"/>		
<b>Количественная оценка земли, подлежащей изъятию</b>					
	Предварительный расчёт площади земли, которая потребует для Проекта? <input checked="" type="checkbox"/> Нет <input type="checkbox"/> Да Если да, примерно сколько? гектар		<input checked="" type="checkbox"/>		
<b>Информация о перемещенных лицах:</b>					
	Оценочное число домохозяйств, которые будут перемещены Проектом? <input checked="" type="checkbox"/> Нет <input type="checkbox"/> Да Если да, примерно сколько?		<input checked="" type="checkbox"/>		
	Являются ли кто-либо из них бедными, женщинами-главами домохозяйств или подвержены рискам бедности? <input type="checkbox"/> Нет <input type="checkbox"/> Да Если да, примерно сколько?				
	Относятся ли кто-либо из перемещенных лиц к группе коренных народов или этнических меньшинств? <input type="checkbox"/> Нет <input type="checkbox"/> Да Если да, примерно сколько?				

Специалист ОРП по социальным защитным мерам К.Жусубов  
 Специалист Консалтинга (Темелу) по защитным мерам Н.Кайратова  
 Глава подразделения специального агентства Мамбетов И.И.  
 Глава подразделения Исследовательского агентства Мамбетов У.И.  
 Представитель местного самоуправления/АО Б.Н. Усатов

Фото участков, которые потенциально могут быть подвержены воздействию (местоположение/название объекта)

Проект L3746/G0632-KGZ: «Повышение устойчивости водных ресурсов к изменению климата и стихийным бедствиям»

Компонент Проекта: «Повышение потенциала по управлению рисками стихийных бедствий на национальном уровне»  
 Подпроект/объект: Гидропост р. Кака-Тай, устье р. Торе  
 Местоположение (пакет, контур/название участка): ул. «Беш-Таш»  
 Дата проведения скрининга: «23» сентября 2020г.

Понятие «Изъятие земли и переселение» независимо от правового статуса в данном контексте включает в себя физическое переселение (перемещение, утрата жилой земельной собственности или крова) и экономического переселения (утрата земельной собственности, имущества, доступа к имуществу, источника дохода или средств к существованию) в результате (i) принудительного приобретения земли, или (ii) наложения принудительного ограничения на использование земли или доступ к установленным законом паркам и другим охраняемым зонам, вне зависимости от того, являются ли такие потери или принудительные ограничения полными или частичными, постоянными или временными.

Контрольный список вопросов по воздействию на вынужденное переселение

№	Возможные последствия вынужденного переселения	Да	Нет	На изве- стно	Примечания
<b>Вынужденное изъятие земли</b>					
1.	Будет ли изъятие земли?		<input checked="" type="checkbox"/>		
2.	Известны ли места изъятия земли?		<input checked="" type="checkbox"/>		
3.	Известен ли статус собственности и текущее использование земли для изъятия?		<input checked="" type="checkbox"/>		<i>100% изъят</i>
4.	Будет ли потеря жилья и жилой земли из-за изъятия земли?		<input checked="" type="checkbox"/>		
5.	Будет ли потеряно сельскохозяйственное и другое производственное имущество из-за изъятия земли?		<input checked="" type="checkbox"/>		
6.	Будут ли потери урожая, деревьев и основных средств из-за изъятия земли?		<input checked="" type="checkbox"/>		
7.	Будет ли потеря бизнеса в связи с изъятием земли?		<input checked="" type="checkbox"/>		
8.	Будет ли потеря источников дохода и средств к существованию из-за изъятия земли?		<input checked="" type="checkbox"/>		
9.	Будет ли физическое перемещение ППТ? <input checked="" type="checkbox"/> Нет   <input type="checkbox"/> Да Если да, примерно сколько (ПД/ПЛ)?		<input checked="" type="checkbox"/>		
<b>Непреднамеренные ограничения на землепользование или доступ к законным паркам и охраняемым территориям</b>					
10.	Потеряют ли люди доступ к природным ресурсам, общественным объектам и услугам?		<input checked="" type="checkbox"/>		
11.	Если изменится землепользование, окажет ли оно негативное влияние на социально-экономическую деятельность?		<input checked="" type="checkbox"/>		
12.	Будет ли ограничен доступ к земле и ресурсам, принадлежащим общественности или государству?		<input checked="" type="checkbox"/>		
<b>Количественная оценка земли, подлежащей изъятию</b>					
	Предварительный расчет площади земли, которая потребуется для Проекта? <input checked="" type="checkbox"/> Нет   <input type="checkbox"/> Да Если да, примерно сколько? гектар		<input checked="" type="checkbox"/>		
<b>Информация о перемещенных лицах:</b>					
	Оценочное число домохозяйств/лиц, которые будут перемещены Проектом?   <input type="checkbox"/> Нет   <input type="checkbox"/> Да Если да, примерно сколько?		<input type="checkbox"/>		
	Являются ли кто-либо из них бедными, женщинами-главами домохозяйств или подвержены рискам бедности?   <input type="checkbox"/> Нет   <input type="checkbox"/> Да Если да, примерно сколько?		<input type="checkbox"/>		
	Сносятся ли кто-либо из перемещенных лиц к группе коренных народов или этнических меньшинств?   <input type="checkbox"/> Нет   <input type="checkbox"/> Да Если да, примерно сколько?		<input type="checkbox"/>		

Специалист ОРП по социальным защитным мерам К. Жусубов  
 Специалист Консультанта (Темелсу) по защитным мерам Н. Кадырбекова  
 Глава представительства местного исполнительного агентства Ш. Т. Аманжол  
 Глава представительства областного исполнительного агентства У. Мамитов  
 Представитель государственного управления АО Н. Кашабаев

Фото участка, которые потенциально могут быть подвержены воздействию (местоположение/название объекта)

Проект L3746/G0632-KGZ: «Повышение устойчивости водных ресурсов к изменению климата и стихийным бедствиям»

Компонент Проекта: «Повышение потенциала по управлению рисками стихийных бедствий на национальном уровне»  
 Подпроект/объект: Гидропост «Таджикистан - Азия»  
 Местоположение (линей, контур/название участка): р. Сибирь, район «Уосму»  
 Дата проведения скрининга: 22 сентября 2020г.

Понятие «Изъятие земли и переселение» независимо от правового статуса в данном контексте включает в себя физическое переселение (перемещение, утрата жилой земельной собственности или крова) и экономического переселения (утрата земельной собственности, имущества, доступа к имуществу, источника дохода или средств к существованию) в результате (i) принудительного приобретения земли, или (ii) наложения принудительного ограничения на использование земли или доступ к установленным законом паркам и другим охраняемым зонам, вне зависимости от того, являются ли такие потери или принудительные ограничения полными или частичными, постепенными или временными.

Контрольный список вопросов по воздействию на вынужденное переселение

№	Возможные последствия вынужденного переселения	Да	Нет	Не известно	Примечания
<b>Вынужденное изъятие земли</b>					
1.	Будет ли изъятие земли?		<input checked="" type="checkbox"/>		
2.	Известны ли места изъятия земли?		<input checked="" type="checkbox"/>		
3.	Известен ли статус собственности и текущее использование земли для изъятия?		<input checked="" type="checkbox"/>		100% изъятие
4.	Будет ли потеря жилой и жилой земли из-за изъятия земли?		<input checked="" type="checkbox"/>		напрямую
5.	Будет ли потеря сельскохозяйственное и другое производственное имущество из-за изъятия земли?		<input checked="" type="checkbox"/>		
6.	Будут ли потери урожая, деревьев и оо-сенья средств из-за изъятия земли?		<input checked="" type="checkbox"/>		
7.	Будут ли потери бизнеса в связи с изъятием земли?		<input checked="" type="checkbox"/>		
8.	Будет ли потеря источника дохода и средств к существованию из-за изъятия земли?		<input checked="" type="checkbox"/>		
9.	Будет ли физическое перемещение ПП? <input checked="" type="checkbox"/> Нет   <input type="checkbox"/> Да Если да, примерно сколько (ПП/П)?		<input checked="" type="checkbox"/>		
<b>Непреднамеренные ограничения на землепользование или доступ к законным паркам и охраняемым территориям</b>					
10.	Потеряют ли люди доступ к природным ресурсам, общественным объектам и услугам?		<input checked="" type="checkbox"/>		
11.	Если изменится землепользование, окажет ли оно негативное влияние на социально-экономическую деятельность?		<input checked="" type="checkbox"/>		
12.	Будет ли ограничен доступ к земле и ресурсам, принадлежащим общественности или государству?		<input checked="" type="checkbox"/>		
<b>Количественная оценка земли, подлежащей изъятию</b>					
	Предварительный расчёт площади земли, которая потребуется для Проекта?	<input checked="" type="checkbox"/>	Нет   <input type="checkbox"/> Да		
	Если да, примерно сколько? гектар				
<b>Информация о перемещенных лицах:</b>					
	Оценочное число домохозяйств/лиц, которые будут перемещены Проектом?	<input checked="" type="checkbox"/>	Нет   <input type="checkbox"/> Да		
	Если да, примерно сколько?				
	Являются ли кто-либо из них бедными, женщинами-главами домохозяйства или подвержены рискам бедности?	<input checked="" type="checkbox"/>	Нет   <input type="checkbox"/> Да		
	Если да, примерно сколько?				
	Относятся ли кто-либо из перемещенных лиц к группе коренных народов или этнических меньшинств?	<input type="checkbox"/>	Нет   <input type="checkbox"/> Да		
	Если да, примерно сколько?				

Специалист ОРП по социальным защитным мерам

*[Подпись]*

К. Жунусбаев

Специалист Консультационно-Технической Группы по защитным мерам

*[Подпись]*

Н. Кадыралиев

Глава представительства от Исполнительного агентства

Каримов И. М.

А. Кенжетов И. Э.

Глава представительства от Исполнительного агентства

Шамшиев И. М.

Ташбаев Н.

Представитель органа местного самоуправления

Султанов С. И.

И. И. Ибрагимов И. Э.

Фото участков, которые потенциально могут быть подвержены воздействию (местоположение/название объекта)

Проект L3748/G0632-KGZ: «Повышение устойчивости водных ресурсов в изменению климата и стихийным бедствиям»

Компонент Проекта: «Повышение потенциала по управлению рисками стихийных бедствий на национальном уровне»  
 Подпроект/объект: Гидропост р. Шаидан  
 Местоположение (лимит, контур/название участка): с. Шаидан  
 Дата проведения скрининга: «24. сентября» 2020г.

Понятие «Изъятие земли и переселение» независимо от правового статуса в данном контексте включает в себя физическое переселение (перемещение, утрата жилой земельной собственности или кровля) и экономического переселения (утрата земельной собственности, имущества, доступа к имуществу, источника дохода или средств к существованию) в результате (i) принудительного приобретения земли, или (ii) наложения принудительного ограничения на использование земли или доступ к установленным законом парковым и другим охраняемым зонам, вне зависимости от того, являются ли такие потери или принудительные ограничения полными или частичными, постоянными или временными.

Контрольный список вопросов по воздействию на вынужденное переселение

№	Возможные последствия вынужденного переселения	Да	Нет	Не известно	Примечания
<b>Вынужденное изъятие земли</b>					
1.	Будет ли изъятие земли?		<input checked="" type="checkbox"/>		
2.	Известны ли места изъятия земли?		<input checked="" type="checkbox"/>		
3.	Известен ли статус собственности и текущее использование земли для изъятия?		<input checked="" type="checkbox"/>		Вопросы
4.	Будет ли потеря жилья и жилой земли из-за изъятия земли?		<input checked="" type="checkbox"/>		Вопросы
5.	Будет ли потеряно сельскохозяйственное и другое производственное имущество из-за изъятия земли?		<input checked="" type="checkbox"/>		
6.	Будут ли потери урожая, посеянных и основных средств из-за изъятия земли?		<input checked="" type="checkbox"/>		
7.	Будут ли потери бизнеса в связи с изъятием земли?		<input checked="" type="checkbox"/>		
8.	Будет ли потеря источников дохода и средств к существованию из-за изъятия земли?		<input checked="" type="checkbox"/>		
9.	Будет ли физическое перемещение ПП? <input checked="" type="checkbox"/> Нет   Да Если да, примерно сколько (ПД/ГП)?		<input checked="" type="checkbox"/>		
<b>Непреднамеренные ограничения на землепользование или доступ к законным паркам и охраняемым территориям</b>					
10.	Потеряют ли люди доступ к природным ресурсам, общественным объектам и услугам?		<input checked="" type="checkbox"/>		
11.	Если изменится землепользование, окажет ли оно негативное влияние на социально-экономическую деятельность?		<input checked="" type="checkbox"/>		
12.	Будет ли ограничен доступ к земле и ресурсам, принадлежащим общественности или государству?		<input checked="" type="checkbox"/>		
<b>Количественная оценка земли, подлежащей изъятию</b>					
	Предварительный расчёт площади земли, которая потребуется для Проекта? Если да, примерно сколько? <u>0,2</u> гектар		<input type="checkbox"/> Нет   <input checked="" type="checkbox"/> Да		
<b>Информация о перемещенных лицах:</b>					
	Оценочное число домохозяйств, которые будут перемещены Проектом? Если да, примерно сколько?		<input checked="" type="checkbox"/> Нет   <input type="checkbox"/> Да		
	Являются ли кто-либо из них бедными, женщинами-главами домохозяйств или подвержены рискам бедности? <input type="checkbox"/> Нет   <input type="checkbox"/> Да Если да, примерно сколько?				
	Относятся ли кто-либо из перемещенных лиц к группе коренных народов или этнической меньшинств? <input type="checkbox"/> Нет   <input type="checkbox"/> Да Если да, примерно сколько?				

Специалист ОРП по социальным защитным мерам К. Жунусбаев  
 Специалист Контракта (ТМ) по защитным мерам Н. Кадыралиев  
 Глава проекта от имени местного агентства Маматов У.И.  
 Глава проекта от имени местного агентства Маматов У.И.  
 Представитель органа местного самоуправления АО М. Исламов

Фото участков, которые потенциально могут быть подвержены воздействию (местоположение/название объекта)

Проект L3746/0632-KGZ: «Повышение устойчивости водных ресурсов в изменении климата и стихийным бедствиям»

Компонент Проекта: «Повышение потенциала по управлению рисками стихийных бедствий на национальном уровне»  
 Подпроект/объект: Гидропост Кара-Алма - Кара-Алма  
 Местоположение (экет, контурирование участка): Между Кара-Алма  
 Дата проведения скрининга: 26. 09 2020г.

Понятие «Изъятие земли и переселение» независимо от правового статуса в данном контексте включает в себя физическое переселение (перемещение, утрата жилой земельной собственности или кровли) и экономического переселения (утрата земельной собственности, имущества, доступа к имуществу, источника дохода или средств к существованию) в результате (i) принудительного приобретения земли, или (ii) наложения принудительного ограничения на использование земли или доступ к установленным законом парковым и другим охраняемым зонам, вне зависимости от того, являются ли такие потери или принудительные ограничения полными или частичными, постоянными или временными.

Контрольный список вопросов по воздействию на вынужденное переселение

№	Возможные последствия вынужденного переселения	Да	Нет	Не известно	Примечания
<b>Вынужденное изъятие земли</b>					
1	Будет ли изъятие земли?		<input checked="" type="checkbox"/>		
2	Известны ли места изъятия земли?		<input checked="" type="checkbox"/>		
3	Известен ли статус собственности и текущее использование земли для изъятия?		<input checked="" type="checkbox"/>		
4	Будет ли потеря жилья и жилой земли из-за изъятия земли?		<input checked="" type="checkbox"/>		
5	Будет ли потеряно сельскохозяйственное и другое производственное имущество из-за изъятия земли?		<input checked="" type="checkbox"/>		
6	Будут ли потери урожая, деревьев и основных средств из-за изъятия земли?		<input checked="" type="checkbox"/>		
7	Будут ли потери бизнеса в связи с изъятием земли?		<input checked="" type="checkbox"/>		
8	Будет ли потеря источников дохода и средств к существованию из-за изъятия земли?		<input checked="" type="checkbox"/>		
9	Будет ли физическое перемещение ПП? <input type="checkbox"/> Нет <input type="checkbox"/> Да Если да, примерно сколько (ПД/П)?		<input checked="" type="checkbox"/>		
<b>Непреднамеренные ограничения на землепользование или доступ к законным паркам и охраняемым территориям</b>					
10	Потеряют ли люди доступ к природным ресурсам, общественным объектам и услугам?		<input checked="" type="checkbox"/>		
11	Если изменится землепользование, окажет ли оно негативное влияние на социально-экономическую деятельность?		<input checked="" type="checkbox"/>		
12	Будет ли ограничен доступ к земле и ресурсам, принадлежащим общественности или государству?		<input checked="" type="checkbox"/>		
<b>Количественная оценка земли, подлежащей изъятию</b>					
	Предварительный расчет площади земли, которая требуется для Проекта? Если да, примерно сколько? гектар	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Да
<b>Информация о перемещенных лицах:</b>					
	Оценочное число домохозяйств, которые будут перемещены Проектом? Если да, примерно сколько?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Да
	Являются ли кто-либо из них бедными, женщинами-главами домохозяйств или подвержены риску бедности? <input type="checkbox"/> Нет <input type="checkbox"/> Да Если да, примерно сколько?		<input checked="" type="checkbox"/>		
	Относятся ли кто-либо из перемещенных лиц к группам коренных народов или этнических меньшинств? <input type="checkbox"/> Нет <input type="checkbox"/> Да Если да, примерно сколько?		<input checked="" type="checkbox"/>		

Специалист ОРП по социальным защитным мерам К. Жунусбаев  
 Специалист Контекста (Темелсу) по защитным мерам Н. Кадыралиев  
 Глава представительства от Министерства сельского хозяйства Маматбаев И.  
 Глава представительства от Министерства сельского хозяйства Маматбаев Ч. И.  
 Представитель местного самоуправления Маматов С.

Фото участков, которые потенциально могут быть подвержены воздействию (местоположение/название объекта)

Проект L3746/G0632-KQZ: «Повышение устойчивости водных ресурсов к изменению климата и стихийным бедствиям»

Компонент Проекта: «Повышение потенциала по управлению рисками стихийных бедствий на национальном уровне»  
 Подпроект/объект: Гидротехн. р. Шарт - Салангога  
 Местоположение (линей, контур/название участка): с Салангога  
 Дата проведения скрининга: 25.09.2020г.

Понятие «Изъятие земли и переселение» независимо от правового статуса в данном контексте включает в себя физическое переселение (перемещение, утрата жилой земельной собственности или кровля) и экономическое переселение (утрата земельной собственности, имущества, доступа к имуществу, источника дохода или средств к существованию) в результате (i) принудительного приобретения земли, или (ii) налагаемых принудительного ограничения на использование земли или доступ к установленным законом парковым и другим охраняемым зонам, вне зависимости от того, являются ли такие потери или принудительные ограничения полными или частичными, постоянными или временными.

Контрольный список вопросов по воздействию на вынужденное переселение

№	Возможные последствия вынужденного переселения	Да	Нет	Не известно	Примечания
<b>Вынужденное изъятие земли</b>					
1.	Будет ли изъята земля?				
2.	Известны ли места изъятия земли?				
3.	Известен ли статус собственности и текущее использование земли для изъятия?				
4.	Будет ли потеря жилья и жилой земли из-за изъятия земли?				
5.	Будет ли потеря сельскохозяйственного и другое производственное имущество из-за изъятия земли?				
6.	Будут ли потери урожаев, деревьев и основных средств из-за изъятия земли?				
7.	Будут ли потери бизнеса в связи с изъятием земли?				
8.	Будет ли потеря источников дохода и средств к существованию из-за изъятия земли?				
9.	Будет ли физическое перемещение ПП? <input type="checkbox"/> Нет <input type="checkbox"/> Да Если да, примерно сколько (ПД/ПЛ)?				
<b>Непреднамеренные ограничения на землепользование или доступ к экосистемным паркам и охраняемым территориям</b>					
10.	Потеряют ли люди доступ к природным ресурсам, общественным объектам и услугам?				
11.	Если изменится землепользование, ожидает ли оно негативное влияние на социально-экономическую деятельность?				
12.	Будет ли ограничен доступ к земле и ресурсам, принадлежащим общественности или государству?				
<b>Количественная оценка земли, подлежащей изъятию</b>					
	Предварительный расчёт площади земли, которая потребуется для Проекта? <input type="checkbox"/> Нет <input type="checkbox"/> Да Если да, примерно сколько? гектар				
<b>Информация о перемещенных лицах:</b>					
	Одночное число домохозяйств, которые будут перемещены Проектом? <input type="checkbox"/> Нет <input type="checkbox"/> Да Если да, примерно сколько?				
	Являются ли кто-либо из них бедными, женщинами-главами домохозяйств или подвержены рискам бедности? <input type="checkbox"/> Нет <input type="checkbox"/> Да Если да, примерно сколько?				
	Относятся ли кто-либо из перемещенных лиц к группе коренных народов или этнических меньшинств? <input type="checkbox"/> Нет <input type="checkbox"/> Да Если да, примерно сколько?				

Специалист ОРП по социальным защитным мерам К. Жунусбаев  
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 Представитель органа местного самоуправления (АО) Муррабатов Р. Б.

Фото участков, которые потенциально могут быть подвержены воздействию (местоположение/название объекта)