Initial Environmental Examination

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Republic of Uzbekistan: Western Uzbekistan Water Supply System Development Project

Prepared by the Communal Services Agency of the Republic of Uzbekistan "KOMMUNKHIZMAT" for the Asian Development Bank (ADB)

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LIST OF ABBREVIATIONS

ADB	–	Asian Development Bank
CPS	–	Country's Partnership Strategy
CWR	–	Clean Water Reservoir
DMA	–	District metering Areas
EA	–	Executing Agency
EIA	–	Environmental Impact Assessment
EMP	–	Environmental Management Plan
EMR	–	Environmental Monitoring Report
EMU	–	Environmental Monitoring Unit
FAM	–	Facility Administration Memorandum
FGD	–	Focus Group Discussions
GOU	–	Government of Uzbekistan
GRC	–	Grievance Redress
GRM	–	Grievance Redress Mechanism
HH	–	Household
ICB	–	International Contract Bidding
IEA	–	Initial Environmental Assessment
IEE	–	Initial Environmental Examination
IRTM	–	Interregional Trunk Main
LAR	–	Land Acquisition and Resettlement
NCB	–	National Contract Bidding
NRW	–	Non-revenue water
NWSDP	–	National Water Supply Development Program
OCC	–	Operational Control Center
O&M	–	Operation and Maintenance
PCU	–	Project Coordination Unit
PIA	–	Project Implementation Assistance
PLC	–	Programmable Logic Controllers
PMC	–	Project Management Consultant
PPMU	–	Program Preparation and Management Unit
PPTA	–	Project Preparatory Technical Assistance
PVC	–	Polyvinylchloride
REA	–	Rapid Environmental Assessment (ADB checklist)
SES	–	Sanitary and Epidemiological Services
SNPC	–	State Nature Protection Committee
TA	–	Technical Assistance
TN	–	Tuyamuyun-Nukus inter regional trunk main
CSA	–	Communal Services Agency
WDC	–	Water Distribution Center
WSS	–	Water Supply and Sanitation
WT	–	Water towers
WTP	–	Water Treatment Plant
WWTP	–	Waste Water Treatment Plant

GLOSSARY

Glavgosexpertisa	State Department responsible for Conducting Environmental Expertise Under SNPC
Khokim	Governor of administrative unit
Khokimiyat	Regional government authority
KMK	National acronym for Construction norms and regulations
Makhalla	A community of neighbors, which is based on full independence and self-governance.
OVOS	National acronym for EIA assessment process
PZVOS	National acronym for Concept Statement on Environmental Impact
SanR&N	Sanitary - epidemiological norms and regulations
Som	Local currency
SNiP	Set of basic regulatory requirements and regulations governing the design and construction in all sectors of national economy of Uzbekistan
Uzbekenergo	Managerial body in the electric power and coal industries, which are major structural components of the national economy
Uzhydromet	State governing body specially authorized for the solution of tasks in the field of hydrometeorology in the Republic of Uzbekistan and in its activities it is accountable to Cabinet of Ministers
ZVOS	National acronym for Statement on Environmental impact
ZEP	National acronym for Statement on Environmental Consequences

WEIGHTS AND MEASURES

LPCPD – liters per capita per day

NOTE

In this report, "$" refers to US dollars.

EXECUTIVE SUMMARY

The project has been designed to address the water supply shortage, quality and operational and maintenance issues in six districts of the Republic of Karakalpakstan. Alternative technical options were analyzed and the optimum design solution for regional water supply system was identified based on the efficiency of the investment and operational expenditures and reduction of social and environmental impacts.

The Project is in line with priorities set by both ADB and the GOU, namely with the ADB Country Operation Business Plan Uzbekistan 2012-2014 and the Country's partnership Strategy (CPS) Uzbekistan 2012-2016 as well as with the Development Strategy, road Map and Investment Program for the Water Supply and Sanitation Sector of the Republic of Uzbekistan until 2020.

The project activities consist of the construction and rehabilitation of some 650 km of water pipelines and of several pumping water distribution centers, the rehabilitation of the 2nd lift pumping station at the Tuyamuyun water treatment plant (WTP), and the extension of the treatment capacity of the existing WTP at Takhiatash. The construction of a new WTP in Mangit (Amudarya district) will be included as well.

The Tuyamuyun WTP will be headwork for the supply of the rural and urban networks in Beruniy. Urban and rural distribution networks in Nukus and Karauzak districts will be fed from either Tuamuyun WTP and/or Takhiatash WTP, the two production units being interconnected. The distribution networks of Kungrad and Maynak will convey water from Takhiatash WTP. Parts of investments required for the finance of the rehabilitation works in Muynak, Amudarya, Kungrad and Karauzak districts are to be financed under the GCF grant.

Under the Project 292 km of Dai 150 mm to 400 mm distribution mains and 973.5 km of Dia 76 mm to 200 mm of water distribution network will be rehabilitated or new constructed. 21 pumped water dispatching centers (WDC) will be rehabilitated and 7 new constructed. Other project components consist of: i) supply of maintenance machineries, and ii) implementation of a non-revenue water program. The summary of planned works is presented in below table:

Name of WDC	Type of works	
	Construction	**Rehabilitation**
Amudarya district		
Water Intake Facilities VU-2	Raw water pumping station (RWPS) Pipeline from RWPS to Contact chamber, Contact chamber, Inlet chamber, Filter station, Process water reservoir & PS, Chemical plant, Transformer substation, Internal piping Landscaping and fence, 2 Clean water reservoir 2,000 m^3, 2nd lift pumping station and etc.	Rehabilitation of 2 x 50,000 m^3 settlement ponds
WDC RU-1	Clean Water Reservoirs with capacity 1000 m^3	Technological communication Fencing, landscaping, greening
WDC«Kuyuk Kupir»	2 Clean Water Reservoirs with capacity 2000 m^3 each, pumping station with electrolysis facilities, Transforms and technological communication, internal and external electricity supply. Entrance, toilet Landscaping, greening and fencing of territory, gates and access road	
WDC "Qilichboy"	Internal power supply, fencing and etc.	Clean water reservoirs 2x250 m3. Installation of filter absorber,

Name of WDC	Type of works	
	Construction	Rehabilitation
		ladder and recovery of soil cover. Transformers substation
Ground water intakes "Urazbaev"	Drilling 3 wells, Clean Water Reservoirs with capacity 500 m3 Transforms and technological communication and etc.	2 clear water reservoirs 250 m3. Installation of filter absorber, ladder and soil cover. II lift pump station.
Transmission trunk	31.7 km	
Network	237.2 km	41.4 km
Beruniy district		
RU-1	2 Clean Water Reservoirs with capacity 1000 m^3 each Pumping station combined with electrolysis, transformers and etc.	Clean water reservoirs 250 m3 -2 units. Pumping station including electrolysis plant (basic)
WDC "Shimom"	2 Clean Water Reservoirs with capacity 1000 m^3 each Pumping station combined with electrolysis, Transformers and etc.	
Pumping Distribution Centre (PDC) - 15	Electrolysis facilities using imported hypochlorite Technological communication and etc.	Two CWRs with capacity 700 m^3 Installation of filter-absorber, staircase and recovery of soil cover
PDC-17	Toilet, technological communication and etc.	Two CWRs with capacity 700 m^3 Installation of filter-absorber, recovery of soil cover, rehabilitation of pumping station and installation of lifting equipment
PDC-16	Electrolysis equipment in pumping station. Transformers and etc.	Two CWRs with capacity 500 m^3 Installation of filter-absorber, staircase and recovery of soil cover rehabilitation of pumping station and installation of technological and lifting equipment
WDC "Bodom Bosh"	Two CWRs with capacity 500 m^3, Pumping station, Transformers, and etc.	**Fencing, lightening and**
Transmission trunk	38 km	
Network	134 km	34 km
Karauzyak district		
WDC "Karauzyak"	2 Clean Water Reservoir with capacity 1000 m^3 each Transformers and etc.	Reconstruction of Two CWRs with capacity 500 m^3, pumping station and chlorination facilities
Distribution hub (DH) RU-1	2 Clean Water Reservoir with capacity 500 m^3 each Installation of electrolysis equipment in pumping station And etc.	One CWRs with capacity 100 m^3 and one with capacity 400 m^3, Reconstruction of transformers and technological equipment and etc.
WDC "Samat"	Clean Water Reservoir with capacity 500 m^3 Pumping station with electrolysis facilities	One CWR with capacity 100 m^3, Installation of filter-absorber, staircase and recovery of soil cover

Name of WDC	Type of works	
	Construction	Rehabilitation
	Transformers, and etc.	
WDC "VS-1"	Pumping station with electrolysis facilities. Transformers, technological communication and etc.	Two CWRs with capacity 500 m^3 each, Installation of filter-absorber, staircase and recovery of soil cover
Transmission trunk	52 km	12 km
Network	37 km	59 km
Kungrad district		
WDC "Kungrad"		Pumping station with electrolysis facilities Installation of sensor for water level measurement
Water intake "Altinkul"		Two CWRs with capacity 1000 m^3 each, technological communication, landscaping
WDC "Ahunbabaev"	Clean Water Reservoir with capacity 500 m^3	Two CWRs with capacity 250 m^3 each, Installation of filter-absorber, staircase and recovery of soil cover, pumping station and etc.
WDC "Khorezm"	Landscaping, greening and fencing of WDC territory and access road	Four CWRs with capacity 500 m^3 each, Installation of filter-absorber, Pumping station with electrolysis facilities and etc.
WDC "Ustyurt"	2 CWRs with capacity 500 m^3 each, Installation of filter-absorber, pumping station, transformer and etc.	Electrolysis facilities, toilet
WDC "Kanjigal"		Demolishing of existing tower 25 m^3, rehabilitation of water tower with capacity 25 m^3, pumping station and etc.
WDC "Kokdarya"		Demolishing of existing tower 25 m^3, rehabilitation of water tower with capacity 25 m^3, Pumping station and etc.
Kugrad city "Kobora-laboratoriys»	Administration building, Workshops and store, garage for 2 cars and etc.	
Transmission trunk	29 km	28 km
Network	114 km	38 km
Muynak district		
WDC "Muynak"	Entrance, toilet, workshops, store, garage	Two CWR with capacity 1000 m^3 each, and one CWR with capacity 1000 m^3, replacement of equipment in pumping station and etc.
WDC "Uchsay"	Two CWRs with capacity 300 m^3 each, pumping station, transformers and etc.	
WDC "Shagirli"	Two CWRs with capacity 1000 m^3 each	

Name of WDC	Type of works	
	Construction	Rehabilitation
	Pumping station with electrolysis equipment, transformers and etc.	
WDC "Shege"	Two CWRs with capacity 300 m^3 each Pumping station with electrolysis equipment, transformers and etc.	
Transmission trunk		
Network		
Nukus district		
WDC "Medeniyat"		Two CWRs with capacity 1000 m^3 each, Installation of filter-absorber, staircase and recovery of soil cover, Pumping station with electrolysis equipment, transformers and etc.
WDC "Kerder"	Two CWRs with capacity 500 m^3 each staircase and recovery of soil cover	Installation of filter-absorber, pumping station with electrolysis equipment, transformers and etc.
WDC "Shortanbay"	Two CWRs with capacity 500 m^3 each staircase and recovery of soil cover	Installation of filter-absorber, pumping station with electrolysis equipment, transformers and etc.
Transmission trunk		
Network		

Along with physical component, the Project will upgrade the operations and maintenance (O&M) of the inter regional trunk main and strengthen the institutional and management capacity of the water utility.

Categorization of reviewed project as per ADB requirements was done based on REA. It was defined that the Project belongs to category B, as a project with site-specific impacts, few of which are irreversible, and where in most cases mitigation measures can be designed. The Project requires an initial environmental examination (IEE), which will be based on data from the feasibility study, preliminary design, site visits and interviews with technical experts, as well as primary and secondary data including thus the feedback received during the public disclosure process.

In accordance with national legislation the Project belongs to Category 3 with respect to its environmental impact (low impact risk)[1]. Prior to to commencing construction such project requires the conduction of the Environmental Impact Assessment and receiving of Environmental Appraisal from the State Committee on Ecology and Environment Protection Uzbekistan at the provincial level.

The Republic of Karakalpakstan (RK) is located in the southwest part of Uzbekistan and occupies northwest part of Kyzylkum desert and Amudarya delta. The total area of RK is 165 600 sq.m Climate is sharp-continental with very hot summer and cold winter almost without snow. Annual amount of precipitation does not exceed 150 mm.

The main drinking and irrigation source of water in RK is the Amudarya river. The flow of the Amudarya is regulated by means of a complex of reservoirs (Tuyamuyun, Kaparas, Sutansanjar and Koshbulak reservoirs).

[1] Appendix 2 of the Cabinet Ministers' Decree (CMD) of the RUz No. 491, dated from 2001 with amendments made in CMD # 152 dated from 2009.

There are four recognized groundwater aquifers in RK: i) the lower Amudarya aquifer, extending in both right and left bank of the Amudarya; ii) the Karakalpak aquifer in the left bank of the River; iii) the Khorezm aquifer; and iv) the Turtkul aquifer. Generally, groundwater in RK is salinized due to the high salinization of the groundwater bearing sediments. Ground water is also using for drinking purposes due to lack or absence another drinking water sources.

Records of diseases typically related to insufficient water supply and sanitation over the period 2014 to 2016 from the the Ministry of Health (MOH) of the Republic of Karakalpakstan showed that incidence of hepatitis A and acute intestinal diseases is higher in Muynak district. Amudarya and Beruniy districts have higher incidence on urolithiasis and calcified diseases.

A large part of the Republic of Uzbekistan is occupied by the deserts of Ustyurt plateau and Kyzylkum. The drying Aral Sea and the Amudarya river delta intervene between them and are, in their turn, divided by another (new) desert named Aralkum. The flora and fauna of the deserts reveal their adaptation to rather unfavourable ambient conditions.

The Republic of Karakalpakstan (RK) records 498 vertebrate species spread over its territory, including 68 mammals, 307 birds (of which, 141 breeding, 20 wintering, and 14 migratory birds), 33 reptiles, 2 amphibians, and 49 fish species. Overall, the flora of the Aral Sea's desiccated floor is characterized by a small number of species. Only a small portion of the dried-up part of the Aral Sea floor is occupied by sparse desert vegetation.

There is Lower Amudarya Biological Reserve (LABR) located in the territory of Beruniy and Amudarya districts. LABR is of great importance as the guardian of the world's largest population of Bukhara/Bactrian deer (582 animals, according to records in 2010) vital for the regional and global biodiversity. Small part of the project works will be implemented in the area located 2 km away from protected zone of LABR.

In view of setting reference baselines for further reference of potential impacts related to the Project during the constructing phase or in the long range a series of analysis of indicators of water and air quality has been carried out. NO_2, CO_2, and airborne particulate as indicators of air quality, namely 10 representative sites. Analysis showed exceeding national standards on airborne particulate almost in each site.

Noise baseline measurements were carried out at 10 sites showing that currently maximum allowed day noise levels are exceeded at 1 points only in one place – center of Kungrad city.

Quality of water at 24 representative places of surface, ground water and hand pumps, including Tuyamuyun, Takhiatash TWPs and Mangit water treatment plants were tested. The analysis showed compliance of water samples from WTPs with national standards and exceeding allowed concentration of mineralization and hardness in ground water.

There are number of historical monuments, remains of ancient settlements, fortresses in each district of Karakalpakstan. Within the current IEE locations of historical places in relation to the project works were discussed during the meetings with experts from Ministry of Culture of the Republic of Karakalpakstan and representatives of settlements, included into the project. It is confirmed that there are no historical objects within the project area and settlements which could be negatively impacted by the project. The nearest heritage to the project site is located in 3 km from project site in Beruniy district.

Anticipated environmental impacts from the Project were reviewed at pre-construction, construction and operation stages. Identified impacts which are likely to occur during the construction stage are related to construction and rehabilitation of the trunk main, WDCs and distribution networks. These impacts consist mainly of: interferences with normal road traffic, temporary occurrence of noise, increase locally of airborne particulate, disturbance to access to private and public sites during construction of pipeworks, possible accidental spills of oils, or other liquid compounds potentially polluting soils and water, visual impacts. Feasibility conceptual design were established and reviewed in order to minimize impacts on existing infrastructure and other sites of natural and cultural importance.

Mitigation measures include development of Traffic Management, Waste Management Plans and minimization of noise, dust and other type of emissions. The sites with potential high risk of noise and air pollution and negative impacts on surrounded living houses and schools were identified and relevant mitigation measures were included in EMP.

The Project involves also dismantling of obsolete components of the existing WTPs as well as old building and pump stations. The majority of transformers produced prior 1986 year and there is a possibility that oil contained PCB was used for such equipment. Particular measures will have to be applied for the removal and disposal of hazardous materials, such as PCBs containing oil from old transformers as well as asbestos-based materials. Proposed mitigation measures include initial examination of the transformer's old oil for PCBs content and implementation the special procedure on handling and disposal of such materials. Recycling of material in other sectors of the civil works is recommended.

Major environmental impacts likely to occur in the long term are identified as a substantial increase of release of wastewater particularly from the domestic users, in a milieu not equipped with the required sewerage infrastructure.

The supplementary abstraction of water from the Amudarya river will not impact on the downstream water users, particularly irrigated agriculture. Changes in total withdraw of water from Amudarya river below Tuyamuyun gauge will increase on 0,003%.

The environmental monitoring plan (EMP) proposed in the IEE contains a set of measures to be implemented by the Contractors awarded civil works contracts. These measures will have to be clearly detailed in the Bills of Quantities (BOQ) included in the tender documents for civil works under both International Competitive Biddings (ICB) and National Competitive Biddings (NCB).

The EMP includes provisions for (i) monitoring of environmental indicators of air, water, noise, soils at selected monitoring sites and with a proposed time lag, and (ii) supervision of implementation of environmental requirements during three stages of the project cycle.

To fulfil ADB requirement on information disclosure, number of meetings with stakeholders were conducted in the project areas in order to introduce them with the planning project, discuss possible impacts and mitigation measures. These topics were discussed with representatives of the district level Committee on Ecology and Environment Protection, district Khokimiyats and makhallas, the representatives of Low Amudarya Bioreserve (LABR), MHCS, land cadaster committee, Ministry if Culture, Uzhydromet.

During 9 public consultations conducted in the Project districts information about the project, main findings of environmental and social assessment (in part of land acquisition and resettlement) impact assessment, GRM were presented to representatives of almost all settlements included into the project. Most part of participants were represented by Rural Citizens Assemble (RCA) leaders, citizens, representatives of district branches of nature protection committee, land cadaster, sanitarian epidemiological station, women committee, schools, hospitals and etc. Total 323 participants attended the public consultations.

The Implementing Agency (IA) will be the Department for Operation of Interregional Trunk Main Tuyamuyun – Nukus (DOTM-TN). Executive Agency (EA) and Project Coordination Unit (PCU) PCU will be supported by a Project Management Consultant (PMC).

Responsibility for the supervision of the EMP implementation and relative reporting as indicated in the EMP will lay with the Project Coordination Unit (PCU) through its environmental specialist supported by the Project Management Consultant's (PMC) international and national environmental specialist. Contractors will be responsible for implementing mitigation measures at the construction sites.

In general terms, the implementation of the the Project will imply some negative and positive impacts, for which mitigation measures have been identified. Main negative impacts occurring during the construction period are typical impacts arising during the execution of civil works,

and pipe lying. These impacts are temporary and can be easily mitigated by means of adopting appropriate measures by contractors. Special provision will be included in the BOQs for civil works in accordance with the EMP.

A major impact identified to occur in the long term will be due to the anticipated supplementary amounts of wastewater produced from the various categories of consumers. This impact can be mitigated by implementing a regional sewerage system which are under development.

The positive impacts are related essentially to the provision of safe water supply on a 24 hours basis which is anticipated to induce less occurrence of typically waterborne disease, better individual sanitation practices and overall improved health, to the beneficiary population. Based on analysis a population of some 388,000 living in 116 rural settlements and the six district centers will benefit of improved of new water service upon completion of the construction works in 2021. At the project horizon in 2045, the beneficiaries will be grown to some 518,000.

1. INTRODUCTION

1. The Republic of Karakalpakstan is located in west part of Uzbekistan on 165600 km^2 with population 1.79 mln. people. The main water sources in the region are surface water from regional transmission main, ground water from local deposits and shallow water.

2. Currently, due to prolonged use steel pipes are worn out, and most of them require replacement. Because of breach of tightness of wells, they are filled with water, which leads to corrosion of the stop valves and its rapid wear. Poor condition of pipes is not allowing to increase pressure in the system up to demanded level, which cause water shortage and deterioration delivered water. As a result, water through centralized network is delivering by schedule during several hours per day. The population have serious difficulties with drinking water supply, especially during the the summer time. The region is characterized by very sharp continental climate.

3. The water supply system in the Republic of Karakalpakstan faced with number of issues constraining improvement the situation: lack of funds, inefficient technical maintenance, high cost of electricity and high expenses for repairs, maintenance and materials are typical for water supply organizations. Untimely and no full payment for services by the population also worsen the situation.

4. The Government of Uzbekistan has received Technical Assistance (TA) from the Asian Development Bank (ADB) for the development and modernization of water supply systems of Nukus, Muynak, Kungrad, Beruniy, Amudarya and Karauzyak districts of the Republic of Karakalpakstan Project (“the Project”) which will involve rehabilitation, improvement and construction of water supply facilities and provide a stable and safe water supply in indicated districts of the Republic of Karakalpakstan.

5. The Project is in line with priorities set by both ADB and the GOU, namely with the ADB Country Operation Business Plan Uzbekistan 2012-2014 and the Country’s partnership Strategy (CPS) Uzbekistan 2012-2016 as well as with the Development Strategy, road Map and Investment Program for the Water Supply and Sanitation Sector of the Republic of Uzbekistan until 2020.

6. The following regulatory documents are relevant to the implementation of the Project:

- The Decree of the President of the Republic of Uzbekistan # PP “On the State Program for the Development of the Aral Sea Region for 2017-2021" dated from 18 January 2017;
- The Resolution of the President of the Republic of Uzbekistan №PP-2313 "On the program of development and modernization of engineering, communication and road transport infrastructure for 2015-2019" dated from of March 6, 2015.
- The Order of the President of the Republic of Uzbekistan No. P-4647 "On measures to further expand financial cooperation with the Asian Development Bank and other international financial institutions" dated May 18, 2016.
- The Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No 255 "On the Comprehensive program of measures to mitigate the consequences of the Aral catastrophe, rehabilitation and socio-economic development of the Aral Sea region for 2015-2018" dated from August 27, 2015.

7. The main objective of this project is social development, health improvement, improvement of water supply and delivery good quality drinking water to district centers and rural settlements of Nukus, Muynak, Kungrad, Beruniy, Amudarya and Karauzyak districts of the Republic of Karakalpakstan. The project will contribute to implementation of resource saving policy and improvement of drinking water supply infrastructure, strengthening reliability of water supply system.

Project outputs:

8. The project will cover 6 of 14 districts of the Republic of Karakalpakstan: Nukus, Muynak, Kungrad, Beruniy, Amudarya and Karauzak districts.

9. The Project is expected to be implemented within a period of five years starting from January 2017. Preparation and planning activities will be carried out during 2017. Physical works will start in January 2018 and are expected to be completed as of December 2021.

10. The project will have two outputs:

- **Output 1: Improved water supply services** in the Project area. Output 1 will consist of a reconstruction works on two water treatment plants (WTP) and upgrading one Water intake, 58,3 km length of water transmission mains, 27,8 km of distribution main pipes, about 337,7 km of distribution pipeworks, and about 49 256 household water supply connections.

- **Output 2: Tuyamuyun-Nukus (TN) utility and system management improved.** The TN will sustainably operate and maintain all components of the water supply system including the system management of the WTP and distribution system. It will control non-revenue water, provide customer services and tariff collection, procure and manage outsourced works and services, control and monitor its finances, ensure environmental compliance and conduction public awareness program for population and capacity building programs for TN staff.

11. It is planning that funds of Green Climate Fund (GCF) will be used for the project. At the stage of preparation this IEE, application for submission to GCF was developing.

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK AND STANDARDS

12. This section discusses the national and local legal and institutional framework within which the environmental assessment is carried out. It also identifies project-relevant international environmental agreements to which the country is a party.

2.1. Institutional set up of water supply and environmental sectors

2.1.1. Institutional set up of water supply sector

13. This section provides brief information on institutions responsible for water supply sector management and which are involved in this process. At the time of the report preparation, the management structure of utilities service was at a reforming stage. Uzkommunkhizmat Regional Utilities Agency, which was an independent body of state administration specially authorized to resolve the tasks of utilities service, was included into the Ministry of Housing and Communal Services (MHCS) of the RoUz. The MHCS was established as per the President Resolution (PR) No. 2900 of 18th April 2017[2].

14. As per the PR No. 2900, the following have been determined to be the main tasks and areas of operations of the MHCS of RUz (in terms of water supply and sewerage):

- Develop and arrange high-quality performance of the programs for development, upgrading and reconstruction of water supply and sewerage facilities and heat supply systems in linkage to human settlements layouts and master plans, as well as ensure operations coordination and management of the of organizations in this field;

[2] 'On Arranging the Operations of the Ministry of Housing and Communal Services of the Republic of Uzbekistan', Resolution of the RoUz President No. 2900 of 18th April 2017

- Introduce resource-saving and energy-saving technologies and equipment into the housing and utilities system, incl. equip the housing and utilities facilities with modern accounting and measuring devices, and apply widely the modern and high-quality domestic building materials and products that ensure cost reduction of construction and erection work;
- As agreed with the RUz Ministry of Finance, form a tariff policy for provision of water supply, sewerage, and heat supply services and implementation of integrated activities on strengthening the economic sustainability of housing and utilities organizations.

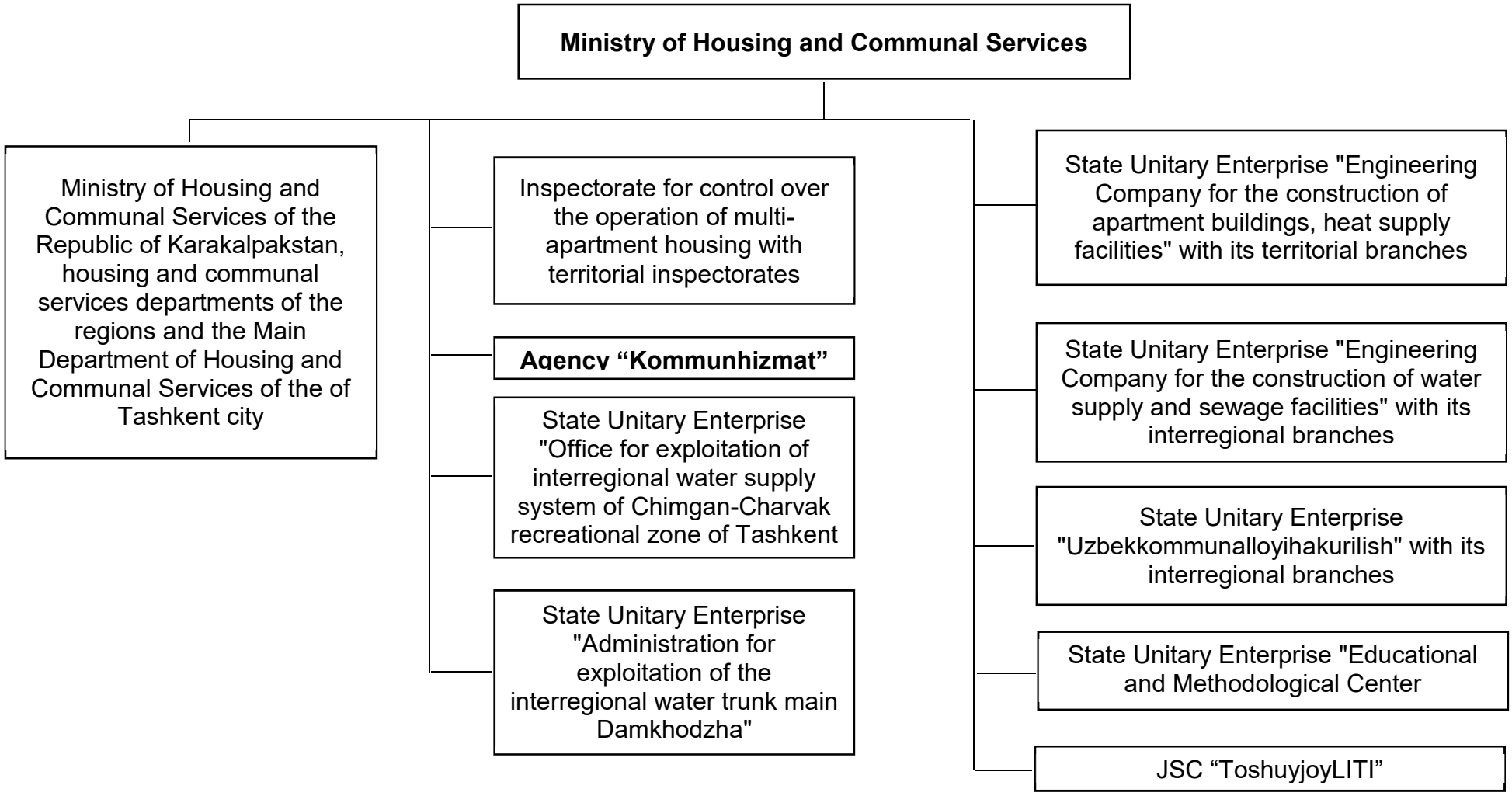
15. Within the territory of the Republic Karakalpakstan (RK), these tasks are entrusted to the MHCS of the RK, which reports to the MHCS and the Council of Ministers of the RK.

16. ***Tuyamuyun - Nukus Interregional Water Conduit Operation Administration (TN)***, which is the Implementation Agency of this project, is within the composition of the MHCS of RK.

17. Among other subdivisions, ***Communkhizmat Agency (CSA) and the SUE*** [State Unitary Enterprise]***, 'Engineering Company for Water Supply and Sewerage Facilities Construction'*** with its regional branches were included into the structure of the RUz MHCS and the MCHS of RK. The provisions determining the tasks and areas of operations of both of these organizations are under development.

18. Moreover, the PR No. 2900 of 18th April 2017[3] ***established the State Inspectorate for Drinking Water Use Control*** under the RUz Cabinet of Ministers (Uzdavinspektsiya). It was determined by one of the main tasks of Uzdavinspektsiya to conduct surveys and inspections of all categories of water supply and sewerage facilities as well as to address matters related to water intake wells, regardless of the forms of ownership, in terms of matters within its competence.

[3] 'On Arranging the Operations of the State Inspectorate for Drinking Water Use Control under the RUz Cabinet of Ministers', RUz PR No. 2899 of 18the April 2017



Picture 1: Organizational Structure of Ministry of Housing and Communal Services (MHCS) of the Republic of Uzbekistan

20. Moreover, according to the PR No. 2954 of 4th May 2017[4], ***the State Committee for Geology and Mineral Resources, State Committee for Ecology and Environmental Protection of the Republic of Uzbekistan, State Inspectorate for Drinking Water Use Control, Sanoatgeokontekhnazorat State Inspectorate for Supervision of Subsurface Resources Geological Investigation, Safe Work in Industry, Mining, Utilities and Household Sector,*** and local bodies of state authority constitute the authorized state bodies for ensuring proper control and accounting of rational underground water use.

2.1.2. Institutional set up of environmental protection

21. New steps to reforms of some Government institutions took place in 2017. Thus, the previous State Nature Protection Committee was established as a specially designated above-departmental and coordination body that implemented state supervision and inter-branch management in terms of nature protection, and usage and recreation of natural resources.

22. Based on the RUz President Resolution No. 5024 'On Improving the System of State Management in the sphere of Ecology and Environmental Protection' of 21th April 2017, the State Committee for Nature Protection was reorganized into the State Committee for Ecology and Environmental protection. The newly organized Committee is designated to improve the state management in the sphere of environmental safety and environmental protection within the country, improve the environmental situation, prevent the harmful impact of wastes on the health of citizens, create favorable conditions for improving the level and quality of population's life, further improve the collection, storage, transportation system, utilization, treatment and disposal of domestic wastes5.

23. The Resolution No. 5024 highlights some changes in the institutional set up of the Committee which includes re-naming the provincial committees into departments and organizing a new department within the central body of Committee and its provincial branches – Inspectorate for Control of Wastes Generation, Collection, Transportation, Utilization, Treatment, Disposal and Sales. The Resolution also states about establishment of unitary enterprises named 'Toza Hudud' (clean area) under the Committee of the Republic of Karakalpakstan and provincial departments, which will be based at the sites of providing services on transportation of domestic wastes under the district administration.

24. The Existing 'Republican Inspectorate for Protection of Wild Animals and Plants and their Rational Usage' has been reformed into 'Inspectorate for Control of Biodiversity Protection and its Usage, and Protected Natural Areas' under the State Committee for Ecology and Environmental Protection.

25. The newly organized State Committee for Ecology and Environmental Protection (Goskompriroda) is the primary environmental regulator, which reports directly to the Cabinet of Ministries of the Republic of Uzbekistan.

26. The structure of Goskompriroda takes the form of a central body in Tashkent with regional branches and agencies providing scientific and technical support. Regional environmental authorities are structured similarly to the Goskompriroda.

27. At the moment of preparation hereof, the final structure of Goskompriroda was under revision and finalization.

28. Other state bodies of the Republic of Uzbekistan dealing with environment-related issues are:

- Ministry of Agriculture and Water Resources (MAWR);

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4 'On Measures to Regulate the Control and Accounting of Rational Underground Water Reserves Use for 2017-2021', RoUz PR No. 2954 of 4th May 2017

5 RoUz President Resolution No. 5024 'On Improving the System of State Management in the sphere of Ecology and Environmental Protection' of 21th April 2017

State Committee for Geology and Mineral Resources (or Goskomgeologia);
- Centre of Hydro-meteorological Service (or Uzhydromet);
- Ministry of Health (or MoH RUz);
- State Inspectorate for Exploration Supervision, Operations Safety Supervision of Industry, Mining and Utilities Sector (or Sanoatgeokontekhnazorat).

29. **Ministry of Agriculture and Water Resources** is responsible for water allocation among different users within Republic of Uzbekistan. Based on forecast and limits provided by Interstate Commission for Water Coordination (ICWC), water is allocated among users with the priority given to drinking water supply sector[6].

30. **State Committee for Geology and Mineral Resources:** (i) carries out, together with Geological Survey Services of the neighboring countries, work on identifying and studying the focal points of radioactive and toxic pollution within transboundary territories, prepare geological maps and atlases reflecting specially hazardous zones and sections; (ii) in accordance with the procedure established by legislation, exercises control over protection of geological and mineralogical facilities as well as underground water from pollution and depletion.

31. **Uzhydromet** establishes and maintains the State Hydrometeorological Fund of Data, the State Fund of data on environment pollution, state accounting of surface waters; systematic observations of air, soil, surface water, as well as formation and development of disastrous hydrometeorological phenomena.

32. **Ministry of Health of RUz** – develops and approves sanitary regulations, rules, and hygienic standards, carries out state sanitary supervision over their observance as well as methodological supervision of the work of sanitary and epidemiological services, regardless of their departmental subordination.

33. **Sanoatgeokontekhnazorat** (State Inspectorate for Supervision of Subsurface Resources Geological Investigation, Safe Work in Industry, Mining, Utilities and Household Sector) – works together with the State Committee for Ecology and Environment protection of the Republic of Uzbekistan and carries out control in the field of geological investigation, use and protection of subsurface resources.

2.2. Policy and Legal Framework

2.2.1 ADB Safeguards Policy

34. Environmental and social safeguards are a cornerstone of ADB's support to inclusive economic growth and environmental sustainable growth. ADB Safeguards Statement Policy (SPS) adopted in 2009 governs the environmental and social safeguards of ADB's operations. The objectives of the SPS are to avoid, or when avoidance is not possible, to minimize and mitigate adverse project impacts on the environment and affected people, and to help borrowers strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

35. SPS builds upon the three previous safeguard policies on the environment, involuntary resettlement, and indigenous peoples, and brings them into a consolidated policy framework that enhances effectiveness and relevance. The SPS applies to all ADB-supported projects. ADB works with borrowers to put policy principles and requirements into practice through project review and supervision, and capacity development support. The SPS also provides a platform for participation by affected people and other stakeholders in project design and implementation[7].

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[6] Law of RUz "On water and water use" (1993), chapter 8, para 25

[7] htTN://www.adb.org/site/safeguards/overview

36. The objectives of ADB's safeguards are to:

(i) avoid adverse impacts of projects on the environment and affected people, where possible;

(ii) minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and

(iii) help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

37. ADB will not finance projects that do not comply with its safeguard policy statement, nor will it finance projects that do not comply with the host country's social and environmental laws and regulations, including those laws implementing host country obligations under international law.

38. Based on preliminary review projects are assigned to one of the following four categories:

Category A. A proposed project is classified as category A if it is 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 is required.

Category B. A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These 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 is required.

Category C. A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.

39. ADB pays special attention to processes of information disclosure, and consultations and participation during the project preparation and implementation phases. ADB publishes final or updated environmental impact assessments and/or initial environmental examinations on its own website. ADB is committed to working with borrowers/clients to put meaningful consultation processes into practice. Consultations process with communities, groups, affected people starts at the earliest stages of the project preparation and continues through all process of environmental assessment.

40. ADB requires that the borrower/client establish and maintain a grievance redress mechanism to receive and facilitate resolution of affected peoples' concerns and grievances about the borrower's/client's social and environmental performance at project level.

41. Categorization of reviewed project was done based on REA. It was defined that the Project belongs to category B, as a project with site-specific impacts, few of which are irreversible, and where in most cases mitigation measures can be designed. The Project requires an initial environmental examination (IEE), which will be based on data from the feasibility study, preliminary design, site visits and interviews with technical experts, as well as primary and secondary data including thus the feedback received during the public disclosure process.

2.2.2 National Environmental Regulatory Framework

42. RUz has developed over 100 laws and regulations, and revised old Soviet legislation and policies. One of the country's objectives is the transition to sustainable social and

economic development. For this purpose, RUz has revised and improved the national environmental legislation, enacted new environmental laws and regulations, developed programs and action plans to address environmental issues and promoted sustainable use of natural resources.

43. Legal Framework in the field of Nature Protection and Management established in RUz, provides to the citizens the rights and duties specified in the country's Constitution. Specific articles that address environment protection issues within the Constitution are:

- Article 50. All citizens shall protect the environment
- Article 51. All citizens shall be obliged to pay taxes and local fees established by law
- Article 54. Any property shall not inflict harm to the environment
- Article 55. Land, subsoil, flora, fauna, and other natural resources are protected by the state and considered as resources of national wealth subject to sustainable use.

44. Uzbekistan has enacted several supporting laws and statutes for environmental management, and is party to several international and regional environmental agreements and conventions. The key national environmental law is the Law on Nature Protection (1992). A brief description of this law and the other supporting laws related to environmental protection is presented below.

3. The law ***"On nature protection"*** (1992) states legal, economic, and organizational bases for the conservation of the environment and the rational use of natural resources. Its purpose is to ensure balanced relations between man and nature, to protect the environmental system and to guarantee the rights of the population of a clean environment. Article 25 of this law states that State Environmental Expertise (SEE) is a mandatory measure for environmental protection, preceded to decision-making process. In addition, article 25 says that the implementation of the project without a positive conclusion of SEE is prohibited.

4. Law ***"On Atmospheric Air Protection"*** (1996, amended on 10.10.2006). It describes regulations on atmosphere protection and its objectives. It specifies standards, quality and deleterious effect norms, requirements on fuels and lubricants, production and operation of vehicles and other transport means and equipment, ozone layer protection requirements, obligations of enterprises, institutions and organizations toward atmospheric protection, and compensations for damages from atmospheric pollutions.

5. Law ***"On water and water use" (***1993). It regulates the water relations, rational use of water by the population and economy. The law regulates the protection of waters from pollution and depletion, and prevention and liquidation of harmful effects of water, improvement of water bodies and the protection of the rights of enterprises and institutions, organizations and dehkan farms and individuals in the field of water relations.

6. ***Land Code*** of the Republic of Uzbekistan (1998). It aims to regulate land relations in order to ensure that present and future generations have science-based, sustainable use and conservation of land, breeding and improvement of soil fertility, conservation and improvement of the environment and creating conditions for equitable development of all forms of management, the protection of individuals and legal entities' right for land, as well as strengthening the rule of law in this area.

7. ***Law "On Wastes"*** (2002, as amended on 2011). It addresses waste management, exclusive of emissions and air and water pollution, and confers authority to the SNPC concerning inspections, coordination, ecological expertise and establishing certain parameters with regard to the locations where waste may be processed. Enterprises are responsible for their waste, but, if they recycle, they may be provided with assistance from the state budget, the National Fund for Nature Protection or voluntary payments. The principal objective of this law is to prevent negative effects of solid wastes on people's lives and health,

as well as on the environment, reduce wastes generations, and encourage rational use of waste reduction techniques in household activities.

8. ***Law "On Protected Natural Reserves"*** (2004) - The purpose of this Law is to regulate relations in term of organization, protection and use of protected natural territories. The main tasks of this Law are the preservation of typical, unique, valuable natural objects and complexes, the genetic fund of plants and animals, the prevention of the negative impact of human activities on nature, the study of natural processes, the monitoring of the environment, the improvement of environmental education.

9. ***Law "On environmental control"*** (2013) - The purpose of this Law is to regulate relations in the field of environmental control. The main objectives of environmental control are: (i) prevention, detection and suppression of violation of the requirements of legislation in the field of environmental protection and rational use of natural resources;(ii) monitoring the state of the environment, identifying situations that can lead to environmental pollution, irrational use of natural resources, create a threat to life and health of citizens; (iii) determination of compliance with the environmental requirements of the planned or ongoing economic and other activities; (iv) ensuring compliance with the rights and legitimate interests of legal entities and individuals, performing their duties in the field of environmental protection and rational use of natural resources.

10. Other laws and standards applicable for the current project are:

- Law on Protection and Usage Objects of Archeological Heritage (2009);
- Decree of Cabinet Ministries of RUz on the procedure of issuing permits for special water use and consumption No. 171 of 14.06.2013.
- Decree of the Cabinet of Ministers of the Republic of Uzbekistan on Approval of the collection and disposal of used mercury-containing lamps. No. 266 of 21.09.2011;
- State Standard - Water quality. O'z DST 951:2011 – Sources of centralized household water supply. Hygienic, technical requirements and classification code;
- State Standard - Drinking water. O'z DST 950:2011 – Drinking water. Hygienic requirements and quality control;
- State standard O'z DSt 1057:2004 "Vehicles. Safety requirements for technical conditions" and O'z DSt 1058:2004 "Vehicles. Technical inspection. Method of control"
- SanR&N RUz No.0179-04 Hygienic norms. List of Maximum Allowable Concentrations (MACs) of pollutants in ambient air of communities in the Republic of Uzbekistan including Annex 1;
- SanR&N RUz No. 0158-04 Sanitarian Rules and Norms on collection, transportation and disposal of wastes contained asbestos in Uzbekistan;
- SanR&N RUz No. 0267-09Admissible noise level into the living area, both inside and outside the buildings.
- SanR&N RUz №0120-01 Sanitarian Norms of allowed level of noise at the construction sites
- SanR&N RUz No 0088-99 Sanitarian requirements for development and approval of maximum allowed discharges (MAD) of pollutants discharged into the water bodies with waste waters.

2.2.3 National EIA requirements

19. The national EIA procedure is regulated by **Law on Environmental Expertise** and The Regulation on State Environmental Expertise (SEE) approved by Cabinet of Ministry Decree No.491 dated from 31 December 2001 with amendments in 2005 and 2009. The regulation defines the legal requirements for EIA in Uzbekistan. SEE is a review process conducted by the Center for SEE ('*Glavgosecoexpertiza'*) under *Goskompriroda* at either the national or the regional level, depending on the project category.

20. *Goskompriroda* on state environmental expertise is a uniform system of State Environmental Expertise, methodological guidance of which implemented by *Glavgosecoexpertise*.

21. Pursuant to Section 10 of the Regulation on SEE, the developer must conduct the EIA assessment process ('OVOS' is the national acronym) in a staged approach, providing the *Glavgosecoexpertiza*/*Gosecoexpertisa* with OVOS documents for review at three distinct stages of the Project. Section 11 of the Regulation on SEE outlines the information that should be within the documentation at each of these stages. The three OVOS stages and their required deliverables are summarized as follows:

22. **Stage I:** *The 'Concept Statement on Environmental Impact'* ('PZVOS' is the national acronym), to be conducted at the planning stage of the proposed project prior to development funds being allocated.

23. **Stage II:** *The 'Statement on Environmental Impact'* ('ZVOS' is the national acronym), to be completed where it was identified by the *Glavgosecoexpertiza/Gosecoexpertise* at Stage I that additional investigations or analyses were necessary. The Statement must be submitted to the *Glavgosecoexpertiza/Gosecoexpertise* before approval of the project's feasibility study, and therefore before construction.

24. **Stage III:** *The 'Statement on Environmental Consequences'* ('ZEP' is the national acronym) represents the final stage in the SEE process and is to be conducted before the project is commissioned. The report details the modifications to the project design that have been made from the *Glavgosecoexpertiza/Gosecoexpertise* review at the first two stages of the EIA process, the comments received through the public consultation, the environmental norms applicable to the project and environmental monitoring requirements associated with the project and principal conclusions.

25. SEE approval (*Glavgosecoexpertiza/Gosecoexpertise* opinion) is a mandatory document for project financing by Uzbek banks and other lenders (Section 18) at Stages I and II and for project commissioning at Stage III of the national EIA procedure.

26. All economic activities subject to SEE are classified into one of four categories:

- Categories I and II — "high and medium risks of environmental impact" (SEE is conducted by the national SNPC within 30 days, all EIA materials are required);
- Category III — "low risk of impact" (SER is conducted by regional branches of SNPC within 20 days, all EIA materials are required); and
- Category IV – "low impact" (SEE is conducted by regional branches of SNPC within ten days, only a draft EIA is required).

27. As per national legislation the Project belongs to Category 3 with respect to their environmental impact (low impact risk)[8]. Prior to to commencing construction such project requires the conduct of the Environmental Impact Assessment and Environmental Appraisal from the State Committee on Ecology and Environment Protection at the provincial level. At the stage of this report preparation, national EIA was developing by a national design institute under MCHS - "Uzbekkomunalloyihaqurilish".

28. The Table 1 presents approvals and permissions from national agencies which are needed to be received prior commencement of civil works and the project operation.

Table 1: List of necessary approvals and permissions

#	Name of the document	Time of receiving permission	Responsible entity

[8] Appendix 2 of the Cabinet Ministers' Decree (CMD) of the RUz No. 491, dated from 2001 with amendments made in CMD # 152 dated from 2009.

1	Environmental Appraisal (Positive Conclusion of Environmental Expertise)	Prior commencement of the construction works	TN
2	Permission/license for using existing borrow pits or opening new ones	Prior commencement of the construction works	Contractor
3	Permission on cutting trees and bushes	Prior commencement of the construction works	Contractor
4	Statement on Environmental Consequences (Permission on waste water, emissions discharge, disposal wastes)	Prior commencement of WTN (Tuyamuyun, Takhiatash and Mangit) operation	TN
5	Permission on special water use for surface and ground water	Prior commencement of WTN (Tuyamuyun, Takhiatash and Mangit) operation	TN

2.2.4 International Environmental Legislation

29. It is important that the Project meets international lending requirements. The following international guidelines are relevant to the Project and will be considered during the EIA process:

- ADB's Safeguards Policy Statement (June 2009);
- ADB´s Operations Manual Bank Policies: Safeguard Policy Statement (March 2010);
- ADB`s Environmental Assessment Guidelines (2003);
- IFC General Environmental, Health and Safety Guidelines (April 2007);
- WHO, Guidelines for Drinking-water Quality (1997).

International conventions

30. Under international cooperation in the field of environment protection, Republic of Uzbekistan signed number of International Conventions, which should be undertaken by State Committee for Ecology and Environment Protection of the RUz. Those potentially applicable to the Project, and for which Uzbekistan is signatory, are outlined in Table 2.

Table 2: Key applicable international conventions and protocols

Convention or protocol	Overview	Relevance to project
UN Framework Convention on Climate Change (2007) **Kyoto Protocol (1997), ratified in 1999**	The Kyoto Protocol (a Protocol to the UN UNFCCC) aims to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.	The Project will not lead to increasing emission to atmosphere.
Paris Agreement on Climate Change (2016)	Paris Agreement provides an opportunity for countries to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius and to pursue efforts to limit the temperature	

	increase even further to 1.5 degrees Celsius.	
Convention Concerning the Protection of World Cultural and Natural Heritage (2004).	The Convention Concerning the Protection of World Cultural and Natural Heritage is the precursor to the establishment of UNESCO World Heritage Sites as a place (i.e. natural or built environment) that is listed by the UNESCO as of special cultural or physical significance.	The Project will have no interaction with these. As such, requirements under the convention will not be triggered.
The Stockholm Convention on Persistent Organic Pollutants (2004)	The Convention is a global treaty to protect human health and the environment from chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of humans and wildlife, and have harmful impacts on human health or on the environment.	The project will comply with national and international standards for hazardous wastes (chemicals) generation and management.

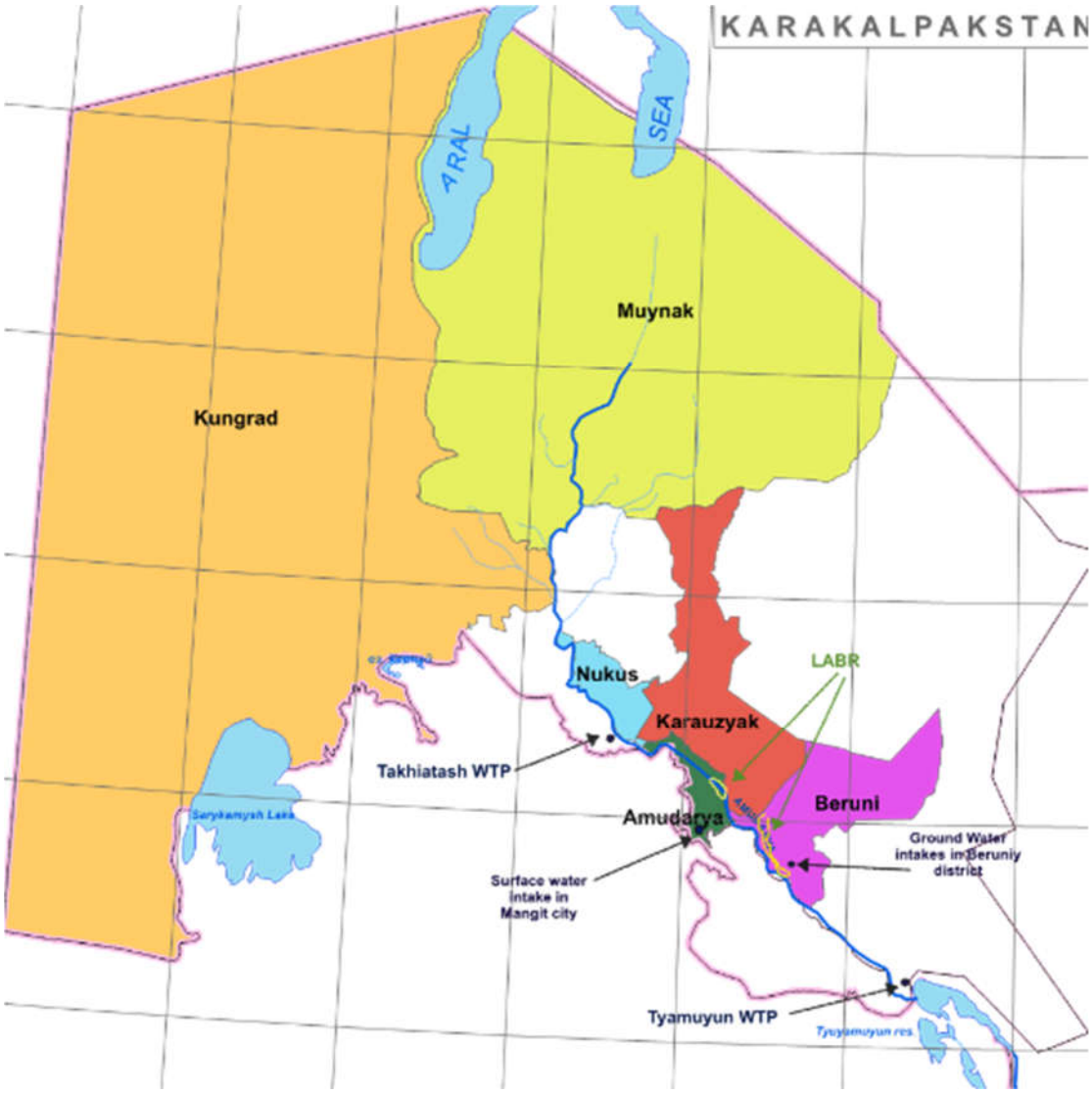
3. DESCRIPTION OF THE PROJECT

3.1. Existing situation

31. The project will be implemented in 6 districts of the Republic of Karakalpakstan (RK): Amudarya, Beruniy, Karauzyak, Kungrad, Muynak and Nukus (Picture 2). The RK is located in the semi-arid desert of Central Asia, lower reaches of the Amudarya River, the southern part of the Aral Sea and the western part of the Kyzyl-Kum desert.

32. The project will cover six above mentioned districts of the RK whose total area is 125 654 square km which is 75.4 % of the total area of the RK. The works to be implemented under the project include construction and reconstruction of water intakes, treatment and supply structures and construction and reconstruction of water pipelines in 6 project districts covering 130 settlements including 124 rural and 6 urban.

33. The Amudarya River is the main resource of fresh water in the region and the main tributary to what now remains of the Aral Sea. Other, sources of water supply include the groundwater contained in local aquifers in along the Amu Darya floodplains replenished by infiltration from the River banks or in the form of lenses of fresh water trapped in permeable soil lenses.



Picture 2: Map of the Republic of Karakalpakstan with indication project districts

34. Settlements at the Amudarya's right river bank districts of Karakalpakstan (Turtkul, Beruniy, Ellikkala, Nukus, Kegeyli, Chimbay, Karauzak and Takhtakupir) are supplied by the regional transmission system "Tuyamuyun-Nukus-Takhtakupir" (TN) Tuyamuyun Water Treatment Plant (WTP) and by local surface and local ground water sources.

35. Left river bank of Karakalpakstan (Khodjeyli, Kanlikul, Shumanay and Kungrad) is supplied by the transmission main "Takhiatash–Kungrad" (Takhiatash WTP), local ground and surface sources located on/along channels of Yorkin, Shumanay, Kartabay etc.

36. Muynak district is the only district of RK which was not connected to the inter-regional transmission main system. In accordance with the Resolution of the President of the Republic of Uzbekistan # PP 2754 dated from 2nd February 2017 «About measures on providing with high quality drinking water in Muynak district of Republic of Karakalpakstan" implementation of a project "Construction main trunk Kungrad-Muynak and water distribution unit" has been launched in February 2017 and in accordance with schedule the project will be competed by July 2017. The project includes construction of new WDC "Kungrad" and main trunk "Kungrad-Muynak" with the length of 101.5 km.

37. Summary of water sources and percentage of district-wise coverage by centralized water supply by districts are provided in Table 3. Detailed description of existing situation in each project district is presented further.

Table 3: Current coverage by centralized water supply and water sources in project districts

District	Population 2017	Domestic connections																Institutional		Commercial		Industrial	
		Connected to a centralized WS network			In-house connections								Standpipe		Trucked water								
					Metered			Not metered		Total in-house connections													
		Customers	Population	%	Connections	Population	in % of total connections	Connections	Population	Customers	Population	%	Customers	Population	Customers	Population	In %	Meterd	Not metered	Meterd	Not metered	Meterd	Not metered
Amudaria	**185700**	**7850**	**41729**	**22.5%**	**2972**	**17291**	**42.2%**	**4064**	**19923**	**7036**	**37214**	**20.0%**	**814**	**4515**	**3868**	**21277**	**11.5%**	**37**		**136**		**3**	
Urban	35830	4135	22322	62.3%	2196	12778	**53.9%**	1877	9201	4073	21979	61.3%	62	343				35	0	136	0	3	0
Rural	149870	3715	19407	12.9%	776	4513	**26.2%**	2187	10722	2963	15235	10.2%	752	4172	3868	21277	14.2%	2	0		0		0
Beruni	**177200**	**9485**	**57828**	**32.6%**	**5191**	**33874**	**59.6%**	**3522**	**19793**	**8713**	**53667**	**30.3%**	**772**	**4161**	**160**	**881**	**0.5%**	**38**		**140**		**2**	
Urban	59482	4897	31207	52.5%	4085	26659	**84.5%**	749	4211	4834	30870	51.9%	63	337				33	0	140	0	2	0
Rural	117718	4588	26621	22.6%	1106	7215	**28.5%**	2773	15582	3879	22797	19.4%	709	3824	160	881	0.7%	5	0		0		0
Nukus	**46100**	**3692**	**19969**	**43.3%**	**2427**	**14982**	**75.9%**	**770**	**2746**	**3197**	**17728**	**38.5%**	**495**	**2241**	**430**	**2367**	**5.1%**	**20**		**18**		**2**	
Urban	10123	1951	4815	47.6%	1461	3026	**76.6%**	446	1589	1907	4615	45.6%	44	199				16	0	18	0	2	0
Rural	35977	1741	15154	42.1%	966	11956	**74.9%**	324	1157	1290	13113	36.4%	451	2042	430	2367	6.6%	4	0		0		0
Karauzak	**50900**	**3829**	**17818**	**35.0%**	**1547**	**9553**	**53.8%**	**1326**	**3919**	**2873**	**13472**	**26.5%**	**956**	**4346**	**492**	**2707**	**5.3%**	**23**		**35**			
Urban	15259	1886	9528	62.4%	1185	7318	**65.9%**	614	1815	1799	9133	59.9%	87	395				16	0	35	0	0	0
Rural	35641	1943	8290	23.3%	362	2235	**33.7%**	712	2104	1074	4339	12.2%	869	3951	492	2707	7.6%	7	0		0		0
Kungrad	**123600**	**14500**	**76628**	**62.0%**	**5751**	**35021**	**54.9%**	**4725**	**22155**	**10476**	**57176**	**46.3%**	**4024**	**19452**	**71**	**388**	**0.3%**	**56**		**184**		**15**	
Urban	66699	10270	55423	83.1%	5136	31274	**52.7%**	4603	21582	9739	52856	79.2%	531	2568				50	0	183	0	14	0
Rural	56901	4230	21205	37.3%	615	3747	**83.5%**	122	573	737	4320	7.6%	3493	16884	71	388	0.7%	6	0	1	0	1	0
Muynak	**30200**	**2623**	**10491**	**34.7%**	**728**	**3606**	**35.0%**	**1354**	**4463**	**2082**	**8069**	**26.7%**	**541**	**2422**	**1261**	**6935**	**23.0%**	**29**		**29**		**3**	
Urban	13237	1967	7615	57.5%	652	3227	**33.9%**	1269	4182	1921	7409	56.0%	46	206				26	0	0	0	3	0
Rural	16963	656	2876	17.0%	76	379	**47.3%**	85	281	161	660	3.9%	495	2216	1261	6935	40.9%	3	0	0	0		0
Total	**613700**	**41979**	**224463**	**36.6%**	**18616**	**114327**	**54.2%**	**15761**	**72999**	**34377**	**187326**	**30.5%**	**7602**	**37137**	**6282**	**34555**	**5.6%**	**203**	**0**	**542**	**0**	**25**	**0**
Urban	200630	25106	130911	65.2%	14715	84282	**60.6%**	9558	42580	24273	126862	63.2%	**833**	**4049**				**176**	**0**	**512**	**0**	**24**	**0**
Rural	413070	16873	93552	0.23	3901	30045	**38.6%**	6203	30419	10104	60464	14.6%	**6769**	**33088**	**6282**	**34555**	8.4%	**27**	**0**	**1**	**0**	**1**	**0**

Source: Tuyamuyun-Nukus, 2017

Tuyamuyun Water Treatment Plant (WTP)

38. Tuyamuyun WTP is located in Turtkul district in 2.6 km to north west from downstream of Tuyamuyun water reservoir lower reaches. The WTP was commissioned in 1992 with a rated capacity 140,000 m^3/d. It feeds the 234 km dia 1420-1000 mm Tuyamuyun-Nukus-Taktakupir transmission main system. Water from Right Bank Canal (RBC) flows through an intake canal into the intake basin. Next water is pumped by 1st lift pumping station through 1.7 km pipe into WTP (Picture 3).

39. Most of the amount of water conveyed through the first trunk of the transmission main supplies the urban and rural centers in the districts Turtkul, Berunyi and Ellikala. Additional amounts of water are pumped up to Nukus where the water is mixed with the water presently produced from at the Takhiatash Water Treatment Plant.

Picture 3: Location of water intake facilities and Tuyamuyun WTP

40. Water treatment process consists of two steps sedimentation (4 circular clarifiers with a diameter of 52 m and a capacity of 50,000 m^3/d each and longitudinal clarifiers), filtration and chlorination stages. Currently only two circular clarifiers are operating. Aluminum sulfate is used as coagulant which is added to the raw water at the inlet of the circular clarifiers. From the circular settlers the raw water flows into a set of longitudinal clarifiers from where the clarified raw water flows by gravity via large diameter feeder into the rapid sand filters rooms.

41. After filters water flows into Clean Water Reservoirs, where from it is pumped via 2nd lift pumping station. The 2nd lift pumping station is equipped with 6 pumping units each consisting of 2 pumps arranged in serial. The pumps were dimensioned to convey water until over a distance of 243 km until the next boosting station in Nukus, and over a maximum topographic elevation of 218 m above sea level (asl). Chlorine gas is using for disinfection.

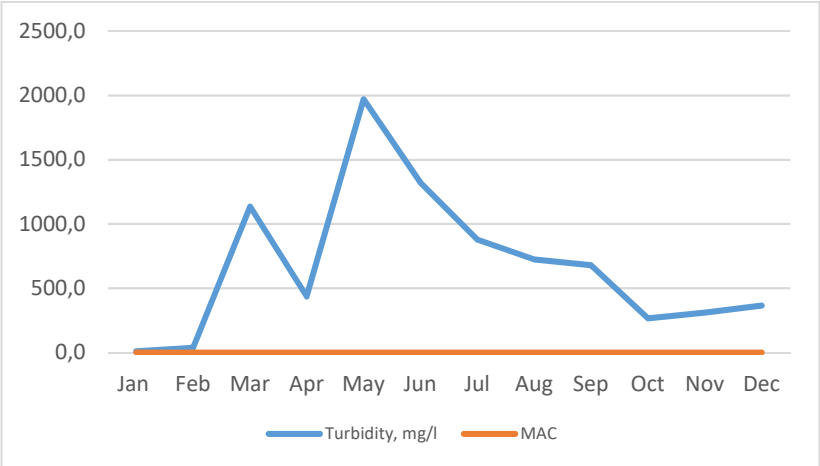
42. Two from four circular clarifiers are not operating and they require a total replacement of equipment (scraper mechanism, control reducer, pipes) and cleaning from sludge and sediments. Two operating clarifiers also require replacement of equipment (mechanism, pipes). The WTP's layout is presented in Picture 4.

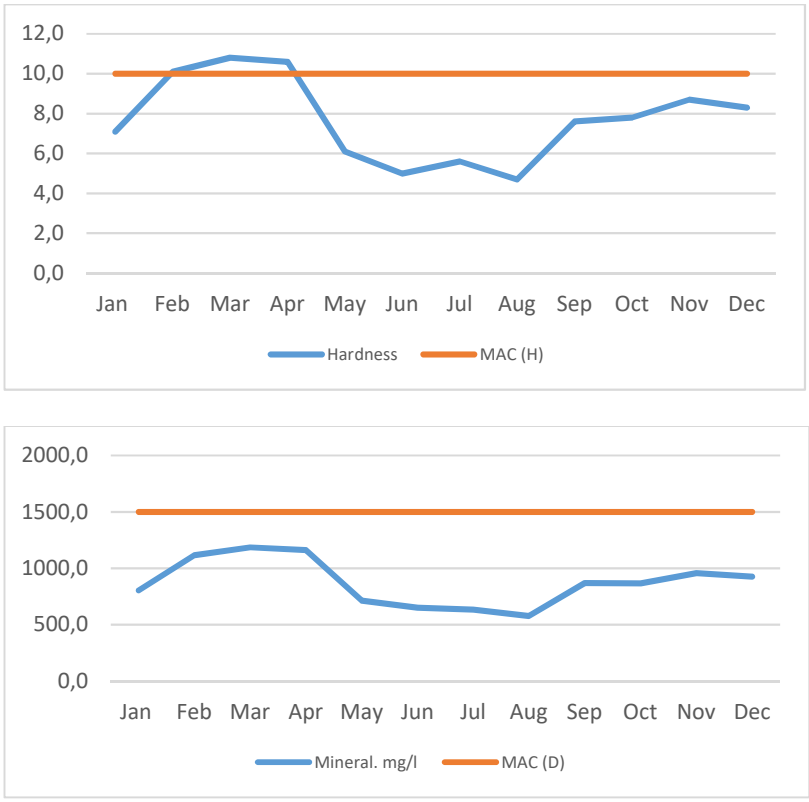
Picture 4: Layout of Tuyamuyun WTP (1-4 circular clarifiers, 5-6 longitudinal clarifiers, 7-8 filtration facilities, 9-11 Clean Water Reservoirs, 12 – 2nd lift pumping station, 13 – pumping station for own needs, 14-administration, laboratory, 15 – reagent unit, 16 – chlorination unit, 17-entrance)

43. There are two filter rooms with each 9 filters 12x6 m. The filtration capacity of the plant can reach and even exceeds the planned 140,000 m^3/d. The present overall treatment regime is 27,000-29,000 m^3/d in autumn, winter and up to 60,000-70,000 m^3/d during the summer season.

44. The 2nd lift pumping station consists of twelve pumps arranges in six arrays of twin pumps disposed in serial. 4 of the 6 units are not operational. Almost all buildings require rehabilitation. Ventilation system in the chlorination building is not operating, which is risky for WTP's workers and population from surrounded area.

45. Monitoring results of water quality during 2016 in advance camera and comparison with standards for drinking water are presented in the Picture 5.





Picture 5: Water quality in Tuyamuyun WTP: turbidity, hardness, mineralization (Source: Tuyamuyun-Nukus-Takhiatash, 2016)

46. As shown in the table, a level of turbidity exceeds standards almost during the whole year. Some increasing of hardness is observing during the March-April (2016).

47. Water quality at the different stages of treatment process was checked within the current IEE. Water samples were taken from advance camera, first and second circular clarifiers and before pumping into the network. Results of analysis are presented in the Table 4. The analysis was taken by PPTA Consultant jointly with representatives of State Sanitarian Epidemiological Service on May 4, 2017.

Table 4: Water quality at the different stages of Tuyamuyun WTP

	Inlet chamber	**circular clarifier 1**	**circular clarifier 2**	**before network**	**National Standard[9]**
Turbidity, mg/l	21.6	5.9	5.6	1.7	2
Hardness, mg*eqv/l	8.4	8.5	8.3	8	7/10
Mineralization mg/l	690	700	700	720	1000/1500**

Source: PPTA, Baseline survey, 2017

** As per standards, it is allowed to use water with these parameters as well

48. As shown in the graphs (Picture 5 and Table 4), water quality at the Tuyamuyun WTP during observation meets standards of Uzbekistan GOST 950-2011 “Drinking water quality. Hygienic requirements and quality control”.

Takhiatash WTP

9 State Standard - Drinking water. O’z DST 950:2011 – Drinking water. Hygienic requirements and quality control

49. Takhiatash WTP is located in Khodjeyly district of the RK. The WTP was commissioned in 1993 with rate capacity 120,000 m^3/day for supplying with drinking water Takhiatash, Khodjeyli and Kungrad cities, Kanlykul and Shumanay district centers.

50. Water treatment process at the Takhiatash WTP is identical to the Tuyamuyun WTP. It includes sedimentation in circular and longitudinal clarifies, filtration and chlorination (Picture 6). Water intake and 1st lift pumping station are located on the bank of Suenly canal.

51. First stage of WTP upgrading (with capacity 60,000 m^3/day) was implemented in 2011 within ADB loan. 2 circular clarifiers (Picture 6, # 2 and 3), part of longitudinal clarifies (#5), filtration facilities (#7), 2nd lift pumping station were rehabilitated (#10 a). WTP's territory is fenced and has lightening.

Picture 6: Layout of Takhiatash WTP (1-4 circular clarifiers, 5-6 longitudinal clarifiers, 7 filtration facilities, 8-9 Clean Water Reservoirs, 10 – 2nd lift pumping station, 11-administration, laboratory, 12 – chlorination unit, 13 – reagent unit)

52. To expand the capacity of WTP up to design 120,000 m^3/day reconstruction of 1st lift pumping station with replacement of pumps, technological communications, two not operating clarifiers (Picture 7, #1,2), second set of longitudinal clarifies (#6) will be rehabilitated.

Operating circular clarifiers

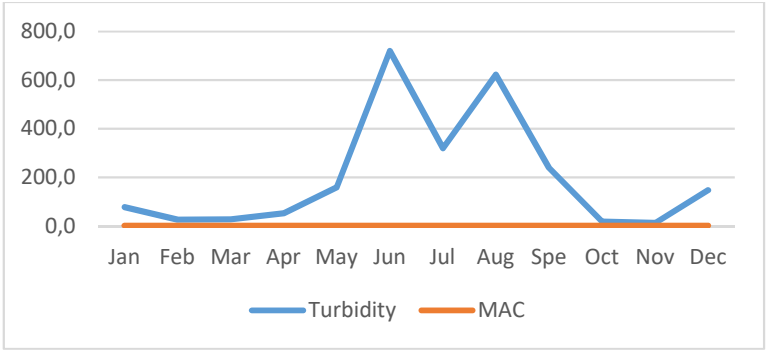
Non-operating circular clarifiers

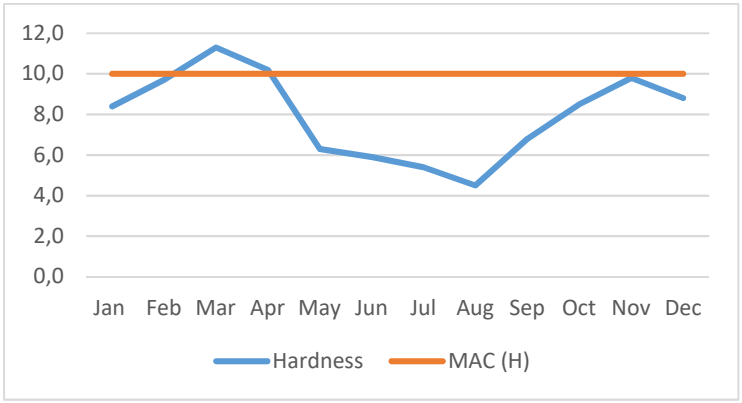
Operating longitudinal clarifiers

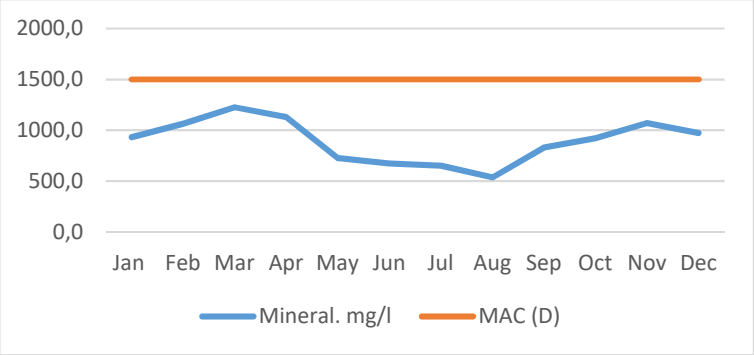
Non-operating longitudinal clarifiers

Picture 7: Water treatment facility on Takhiatash WTP

53. Results of analysis of water quality during 2016 in inlet chamber is presented in Picture 8. The results were provided by TN and they show that water quality in Suenly canal almost complies with national drinking water standards. There is some exceeding (up to 11.2 mg*ecv.) to on hardness during March, 2016.







Picture 7: Water quality in Suenly canal, advance camera: turbidity (mg/l), hardness (mg*eqv/l), mineralization (mg/l),
Source: TN, 2016

Water supply in Amudarya district

54. Until 2014 the main source of drinking water source in Amudarya district was Tuyamuyun-Urgench-Mangit regional system, local surface and groundwater intakes. After institutional re-structuring of former Uzkommunhizmat, Amudarya district was disconnected from this regional system and now the main water supply sources in the district are surface water intakes in Mangit city, hand pumps and tanked water. Two ground water intakes (Qilichboy Pumping Distribution Station (PDS) and PDS # 37) are not operating since 2008 and 2002 accordingly.

55. ***Surface water intake***. Two water intakes (VU-1 and VU-2) are taking water from Ak-Mangit canal (from Amudarya river) to supply with water urban and rural areas. Currently VU-1 is operating and it supplies mostly urban and some part of rural areas. Water is treated only through sedimentation, without filtration and it is disinfected by liquid chlorine before pumping into the network at the VU-1 water intake.

56. ***VU-1.*** This water intake area is 7,5 ha with rate capacity 7,000 m^3/day. 1st level pump station at VU-1 does not work. Water is directly pumped from Ak-Mangit canal by two pumps located at the canal bank into 3 sedimentation ponds in series with capacity: 20,000, 30,000 and 10,000 m^3. After sedimentation, water is accumulated into 2 clean water reservoirs with capacity 1000 m^3 each. Accumulated clean water is pumped into to network through 2nd lift pumping station.

57. 2nd lift pumping station consisting of 4 pumps is in a good condition. The pumping station's building is combined with an operating chemical laboratory. There are two transformers on the territory of VU-1, which were produced at the end of 80's.

Picture 8: Water intakes in Amudarya disctrict center – VU-1 and VU-2, canal Mangit

58. VU-2 is located at a distance of about 1.0 km from the water intake VU-1 upstream of the Mangit canal. Water from Ak-Mangit canal is pumped by one pumps located at the canal bank into 2 concrete sedimentation ponds with capacity 50,000 m^3 each.

Picture 9: Sedimentation ponds in VU-2

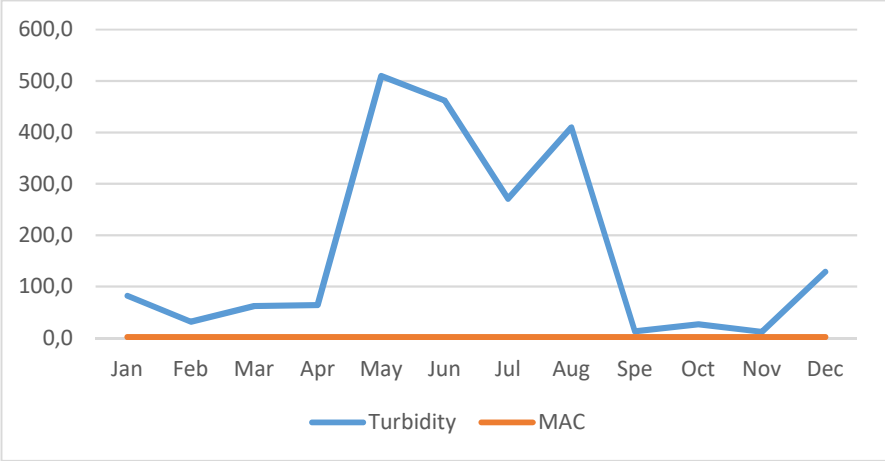
Picture 10: Sedimentation ponds in VU-1

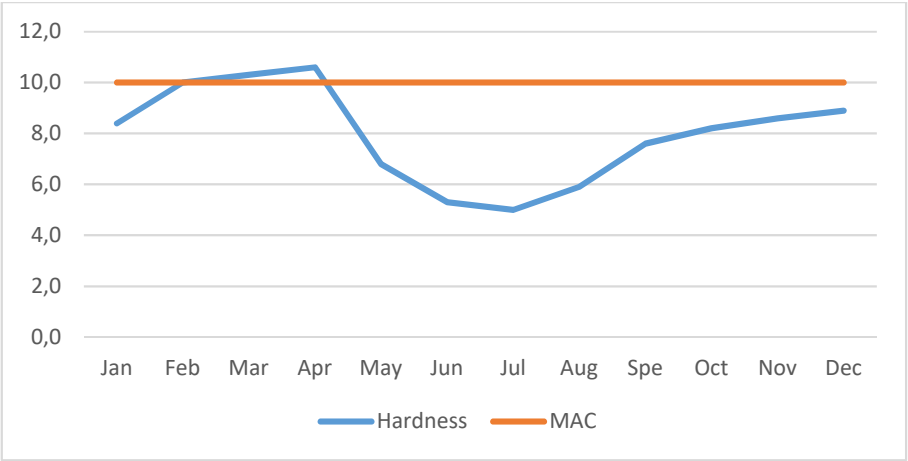
59. There are 3 pumps in 2nd lift pumping station, two of them are operating and one pump is dismantled. One transformer brand KTN-160/10/0.4 is in working conditions. There is no chlorination unit in VU-2. It was planned, that after sedimentation, water would be pumped until distribution hub (RU-1) through water pipe with diameter 300 mm for chlorination and further pumping into the networks for rural area. Currently VU-2 operates on the permanent base.

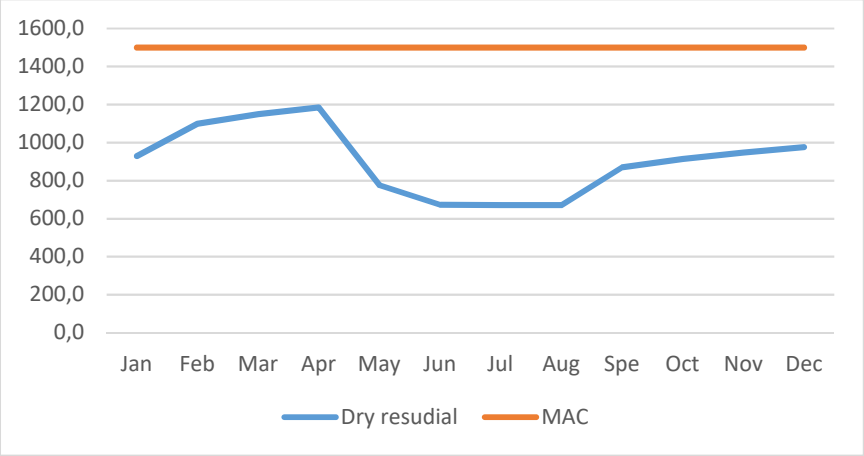
Picture 11: Bank pump on VU-2

Picture 12: Bank pump on VU-1

60. Mangit canal flows from Amudarya river until water intake through inhabited area which put quality of water in Ak-Mangit canal under pollution risk. Water samples from both water intake points at the Ak-Mangit canal were taken to examined water quality (Table 5).







Picture 13: Water quality in Ak-Mangit canal: turbidity (mg/l), hardness (mg*eqv/l), mineralization (mg/l),
Source: TN, 2016

61. As shown in the graphs, water quality almost complies with standards, with exception turbidity concentration and hardness during the April. Results of analysis taken by PPTA Consultant showed that water after sedimentation complies with national standards on turbidity.

Table 5: Water quality at the Mangit Water intakes

	VU-1		VU-2		National standard
	Mangit canal	before network	Mangit canal	clarifiers-2	
Turbidity, mg/l	19.8	1.8	18.1	0.7	2
Hardness, mg*acv/l	8.2	8	8.1	9.7	10
Mineralization mg/l	690	735	600	930	1500

Source: PPTA, Baseline survey, 2017

62. ***RU-1*** was built in 2006 within ADB project "Improvement of water supply in settlements of Republic of Karakalpakstan". It was planned that RU-1 would receive water from Tuyamuyun-Urgench regional system, however, due to changes in water distribution scheme, the facilities have not been operated more than 10 years.

Picture 13: Canal Ak-Mangit flows inside settlements

Picture 14: Water distribution Unit RU-1

63. ***Pump-distribution station (PDS) "Qilichboy"*** supplied with water Aekchi and Qilichboy settlements from wells. PDS comprises a ground water intake (6 wells, 2 of them are not operating) and Water Distribution Unit (WDC) – 2 reservoirs with capacity 250 m^3, 2nd lift pumping station. Water was pumped from 30 m depth. The facilities were built in 2003, since 2007 they are not operating.

64. ***PDS # 37*** supplied with water Oq oltin settlements from wells from 30 meters depth. Water intake consists of 5 wells, 4 of them are not operating. Water is collected in two reservoirs with capacity 300 m^3 each. The facilities have not been operated since 2002.

65. In accordance with national standards – KMK 2.04.02-97 "Water supply. External networks and facilities" dated from 1997, para 10.8, there are three levels of sanitarian zone. The strictest is the first level zone. First level of sanitarian zone for surface drinking water sources is defined by following borders: 200 m upstream and 100 meters below from water intake point. In width, 50 meters of opposite bank for the canals with width less than 100 meters.

66. There are one living houses, several auxiliary buildings and agricultural plots within first level of sanitarian zone in VU-2 water intake. In accordance with standards, conduction of any construction, rehabilitation works, using chemicals for agricultural lands are allowed within sanitarian zone.

Picture 15: Sanitarian zone for Mangit water intake

67. There are no centralized sewage system and waste water treatment plant in Amudarya district. In most of the cases waste water is collected into ponds located at the backyard of houses and due to infiltration it goes to deeper layers of soil.

Beruniy district

68. Water supply of Beruniy district are being implemented through Tuyamuyun-Nukus interregional transmission main, local sources (underground wells and hand pumps) and

tanked water. Turtkul and Beruniy cities are supplied from transmission main and rural area – from underground sources.

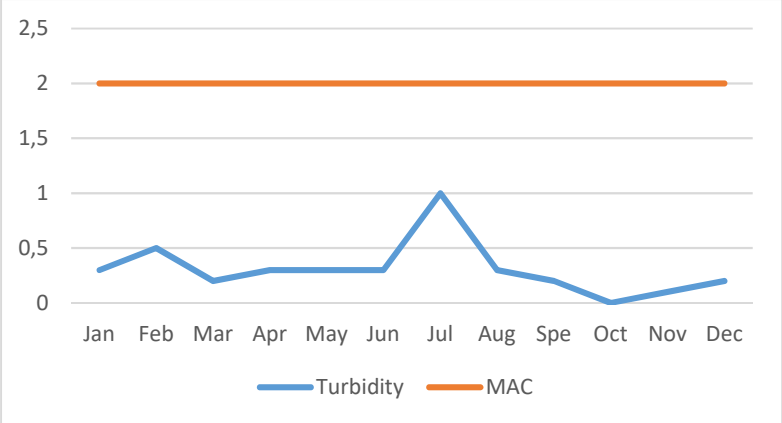
69. Two ground water intakes supplied rural areas in Beruniy district: Beruniy and Abay. Water from Beruniy water intake is pumped directly into the networks and Abay pumps water to the PDSs ## 18, 17, 15 which further pump water into the network. PDS # 18 is not included in this project.

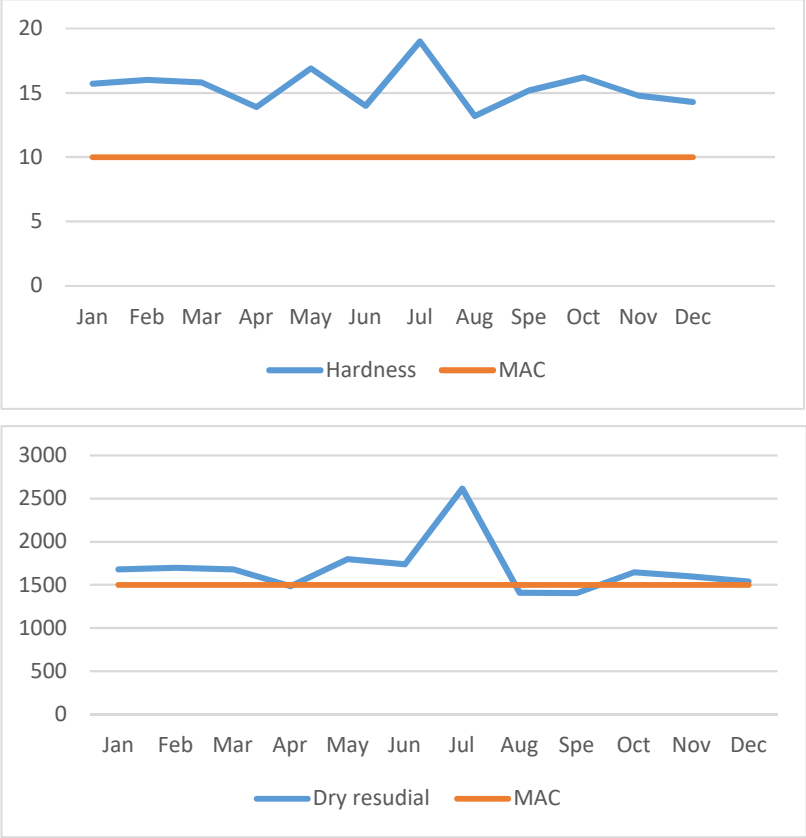
70. ***Beruniy ground water intake (GWI)*** was built in 1969 and it occupies area in 19 ha. There are 9 wells in the field, 4 of them are not operating. The depth of wells is 30 meters. Water is pumped into two reservoirs with capacity 2000 and 3000 m^3 (Picture 16-17).

Picture 16: Facilities for ground water well in Beruniy Ground Water Intake

Picture 17: Ground water well in Beruniy GWI

71. Results of water quality analysis from well located in Beruniy water intake are presented in Picture 18. As shown in the graphs, water from well does not meet national standards for drinking water on hardness and mineralization.





Picture 18: Water quality in Beruniy water intake: turbidity (mg/l), hardness (mg*eqv/l), mineralization (mg/l),
Source: TN, 2016

72. Results of analysis conducted within current IEE also showed exceeding of ground water quality on hardness in Beruniy GWI.

Table 6: Water quality from well in Beruniy GWI

	Turbidity, mg/l	**Hardness, mg*acv/l**	**Mineralization mg/l**
Beruniy GWI	0.6	14.5	1165
National standards	**2**	**10**	**1500**

Source: PPTA, Baseline survey, 2017

73. ***Abay GWI*** was built in 1982 and it is equipped with 12 wells, 4 of them are not operating. Pumped water is collected into two reservoirs with capacity 250 m^3 each. Water is pumped from 25-30 meters. GWI Abay pumps water further to settlements Navoi, Kangshatal, Biybazar, PDS-17, PDS-15 and PDS-18.

Picture 19: Clean Water reservoir in Abay GWI

Picture 20: Not operating ground water well

74. PDSs ## 17 and 15 served for pumping water into currently do not operate. Both PDSs have 2 clean water reservoirs with capacity 700 m^3 each.

75. Waste water treatment plant with rate capacity 100 m^3/day was built in Beruniy district in 2015. 43 multistoried houses and district hospital are connected to WTTP. The rest of the houses dispose water into the septic tanks.

Karauzyak district

76. Water supply sources in Karauzyak district are: Tuyamuyun-Nukus transmission main, hand pumps and tanked water. There are only two operating local ground water intakes in Temirkhan settlements and in a territory of the farm named “Panaev”. A desalinization plant is operating in the farm “Panaev”.

77. Two WDCs “Karauzyak” supplied with water urban and rural area of the district (Picture 21).

Picture 21: Urban and rural WDCs in Karauzyak district. For urban WDC – 1-administrative building/laboratory, 2 – CWR, 3 - 2nd lift pumping station, 5 – sedimentation ponds (not operational now), 6 – 1st lift pumping station (not operational)

78. Urban WDC "Karauzyak" was commissioned in 1980. Initially water from canal was pumped into sedimentation ponds by 1st lift pumping station (6) for clarification. Water flew by gravity to the CWR (2) with capacity 500 m^3, disinfected by chlorine (4) and pumped by 2nd lift pumping station (3) into the Karauzyak city network. ALDOS chlorination unit was installed for water disinfection, however it is not operating. Chlorination are being implemented directly into clean water reservoir from gas balloon (Picture 22). Currently WDC "Karauzyak Urban" is connected to the Tuyamuyun-Nukus transmission main and 1st lift pumping station is not operational, water flows directly to the CWR.

2nd lift pumping station

Chlorination directly into CWR

Laboratory at the WDC Urban

Administrative building at the WDC Urban

Picture 22: Water treatment facilities at the Karauzyak-Urban WDC

79. Rural WDC “Karauzyak” was commissioned in 1980. There are 3 CWRs: one with capacity 500 m^3 and 2 with 100 m^3 each. WDC received water from Tuyamuyun-Nukus transmission main which flew by gravity into CWRs and after pumped into the rural network. Chlorination facilities is designed to produce chlorine from saltine solution. The WDC has not been working since 1997 (Picture 23).

2nd lift pumping station WDC rural

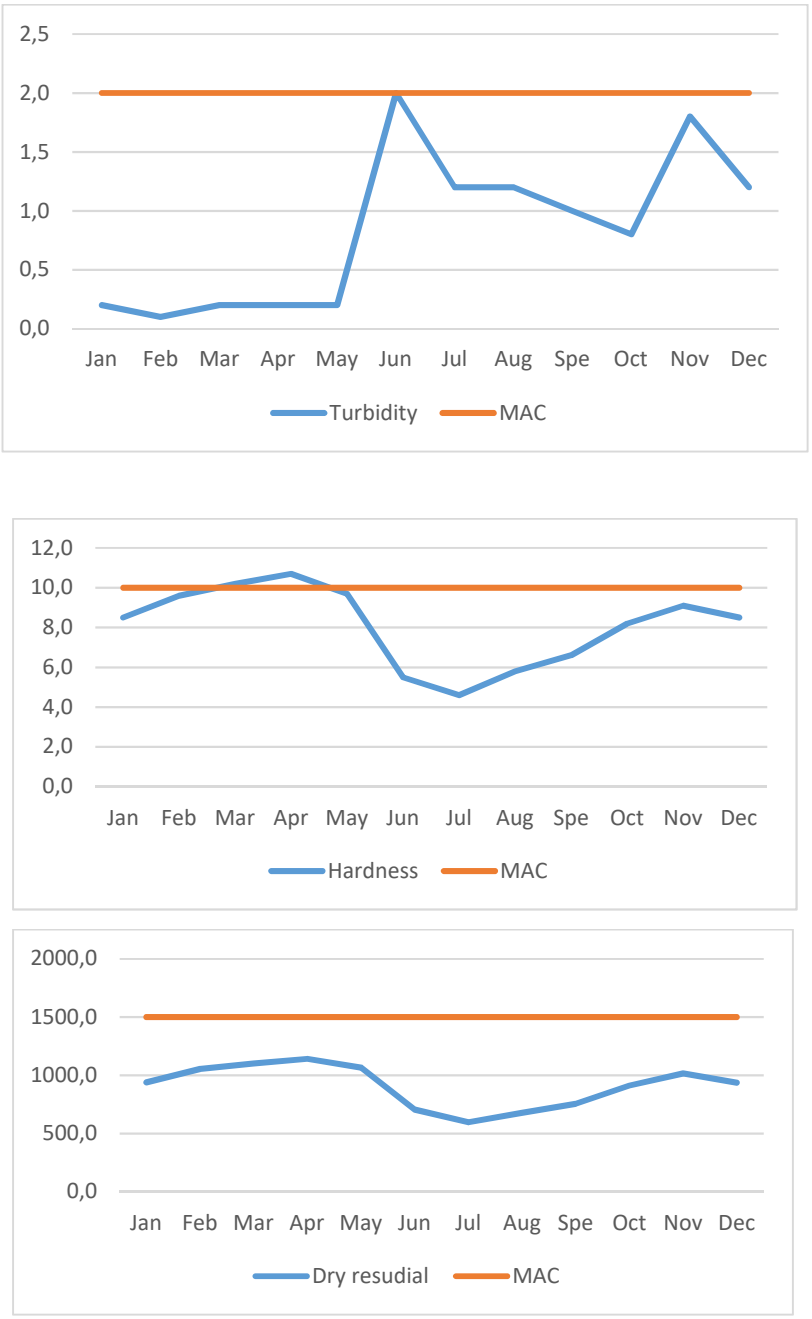
Territory of WDC rural – CWR and chlorination unit

Chlorination facilities

Fence around the WDC rural

Picture 23: Water treatment facilities at the Karauzyak-Rural WDC

80. TN provided data on water quality in CWR in WDC Urban presented in Picture 24. The results showed that water quality in WDC meets standards.



Picture 24: Water quality from CWR: turbidity (mg/l), hardness (mg*eqv/l), mineralization (mg/l), **Source:** TN, 2016

81. However, water quality from ground wells in Temirkhan settlements does not meet requirements on mineralization (Table 7).

Table 7: Water quality from well in Temirkhan settlement

	Turbidity, mg/l	**Hardness, mg*acv/l**	**Mineralization mg/l**
Well in Temirkhan settlement	1.4	2.5	2050.0
National standards	**2**	**10**	**1500**

Source: TN, 2016

82. There is no waste water treatment plant (WWTP) in the district, sewage water is collected into the septic tanks and disposed outside of settlements in some cases.

Kungrad district

83. The main water sources in Kungrad district are: (i) Takhiatash-Kungrad transmission main receiving water from Takhiatash water treatment plant (WTP), (ii) Altinkul surface water intake (WI) and (iii) hand pumps, (iv) tanked water. Water from Takhiatash transmission main supplies the western part of Kungrad district center by means of an off-take and pumping station in the southwestern part of the town with average capacity - 8,000 m^3/d. Altinkul WI supplies water for some part of Kungrad city and rural area – Altinkul settlement.

84. Water from Takhiatash-Kungrad transmission main is delivered to customers through "Ornek" and "Khorezm" Water Distribution Centers (WDC). It comprises of 2nd lift pumping station, CWRs (2 reservoirs with 300 m^3 each) and water tower. There are no chlorination facilities at the "Ornek" WDC, a fence is in a dilapidated state, no lightening.

85. WDC "Khorezm" was built in 1989, comprises of 2nd lift pumping station, 5 CWRs (4 with 500 m^3 capacity and one with 1000 m^3), building for chlorination without equipment. The WDC "Khorezm" is non operating, all pumps are dismantled.

Picture 25: Altinkul water intake general view

86. Water at the Altinkul water intake is pumped from the canal "Rafshan" (Altinkul) via 1st lift pumping station into network. The average capacity of this facilities is 3,300 m^3/day. Chlorination are being implemented by mixing chlorine gas with water and further adding chlorinated water directly into the pipe going to the network.

87. There is a building of filtration station which is not used currently due emergency conditions of structure. Fence of water intake is in a dilapidated state, a territory of WI does not have lightening.

Chlorination facilities at Altinkul WI

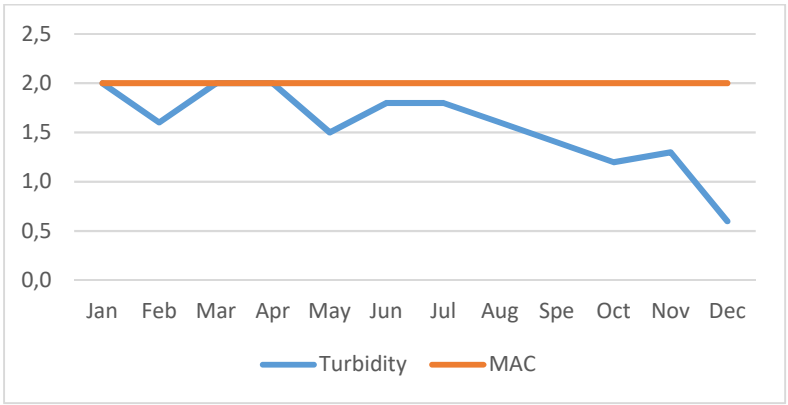
Water is pumped from Rafsan canal

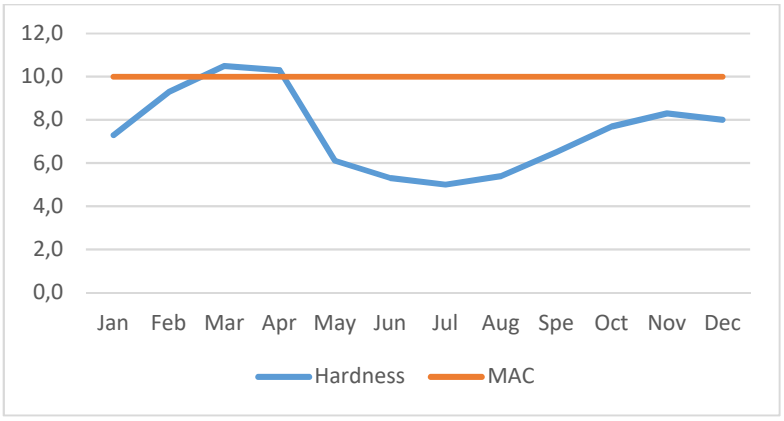
Filtration building in emergancy conditions (non-operating)

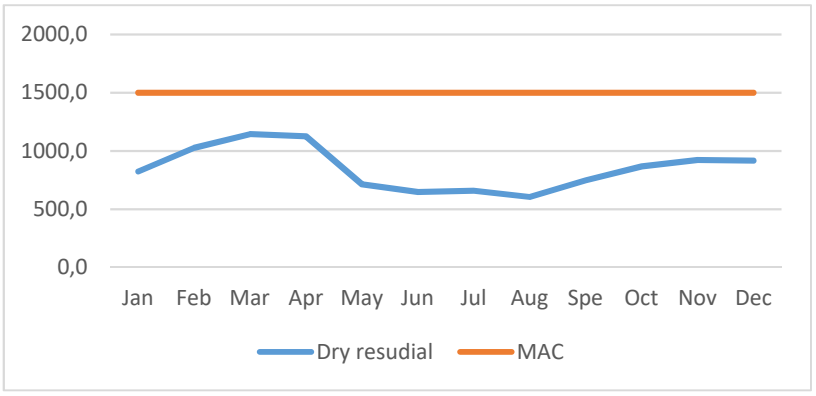
Pumping water at the street

Picture 26: Altinkul water intake facilities

88. There is efficient sanitarian zone for this surface water intake which is comply with national standards. According to data provided by TN, water quality in main transmission during 2016 complied with standards, excepting level of hardness during April-May when this indicator increased up to 10.3-10.5 mg*eqv/l (Picture 27).

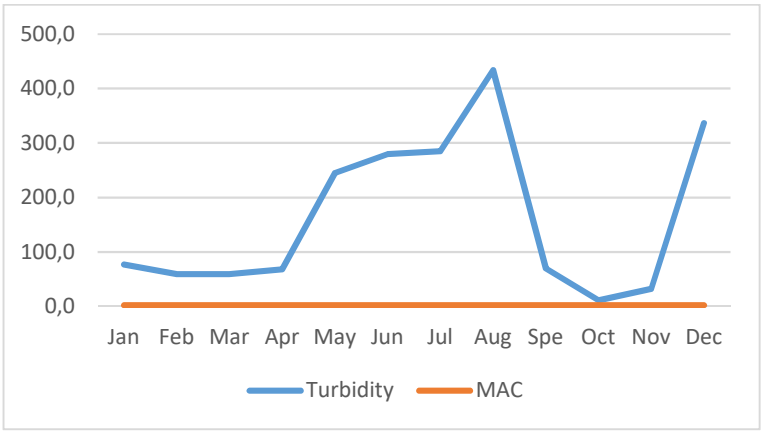


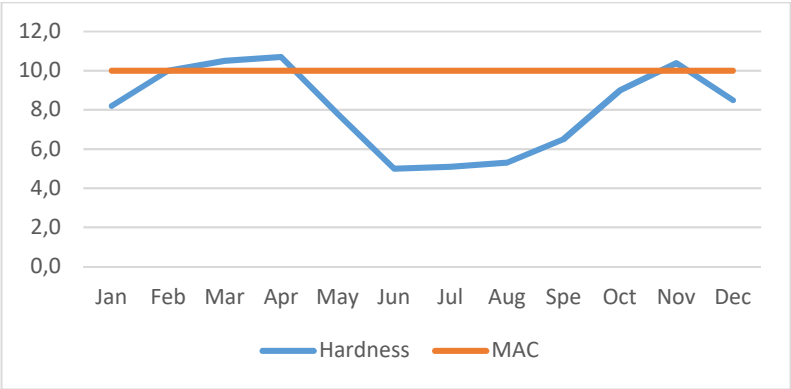


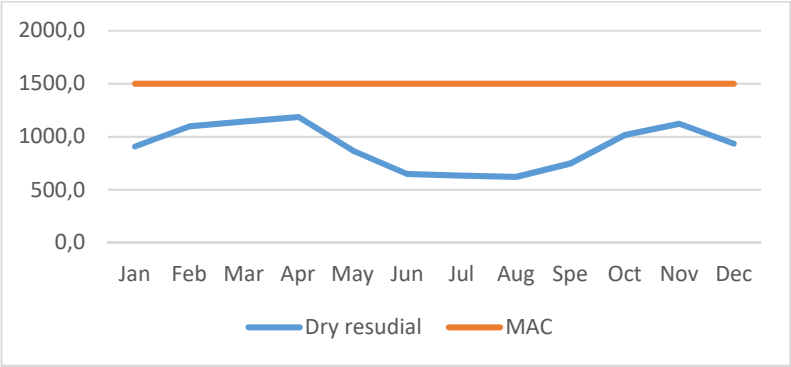


Picture 27: Water quality in distribution network: turbidity (mg/l), hardness (mg*eqv/l), mineralization (mg/l),
Source: TN, 2016

89. Water in Altinkul canal has also good quality excepting turbidity and it meet standards (Picture 28).







Picture 28: Water quality in Altinkul surface water intake, inlet chamber: turbidity (mg/l), hardness (mg*eqv/l), mineralization (mg/l),
Source: TN, 2016

90. Quality of water from sedimentation ponds in Altinkul water intake and hand pump in the street in Kungrad city were examined within the IEE (Table 8). As shown in the table, water quality in Altinkul WI fully complies with standards. However, water from hand pump slightly exceeds allowed concentration on hardness.

Table 8: Water quality in advance camera Altinkul water intake and street hand pump

	Turbidity, mg/l	**Hardness, mg*acv/l**	**Mineralization mg/l**
Altinkul Water Intake	0.9	10	880
Hand pump	0.7	10.3	950
National standard	**2**	**10**	**1500**

Source: PPTA, Baseline survey, 2017

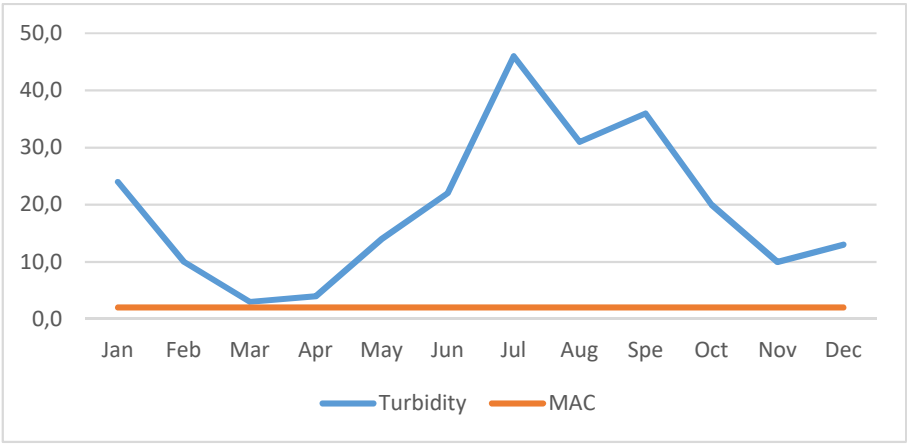
91. There is waste a water treatment plant (WTTP) in Kungrad city. The 30 % of Kungrad city is connected to sewage network, the rest households in city and whole households in rural areas use septic tanks. Sewage from houses located within Kungrad city is disposed into the Kungrad city WTTP, and the sewage from rural area is disposed at the places specially designated by local khokimiyats.

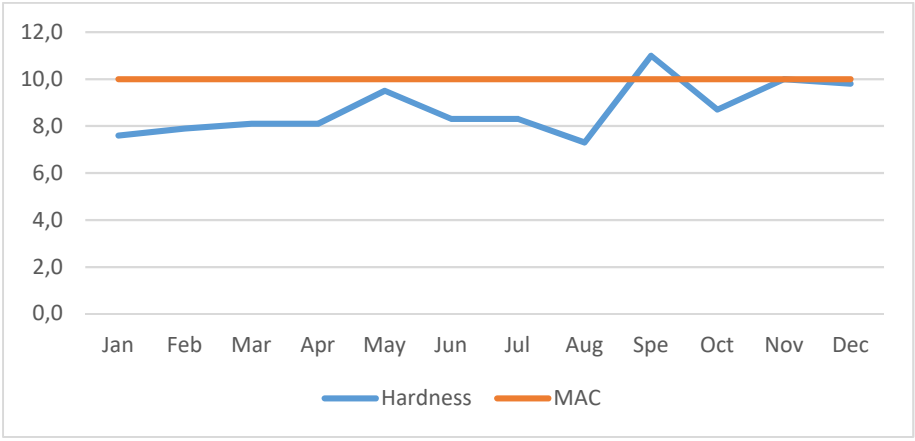
Muynak district

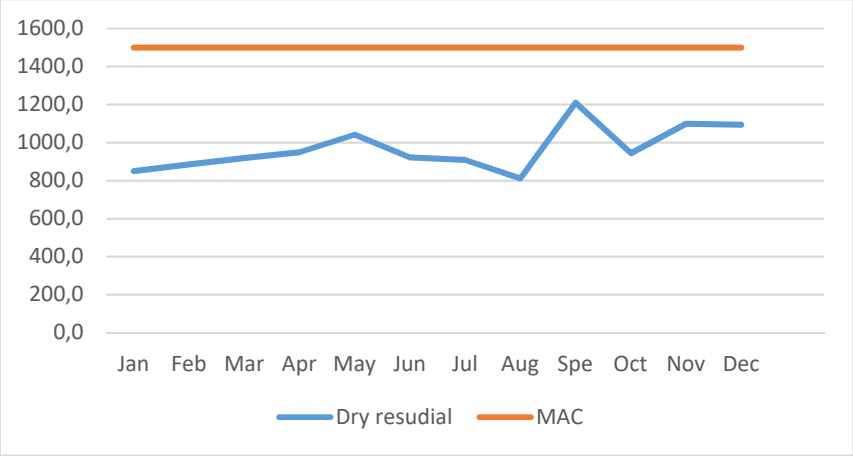
92. Currently water supply source of Muynak city is canal “Talpyk”. Muynak water intake consists of 1st lift pumping station, 8 sedimentations ponds with 400 thousand m^3 each and 2nd lift pumping station delivering water into Muynak city. The length of pipe from water intake until WDC in Muynak city is 8.5 km (Picture 30).

Picture 30: Muynak Water intakes

93. Results of water quality analysis provided by TN showed that water in Talpyk canal serving as water source for Muynak city complies with standards with exception of indicators on turbidity. However, it should be noted, that sample were taken before sedimentation ponds.







Picture 31: Water quality in Tallik canal (Muynak) surface water intake: turbidity (mg/l), hardness (mg*eqv/l), mineralization (mg/l),
Source: TN, 2016

94. In accordance with the President of RUz Resolution # 2574 dated from 2 February 2017[10], a new transmission main is being constructed. The length of new part of transmission line is 101.5 km. It is proposed that other settlements of Muynak district will be also connected to the newly constructed transmission main.

95. WDC Muynak was built in 2009 and it occupies territory 2.1 ha. The current WDCs capacity is 7.5 thousand m^3/day. There are 3 CWRs on the territory of WDC, 2 with storage capacity 1000 m^3 and one with capacity 2500 m^3. Water via 2nd lift pumping station is pumped from Muynak WDC to Muynak city networks and Uchsay rural settlement.

Picture 32: Desalination plant in Porlitay

Picture 33: Water is pumped form Porlitay canal

96. For the rest of rural settlements the sources of drinking water are hand pumps. Water is pumped from 8-12 meters depth. There is only one desalinization facility in the Porlitay settlement which was built in 2004. However, it is not operating currently and the facilities are used as WDC for pumping water from Porlitay canal, chlorination and further delivering into Porlitay network.

Table 9: Water quality in Muynak WI and Porlitay canal

	Turbidity, mg/l	Hardness, mg*acv/l	Mineralization mg/l

10 President Decree #2574 from 2 February 2017 «On measures on providing population of Muynak district of Republic of Karakalpakstan with high quality drinking water"

Muynak WI	1.4	10	1005
Porlitay canal	1.2	10.5	890
National standards	**2.0**	**10**	**1500**

Source: PPTA, Baseline survey, 2017

97. The length of water supply network in Muynak district is 56.9 km. There is no waste water treatment plant. Sewage is collected into the ponds without disposal outside of settlements.

Nukus district

98. The main source of water in Nukus district is the transmission main Tuyamuyun-Nukus-Taktakupir. Additional resource is obtained from wellfields in rural areas: Shortanbay and Medeniyat.

99. ***The Water intake and WDC Medeniyat*** was built in 1992 and occupies 0.6 ha. Since 2016 the water intake has not operated. There are one well within territory of WDC territory and two wells outside. The water was pumped from 30-35 meters deep. There are 2 CWRs with capacity 75 m^3 each in the WDC. The pumps station is combined with electrolysis. Chlorination was implemented with hypochlorite sodium. The fence is in dilapidated condition, no external lightening.

100. ***WDC Kerder*** was commissioned in 1992, received water from Tuyamuyun-Nukus transmission main. There are two CWRs with capacity 500 m^3 each, pumping station combined with chlorination facilities in the WDC. WDC is not operate since 2002 year. Currently drinking water sources for this settlements are hand pumps. Water quality from hand pumps significantly exceeds national standards. Results of water quality are presented in Table 10.

Picture 34: Medaniyat WDC

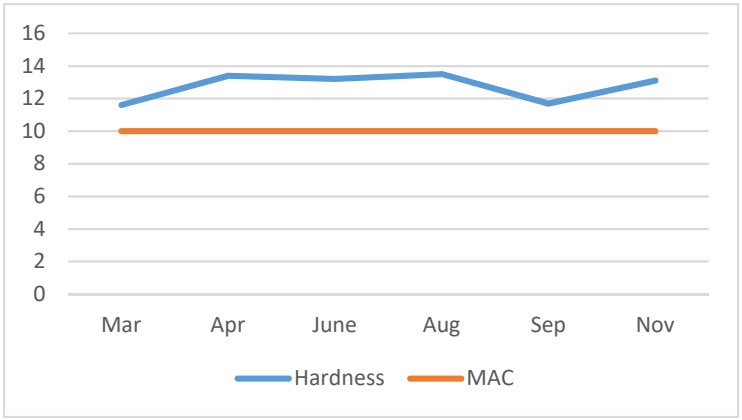
Picture 35: Pumping station in Kerder

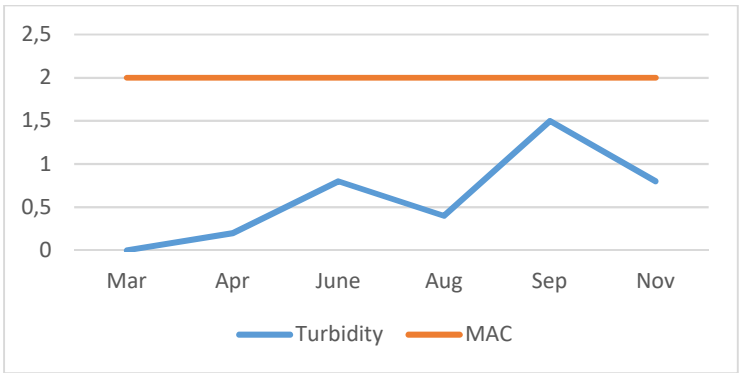
Picture 36: Kerder WDC

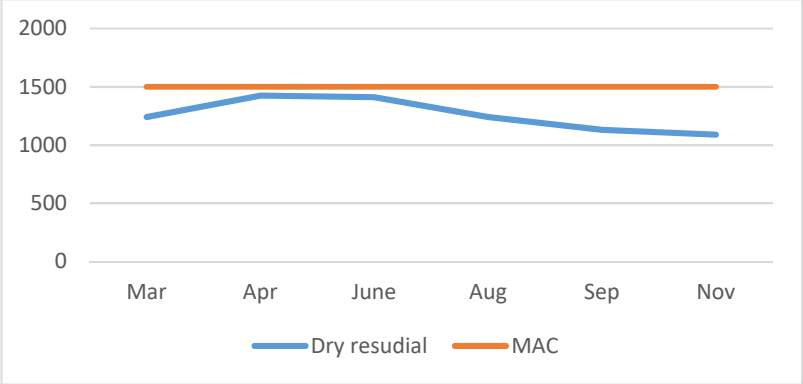
Picture 37: Chlorination facilities on Shortanboy WDC

101. ***Ground Water intake (GWI) and WDC Shortanbay*** was commissioned in 1992. Water supplies from 3 wells at distance 700 meters from WDC without proper fence. Water pumped from 30 meters. There are 2 CWRs with capacity 500 m^3. One of them is not suitable for use due to deterioration. Water from CWR is pumped via 1 pump into the network. There is chlorination unit in WDC, which is not used.

102. According to data provided by TN, water quality in Shortanbay GWI does not meet requirements on hardness (Picture 38).







Picture 38: Quality of water from well on Shortanbay WDC: turbidity (mg/l), hardness (mg*eqv/l), mineralization (mg/l),
Source: TN, 2016

103. Samples from ground water well fields Shortanbay and hand pumps located in Kerder settlement were taken to check quality of water. As showed results, there are significant exceeding on hardness in all samples. Crucial situation was observed in Kerder settlement, where hardness was more than three times higher than standards (Table 10).

Table 10: Water quality in Nukus district

	Turbidity, mg/l	**Hardness, mg*acv/l**	**Mineralization mg/l**
GWI Medeniyat well	0.9	16.8	1400
Kerder s. hand pump near to WDC	0.8	16.8	1295
Kerder s. hand pump near to lyceum	2	39.2	2880
GWI Shortanbay	0.8	14.5	1070
National Standards[11]	**2**	**10**	**1500**

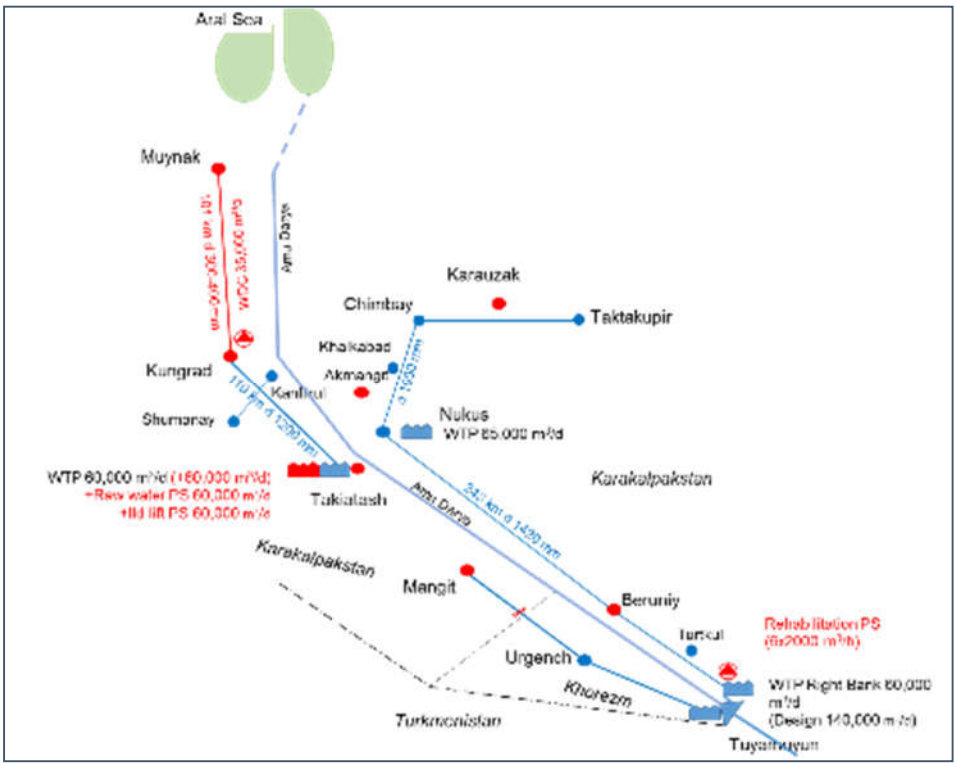
104. There is a waste water treatment plant (WWTP) in Nukus city. It treats sewage from Nukus city and partly from Nukus district. There is no a centralized sewage network in rural areas of the district. The water is collected into the ponds and after it is disposed at the Nukus WTTP.

105. Therefore, results of technical survey showed that, the most urgent problems concerning the stability and quality of drinking water supply services and development of water supply in the project area are:

- shortage of drinking water supply;
- dilapidated networks, often beyond repairs;
- insufficient water supply network coverage;
- technological lag in production and supply of drinking water supply of suitable quality to the population;
- insufficient fencing of buffer zone for water supply facilities in most of the cases;
- lack of local production capacity, skilled production workers in the field of maintenance and modernization of water supply and sanitation;

[11] State Standard - Drinking water. O'z DST 950:2011 – Drinking water. Hygienic requirements and quality control

106. Based on the conducted analysis of current situation the activities proposed within the planning project are presented into the next chapter.



Picture 39: Project Water Supply Scheme

3.2. Project components

107. The selection of type of project works and settlements was done in close collaboration with Tuyamuyun-Nukus Interregional staff in Nukus city and its branches in the project districts. A leading principle in selecting settlements was to secure sustainable, continuous safe water supply to 70-100% of the population living in the villages within the perimeter of the project.

108. Totally the project will cover 130 settlements including 124 rural settlements in 6 districts of Karakalpakstan. The main physical components of the water supply network system are resumed hereafter:

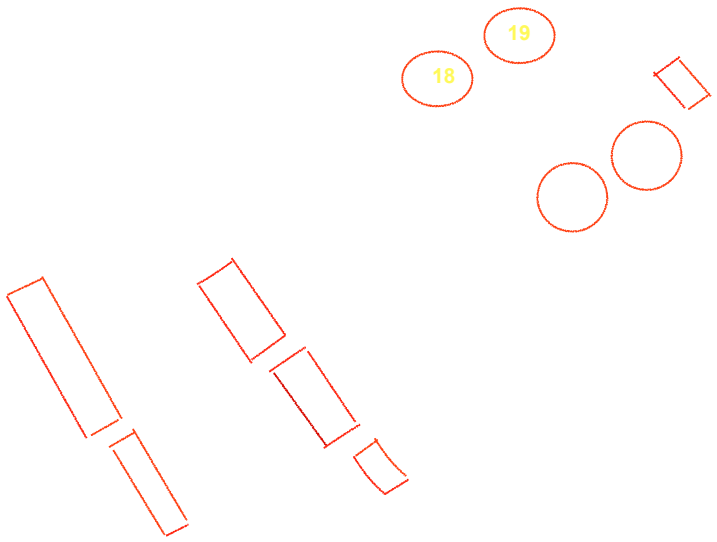
- Upgrading 2nd lifting pump station at the Tuyamuyun WTP;
- Upgrading Takhiatash WTP with bringing capacity up to 120000 m^3/day;
- Construction of 6 new (in Amudarya, Beruniy, Nukus and Mangit districts) and reconstruction of 22 existing WDCs (in all districts);
- Reconstruction of surface water intake in Amudarya district;
- Construction of 216 km of new and rehabilitation of 74 km of existing transmission trunk from Tuyamuyun WTP to WDCs;
- Construction of 641,7 km new and rehabilitation of 330 km of water distribution networks with Dia 400 to 76 mm;
- Installation of 65386 house connections with metering;

- Purchase of machine and mechanism.

109. Upgrading of Tuyamuyun WTP includes replacement of old outdated pumps (Picture 39).

110. Upgrading of Takhiatash WTP consists of: rehabilitation of 1st lift PS, radial settlers, distribution chamber, horizontal settlers, filters chamber, electrolysis facility, mixing chamber, 2nd lift PS, internal technological communication facilities, distribution pipework, internal electrification, transformer substation, power counter, automation, landscaping and gardening (Picture 40). All construction work will be implemented within existing territory, without acquiring additional land.

111. Type of works to be implemented in water distribution centers are similar and their content slightly varies. Rehabilitation of WDC will consist of any or all of the following works: replacement of pumps switches and controls, rehabilitation of and/or construction of new water reservoirs, provision of water disinfection units (chlorination), automatic controls, upgrading of ancillary buildings, fences and other accessory works.



Picture 40: Project works at Tuyamuyun WTP (circled in red) rehabilitation of 2nd lift pumping station - 12

Picture 41: Project works at Takhiatash WTP (circled in red) rehabilitation of: circular clarifiers -1, 2; filtration facilities – 6; 1st lift pumping station – 15, 2nd lift pumping station – 10, mixing chamber - 13

112. Planning activities at the Water Intakes and WDCs are presented in below Table 11.

Table 11: Planned activities at the WDCs

Name of WDC	Type of works	
	Construction	**Rehabilitation**
Amudarya district		
WDC VU-2	Raw water pumping station (RWPS) Pipeline from RWPS to Contact chamber, Contact chamber, Inlet chamber, Filter station, Process water reservoir & PS, Chemical plant, Transformer substation, Internal piping Landscaping and fence, 2 Clean water reservoir 2,000 m^3, 2nd lift PS, Electrolysis plant, Internal power supply networks, out-site power supply. Lighting. Water supply & sewerage network, checkpoints (2 pcs), toilet, housing for operators (2), landscaping, planting and fencing, Repair workshop including, laboratory – dispatching office, repair-mechanical workshop, warehouse, carport for 2 vehicles	Rehabilitation of 2 x 50,000 m^3 settlement ponds
WDC RU-1	Clean Water Reservoirs with capacity 1000 m^3	Technological communication Fencing, landscaping, greening
WDC«Kuyuk Kupir»	2 Clean Water Reservoirs with capacity 500 m^3 each, pumping station with electrolysis facilities, Transforms and technological communication, internal and external electricity supply. Entrance, toilet Landscaping, greening and fencing of territory, gates and access road	
Ground water intakes "Urazbaev"	Drilling 3 wells, Clean Water Reservoirs with capacity 500 m^3 Transforms and technological communication Internal and external electricity supply. Entrance, toilet Greening and fencing of territory	Two Clean Water Reservoirs with capacity 250 m^3 each, pumping station with electrolysis facilities and etc.
Network		
Beruniy district		
RU-1	2 Clean Water Reservoirs with capacity 1000 m^3 each Pumping station combined with electrolysis, transformers and etc.	Clean water reservoirs 250 m^3 -2 units.
WDC "Shimom"	2 Clean Water Reservoirs with capacity 1000 m^3 each Pumping station combined with electrolysis, Transformers and etc.	

Pumping Distribution Centre (PDC) - 18	Electrolysis facilities using imported hypochlorite Technological communication and etc.	Two CWRs with capacity 700 m^3 Installation of filter-absorber, staircase and recovery of soil cover
PDC-17	Toilet, technological communication and etc.	Two CWRs with capacity 700 m^3 Installation of filter-absorber, recovery of soil cover, rehabilitation of pumping station and installation of lifting equipment
PDC-16	Electrolysis equipment in pumping station. Transformers and etc.	Two CWRs with capacity 500 m^3 Installation of filter-absorber, staircase and recovery of soil cover rehabilitation of pumping station and installation of technological and lifting equipment
WDC "Bodom Bosh"	Two CWRs with capacity 500 m^3, Pumping station, Transformers, and etc.	
Network		
Karauzyak district		
WDC "Karauzyak"	2 Clean Water Reservoir with capacity 1000 m^3 each Transformers and etc.	Reconstruction of Two CWRs with capacity 500 m^3, pumping station and chlorination facilities
Distribution hub (DH) RU-1	2 Clean Water Reservoir with capacity 500 m^3 each Installation of electrolysis equipment in pumping station And etc.	One CWRs with capacity 100 m^3 and one with capacity 400 m^3, Reconstruction of transformers and technological equipment and etc.
WDC "Samat"	Clean Water Reservoir with capacity 500 m^3 Pumping station with electrolysis facilities Transformers, and etc.	One CWR with capacity 100 m^3, Installation of filter-absorber, staircase and recovery of soil cover
WDC "VS-1"	Pumping station with electrolysis facilities Transformers, technological communication and etc.	Two CWRs with capacity 500 m^3 each, Installation of filter-absorber, staircase and recovery of soil cover
Network		
Kungrad district		
WDC "Kungrad"		Pumping station with electrolysis facilities Installation of sensor for water level measurement
Water intake "Altinkul"		Two CWRs with capacity 1000 m^3 each, technological communication, landscaping
WDC "Ahunbabaev"	Clean Water Reservoir with capacity 500 m^3	Two CWRs with capacity 250 m^3 each, Installation of filter-absorber, staircase and recovery of soil cover, pumping station and etc.

WDC "Khorezm"	Landscaping, greening and fencing of WDC territory and access road	Four CWRs with capacity 500 m^3 each, Installation of filter-absorber, Pumping station with electrolysis facilities and etc.
WDC "Ustyurt"	2 CWRs with capacity 500 m^3 each, Installation of filter-absorber, pumping station, transformer and etc.	Electrolysis facilities, toilet
WDC "Kanjigal"		Demolishing of existing tower 25 m^3, rehabilitation of water tower with capacity 25 m^3, pumping station and etc.
WDC "Kokdarya"		Demolishing of existing tower 25 m^3, rehabilitation of water tower with capacity 25 m^3, Pumping station and etc.
Kugrad city "Kobora-laboratoriys»	Administration building, Workshops and store, garage for 2 cars and etc.	
Network		
Muynak distrcit		
WDC "Muynak"	Entrance, toilet, workshops, store, garage	Two CWR with capacity 1000 m^3 each, and one CWR with capacity 1000 m^3, replacement of equipment in pumping station and etc.
WDC "Uchsay"	Two CWRs with capacity 300 m^3 each, pumping station, transformers and etc.	
WDC "Shagirli"	Two CWRs with capacity 1000 m^3 each Pumping station with electrolysis equipment, transformers and etc.	
WDC "Shege"	Two CWRs with capacity 300 m^3 each Pumping station with electrolysis equipment, transformers and etc.	
Network		
Nukus district		
WDC "Medeniyat"		Two CWRs with capacity 1000 m^3 each, Installation of filter-absorber, staircase and recovery of soil cover, Pumping station with electrolysis equipment, transformers and etc.
WDC "Kerder"	Two CWRs with capacity 500 m^3 each staircase and recovery of soil cover	Installation of filter-absorber, pumping station with electrolysis equipment, transformers and etc.

WDC "Shortanbay"	Two CWRs with capacity 500 m^3 each staircase and recovery of soil cover	Installation of filter-absorber, pumping station with electrolysis equipment, transformers and etc.
Network		

113. Works will also include the construction of maintenance and repair workshops in each of the district centers as well as the provision of tool machineries and mobile maintenance equipment in the offices of district branches TN. A list of mechanism and machinery which planned to be purchased is presented in the Table 12.

Table 12: List of purchased mechanism and machinery

№ п/п	Name of equipment	Quantity	Note
1	Mobile laboratory based on automobile	1	The laboratory is designed to perform geophysical (hydrodynamic) studies of wells with deep instruments and perform repair work
2	Backhoe loader with a capacity of 93 hp	6	Backhoe loader MST M542
3	Crawler Excavator	1	
4	Sewage vehicles	6	Sewage vehicles with capacity 4000 liters
5	A car for an emergency and recovery brigade, with a capacity of up to 50 hp.	6	Automotive basic equipment
6	Electrotechnical laboratory ETL-10 for detection of damage to cables (based on a car with a diesel engine)	2	
7	Mobile diesel welding machine	7	
8	Mobile diesel pumps with a capacity of 100 m3 / h	7	
9	Special equipment for detecting water leaks	12	It is designed to search for leaks of liquids and gases from pipelines and tanks

114. Water quality and related risks of waterborne disease is a serious concern in the Republic of Karakalpakstan. In order to make sure that the water distributed will meet in future all required standards of quality it is envisaged to procure appropriately furnished water quality laboratory equipment for each of the district branch of TN. The laboratories will be financed under the GCF Grant.

115. Upon completion the project will a benefit to a population of 388,000 in 2022 living in the 6 district centers and in 116 rural settlements with the provision of safe water supply on a continuous base. At the project horizon 2043, the beneficiaries will be grown to some 518,000. The water supply of 34 rural settlements with 46,500 inhabitants in 2022 will be financed under the GCF Grant.

116. In Amudarya district, taking into account that the new WTP Mangit will be also funded under the GCF grant, in addition of the 28,300 direct beneficiaries, the remaining 57,700 rural and district center inhabitants will benefit of the treated water from the new WTP.

Table 13: Summary of key data

Settlement	No.	2017	2022	2043	Water demand (m3/d)
Mangit center		35,179	37,935	52,074	9,477
Total Amudarya district	25	79,782	86,032	118,098	17,674
Beneficiaries under GCF-Amudarya	12	26,230	28,285	38,827	
Beruniy center		59,697	64,787	91,358	16,627

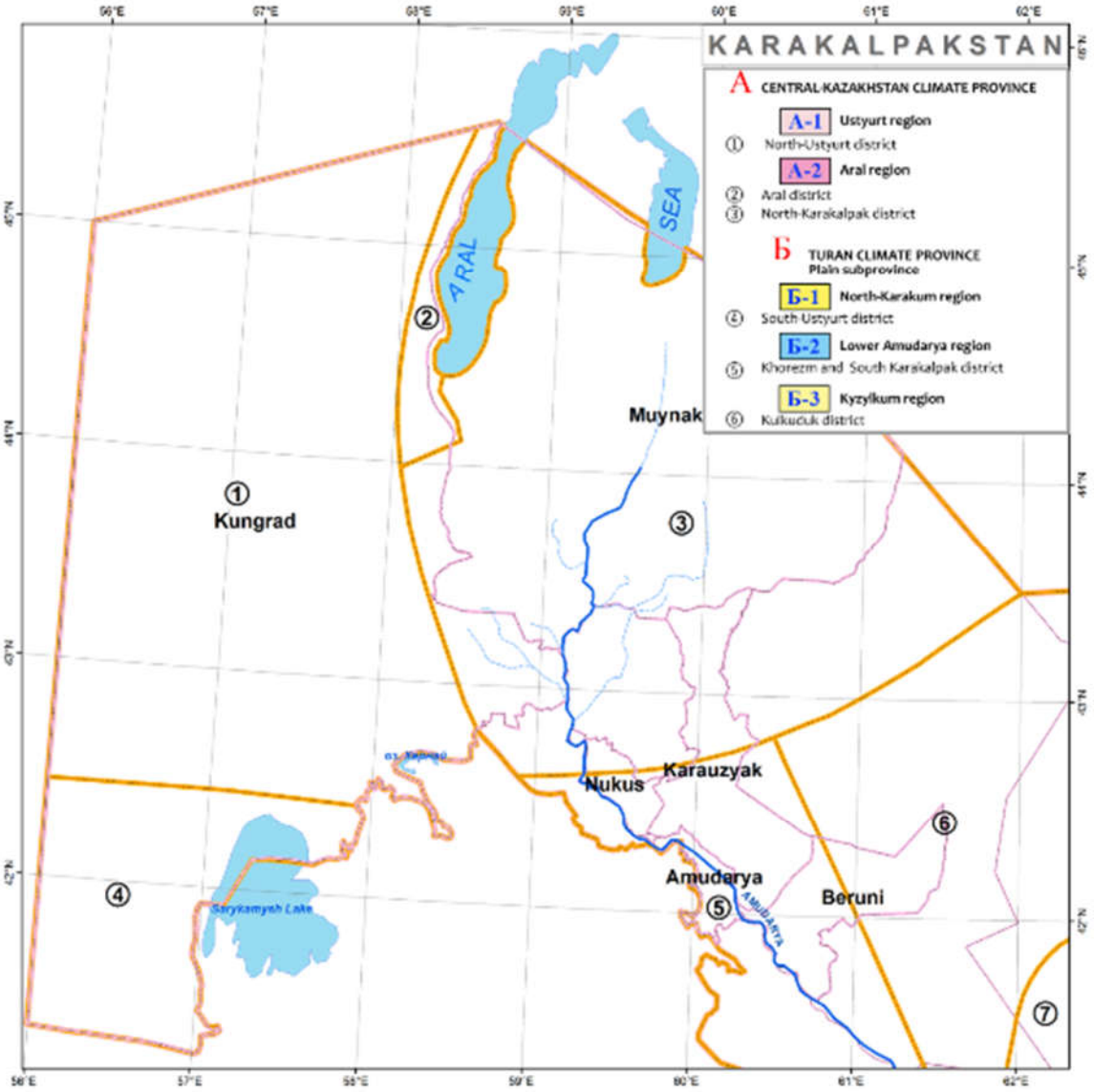
Settlement	No.	2017	2022	2043	Water demand (m3/d)
Total Beruniy district	15	97,520	105,835	149,240	23,616
Karauzak center		15,302	16,404	21,966	3,712
Total Karauzak district	26	31,781	34,069	45,620	6,568
Beneficiaries under GCF Grant - Karauzak	10	5,817	6,236	8,350	
Kungrad center		67,521	71,670	92,072	16,757
Total Kungrad district	20	96,015	101,915	130,927	21,449
Beneficiaries under GCF Grant - Kungrad	3	1,991	2,113	2,714	
Muynak center		13,350	14,031	17,292	3,147
Total district Muynak	10	23,920	25,140	30,982	4,823
Beneficiaries under GCF Grant - Muynak	9	9,450	9,932	12,240	
Akmangit distr. Center		9,772	10,295	12,821	1,917
Total distr. Nukus	20	33,399	35,190	43,821	5,507
TOTAL 6 districts	**116**	**362,416**	**388,181**	**518,688**	**79,638**
Total under the GCF Grant	**34**		**46,585**	**62,132**	
Additional beneficiaries of GCF Grant in Amudarya			**56,746**		

4. DESCRIPTION OF THE ENVIRONMENT

4.1. Physical conditions

Climatic data

117. The Republic of Karakalpakstan (RK) is located in the southwest part of Uzbekistan and occupies northwest part of Kyzylkum desert and Amudarya delta. The total area of RK is 165 600 sq.m. Climate is sharp-continental with very hot summer and cold winter without snow.



Picture 42: Climatic zoning of the Republic of Karakalpakstan

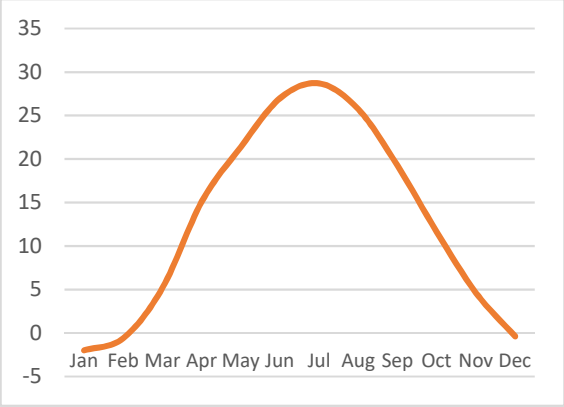
118. ***Beruniy administrative district*** is located in two climatic regions. The northern part is located in the Kulkuduk climatic district of the Kyzylkum region, and the southern part is located in the South Karakalpakstan districts of Lower Amudarya region.

119. The Kyzylkum climate region covers Kyzylkum desert. The county differs little from the neighboring Lower Amu Darya county in winter temperature regimes. The average January temperature varies from -4° to -7° on northwest and from -1° to -2° on southeast. The winter duration in the northern parts alone reaches 2 months. The summer is hot. The average July temperature is +29 +31°. The annual precipitation is 100 mm.

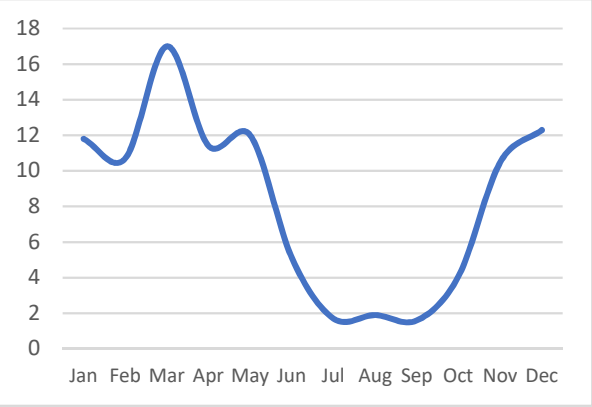
120. The region is relatively abundant in thermal resources – up to 5,000° in the southeast.

121. Lower Amudarya region covers plains in downstream of Amudarya River from Tyuyamuyun gorge on south to the River delta in north and it border with Ustyurt in the west, with Kyzylkum in the east, with Zaunguz Karakum in the south.

122. It is also characterized by low wintertime (average January temperature varying from -4 to -5°), relatively long winter (2 - 3.5 months), high summer temperatures (average July temperature varying from +25 to +26°), and small amount of atmospheric precipitation (100-110 mm a year).



Average monthly air temperature, °C
Meteostation (MS) Urgench (2008-2016)

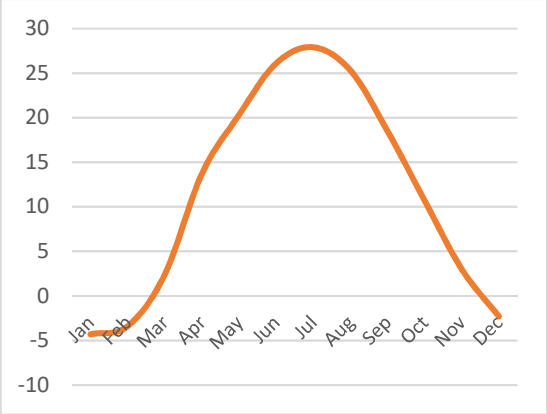


Monthly sum precipitation, mm
MS Urgench (2008-2016)

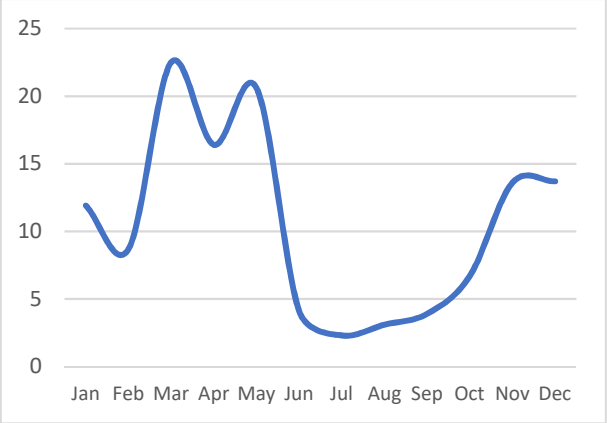
123. The northern part of the county covering Karakalpakstan's Beruni district is located within the very warm zone with temperature amounts of less than 4,000° (zone of short-season grape varieties, early rice varieties, and late maize varieties).

124. ***Karauzyak district*** is located in two climatic districts. In the north, it is characterized by climatic conditions of the Aral county and adjacent delta of Amu Darya, and in the south – those of Lower Amu Darya county.

125. The Aral county covers the territory of former water area of the Aral Sea. The January temperature averages -4.3° in Chimbay. The summer has high temperatures (July temperature averages +28°). The amount of precipitation is small (127.5 mm).



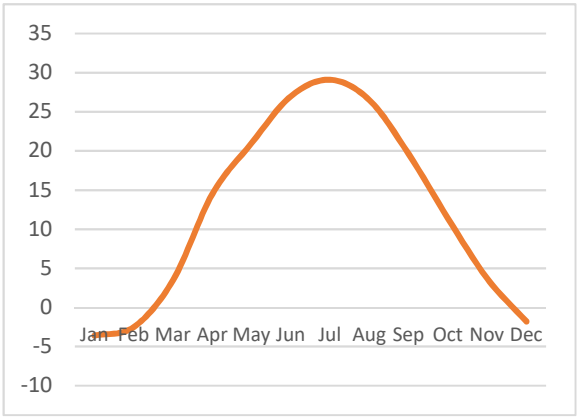
Average monthly air temperature, °C
MS Chimbay (2008-2016)



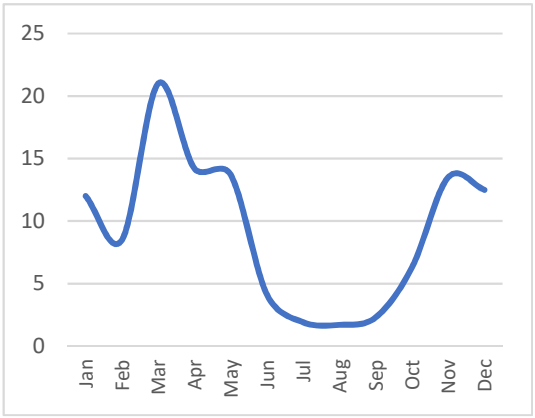
Monthly sum precipitation, mm
MS Chimbay (2008-2016)

126. The district is located within the very warm zone with temperature amounts between 3,500 to 4,000°. Short-season grape varieties, early rice varieties, and late grain maize varieties ripen well in this zone.

127. ***The territory of Amu Darya and Nukus districts*** shares the climatic characteristics of Lower Amu Darya climatic district, which, in its turn, is characterized by low winter temperatures (average January temperature varying from -4 to -5°), relatively long winter (2 - 3.5 months), high summer temperatures (average July temperature varying from +25 to +26°), and small amount of atmospheric precipitation (100-110 mm a year). The temperature amount is less than 4,000° (zone of short-season grape varieties, early rice varieties, and late maize varieties).

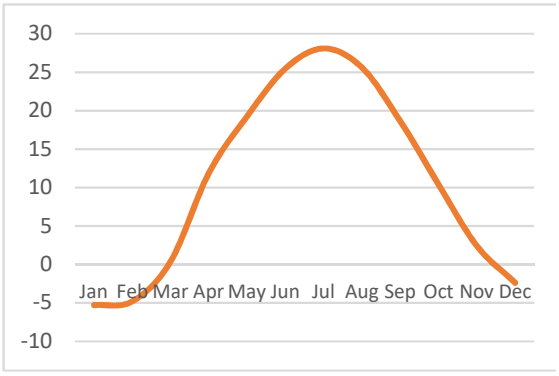


Average monthly air temperature, °C
MS Nukus (2008-2016)

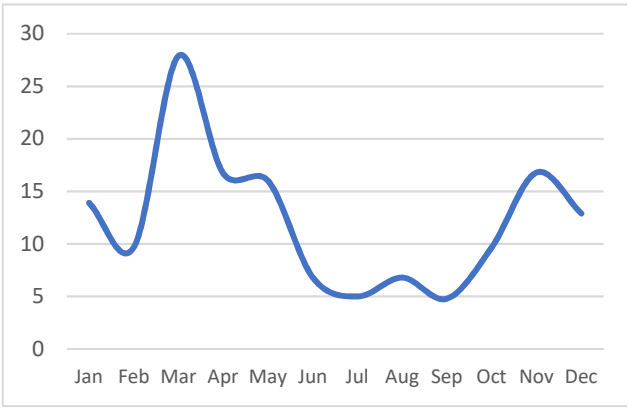


Monthly sum precipitation, mm
MS Nukus (2008-2016)

128. ***Muynak district*** is described by climatic characteristics of the Aral county. The district's climate is extremely continental, with hot and dry summer given fairly cold winter. Despite close proximity of the Aral Sea, the influence of adjacent deserts appears to be predominant, which causes the climate to be arid and continental. The January temperature averages -5.3°, the July temperature averages +28.1°. The precipitation per year amounts 147 mm.



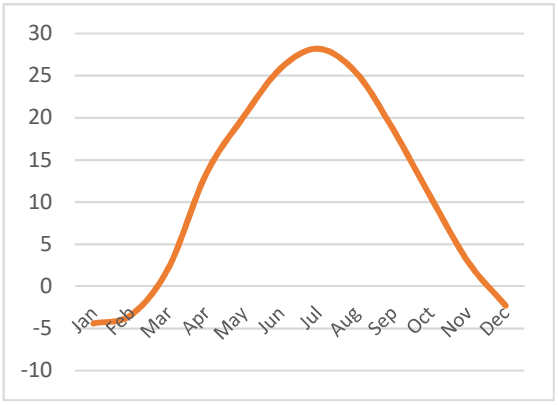
Average monthly air temperature, °C
MS Muynak



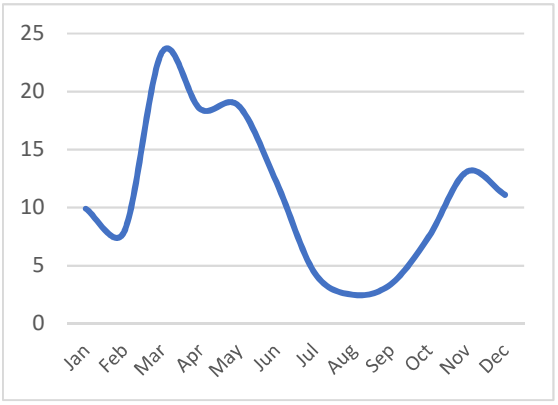
Rate of monthly precipitation amounts – Muynak, mm

129. The district is located within the very warm zone with temperature amounts between 3,500 to 4,000°. Short-season grape varieties, early rice varieties, and late grain maize varieties ripen well in this zone.

130. ***Kungrad administrative district*** is located in North-Ustyurt climate district. The features of the geographical location of Ustyurt in the center of the Turan lowland are determined by its climatic features: the climate of the district is arid – low winter temperature (average temperature of January is -4,4°, duration of wintertime is 4 months), high summer temperature (average temperature of July is +28,8°), annual amount of precipitation is 132,7 mm.



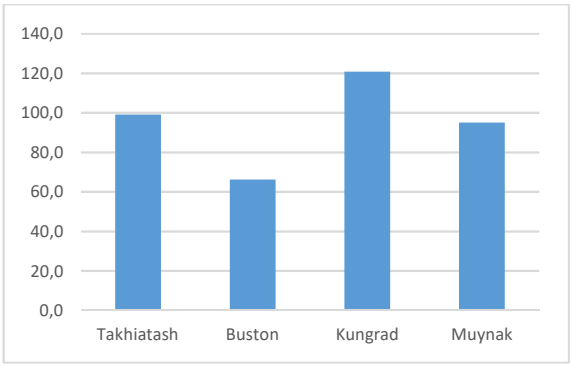
Average monthly air temperature, °C
MS Kungrad (2008-2016)



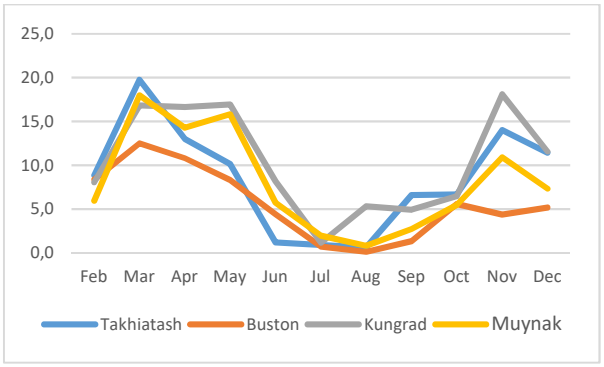
Monthly sum precipitation, mm
MS Kungrad (2008-2016)

131. Thermic zones of the Ustyurt plateau take turns from north to south: warm zone has temperature sum less than 3500° (grape zone), very warm zone has temperature sum 3500°-4000° (zone of mid-ripening corn sorts), moderately hot zone has temperature sum 4000°-4500° (early ripening and very early ripening cotton sorts), hot zone has temperature sum more than 4500° (mid-ripening cotton sorts).

132. Average annual amount of precipitation and average monthly amount of precipitation for 2008-2016 years are presented in the below pictures.



Average annual amount of precipitation for 2008-2016 years, mm



Average monthly amount of precipitation for 2008-2016, mm

133. Baseline survey of air quality in all 6 project districts was conducted during the IEE preparation. Results of air quality measurement and applicable national and international standards are presented in Table 14.

Table 14: Results of background measurement of air quality

#	Location	NO_2 mg/m^3	CO	Dust (30 min)
1	Karayzuak area adjusted to district center - near to WDC	0,09	1,0	0,57
2	Karayzuak district center - close to Vodocanal office	0,091	0	0,66
3	Muynak - street in front of living area	0,073	0	0,67
4	Kungrad district	0,089	0	0,65
5	Kungrad district	0,086	0	0,58
6	Kungrad district	0,083	0	0,63
7	Beruniy district	0,086	0	0,68

8	Beruniy district	0,087	0	0,71
9	Amudarya Disctrict center	0,089	0	0,61
10	Nukus district -	0,09	1	0,57
	Uzbek Standards[12] (30 min)	0,085	5,0	0,5
	IFC standards[13]	-		
	10 min			
	1 hour	0,2		0,05

Source: Baseline survey, PPTA, May 2017

134. Samples were taken in more populated areas of each projects areas. According to data presented in Table 15, exceeding of dust concentration are observed in all places. There project area is characterized by dry climate and low amount of precipitations (less than 100 mm per year).

135. National standards for noise level is described in Sanitarian Norms and Rules (SanPiN) # 0267 (2007) "Admissible noise level into the living area, public buildings and outside the buildings". The standard defines admissible noise level for living area, educational entities and hospitals. The main requirements applicable for the current project are presented in below table.

Table 15: Admissible noise level

Receiver	**National**		**International (WHO[14])**	
	Day time (7.00 am – 11 pm)	Night time (11.00 pm – 7.00 am)	Day time (7.00 am – 11.00 pm)	Night time (11.00 pm – 7.00 am)
Residential (inside rooms)	55	45	55	45
Schools (inside room)	40		35	
Hospitals (inside room)	35		30	
Area adjusted to living houses	70		60	

136. National requirements for noise level in residential area complies with international standards. However, the national requirements on noise level for school and hospital are lower than international. Therefore, international standards will be applied for further assessment of the project impact on noise level in schools and hospitals.

137. To review baseline situation, noise measurements were conducted in May 3-4, 2017 during the day time at the living areas located at the closest distance to the territory of planning construction works and inside cities. Results of noise measurement are presented in Table 16.

Table 16: Results of noise measurements

#	**Location**	**Actual results Day time, dB**	**Exceeding 55 dB**
1	Karayzuak area adjusted to district center - near to WDC	47-49	-
2	Karayzuak district center - close to Vodocanal office	50-51	-

12 Hygienic norms. List of Maximum Allowable Concentrations (MACs) of pollutants in ambient air of communities in the Republic of Uzbekistan including Annex 1. SanR&N RUz No.0179-04;

13 WHO Ambient Air Quality Guidelines (General IFC Guidelines, 2007)

14 WHO, Guideline for Community Noise, Table 4.1

3	Muynak - street in front of living area	54-55	-
4	Kungrad district	47-50	-
5	Kungrad district	44-45	-
6	Kungrad district	54-55	-
7	Beruniy district center	50-54	-
8	Beruniy district, near to WDC-16	44-45	-
9	Amudarya district center	34-35	-
10	Nukus district center	55-56	1

Source: Baseline survey, PPTA, May 2017

138. As shown in the table, noise levels do not exceed standards in almost all points. In only one point – in Nukus district center noise level was higher on 1 dB. Therefore, ambient noise level in the project sites complies with standards.

Lithology

139. Lithological, there is soil and vegetative layer extending from the surface to the depth of 0.3 m, it is underlain by 0.9 - 1.1 m thick sandy loam, and beneath – 0.6 - 0.7 m thick clay loam. Underneath, sands are deposited to the explored depth of 6 m. By the seismic-risk zoning, the territory of RK falls into 7-magnitude zone.

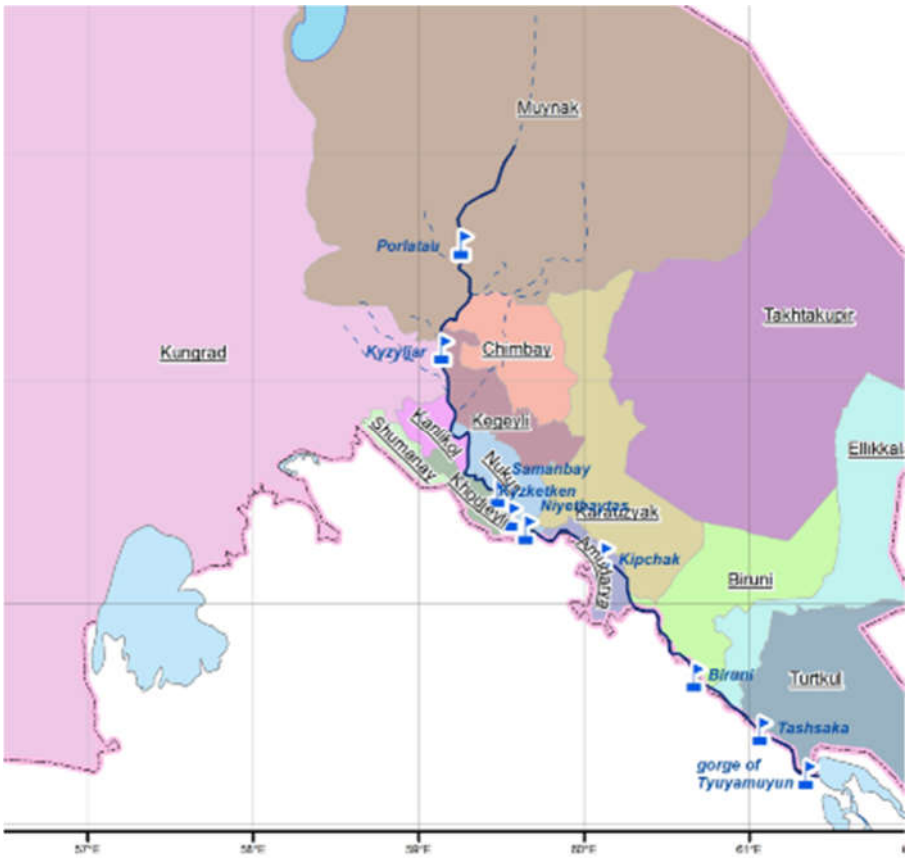
4.2. Water resources

Surface water

140. Due to the arid climate and little precipitation a permanent surface discharge is not being formed in the Project zone. The major transit river in the region is the Amudarya. The Amudarya is partially a regulated river. In the upstream there is the Nurek dam on the Vaksh River, which is currently run mainly for all-the-year-round production of hydroelectric power. The Tuyamuyun dam in the upper delta of the Amudarya provides inter-seasonal storage of water, and the Takhiatash dam located to the north provides gravity distribution of water for irrigation of lands bordering the Sub-Aral area.

141. The flow of the Amu Darya is regularized by means of a complex of reservoirs (Channel, Tuyamuyun, Kaparas, Sutansanjar and Koshbulak reservoirs) impounded with four main dams completed between 1981 in 1983 in Tuyamuyun, some 300 km upstream of the former geographical boundaries of the Aral Sea and extending over the territories of Uzbekistan and Turkmenistan. Based on planning, the reservoir complex is used to regularize the flow of the Amu Darya mainly for agriculture (98%), and partly for industry and drinking water supply (up to 2%).

142. There are 9 hydrological monitoring posts along the Amudarya river, six of them monitor water discharge and water quality, and 3 of them - only water quality. During the last 20 years the average annual consumption of water from the Amudarya at the Tuyamuyun power site has been 920 m3/s, the peak consumption being in the period from May to August (1,243- 2,058 m3/s).



Picture 43: Location of observation points of Uzhydromet in the Republic of Karakalpakstan

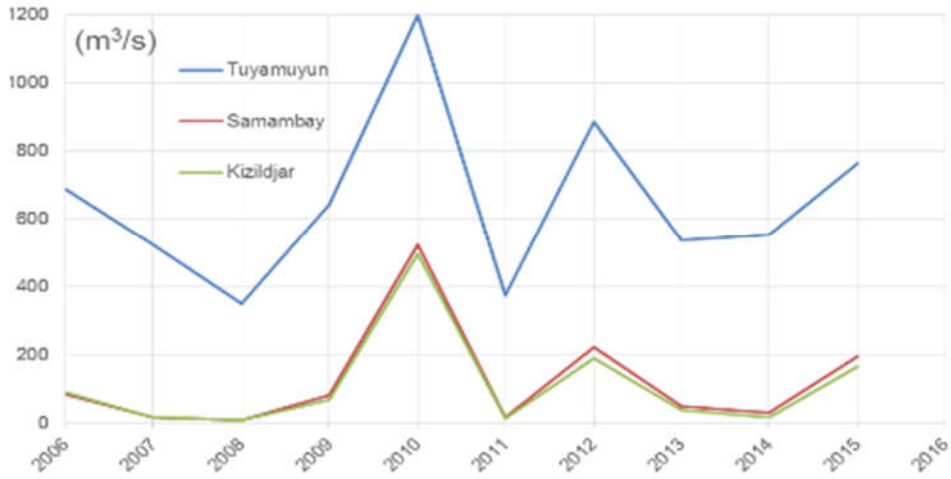
143. Under the Almaty Agreement of 1992[15] the water withdrawal limits from the Amudarya for Uzbekistan are set at 22 billion m^3/yr. However, the Agreement has not enhanced harmonic cooperation between the riverine Countries concerning management of the water resources.

144. Currently raw water is withdrawn from Tuyamuyun for the supply, after treatment and filtration, of urban and rural settlements in Khorezm and Karakalpakstan including the provincial centers Urgench and Nukus. The Amudarya remains also the main source of water supply of the whole settlements of Karakalpakstan until the city of Muynak in the Karakalpakstan desert.

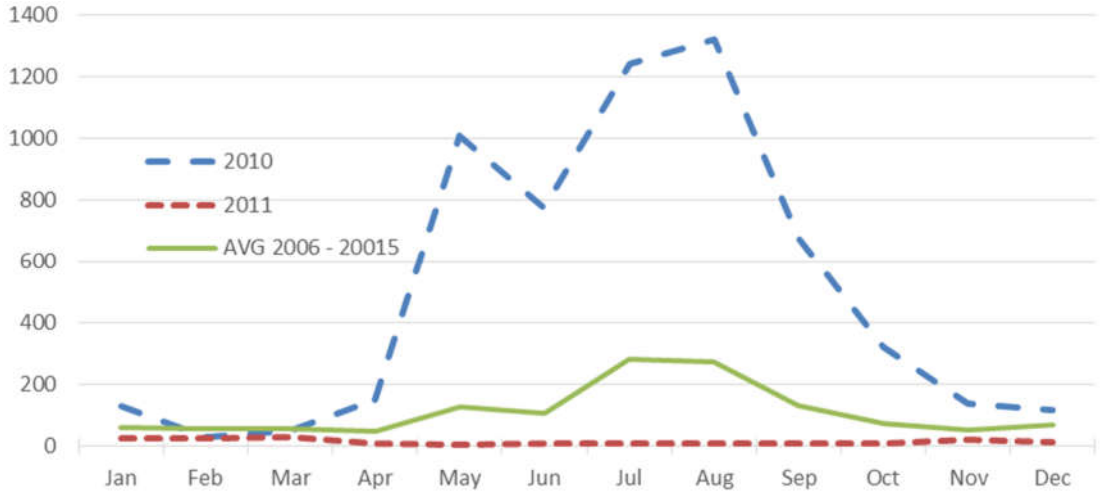
145. Nowadays the flow of the Amudarya reaches the village Porlitau, in the Muynak district, some 40 km Southeast of Muynak city, where the river is impounded and the flow diverted into a Lagoon extending South of the road connecting Shagilik to Porlitau.

146. Based on a 10-years record period (2006-2015) the flow of the Amudarya at the gauging station Kiziljar, near Porlitau averages a still non-negligible 167 m3/s (Table 14). However, the discharge of the lower Amudarya varies significantly from year to year and can decrease to alarmingly low values (Picture 44). In 2011 the flow or the Amudarya at Kiziljar has averaged a low 15 m^3/s (Picture 45).

[15] Interstate Commission for Water Coordination of Central Asia (1992). Agreement between the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Uzbekistan, the Republic of Tajikistan and Turkmenistan on Cooperation in Joint Management of Use and Protection of Water Resources of Interstate Sources



Picture 44: Annual average discharge of the Amudarya at various gauging stations



Picture 45: Average monthly flows for selected years and over the period 2006-2015 in m^3/s

147. Total dissolved solids (TDS) in the Amudarya are monitored monthly at Tuyamuyun, Kipchak, Kiziljar and Samanbay. The multi-annual average TDS in the water of the Amudarya progresses from 936 mg/l at Tuyamuyun to 1,177 mg/l in Samanbay in the lower Amudarya. Instantaneous measurements indicate TDS in excess of 3 g/l in Samanbay (Table 17).

Table 17: TDS in water at various sampling station of the Amudarya

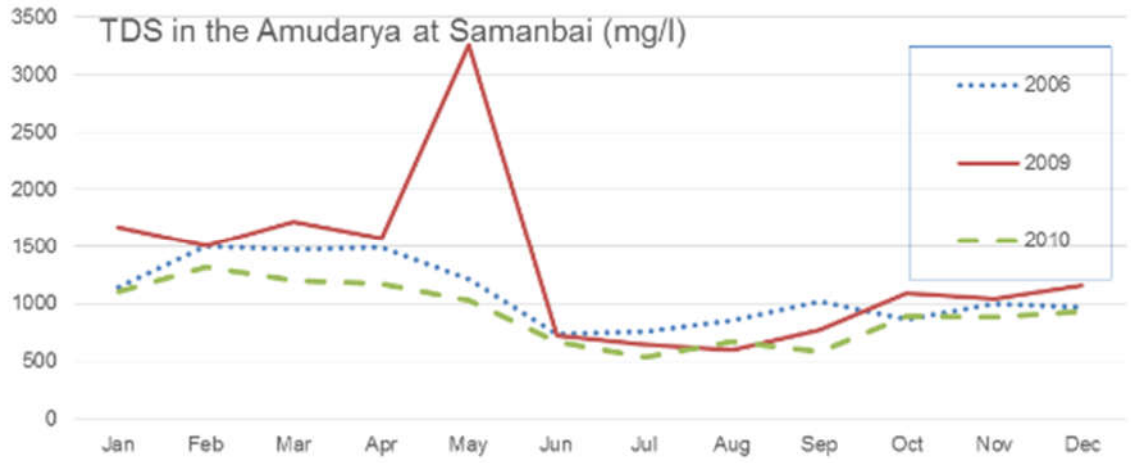
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVG
							Tuyamuyun						
2006			1,395			558	549						
2007				739	745		737						
2008			1,122	1,441	1,443				1,001				
2009		1,566		1,116	909		552						
2010			1,071		804	781		527	719		920		
AVG 2006-10		1,566	1,196	1,098	975	669	613	527	860		920		936
							Kipchak						
2006		1,471	1,436	1,758	946	581	719	643		1,060	1,096		

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVG
2007		1,348	1,807	1,211	936	835	704	820		1,027	956		
2008			1,563	1,541	953	710	943	856					
2009		623	1,393	625		671		640	669	1,001			
2010		1,157	943	1,027	882	683		932	819		581		
AVG 2006-10		1,150	1,428	1,232	929	696	789	778	744	1,029	878		965
							Samanbai						
2006	1146	1,501	1,471	1,488	1,213	741	755	858	1,021	866	998	972	
2007	1230	1,204	3,056	1,515	1,498	863	1,108	792	979		980	998	
2008		1,693	1,724	1,388	1,686	1,004	1,031	1,189	1,196	1,193	1,153	1,089	
2009	1668	1,508	1,718	1,570	3,255	723	651	598	778	1,089	1,040	1,162	
2010	1106	1,321	1,205	1,171	1,025	671	534	669	588	891	885	928	
AVG 2006-10	1287	1,445	1,835	1,426	1,735	800	816	821	912	1,010	1,011	1,030	1,177

148. Continuous series of TDS records are available from the station Samanbay for the years 2006, 2009 and 2010 (Table 18). The TDS generally hits highest values during the spring months, reaching and even exceeding the national standard concentration limits of TDS for drinking water which are set at 1,500 mg/l.

Table 18: TDS in the water of the Amudarya at the Samanbay gauging station

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2006	1146.2	1501	1470.5	1487.6	1212.6	741.2	754.8	858	1021.1	865.6	998.4	972.3
2009	1667.5	1507.7	1718	1569.5	3255.3	722.8	651	597.7	777.8	1089.2	1039.8	1162
2010	1105.8	1321.1	1205.1	1170.6	1024.7	670.5	534	669.1	588.2	891.4	884.6	927.8

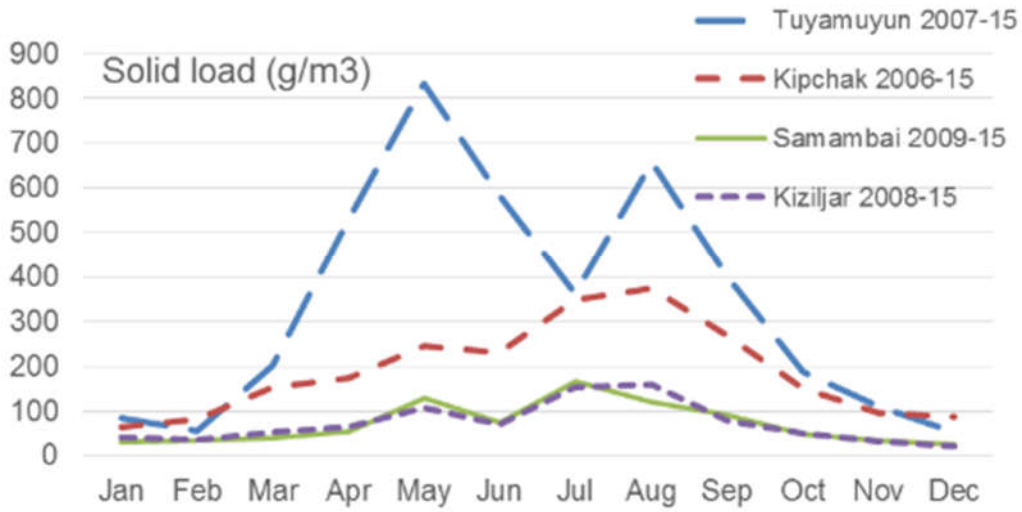


Picture 46: Variations of TDS content in the Amudarya at Samanbay gauging station

149. The suspended solids carried in suspension in the water of the Amudarya is also a factor limiting direct use of the water for domestic use. Solid load in water is also an important parameter for the dimensioning of the equipment and operations of a water treatment plant (WTP). The solid load is monitored at various gauging stations along of the Amudarya, including the Kiziljar and Samanbai in the Lower Amudarya. Average data resumed in Table 16 and graphically displayed in Figure 47 indicate that solid load in the Amudarya: i) peaks normally during the summer months (July August) but also in May, and ii) throughout the year it is higher at Tuyamayun and decreases progressing towards the lowest reaches of the River.

Table 19: Average values of solid load in the Amudarya at various gauging stations

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Tuyamuyun 2007-15	83.9	56.1	202.8	529.7	833.3	581.9	362.2	658.6	399.6	187.1	110.7	53.7
Kipchak 2006-15	64.6	80.6	152.5	173.8	244.0	230.0	348.2	375.0	268.8	151.0	96.0	85.8
Samambai 2009-15	32.4	35.4	40.8	54.3	127.6	72.9	166.3	120.7	91.0	47.9	33.3	24.1
Kiziljar 2008-15	40.4	34.3	51.8	62.8	106.9	68.9	152.9	158.0	79.1	48.6	32.4	21.8



Picture 47: Seasonal variations of average solid load at various stations in the Amudarya

Ground water

150. In accordance with data provided by Aral Hydrogeological Expedition, there are four recognized groundwater aquifers in Karakalpakstan: i) the lower Amudarya aquifer, extending in both right and left bank of the Amudarya; ii) the Karakalpak aquifer in the left bank of the River; iii) the Khorezm aquifer; and iv) the Turtkul aquifer.

151. Generally, groundwater in RK is salinized due to the high salinization of the groundwater bearing sediments. Shallow aquifers of generally limited extension are found within old alluvial River channels, constituted by alluvial sediments and recharged mainly by water seepages from irrigation canals. Due to the recharge of surface water from canals, which generally exhibits moderate mineralization content, these lenses of groundwater can be exploited for local water supplies. The exploitable reserves of these aquifers are limited in quantity due to the limited and variable recharge and also in time due to the upcoming invasion of salinized groundwater from the peripheral zones of the lenses of fresh groundwater. This is why the term “fresh groundwater” is commonly used in the hydrogeological context of the lower Amudarya area to identify groundwater bearing units or even small extension with a total dissolved solids (TDS) concentration in water up to 1.5 g/l16. These groundwater lenses are generally exploited by means of small discharge wells for the supply of remote settlements, and in amounts carefully planned in order to relent as much as possible the diffusion of the surrounding salinized groundwater.

152. Regarding the hydraulic regime of water use and quality in the canals can be distinguished into three different periods in the year

16 According to the National Standard O’z DST 950:2011 – Drinking water. Hygienic requirements and quality control, the permissible Total Dissolved Solids (TDS)16 in drinking water is set at 1.5 g/L, and Total hardness up to 10 meq/l.

153. The period of recharge, from December to May, during which TDS in surface waters averages 1.2 to 1.7 g/l, with peaks up to 2.3 g/l. In December-January the irrigation canals flow full and recharge groundwater with rather salinized water. From mid-January to mid-March the water in the canals is generally frozen while a baseflow is maintained in the canals bottoms by drainage of groundwater. From March to end of May the canals are flowing again and supplied with not conditioned water.

154. During the vegetative period, June to September, the salinity of water in canals decreases to 1 g/l. During the regression period, between October and November, flow in canals falls to minimum annual discharges generally sustained only by the baseflow contributed by groundwater; the TDS averages 1.2 g/l.

155. The analysis of several years of monitoring indicate that shallow aquifers are recharged by main canals during the 3 to 4 months high waters period. During the 3 to 4 months recession period flow in canals is generally sustained by drainage of groundwater.

The Lower Amudarya – Right and Left Bank - Aquifer

156. Surveys carried out at different stages in time revealed a total of 24 groundwater bearing lenses with quality acceptable for water supply. The estimated renewable reserves in the northern Karakalpakstan amounted to 199,590 m3/day including 156,140 m3/day categorized for industrial use. Effective withdrawals as of 01.01.1994 were assessed at 37,600 m3/day.

157. As of 01.01.2005, intakes were reduced to 8,340 m3/day produced from 38 wells. Degradation of water quality was the reason for such reduction. In the last 35 years, due to increasing of water withdrawals from the Amudarya and to the return of drainage waters into the River, the overall quality of surface waters degraded steadily while reserves of fresh groundwater decreases accordingly.

Alluvial Deposits in Right Bank of the Amudarya

158. The **Nukus aquifer** is located along the channel “Kyzketken” and is constituted by sediments of upper Cretaceous period. It has a length of 7 km and width from 800 m to 3 km. At the time of the first survey in 1965, the TDS in groundwater ranged 0.5-0.75 g/l. Surveys in 1990 showed that reserves of fresh water had decreased by 10% due to poor recharge occurring from the canal. Renewable reserves were assessed at 16,800 m3/d (194.4 l/s) and approved by the State Committee of USSR of Mineral Resources in 1965 for industrial use. The exploitable reserves were estimated at 2.41 m3/day or 27.9 l/s. Part of the city of Nukus was supplied with water from this aquifer.

159. In 2005 the salinity of groundwater was in the still acceptable range of 1-1.5 g/l for water supply. However, the production wells are not operated due to high fluorine content.

Khorezm Aquifer (Republic of Karakalpakstan)

160. This aquifer is located in the Amudarya district, in the Republic of Karakalpakstan, on the left bank of the Amudarya. The perimeter of the aquifer is bound by the Amudarya River, the Kara-Kum desert and the national borderline with Turkmenistan. Medium and lower Neogene sediments are a local aquitard at depth of 25-100 m. Their lithological composition is constituted by clays, siltstones with interbedded sandstone layers. Pliocene sandstones with thickness ranging 20 to 30 m are found everywhere at depths of 17 to 35m.

161. The groundwater bearing unit Beruniy is also, located on the right bank of the Amudarya, 5 km south-west from Beruniy city, in the Beruniy district. In 1982 State Reserves Committee of Soviet Union approved exploitation of reserves of fresh ground waters responding to requirements for industrial categories in the amount of 12,800 m3/d (148 l/s). From 1967 the well field Beruniy is operated for household drinking water supply of Beruniy city.

162. There are several standards for water quality in Uzbekistan depending on purpose of usage water body (Appendix 7). The canals located in the project area are used for communal and service purposes (swimming during the summer); therefore, stricter standards were used for assessment. As showed results of analysis water quality in reviewed canals almost complies with national standards with the exception concentration of suspended matter (Table 20).

Table 20: Water quality in points close to construction sites

Component	Altinkul c. (Kungrad d.)	Mangit c. (Amudarya d.)	Daulet c. (Nukus d.)	Esim c. (Karauzyak d.)	Talpik c. (Muynak d.)	Standards
Suspended matter, mg/l	80	825	825	82	82	shall not be increased by more than 75 mg/l
pH	6.2	8	8	7.8	7.2	6,5-8,5
Dissolved oxygen, mg/l	5.9	7	5.3	3.7	4.7	No less than 4
Hardness mgecv/l	10	8.2	8.2	9.5	10	7-10
Dry residual, mg/l	880	690	685	940	1005	1000
Fe total	0.19	0.24	0.25	0.24	0.27	0,5
Cl^-	310	210	225	270	45	350
SO^{2-}_4	379	249	72	192	292	500
NO^-_2	0,023	0.16	0.228	0.028	0.032	3,3
NO_3^-	11	29.2	8.9	9.3	6.6	45
Oil products	n/a	n/a	n/a	n/a	n/a	0,3

Source: PPTA, Baseline survey, May 2017

4.3. Biological resources

163. Individual peculiarity of the nature of Karakalpakstan located in a desert zone of the Central Asian region is defined by extremely continental, desert climate with extremely small amount of precipitation given large evaporation rate. A large part of the territory is occupied by the deserts of Ustyurt plateau and Kyzyl Kum. The drying Aral Sea and Amudarya river delta intervene between them and are, in their turn, divided by another (new) desert named Aral Kum.

164. The flora and fauna of the deserts reveal their adaptation to rather unfavourable ambient conditions. The deserts' vegetative cover sharply changes depending on the substrate: psammophytic vegetation commands the sands, gypsophyte vegetation – the rocky substratum, halophytic vegetation – the solochak soils, and sagebrush and sagebrush-and-saltwort and ephemeral vegetation – the loamy soils. The desert's animals also adjust to excessive heat and moisture shortage in a number of ways. Some of them shift to nocturnal way of life and escape from the day heat hiding in holes or burrowing in the sand or sitting out on the bush branches. What water shortage in the desert has led to is that some desert animals do not drink water at all and do not even know how to drink (yellow ground squirrel). They obtain the necessary moisture from plants, and predators – from their preys' blood. The animals of ephemeral deserts that lead strenuous life in the spring go into aestivation during the hot summer period.

165. The Republic of Karakalpakstan records 498 vertebrate species spread over its territory, including 68 mammals, 307 birds (of which, 141 breeding, 20 wintering, and

14 migratory birds), 33 reptiles, 2 amphibians, and 49 fish species. There is roughly 7 times as many invertebrate animals, but they have been very poorly studied. Insects are the most diverse – 1,392 species that fall into 23 orders. Other invertebrates – the parasites of fish, birds, crustaceans, and shellfish are the most fully investigated. Thus, the fish are known to have 436 parasite species, the birds – 133 helminth species alone. 45 flea species and 16 mite species have been found on rodents. The tugai biocoenosis records 420 invertebrate species, 264 – in gypsum desert, and 180 – in sandy desert.

166. Species composition of Karakalpakstan's vertebrate animals has undergone noticeable changes in recent decades. A considerable part of the terrestrial species has greatly reduced in number and is now listed as vulnerable, rare or endangered. Uzbekistan's Red Book (2006) includes 10 species of mammals, 37 – birds, 12 – fish, and 4 – reptiles. Of Karakalpakstan's mammals, the Red List of the International Union for Conservation of Nature (IUCN) includes 2 extinct (*Asiatic cheetah and Turanian* tiger) and 4 critically endangered species (Indian ratel, Turkmenistan caracal [*caracal Schmitzi*], Turkmenian kulan, Ustyurt mountain sheep); of its birds – 5 endangered and critically endangered species (marbled duck, stiff-tailed duck, Asiatic white crane, bustard, slender-billed curlew), and of its fish – 5 species (Aral bastard sturgeon, large and small Amu Darya false shovelnose sturgeon, Aral spined loach [*sabanejewia aurata aralensis],* and Aral Sea trout).

167. At the same time, 14 fish species have emerged in Karakalpakstan's water bodies as a result of acclimatization activities and the fish resettlement. However, only 4 of them are of commercial importance and even take the lead in fishery.

168. Overall, the flora of the Aral Sea's desiccated floor is characterized by a small number of species. Only a small portion of the dried-up part of the Aral Sea floor is occupied by sparse desert vegetation. Biyurgun *[anabasis salsa/eriopoda]* and keyreuk *[salsola orientalis]* communities form the basis of the vegetation.

169. Black saxaul, kuyandyk, kandym, [*calligonum junceum*], and stipa are found in the sand. However, a considerable part of the Aral Kum is represented by wet solonchaks at places where bays were formerly located, as well as by sandy-clayey solonchaks. This territory is barren of flora and fauna. The surface is normally armoured with up to 5 cm thick salt crusts.

170. The Kyzyl Kum desert in the northwest has merged with the new desert of Aral Kum composed of the entire territory of the string of islands ranging from Muynak Upland (Tokmok Ata island) in the south up to Kulandy peninsula in the north: these are the former islands of Lazarev, Konstantin, Vozrozhdeniya [Renaissance], Komsomolsky, and the 'banks [shoals]' of Bellingshausen, Komsomolskaya, and Beninga.

171. Of Karakalpakstan's wild flora (a little over a thousand species), about 700 species are in the Kyzyl Kum. They are represented by typical desert life forms. Herbaceous plants (representatives of the families goosefoot, buckwheat, and composite) account for more than half of them, bushes – just under a quarter of the species, and semishrubs and dwarf semishrubs – the remaining portion.

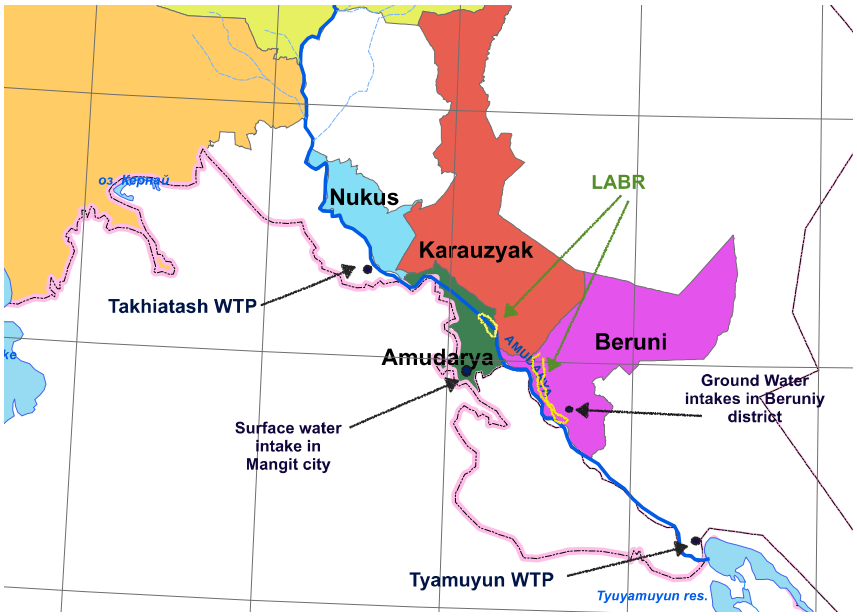
172. Almost all of the indigenous fish inhabiting Amu Darya's plain areas are suppressed endemics of the Aral Basin. All sturgeons are on the verge of extinction: Amu Darya's relict endemics – large and small Amu Darya shovelnose, and bastard sturgeons. Just as all sturgeons of the world fauna, these three species are globally protected. They were included in the Red List of the International Union for Conservation of Nature and in Uzbekistan's Red Book (2006). A total of 15 species and subspecies of the Amu Darya Basin fish were listed in Uzbekistan's Red Book (2006). Along with that, Amu Darya's role is also important as a transit canal for breeding of such commercial fish in the riverbed as silver carp, grass carp, white Amur bream, and their juveniles migrating downstream from the spawning grounds to the delta zone lakes.

173. The valley and delta of Amu Darya, like those of other Central Asian rivers, are characterized by individually peculiar tugai [riparian woodland] landscape. Tugais are tree and

shrubbery forests, development of which is ensured by optimal soil moistening conditions due to river water overflows and high groundwater level. They grow linearly along the river banks, islands, and the lowland topographic lows. In its most typical form, a tugai represents a dense, heavy-going thicket of turanga [Asiatic/Euphrates poplar], willow, and oleaster that are enlaced with lianas, and large shrubs - tamarisk, and chingil [salt tree]. While, in damp habitat areas there is a mass of common reeds [*phragmites australis*] and kendir [dogbane] amid the trees.

174. The tugais of Amu Darya's lower reaches currently feed 61 species of tugai plants. Of which, the main group of tugai plants includes turanga [Asiatic/Euphrates poplar], willow (5 species), oleaster (1 species), tamarisk, chingil [salt tree], clematis, vincetoxicum, and glycyrrhiza. The tugais' shrub zone is mainly represented by species associated with permanent ground moistening and the process of salinization. These are tamarisk, ajiriq [cynodon dactylon], atriplex, zygophyllum, kermek [limonium], aqbash [karelinia], qarabaraq [halostachys], and various salsolas.

175. There is Lower Amudarya Biological Reserve (LABR) located in the territory of Beruniy and Amudarya districts, which was reorganized into the biological reserve from Badai Tugai Preserve (1971) in 2011 (Picture 48).



Picture 48: Location of LABR within the project area

176. The total area of the LABR is currently estimated at 68,171.8 hectares. The LADBR territory is divided into three zones – preserved (11,568.3 ha), transitional (6,731.4 ha), and economic (504,18.1 ha).

Picture 49: Location of project area in relation to LABR (Red area – protected zone, green zone – buffer zone, white line – transmission main)

177. In recent years, the fauna of Amu Darya delta tugay forests has been represented by 27 mammal species, which is 40 % of the overall diversity of Karakalpakstan's mammals. Jackals are common in Baday tugay and other tugays, they stick to heavy-going areas. Badgers reside amid the shrub thickets; occasionally, reed cat and fox also occur there. Insectivores in the tugais are represented by long-eared hedgehog and piebald shrew. Of rodents, tolai hare and house mouse are quite numerous; short-tailed bandicoot rat, midday gerbil, and others are common. Of ungulates, the tugay is commonly inhabited by wild boar, and the Baday Tugay – by Bukhara/Bactrian deer. Wild boars keep themselves exclusively in tugai, where they feed on the rhizomes of typha and common reeds, and on oleaster fruits in autumn.

178. The Baday Tugay preserve is of great importance as the guardian of the world's largest population of Bukhara/Bactrian deer (582 animals, according to records in 2010) vital for the regional and global biodiversity.

179. As shown in the Picture 49, the Project works will be implemented in the area located at least 2 km away from protected zone of LABR. They are two settlements in Amudarya district – Qizil Choli and Jumur ovul settlements, where project works on construction and rehabilitation network will be implemented.

4.4. Soils

180. The Republic of Karakalpakstan is located in the northwestern part of Uzbekistan, its area being estimated at 167,100 square kilometres or over 37 percent of Uzbekistan's entire territory. The territory of Karakalpakstan can be conditionally divided into 4 geographical districts: Karakalpak part of the Ustyurt, Karakalpak part of the Kyzyl Kum, lower reaches of Amu Darya, and relatively newly emerged solonchak sands of the Aral Sea.

181. Karakalpakstan has a wide range of soils, from sandy soils of the deserts with hummocky and barkhan sands to marshy soils of the floodplain forests in Amu Darya mouth. Karakalpakstan's soils are characterized by different salinity degrees and are subdivided into non-saline, weakly saline and highly saline (salt content of more than 0.5 g per 100 cm^3 of soil).

182. Boggy floodplain-and-alluvial soils occupy narrow bands around the lakes and in the topographic lows with meadow-and-bog vegetation. Most of the year, these soils are water-

logged. By the texture, there are various soils: sandy, clayey, loamy, ever-stratified. Meadow soils are most widespread in the territory of Karakalpakstan. Depending on water regime, they can be divided into two types: meadow floodplain-and-alluvial and meadow residual-and-marshy. The drying out part of the floodplain is predominated by the humus-rich mildly saline option. Sulphates predominate in the salts composition.

183. In addition to the above, clean sandy soils, i.e. sands, also occur in Karakalpakstan's territory. The sands of the Northwestern Kyzyl Kum emerged as a result of aeolian reprocessing of alluvium, and those in the region of Sultan Wa'is Taui upland and southeastern Aral seaboard – as a result of bedrock weathering.

4.5. Socio-economic conditions

General district information

184. **Beruniy district.** The district was established in 1927 with administrative center in Beruniy city. It borders with Ellikqala district of Karakalpakstan at the north-east, with Amudarya district at the west, with Karauzyak and Takhtakupir districts at the north west. At the south the districts borders with Khorezm province and with Bukhara province at the south-east.

185. As of 1 January 2017, the total population of Beruniy district was 180497 people. 36,1% of population lives in urban area and 63,9% lives in rural area. 50,2% of populations are man and 49,8% are women. Ethnical composition is represented by Uzbeks (68,2%) Kazakhs (16,68%), Turkmen (7,46%), Karakalpak (7,12%) and other nations.

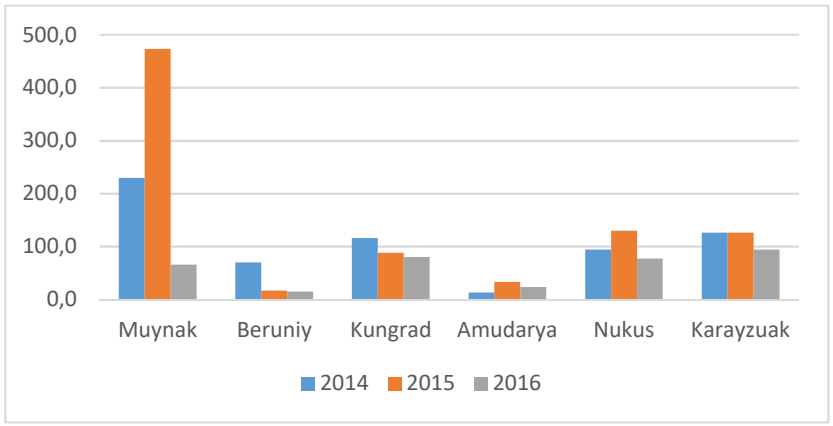
186. District area is 43569,4 ha, including: agricultural land – 31422,7 ha, perennial plantations - 787 ha, pastures – 5830,1 ha and cultivated area – 24804,9 ha. Tha main cultivated crops are cotton, wheat. Besides these main crops vegetables, melons, gardens also are grown in the district. Along with growing crops livestock, poultry production are developed as well.

187. Enterprises facilities: There is the biggest production enterprise JSC “Yoggar” in the Beruniy district. The company produce vegetable oils. Textile plant, ginnery factory, asphalt factory and other smaller production are functioning in the district.

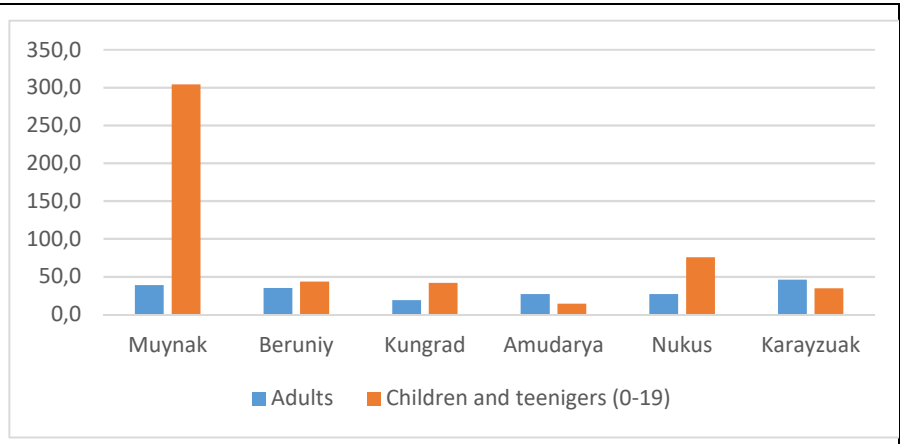
188. There are 57 secondary school, 2 liceum, 36 public libraries, 9 hospitals, 57 medical centers are functioning in the Beruniy district. Turtkul-Nukus highway crossing the district plays the main role in the district transportation.

Public Health. Waterborne disease-related data

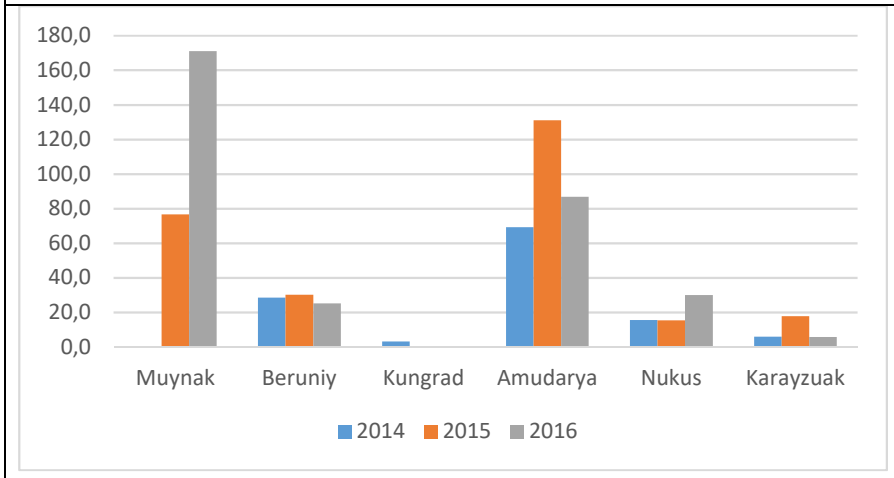
189. Records of diseases typically related to insufficient water supply and sanitation over the period 2014 to 2016 from the the Ministry of Health (MOH) of the Republic of Karakalpakstan showed that incidence of hepatitis A and acute intestinal diseases is higher in Muynak district. Amudarya and Beruniy districts have higher incidence on urolithiasis and calcified diseases.



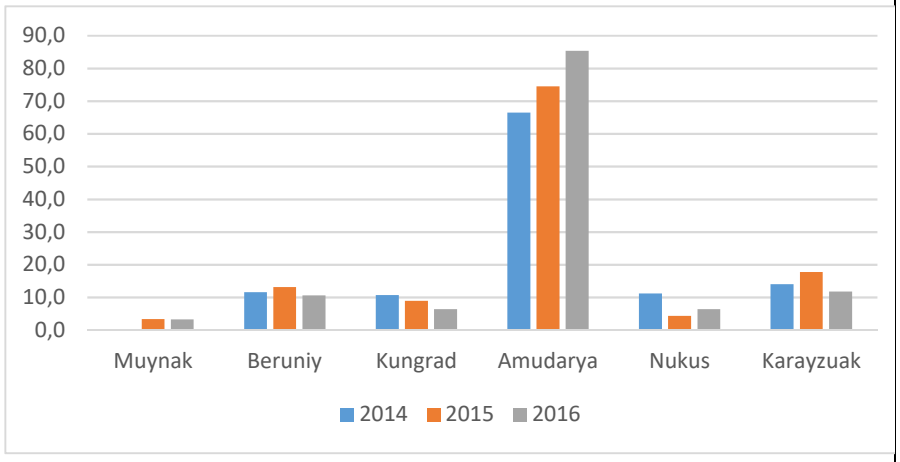
Trends of hepatite A diseases by district during 2015-2016 (cases/100,000)



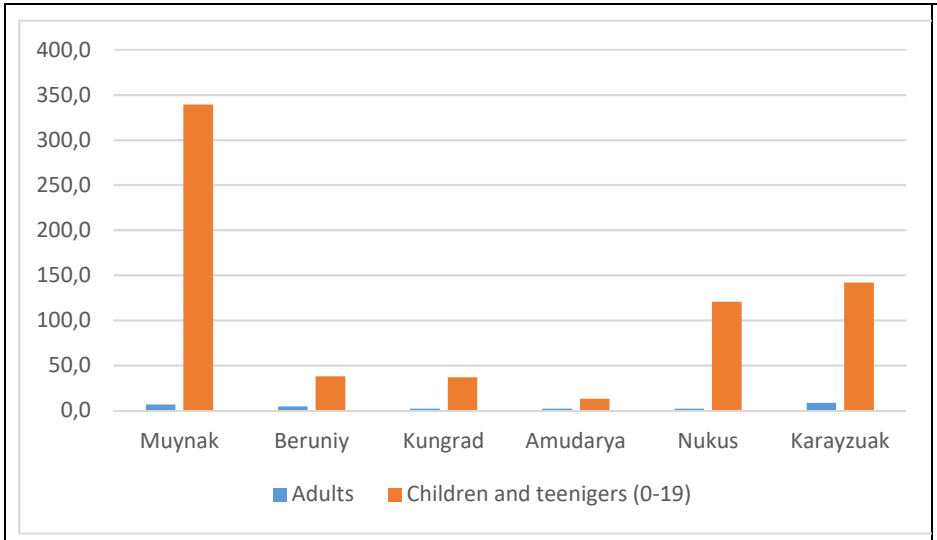
Trends of Acute intestinal diseases by district during 2015-2016 (cases/100,000)

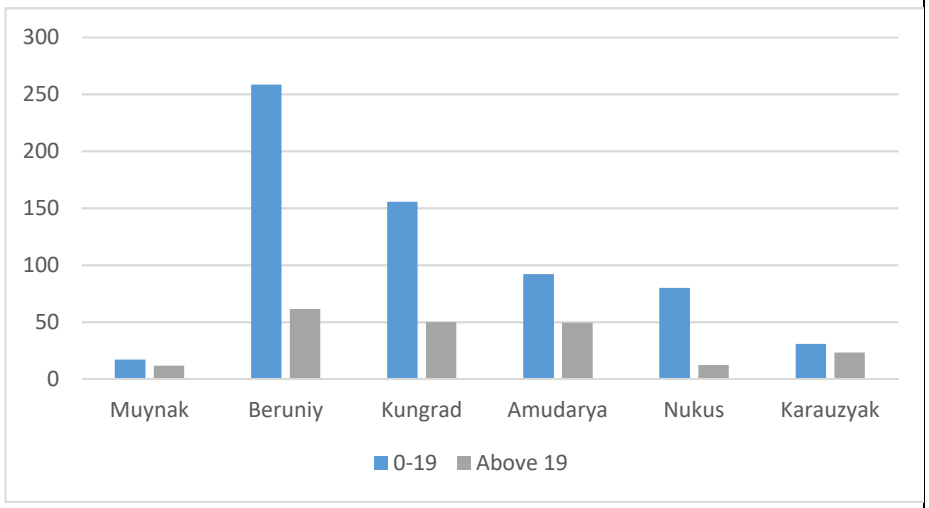


Trends of urolithiasis disease by district during 2015-2016 (cases/100,000)

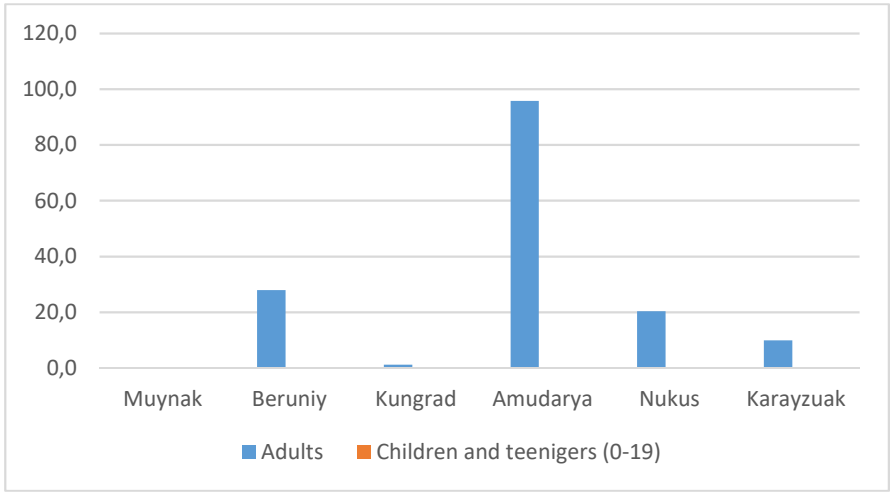


Trends of calcified disease by district during 2015-2016 (cases/100,000)

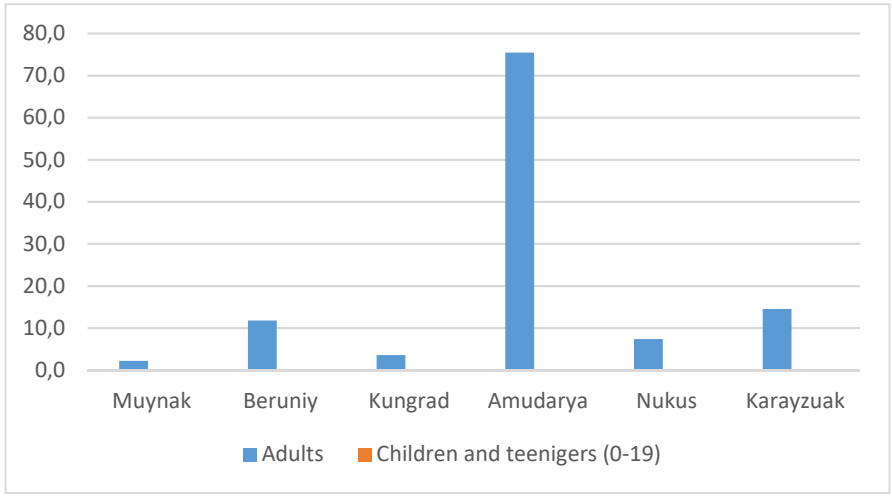




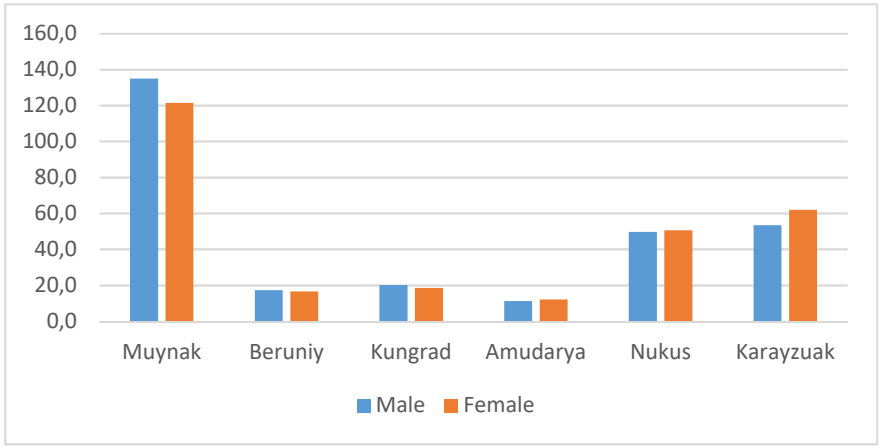
Distribution of Hepatite A diseases by age and by districts (average in 2014-2016) (cases/100,000)



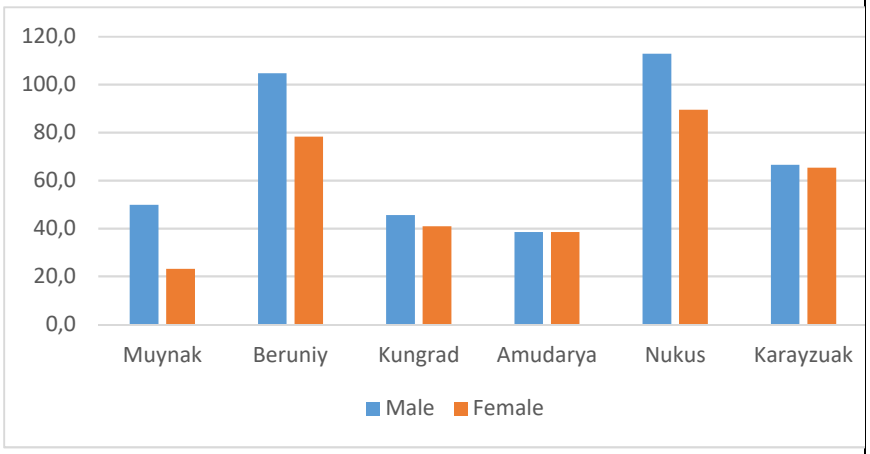
Distribution of acute intestinal diseases by age and by districts (average in 2014-2016) (cases/100,000)



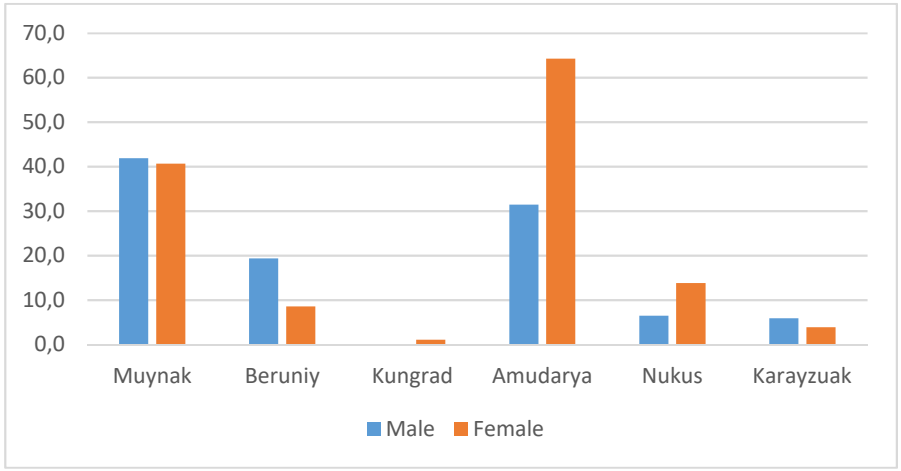
Distribution of urolithiasis disease by age and by districts (average in 2014-2016) (cases/100,000)



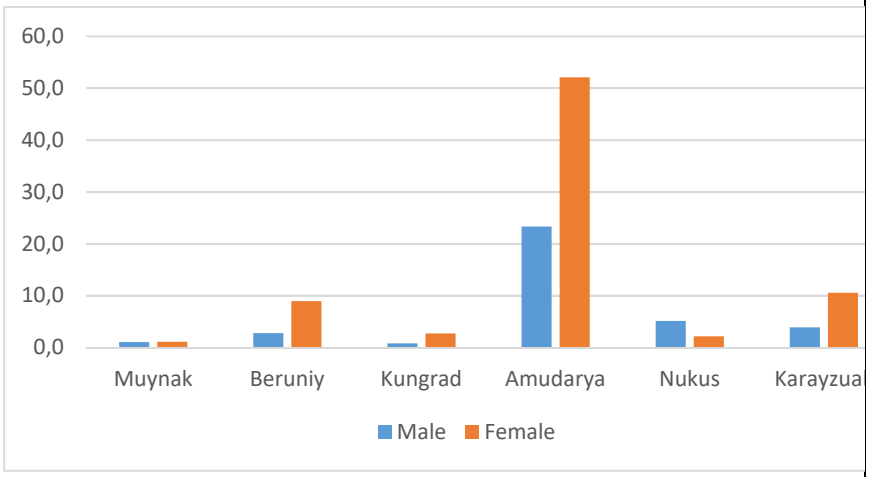
Distribution of calcified disease by age and by districts (average in 2014-2016) (cases/100,000)



Distribution of Hepatite A diseases among male and female (average in 2014-2016) (cases/100,000)



Distribution of acute intestinal diseases among male and female by districts (average in 2014-2016) (cases/100,000)



Distribution of urolithiasis disease among male and female (average in 2014-2016) (cases/100,000)

Distribution of calcified disease among male and female by districts (average in 2014-2016) (cases/100,000)

Picture 50: Distribution disease by district, age and sex

4.6. Cultural Heritage

190. The Republic of Karakalpakstan is rich of cultural and historical heritages. There are number of historical monuments, remains of ancient settlements, towers each district of Karakalpakstan. Some of monuments and historical complexes are included into the national and international lists of protected cultural heritages.

191. Within the current IEE locations of historical places in relation to the project works was discussed during the meetings with experts from Ministry of Culture of Republic of Karakalpakstan and representatives of settlements, included into the project.

192. It was confirmed that there are no historical objects within project area and settlements which could be negatively impacted by the Project. The nearest heritage to the project site is located in 3 km from project site in Beruniy district.

Chilpik Kalla in Beruniy district (IV- century BC)

Historical complex Kyzyl Kaya in 27 km from Beruniy city (I-II centure)

Ancient Mizdakhan settlement, at the territory of Kungrad and Muynak districts (IV century BC)

Ganpik Kala in Amudarya district (IX-XVI centrures)

Picture 51: Historical heritages in Karakalpakstan

5. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATE MEASURES

193. Anticipated the Project's environmental impacts were reviewed at the three stages – pre-construction, construction and operation stages.

5.1. Pre-construction stage

Impact

194. During pre-construction stage the following aspects may impact on effectiveness of implementation of environmental safeguards during whole project cycle and may lead to non-compliance with requirements: (i) design of water treatment facilities will not unsure efficient water quality, (ii) non-efficient sanitarian zone for surface and ground water intakes may lead to deterioration of water quality, (iii) non-inclusion of environmental requirements into the bidding and contract, (iv) no compliance on receiving all required permissions, (v) purchase of goods, techniques and machinery which is not comply with with ADB Prohibited Investment Activities List set forth at Appendix 5 of the Safeguard Policy Statement (2009) and national standards on exhausted gases.

Project design and procurement procedure

195. Selection of inefficient water treatment technology may lead to production of water with quality which does not meet national standards for drinking water (GOST 950-2011. Hygienic requirements and quality control). Within current project existing treatment facilities in Mangit city (Amudarya district) will be upgraded to bring quality of water to the standards. Water treatment process will consist of: sedimentation, filtration and chlorination stages. Due to high level of turbidity chemical reagents – coagulants will be added. Selected technology ensures quality of water which meets national standards in condition when technological requirements of water treatment are in fully compliance.

196. In accordance with initial design, ground water intake in Beruniy district was planning to be used as water supply source of some part of Beruniy city. Since results of monitoring of quality of ground water from well field showed continuously exceeding standards on hardness and mineralization (TDS), this water source for drinking purposes could be used with additional treatment procedures (such as desalinization facilities) to meet producing water standards. Due to high cost of such additional treatment, engineering team decided to reject usage of ground water source and to connect whole city to Tuyamuyun transmission main.

197. For the current project design locations of all new WDCs have been selected in accordance with national requirements indicated in regulation KMK 2.04.02-97 “Water Supply. External network and facilities”. For almost all WDCs and WTP the condition for first level of sanitarian zone are met. Only the Mangit water intake in Amudarya district has inefficient sanitarian zone as described in chapter 3.1. Therefore, this issue was discussed with design institute engineer and it was decided to displace water intake on 60 meters above existing one (Picture 52) in order to meet requirements on first.

Picture 52: Proposing location of new water intake in Mangit (Amudarya district)

198. Some changes in selection of WDCs, their location, WTP layouts could be done at the stage of the project details design. It may lead to generating new impacts which requires updating IEE.

199. The following activities are proposing to mitigate identified impacts at the pre-construction stage.

Mitigation measures

- Develop design and process of water treatment on WTP based on quality of raw water in order to meet the national standards OzDSt 950-2011 “Drinking Water. Hygienic requirements and quality control”;
- Ensure sanitarian zones for ground and surface water intakes in accordance with national standards KMK 2.04.02-97 “Water supply. External networks and facilities” (1997), para 10.8;
- IA with assisting Project Management Consultant’s (PMC) environmental specialist will ensure inclusion environmental provision along with EMP in the bidding documents and the contracts for Contractors;
- Bids evaluation has to be done with consideration of: capacity of bidders to meet EMPs requirements, proposing adequate budget efficient for implementation EMP, existence of good practice in environmental performance within other similar projects;
- During detail design stage, the layout of new WDCs, route of main trunk and water distribution networks will be updated with consideration of minimization of impact on environment and population during construction and operation phases;
- Within 30 days after contract award and prior to commencing any physical works, Site-specific Environmental Management plans (SSEMPs) will be developed by the Contractors under the guidance of the PMC, and be endorsed by PMC before submission to PCU for approval;

- In addition to Site Specific EMPs for construction phase, Traffic Management Plan for construction of WDCs and distribution network within settlements, Waste management Plan, Hazardous Wastes Management Plans for sites with demolishing works as described in the next sub-sections need to be prepared by Contractors, endorsed by PMC and approved by PCU;
- Goods procured for project implementation will be done in compliance with ADB Prohibited Investment Activities List set forth at Appendix 5 of the Safeguard Policy Statement (2009);
- Environmental specifications have to be included in bidding packages for purchase machinery within the project. Particularly, toxic level of machinery must meet "Euro 3" environmental requirements as defined by national regulations[17];
- If any changes in the project design will take place, the IEE has to be updated accordingly.

5.2. Construction stage

5.2.1 Physical resources

Impact on air quality

200. During construction stage pollutants emissions will be caused by earth works, construction/demolishing activities and exhaust gases from vehicles. It is expected that dust pollution will occur more frequently. Equipment and vehicles with improper technical characteristics or in poor conditions also may lead to air pollution by exhausted gases. The impact will be enhanced if burning of construction and domestic wastes will take place.

201. As it was described in chapter 4.1, air quality analysis showed exceeding of dust concentration in all observed places. There project area is characterized by dry climate and low amount of precipitations (less than 100 mm per year). Therefore, implementation of mitigation measures to prevent dust pollution is essential.

202. The project will be implemented both: inside settlements and non-populated areas. For settlements more stringent mitigation measures will be implemented.

203. In some areas, lying of pipeline will be conducted inside narrow street which may cause air pollution by dust, traffic fumes and noise if heavy technics will be used. Therefore, for such cases pipe lying needs to be conducted manually.

Mitigation measures:

204. During construction period regular mitigation measures shall be used in the most of the cases:

- apply watering of construction sites and roads inside settlements during a dry season;
- cover transported bulk materials;
- control speed limitation for vehicles during movement inside of settlements - no more than 40 km/h;
- all vehicles and techniques must comply with technical requirements and have to pass regular inspection as indicated into the national standards[18];

[17] Resolution of President of RUz "On measures for further development of production at the Samarkand automobile plant and renewal automobile park", dated from December 14, 2006

[18] "O'z DSt 1057:2004 Vehicles. Safety requirements for technical conditions" and "O'z DSt 1058:2004 Vehicles. Technical inspection. Method of control".

- prohibit open burning of solid wastes generated particularly from labor camps and construction activities;
- Restrict demolition activities during period of the high winds or under more stabile conditions when winds could nevertheless direct dust towards adjacent communities;
- Pipe lying works in street with width less than 2 meters, needs to be conducted manually.

Noise and vibration

205. Noise pollution and excess norms for vibration will occur mainly during construction phase and an impact will happen due to the very nature of the works at the sites located close to settlement areas.

206. It is expected that more intensive noise will be generated during construction/rehabilitation of WDCs and Tuyamuyun and Takhiatash Water Treatment Plants (WTPs). Temporary noise emissions may be caused from the following equipment:

a. Decommissioning equipment
b. Construction equipment
c. Pile driving for construction
d. Earth moving activity
e. Generators
f. Vehicles used for material transport

207. Modelling and assessment of the noise, caused by construction activities is based on existing information about operation of various equipment at various stage of construction. Level of noise generated by various equipment was used based on existing standards[19]:

Table 21: Noise level form various techniques

Noise source	Equivalent noise level, dBA
Excavator (cabin - 7 meters)	95-92
Bulldozer (cabin - 7 meters)	84-85
Grader (cabin - 7 meters)	85-92
Electric compressor (cabin - 7 meters)	93-80
Pile boring equipment (cabin -7 meters)	72-82

208. As a rule, noise caused by moving equipment is reduced at some distance. Such reduction has logarithmic properties. In case of noise caused by construction activities, noise spread pattern from the noise point is used, that can be determined as: Noise $level_1$ - Noise $level_2 = 20 \log r_2/r_1$. Calculation of noise propagation from noisier equipment - excavator at the different distance is presented in Table 22.

Table 22: Noise levels at the various distances

Distance	Equivalent noise level (maximum), dBA
10	90.9

[19] M. Nechaev, V. Gister, V. Silkin Environmental protection during design and construction roads, Moscow, 2004

20	84.9
50	76.9
60	75.3
70	74.0
80	72.8
90	71.8
100	70.9
111	70.0
110	70.1
120	69.3
130	68.6
140	68.0
160	66.8
200	64.9

209. As shown in the Table 22, after 111 m from noise sources, the noise comes to acceptable level 70 dB (SanPiN #0267, 2007) for the area adjusted to living houses. However, for sensitive objects such as hospitals and schools noise level has to be reduced up to 35 dB and 30 dB accordingly (WHO)[20].

210. There are no hospitals located next or close to the WDCs included in the project. However, it was identified that there are several schools and living houses in Nukus, Beruniy and Karauzyak districts which may be impacted by the construction works.

211. School # 30 is located in 160 meters to the south-west from Shortanbay WDC in Nukus district (Picture 53).

212. In accordance with Table 11 noise level at the distance 110 meters will be 70 dB. Presence of trees rows between WDC and school which reduce the noise level up to 12 dB[21], and acceptance that rooms with open windows reduce noise level on 10 dB were taken in consideration during calculation of expected noise level inside classrooms. The calculation showed that the noise level in the classrooms may reach 48 dB which exceeds WHO standards on 13.8 dB.

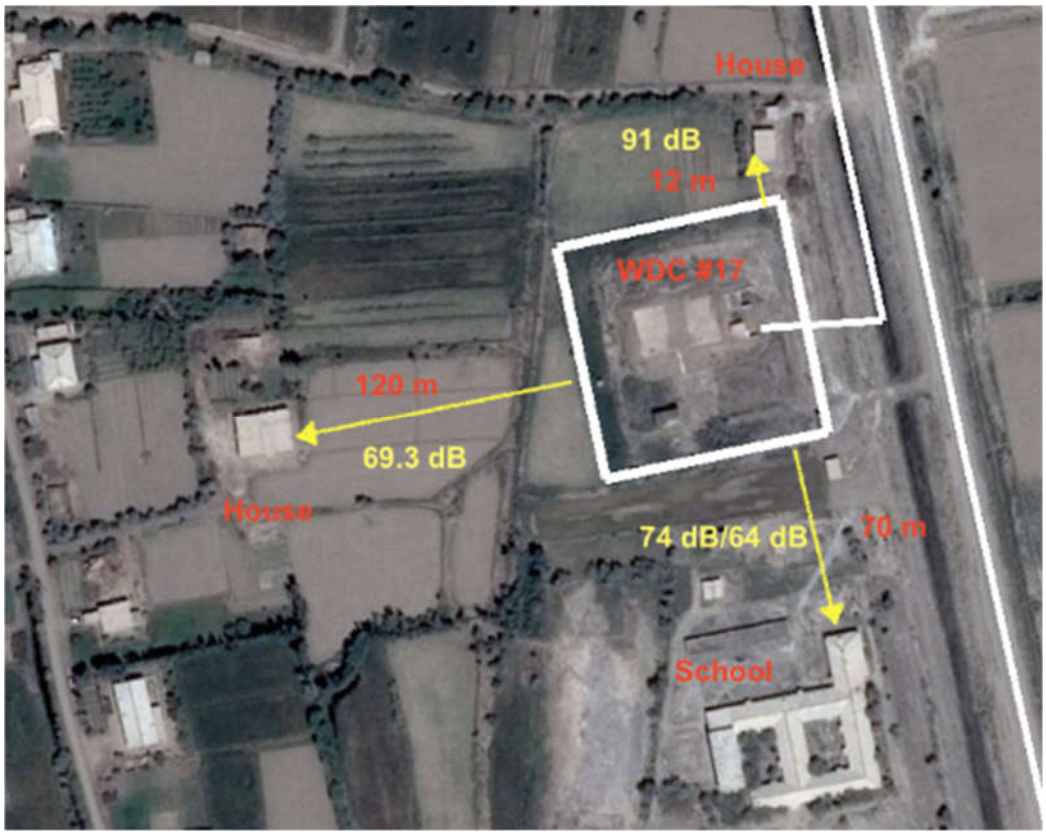
[20] WHO Guideline for Community Noise

[21] SanPiN # 0227-07 Planning and development of settlements, Table 24.1

Picture 53: Location houses and school near WDC Shortanbay, Nukus district

213. Noise level in areas adjusted to houses will decrease up to acceptable level due to trees growing on surrounded area. Therefore, the noise level at the area adjusted to houses will 55 dB limits and it requires implementation of noise screen.

214. Another site where noise level will exceed standards for school is located in Beruniy district - near to WDC # 18. The closest house is located at a distance 12 meters and 120 meters and school is located at 70 meters (Picture 54). As shown in the picture, noise level will significantly increase in the closest house and school – up to 91 dB in the area adjusted to house and 64 dB inside of classrooms.



Picture 54: WDC # 17 in Beruniy RCA, Beruniy distrcit

215. Other houses at this site are located beyond distance in 111 meters where noise will be within standards.

216. At the WDC Bodom Bosh one house also is located at the distance at 20 meters, and noise level at this level will reach 84.9 dB (Picture 55).

Picture 55: Bodombosh WDC, Beruniy district

217. The same situation in the Shimom WDC, where one house is located at the distance 20 meters 60 meters.

Picture 55: Shimom WDC, Beruniy district

218. Location of school # 13 in Birdem settlements in Karauzyak district is presented in Picture 50. The distance between WDC and school is 110 meters. Noise level inside classroom at this distance will be 70 dB which exceeds WHO requirements on 35 dB (Pictture 56).

Picture 56: Location of school in Birdem settlements, Karauzyak district

219. Therefore, during reconstruction works at the sites listed above, mitigation measures for decreasing noise level have to be applied to ensure decreasing noise level up to 70 dB for living houses and 35 dB inside of classrooms.

220. Location of each constructed and rehabilitated WDCs were reviewed and assessed on noise level of impacts. It was identified that in several sites residential houses are located very

close to construction site which leads to exceeding acceptable noise level also. It is: Muynak WDC, KyzylKush and Khorezm WDCs in Kungrad, Mangit Water treatment plant.

Mitigation measures:

221. The following measures need to be implemented to avoid noise and vibration impacts on project sites located within settlements:

- Installation of acoustic screen during construction works at the Shortanbay (Nukus district), WDC# 17 (Beruniy district) and WDC in Birdem settlement (Karauzyak district). The screens have to ensure noise level in classroom no more than 35 dB;
- Installation of acoustic screens during construction works at the Muynak WDC, KyzylKush and Khorezm WDCs in Kungrad, Mangit Water treatment plant (Amudarya district) to ensure noise level at the area adjusted to the closes houses no more than 70 dB;
- establish limits on speed for vehicles inside of settlements (40 km/h);
- schedule construction so as to minimize the multiple use of the noisiest equipment near sensitive receivers;
- use of Personal Protective Equipment (PPE) by workers involving in demolishing and construction works;
- inform population about anticipated works;
- conduct weekly noise measurements at the above listed WDCs .

222. Therefore, above described impacts on air quality, noise and vibration will be temporary and it could be mitigated by implementation of recommended measures.

Impact on water resources

223. The surface water may be polluted due to improper placement of the excavated soil, poor management of construction camps, and improper storage of construction materials, leakage of fuel and lubricates from construction machinery, washing of vehicles and techniques without proper treatment. Temporary contamination of canal during construction water supply pipelines at the river crossing is also anticipated. Waste water from labor camps may be potential source of water contamination.

224. In most cases, construction of new WDCs and rehabilitation of existing ones will be implemented in the areas remote from water bodies. However, there are several places where construction works will be conducted next to canals.

225. Reconstruction of Altinkul WDC (Kungrad district), Mangit water intake (Amudarya district), Medeniyat WDC (Nukus district) will be conducted at the banks of Altinkul, Ak-Mangit and Daulet canals accordingly. Therefore, there is potential risk of pollution due to project works at that sites (Pictures 57-58).

226. Moreover, during pipe laying in Karayzuak, Muynak, Amudarya, Nukus districts big canals will be crossed over. Water samples were taken from the water canals at the points located close to construction sites and results of analysis are presented in Table 21.

Picture 57: Reconstructing Altinkul WDC in Kungrad district

Picture 58: Reconstructing Mangit Water intakes in Amudarya district

227. Implementation of the mitigation measures and continuously monitoring of water quality in the points included into Table is necessary to avoid deterioration of water quality.

Mitigation measures:

228. The following mitigation measures shall be implemented to minimize impact on water resources:

- Construction and labor camps, including storage places for lubricant, fuel and other oils will be located 100 m away from water bodies;
- Conduction of refueling, oil replacement or repairing works will be banded at the area within 50 m from water streams;
- Sanitary waters and solid wastes will not be released directly into water streams;
- Topsoil stripped material shall not be stored where natural drainage will be disrupted;
- Water samples will be taken and analyzed based on the baseline monitoring results obtained in the preconstruction stage.

229. Groundwater table level within the Project zone is 10-12 meters. Therefore, potential impact arises from maintenance of contractors' camps, transport, maintenance of vehicles and handling and storage of lubricants and fuel. The required provisions for construction camps are described in the subsections describing impacts on soil quality and waste management.

Impact on soil

230. The main anticipated impacts on soil during construction stage will be: disturbance or loss of top soil, its compaction and pollution. For pipe lying works, earth excavation, pipe laying and backfill of material including compaction will be implemented. Excavated soil will be temporary stored alongside the trench and refilled after pipe lying. Gravel will be used as a bed for the pipes and excavated soil will be placed back to fill tranche and be compacted. Certain amount soil will surplus due to pipes and gravel in trench.

231. Surplus excavated soil will be generated during construction of WDCs particularly for Clean Water Reservoir and pump station construction. Even surplus materials will be used as embankment fill as far as possible certain amount of earth will remain.

232. The movement of equipment and the temporary storage of materials on the ground during the construction may lead to compaction of the soil. This compaction will take place in the area affected by the construction and rehabilitation works, in its vicinity, in the access areas, pipelines, etc.

233. Gravel and sand will be required for pipe lying and rehabilitation of damaged roads. Unauthorized excavation of such construction materials and improper restoration works on closing used carriers will negatively impact on soil.

234. During rehabilitation of circular and longitudinal clarifiers at the WTPs significant amount of sludge will be generated. At the time of surveying of Takhiatash WTP within current IEE, it was noted that sludge was not disposed timely from the WTP territory. Excavating sludge from the rehabilitated clarifiers without proper disposal may aggravate the existing poor situation at the Takhiatash WTP in term of sludge disposal.

Mitigation measures:

235. To minimize this impact on soil quality the following measures shall be implemented:

- The top soil of about 30 cm depth shall be removed and stored separately during excavation work, and after the construction of the main trunk the same soil shall be replaced on the top, in unpaved areas;
- The excess top soil and earth reminded after construction new WDCs will be used at other project sites or disposed at the places prior approved by local government authorities and Nature protection committee;
- To minimize soil compaction, movement of all type techniques will be allowed only through identified assess roads;
- Contractors will be required to use only authorized carriers with getting all necessary permissions per respective national legislation.
- Remove the existing sludge from the the territory of WTPs and ensure timely disposal of sludge which will be excavated during construction .

234. Pollution of soil during construction phase maybe caused by improper handling of fuel and oil during refueling and poor waste management which is reviewed in the next chapters.

Waste management

Hazardous construction wastes

235. During construction phase hazardous wastes will be generated from vehicle operation and maintenance, rehabilitation works at 22 WDCs, particularly replacement of old transformers. In addition, there is possibility of presence of asbestos materials in remaining buildings and facilities of rehabilitated WDCs.

Picture 59: Old transformer in Altinkul WI (Kungrad district)

Picture 60: Transformer in Karauzyak WDC

236. All rehabilitated WDCs have transformers which had been produced before 1994[22] and there is a possibility that oil contained PCB was used for such equipment. Due to specific of nature of works on transformers demolishing, replacement and further hand over of installed new transformers to Inter-regional trunk main "Tuyamuyun-Nukus", such works could be conducted only by eligible organizations with appropriate certificates/license. Therefore, this activity will be implemented by SJC “Uzbekenergo”, owner of the electricity facility. Demolishing transformers will be transferred to SJC “Uzbekenergo” as well for further storage and disposal.

237. There is procedure on disposal of used oils and transformer in Uzbekistan[23]. However, the procedure does not provide instructions on handling of PCB content in transformer oil, disposal of this equipment requires the special approach. This approach was developed within Framework of the “Modernization and Upgrade of Transmission Uzbekistan” project in 2015 and approved by Uzbekenergo Substations. The framework requires conduction of laboratory testing transformer oils on PCBs. However, as showed baseline survey, there are no certified laboratory, conducted such analysis.

Mitigation measures:

- Because of absence of possibility to conduct analysis on content of PCBs in oil, all transformers produced before 1994 have to be carefully handled and disposed without pouring oil and avoiding oil leakage. All transformers have to be labeled with sign “Content PCB” and disposed in accordance with ""Guidebook on Environmental Sound PCB Management in Electrical Equipment” (prepared under Moldova POPs Stockpiles Sustainable Management and Destruction project)". Notification on presence of such equipment will be sent to State Nature Protection Committee and Sanitarian Epidemiological Station for their further actions;
- If transformers oil does not content PCBs, disposal of used oil has to be conducted in accordance with national legislation “Individual norms of oil usage for maintenance and operational needs for energy enterprises” (Uzbekenergo, 2012)
- Used oil shall be collected into containers placed at the concreted sites and disposed to national oil company designated for accepting and treatment of used oils;
- Refueling vehicles and replacement oils also have to be conducted in special designated and properly equipped places. Emergency facilities have to be at the place for elimination of accident of oil spills;
- A separate Waste Management Plan needs to be developed by Contractor, endorsed by PMC and approved by PCU for the construction sites with demolishing works. The Plan has to include information about type of generating wastes, procedure of their collection and disposal;
-

238. The project involves demolishing of existing WDCs including old buildings and constructions, therefore there is a possibility of presence of asbestos materials (in roofing slate).

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[22] In Russia, last transformer contained PCB was produced in 1993. All transformers used at WDCs in the project area were produced in Russia.

[23] Safety regulations for the maintenance of electrical consumers, Approved by State Inspection under Uzenergonadzor, 2004 and Regulation guideline 34-301-941:2007 Individual norms for oil usage for repairing and maintenance needs for equipment of energy enterprises

Mitigation measures:

- Prior to commencement of rehabilitation works at the WDCs, EO with International or National Environmental Specialist of PMC will conduct vision observation of old buildings and facilities on presence of asbestos materials.
- In case of presence such materials, will developed by Contractor a detailed "Waste Asbestos-Containing Material Management Plan" is to be developed by Contractors (Appendix 8).

Non-hazardous wastes

Municipal wastes

239. Municipal solid wastes and waste waters will be generated at the construction and camp sites. Mainly these are rubbish, plastic or glass bottles, glasses, waste food, etc. Improper wastes management may cause the spread of infectious diseases, emergence of insects and parasites in construction camp sites. In addition, it may lead to conflict with local population.

Mitigation measures:

240. The followings shall be implemented for proper waste management:

- Segregation of wastes on recyclable and non-recyclable wastes;
- Selling recyclable wastes to relevant organizations (paper, scraps, accumulators) and timely disposal of non-recyclable wastes to the landfill, determinate by local hokimiyats;
- Providing hydro isolated septic tank for collecting waste waters at the camp sites and bio toilets for workers at the construction sites and timely disposal of waste waters to the local waste water treatment plants.

Construction wastes

241. Construction wastes in significant amounts will be generated during demolishing of existing buildings and facilities at the WDCs. Storage of such wastes in area close to settlement and untimely or improper disposal may impact on air quality, dust generation and disturbance of neighboring settlements. Besides this wastes, used welding rods, packing materials, woods will be generated as well.

Scrap metals

242. Old equipment from rehabilitated WDCs, such us old pumps, pipes and etc. will be handed over to Inter-regional trunk main "Tuyamuyun-Nukus" for further use, recycling or disposal. As mentioned above, old transformers produce before 1994 will be kept in a safe storage in accordance with establish procedure for PCBs without releasing the oils.

Mitigation measures:

- Segregation of wastes on recyclable and non-recyclable wastes;
- Selling recyclable wastes to relevant organizations and timely disposal of non-recyclable wastes to the landfill, determinate by local hokimiyats.
- Burning of waste on any construction site is forbidden with the exception of stub and small branches from felled trees and bushes, which is better to be burned in order to avoid pest dissemination
- Create a safe (sheltered with concrete foundation) storage facility

5.2.2 Biological resources

243. It is expected that during the construction works some impact on biological resources will occur. Project sites are represented by a combination of populated area and desert areas. Almost all new WDCs will be constructed at the sites without any vegetation. The only construction of WDC “Shagirly” will require cutting bushes on 1 ha. The main plant growing on that site is saxaul (*Halóxylon).*

Picture 55: Location of Shagirly WDC

Picture 56: Saxaul growing at the site where Shagirly WDC is planed to be constructed

244. Some impact will take place during pipe laying works as well. Although most part of the project area has scanty vegetation and construction works on pipe laying will be conducted along existing roads, some places need careful review and design of pipeline alignment in a way which allow to minimize losses of trees and bushes.

Picture 57: Typical view of street where project works will be conducted in Karauzyak district

Picture 58: Street in Kyzyljar settlement in Muynak district

245. The following places require additional attention: the part of transmission main which will be constructed between Amudarya-Kipchak, Shege-Porlitay settlements in Muynak district, distribution network in Mangit city, Amudarya district.

246. Per national legislation [24] a permission from State Committee on Ecology and Environment Protection needs to be received prior cutting trees and respected fees will be paid for each case (as indicated in para 9 of this IEE). It was estimated that length of transmission trunk which may request cutting trees and as consequences compensation payment will be around 5 km. Taking in account that width of corridor needed for lying transmission trunk is 4 meters, total area which may requires cutting trees was estimated around 2 ha.

247. Greening of WDCs territory after completion civil works are included in the project design. The project works will be implemented in the populated areas and along to existing roads. Therefore, impact on wildlife will be limited.

248. There is protected area Low Amudarya Bio Reserve (LABR) located close to Amudarya and Beruniy districts. As described into the Chapter 4.3 the closest distance between LABR and protected area is 2 km (Qizil Chol and Jumur Ovul), which means that the project will not impact on the protected area.

Mitigation measures:

249. To mitigate adverse impact on vegetation and wildlife and to comply with national requirements the following measures are required:

- At the project details stage select an alignment of pipeline in a way which allows to minimize cutting of trees and bushes;
- Conduct joint revision of the project sites with representatives of inspectors from relevant district branches of Goskompriroda to identify number of cutting bushes and trees if any and to pay compensations. This measures is essential to be implemented in the part of transmission main which will be constructed between Amudarya-Kipchak, Shege-Porlitay settlements in Muynak district, distribution network in Mangit city, Amudarya district;
- Don not use chemical and burning for removing vegetation.

Impacts on land use

250. Impact on land use will occur during the construction of new WDCs, upgrading Mangit water intake, reconstruction and construction of main trunk and distribution networks.

251. The feasibility design attempted to minimize the land acquisition and involuntary resettlement and as a results, construction will be implemented only on the territory belonged to local hokimiyats and categorized as reserve lands which is not used for agriculture production.

252. Works on laying pipes will be also implemented within right of way of roads and as described into previous para, the project design will avoid cutting trees.

253. Therefore, the project will not impact on land use.

5.2.3. Socio-economic resources

254. The project will have positive effect and may have some negative impacts on socio-economic resources during construction works.

[24] CMR # 290 dated from 2014, “About regulation use of biological resources and on the order of procedure of getting permission for their use”

255. Personnel with different qualifications will require for construction works, and local population could be hired for some of activities, which means creation of new jobs. Moreover, indirect services will be demanded to provide needs for housing, catering, petrol stations, etc. This temporary positive impact will contribute overall project positive impact – improvement of water supply in the project district of Republic of Karakalpakstan.

256. Small enterprises (shops, barbers and etc.) and people properties may be affected during pipe lying of distribution network in settlements. It could be caused by limited or access to them, techniques movement, temporary closing roads. This impact will be temporary, no resettlement including demolishing such enterprises are expected.

Mitigation measures

257. The following measures need to be undertaken to minimize or compensate this impact:

- If cutting trees is unavoidable, to compensate losses as indicated in CMR # 290 (2014);
- To inform community in advance about planning works;
- Schedule and conduct civil works in the way to minimize period with limited access to enterprises and closing roads;
- Provide safe access to affected properties.

Health and safety issues

258. Besides impacts on air, water and soil quality, described in previous chapters, certain risks may take place related to community health and safety, for workers in campsites.

For community

259. Inadequate lighting and fencing of construction sites inside of settlement areas can be dangerous for pedestrians and vehicles especially during the night time. Increasing of traffic due to trucks and vehicles movements to construction sites, temporary closing of roads during pipe lying inside of settlements may cause inconvenience for local population as well. In addition, pipe lying will cause temporary blockage of household access.

260. Untimely and inefficient disposal of solid waste and improper sanitary conditions generated by the construction workers at construction sites and labor camps may cause pollution of the surrounding environment and affect the health of local people. There could also be some social problems due to irresponsible behavior of the outside work force such as gambling, alcoholism and disrespect to local people and their culture.

261. Cultural interference workers with local communities may cause HIV and sexually communicable diseases (STD) spreading in case of law awareness about these diseases among workers and community.

262. Increased traffic movement may create a risk for inhabitants living in areas adjusted to some of reconstructing and rehabilitation WDCs, particularly for houses and schools listed in chapter 5.2.1 (noise impact).

263. Moreover, a movement of heavy tracks may destroy or deteriorate conditions of roads inside settlements.

Mitigation measures

264. The following measures need to be undertaken to minimize this impacts:

- Contractor and PMC will inform population about anticipated works in the settlement in advance;
- Contractors will require to develop a Traffic Management Plans with clear indication routes of vehicles' movements, placement special signs, and speeding allowance inside of the settlements and schedule transportation activities by avoiding peak traffic periods
- The Traffic Management Plans will be approved by Traffic Police and disclosed to local communities prior commencement of construction works on respective sites;
- Clear signs will be placed at construction sites in view of the public, warning people of potential dangers such as moving vehicles, hazardous materials, excavations etc. and raising awareness on safety issues.
- Contractor will require to install temporary bridges and effectively organize works, which will allow avoid unreasonable delaying of construction works;
- All construction sites will be properly lightened and fenced;
- Development of Site Specific Plans for campsites;
- After completion works all roads shall be rehabilitated at least up to condition of pre-construction stage;
- Carry out regular awareness campaigns among work staff, including specific hazards associated with the spread of HIV/AIDS.

265. Construction sites and areas used for construction camps without proper cleaning and reinstatement works will cause damage and inconvenience to local communities due to debris, spoils, excess construction materials.

- After completion of the main construction Contractor shall provide full reinstatement of the construction and camp sites by bringing them to its primary condition;
- Remove all rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and
- All disrupted utilities restored All affected structures rehabilitated /compensated;
- The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up;
- All hardened surfaces within the construction camp area shall be ripped, all imported materials removed;
- PMC will conduct post-construction audit during defect liability period to make sure that construction sites and camps are properly cleaned and restored to pre-project conditions before acceptance of works before hand-over to inter-regional trunk main Tuyamuyun-Nukus and local khokimiyats.

For workers

266. Separate Site Specific EMP for labor/construction camps will be developed by Contractors, endorsed by PMC and approved by the Environmental/Social Specialist of Project Coordination Unit's prior commencement of works. SSEMP for labor/construction camps will describe waste collection and disposal procedure, set up of camp facilities (such as a storage place for construction materials and techniques if any, laundry and toilets, access roads) in the way, which will allow to minimize disturbance of local population. If washing equipment and vehicle is planning to be conducted at the labor/construction camp's site, appropriate wastewater treatment facilities have to be organized on the camp and respective

permissions on water intake and waste water disposal need to be received by Contractor from relevant government agencies. At the same time, labor camps have to provide safe and adequate living conditions for workers, such as dining rooms, toilets, shower rooms emergency medical kits. Other measures for fire-fighting and preventing electric shocks etc. In addition, the Contractors shall instruct all the workers to act in a responsible manner. After completion works, construction camps

267. At the completion of work at a particular site, Contractor will remove all equipment and structure, clean up and dispose all waste materials, rehabilitate all construction sites and work areas so that these can be returned as possible to their previous use. Safety and health non-compliance may create a risk for construction workers. The Contractors will require to develop Occupation Safety and Health Plan, which covers among others the following topics: usage of PPE, working procedure with hazardous materials (such as asbestos materials, PCBs etc.), training activities and others. The workers have to be provided with appropriate living conditions: safe water supply, washing conditions.

5.2.4. Cultural heritage

268. The land and vegetation clearing, earthmoving activities during the construction of the new WDCs and extension of existing ones, pipelying works may affect the archaeological heritage in the project areas.

269. As it was noted in chapter 4.6, the closest to construction site heritage is located at the distance 3 km from project site.

270. Nevertheless, taking in consideration that some historical artifacts could be found during construction works, the following mitigation measures will be undertaken in accordance with the procedure indicated in the Law of RUz “On Protection and Use of Objectives of the Archeological Heritages” (2009).

Mitigation measures

271. The following measures need to be undertaken in case of possibility to chance of finding heritage:

- Excavation and other works need to be suspended immediately;
- Area with possible heritage shall be fenced with fencing tape;
- A designated focal point from a local administration (khokimiyat) needs to be informed and invited for assessment of potential heritage and undertaken necessary actions;
- Civil works at the finding place could be recommenced after obtaining permission from the focal point.

5.3. Operational stage

Impact on the air

272. Operation of WTP and pumping station may cause disturbance, nuisance and noise. Some temporary impact may occur during maintenance works on WTP, WDCs and water supply network. No permanent impact on air is expecting during operation phase.

Mitigation measures

Watering of earth during maintenance works

- Design of pump station and WDCs will be done to ensure compliance with national and IFC’s standards on noise and vibration level for public and worker places;

- Per national legislation assessment of working places conditions will be implemented once per three years;
- During maintenance works periodically water down temporary roads on site;
- Immediately replacing defective equipment and removing it from the work site;

Impact on water

273. Increasing of water withdraw due to the project works may have impact on water users located at the downstream and other sectors of economy, such agriculture and industry.

274. According to the project, water withdraw at Tuyamuyun TPP will increase from current 70000 m^3/d up to 140000 m^3/d after the project implementation, at Takhiatash WTP - from 60000 m^3/d up to 120000 m^3/d, in Mangit WTP from 2466 m^3/d up to 28000 m^3/d. It means that total amount of taking water for drinking purposes will increase from 132466 m^3/d up to 228000 m^3/d.

275. The average 20 years flow of Amudarya at the Tuyamuyun observation station is 920 m^3/s which means 3,3 bln m^3/day. 132466 m^3/d and 288000 m3/d are 0,004 % and 0,007% accordingly from total Amudarya flow. It means that due to the project implementation water withdraw for drinking purposes will increase on 0,003%. It will not impact on downstream water users.

276. Of the six district centers only Kungrad and Berniy cities have a sewerage system. However, the sewerage network is limited to a central part of the city and is reportedly malfunctioning. There are no sewerage systems in the rural settlements.

277. Sewage is collected into the ponds and in some cases it is disposed into special designated by local khokimyats places. However, in most cases, sewage just collected into the ponds and due percolation process goes into the deeper layers.

278. Increasing delivered water for water supply services will generate additional sewage. In view of the planned improvement and extension of the urban and water supply systems it is necessary to plan development of waste water network within the project districts in the nearest future.

279. Operation of chemical laboratories for monitoring drinking water quality without proper treatment of chemical's reagents residual may pollute surface and ground water.

Mitigation measures

- Conduction of awareness program on proper and timely waste water disposal for population in the project area;
- Discharging chemical's reagents residual into water stream without treatment will be prohibited. Special procedure of utilization of such reagents, indicated in Standards for Drinking Water, 2011 has to be implemented;
- Consider a development of a program on improving sewage water collecting and disposal in the nearest future.

Soil quality

280. As part of water treatment process, sludge generated after sedimentation and filtration stages will be collected into slurry tanks on the territory of Takhiatash WTP. Composition of solid load will be essentially siliceous (SiO2) material 0,002 to 0,02 mm in size. Such content makes it non-suitable for further use, and therefore it needs to be disposed in designated places as it accumulates.

281. In accordance with calculation provided by engineering team it is expected that 15.6 m^3/day (30% of solid content) will be generated. To collect and dry this amount of sludge 2 ponds with size 20x20x0.3m and volume 120 m^3 each will be required.

Designation	Quantity	Unit
Design raw water quantity	72,000	m^3/d
Design water quantity	3,000.00	m^3/h
Solid load	0.066	kg/m3
Density	1.50	kg/dm3
Dray Volume	0.00004	m3/m3
Dry Volume	0.04400	dm3/m3
dry volume	**3.2**	**m3/d**
Dry Volume	**1,156**	**m3/yr**
ratio water/solid	1/4	
Design sludge quantity	15.8	m^3/d
Design sludge quantity	**5,782**	**m^3/yr**
Min. retention time	10	d
Min. volume required	158	m^3
Depth	0.3	m
Required area	528	m^2
Width	20.0	m
Length	20.0	m
Surface per bed	400	m^2
N° of beds	1.32	-
Chosen N° of beds	2.00	-
Accretion of solid load in pond	0.00396	mm/d
Accretion of solid load in pond	0.1188	mm/month

282. Solid loads (dry sludge) will accretion in the ponds with rate 0.12 mm per month. Which means that ponds with depth 30 cm will be filled during 20 years. After 20 years dry sludge from filled ponds has to be disposed at the sites indicated by local branches of State Committee on Ecology and Environment Protection.

283. For Mangit WTP sludge after filtration stage will be disposed back into the Ak-Mangit canal which is allowed by national norms, particularly KMK 2.04.02-97 “Water supply. External networks and facilities”, para 6.200.

284. However, improper sludge management, particularly untimely sludge disposal to the ponds may lead to pollution of air or in case location of excavated sludge next or close to operating clarifies – pollute water.

285. Another impact on soil during the project operation is risk related to land subsidence in case of excessive extraction of ground water at the Urazbaev wellfield, Amudarya district. To avoid such situation, water from wells have to pumped strictly in the amount, indicated in the design documents. Moreover, the amount of withdrawing water will be indicated in the special permission on water usage, which TN will have to obtain from State Committee on Ecology and Environment Protection.

Mitigation measures

- Timely and proper disposal of sludge excavated from clarifiers to the drying ponds;
- Avoiding collection sludge next to clarifiers;
- To make sure that amount of withdrawing water from wells is complies with established in the FS and confirmed in the permission on special water use.

Health Safety

286. In order to meet national standards for drinking water different disinfection approaches will be used: (i) an electrolysis with sodium hypochlorite (SHC) and chlorine gas at the WTPs.

287. Electricity equipment will be used at the WTP and WDCs which may cause of fire and electric shocks for workers.

288. Even SHC is less dangerous than gas chlorine, the special prevention measures need to be undertaken to minimize possibility of SHC leakage and consequently negative impact on facilities personnel, population from vicinity and environment.

Mitigation measures

- Emergency measures in the operation manual to be provided by the equipment suppliers;
- Providing required facilities: storage of SHC in well ventilated rooms;
- Applying special marking for containers with this agent;
- Using vehicles with increased safety measures for transportation;
- Special procedure need to be developed and applied for utilization leakages.

289. Thus during project operation stage some negative impacts and risks may take place. However, all of them could be mitigated by implementation proposed measures described in EMP and required by national legislation.

290. Along with this, positive impact of the project is obvious and it is well described in the part of the project goals and expected outcomes. Detail information about impacts, recommended mitigation measures, responsible people for EMP implementation and monitoring with cost estimates for this activities are presented in Chapter 9.

6. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

291. One of the main goals of the IEE is to facilitate the participation of all stakeholders and local communities at all stages of the project cycle: from the pre-construction phase and construction activities to its operation. In this regards, a number of consultations were held in the project districts to capture the stakeholders' opinions about the project, and agree on the project activities.

292. Prior to the public consultations several meetings were conducted with internal and external stakeholders, such as representatives of the district level committee on Ecology and Environment Protection, district Khokimiyats and makhallas, the representatives of Low Amudarya Bioreserve (LABR), MHCS, land cadaster committee, Ministry if Culture, Uzhydromet and others.

293. In compliance with ADB requirements with the aim of informing the communities in the project area about the upcoming consultations, the announcement has been published in the local daily newspaper “Vesti Karakalpakstana” and “Erkin Karakalpakstan” dated May 23, 2017 (#65 and #42) in Karakalpak and Russian languages. In addition, citizens living in remote areas, announcements about the planning public consultations were posted at the public places at the district centers and in the most of settlements.

294. 9 public consultations were conducted in 6 project districts: three in Muynak, two in Beruniy and one in each of the rest districts. Almost all public consultations were hold in administrative buildings of khokimiyats. One PC in Beruniy district PC was conducted in the yard of rural school. PC participants were introduced with project’s main features, results of environmental assessment and social assessment finding in term of resettlements issues. The consultant introduced Grievance Redress Mechanism and ADB requirements on public disclosure process. The information was presented with using Power Point Presentation.

295. Representatives of almost all settlements included into the project attended PCs. Most part of participants were presented by Rural Citizens Assemble (RCA) leaders, citizens, representatives of district branches of nature protection committee, land cadaster, sanitarian epidemiological station, women committee, schools, hospitals and etc. Representatives of district branches of inter-region trunk main participated on each PC session.

296. The dialog was made through informing communities about the proposed project and obtaining suggestions about the anticipated environmental impacts and developed mitigation measures. Project objectives and main findings of conducted environmental assessment, EMP and Grievance Redress Mechanism (GRM) and ADB requirements on public disclosure process was presented in Power Point presentation. Hard copies of EMP translated in Uzbek were distributed among participants. People were requested to give their opinions and suggestions. In addition, participants were provided with contact information of focal points from district branches of TN, inter regional level and PPTA’s Environmental Specialist for further suggestions and questions.

297. The stakeholders/consultation participants were informed that Contractors would develop an Informative Banner with information on project objectives, activities, implementers, schedule of construction works, deadlines, contact information and logbooks for complaints and suggestions on each construction site.

Muynak district

298. Public consultations in Muynak district were hold during 27-29 May in Muynak city, Shege and Altynkul settlements. First meeting was conducted in administrative buildings of Muynak district khokimiyat, another two – in the hall of local schools. 119 participants from 12 settlements and RCAs included into the project attended the meeting: Muynak city, Uchsay, Shege, Shagirly, Madem, Porlitay, Kipchak, Bozatau, Aliaul, Kiziljar and Dostlik. 44 females participated at the meetings.

299. The main issues raised during the public consultation in regards environmental issues are presented in the Table 22:

Table 22: Issues raised during public consultation in Muynak district

Issues raised	Response	Addressed in IEE
Scope and area of the project activities, including type of works to be implemented within the project	More detail information on requested settlements were provided	Details provided in Chapter 3
Will connection of new settlements to constructing	1. No, new connections to transmission main will not	Details is provided in Chapter 3.2

transmission main Kungrad-Muynak impact on water availability in other settlements? (water supply in Uchsay settlement will decrease water availability in Muynak city)	impact on water availability. Capacity of transmission main will be enough to supply with water whole district.	
In some year we do not have water in the canal. Last several years we had more water. Is it possible to construct dam to keep water and develop fishing on surrounded areas	This question is out of scope of work for this project. But you can develop and submit this proposal for another funding agencies.	
What is coverage of distribution networks? Will it extended until each street?	Figures on scope of work were provided within each settlements. Network will cover each street, however extension until houses is not included in the scope of this project	Details are provided in Chapter 3.2
Will we pay for installation of water meters?	Payment for installation water meters is included in economical returns and will be paid back within bills for water supply services.	
Project implementation timing	Expected duration of the project is 5 years, starting date – beginning of 2017 and completion date – December 2021	Details are provided in Chapter 3.2
Is this project a part of the transmission main Kungrad-Muynak which currently is being constructed?	Yes, our project interconnected with this construction. Because new connections for water supply of all settlements in Muynak district will be connected to this transmission main	Details are provided in Chapter 3.2
How much water we will get during the day? Currently we received couple hours per day and quality is not good	The project is designed to supply 24 hours for all settlements included in the project. Reconstruction works at the WTP will ensure quality of water meeting national standards	Details are provided in Chapter 3.2
In case of cutting trees or bushes during the construction, will compensation be paid and who will?	Yes, compensation will be paid in accordance with CMR # 520. Expenses for compensation will be	Details are provided in Chapter 5.2.2

	included in Contractor's budget	
On the territory of Porlitay we have desalinization facilities "EKOS". It does not work currently. Will project rehabilitate this facilities?	None "EKOS" installation is included in the project. The decision was made based on received information from Vodocanal about high cost of water producing on EKOS and in some cases lack of skills to maintain such eqipment	

300. During each public consultations participants thanks the project for efforts and highlighted that reliable water supply is major issues which significantly impact on their livelihood.

Nukus District

301. Public Consultations for inhabitants from Nukus district was held on May 26 in administrative building of Nukus hokimiyat. Representatives of the following 11 settlements located within the project area attended the meeting: Samanbay, Ak Mangit, Kerder, Shortanbay, Akterek, Toktabay, Toktay, Tahirkol, Kutankul, Baqanshakli. Among 53 consultation participants 3 were females.

302. The presentation flow was the same as described above. During consultations participants raised the following issues related to environmental aspects:

Table 23: Issues raised during public consultation in Nukus district

Issues raised	Response	Addressed in IEE
Scope and area of the project activities, including type of works to be implemented within the project	More detail information on requested settlements were provided	Details provided in Chapter 3
As we learnt, a number of WDCs will be constructed within the project. But we have places where we already have pipes and WDC, but there is no water. Is there any possibility that after your project will be commissioned the situation with new WDCs will be repeated	Capacity of rehabilitated WTPs (Tuyamuyun and Takhiatash) is designed to produce amount of water efficient for supplying whole area included in the project.	Included in Chapter 3.2
Can you please list – which streets in Samanbay village will be included in the project?	Consultant showed a map indicating water supply network in Samanbay and explained that distribution network will cover all streets	Included in Chapter 3.2
Construction impacts on condition of roads. Is proper repairing of the roads in	After completion works all roads shall be rehabilitated at least up to condition of	Included in Chapter 5.2.3

makhallas after completion of the civil works included in the project?	pre-construction stage. This requirements is included in EMP	
Project implementation timing	Expected duration of the project is 4 years, starting date – second half of 2018 and completion date – December 2021	Information is presented in Chapter 3.2
Is it possible to include in the project development of sewage system?	No this project doesn't include any physical works on sewage system rehabilitation. However, as part of capacity building program trainings and awareness program on sanitary, proper collection and disposal of sewage water will be implemented within the project. Moreover, purchase of 6 Sewage vehicles under the project will aim to improve situation on this issue.	Information is presented in Chapters 3.2 and 9.4.2
It was noted about possibility of cutting trees. Could we know when trees will be cut in advance?	First of all, the project will try to avoid cutting trees and bushes as much as possible. However, if cutting trees would be unavoidable, local communities will be informed in advance, and cutting trees or bushes will be done after receiving permission from nature protection committee.	Included in Chapter 5.2.2

Karauzyak District

303. Public Consultation for residents from Karauzyak district was held on May 26 (10.00 am) in administrative building of Karauzyak hokimiyat. Representatives of the following 10 settlements and RCAs located within the project area attended the meeting: Karauzyak district center, Medeniyat, Korakol, Dosnazarov, Esem, Berdakh, Algabas, Abay, Kutly makan. Among 54 consultation participants 17 were females.

304. Presentation flow was the same as described above. During consultation participants raised few questions related to environmental aspects:

Table 24: Issues raised during public consultation in Karauzayk district

Issues raised	Response	Addressed in IEE
Scope and area of the project activities, including type of works to be implemented within the project	More detail information on requested settlements were provided	Details provided in Chapter 3

Project implementation timing	Expected duration of the project is 4 years, starting date – second half of 2018 and completion date – December 2021	Information is presented in Chapter 3.2
Who will be Contractor for the project? Will it local or international company?	Contractor will be selected in accordance with ADB procurement policy and it could both – national or international Contractor	

305. Representative of Karauzyak district khokimiyat pointed out importance of the project and thanked the project for efforts for the project implementation.

Kungrad District

306. Public Consultation for residents from Kungrad district was held on May 29 (2.00 pm) in administrative building of Kungrad hokimiyat. Representatives of the following 26 settlements and RCAs located within the project area attended the meeting: Kungrad city, Elabad, Qonly, Navoiy, Kumbiz, Berdakh, Qiriqqiz, Turon, Khakim ata. Sanoat, Tallyk, Almazor, Taraqli, Boston Monjayli, Kipshak Ornek, Khorezm, Karayan, Ustuyrt, Kokdarya, Sauenly, Miynetabad, Raushan. Among 46 consultation participants 9 were females.

307. Presentation flow was the same as described above. During consultation participants raised few questions related to environmental aspects:

Table 25: Issues raised during public consultation in Kungrad district

Issues raised	Response	Addressed in IEE
Scope and area of the project activities, including type of works to be implemented within the project	More detail information on requested settlements were provided	Details provided in Chapter 3.2
Transmission main Kungrad-Muynak is crossing our territory. Can we connect directly to it and get water from the transmission main?	No, transmission main will supply with water Muynak district's residents only. Kungrad city and urban area will be connected to Takhiatash WTP.	Details provided in Chapter 3.2
The project is going significantly increase coverage of with water supply network. Will Takhiatash WTP have enough capacity to cover the increased demand?	In according with the project design, a capacity of Takhiatash WTP will increase in two times, which means that instead current 60000 m^3/day 120000 m^3/day will be produced. This amount will be enough to cover demand of whole Kungrad district	Details provided in Chapter 3.2
Do we have a risk that after project implementation, particularly connection Muynak district to the	No there is no such risk. As we told before, Kungrad city will be supplied from Takhiatash WTP which is	Details provided in Chapter 3.2

transmission main, Kungrad may have a water shortage?	operating separately from TN transmission main. And capacity of WTP will be enough to meet demand of Kungrad district in water	
We have infrastructure, network, but due to low pressure into the pipe we don't get enough water. How will this problem be resolved? May be there is a need to built new pumping station only for Kungrad?	Low pressure in the pipes caused by their very poor conditions which does not allow to increase pressure in order to prevent pipe rupture even water is enough. The project will improve existing infrastructure. Issue of low pressure into the pipe will be resolved by increasing capacity of Takhiatash WTP and construction new and rehabilitation existing WDCs based on hydrological calculation which ensure efficient water supply within whole territory of the district	
Which organization will be Executing Agency for this project?	The executing agency will be inter regional trunk main "Tuyamuyun-Nukus"	Details provided in Chapter 9.4.1
The project will be funded through ADB loan. Who will be selected as a contractor? Local or international firm?	The bidding process for the project will comply with ADB procurements procedure. Both national, international firm or consortium may participate in the bidding	Details provided in Chapter 9.4.1

Amudarya District

308. Public Consultation for residents from Amudarya district was held on May 30 (10.00 am) in administrative building of Amudarya hokimiyat. Representatives of the following 26 settlements and RCAs located within the project area attended the meeting: Mangit dsitrcit center, Madaniyat, Orta Qala, Oq oltin, Beruniy, Buston,Gulzor, Olmazor, Choyqkul, Bobur, Chordara, Boyovdi, Navoi, Dustlik, Yangiobod. Among 55 consultation participants 16 were females.

309. Presentation flow was the same as in another districts. During consultation participants raised few questions related to environmental aspects:

Table 26: Issues raised during public consultation in Amudarya district

Issues raised	Response	Addressed in IEE
Scope and area of the project activities, including type of works to be implemented within the project	More detail information on requested settlements were provided	Details provided in Chapter 3

Project implementation timing	Expected duration of the project is 4 years, starting date – second half of 2018 and completion date – December 2021	Information is presented in Chapter 3.2
Who will be Contractor for the project? Will it local or international company?	Contractor will be selected in accordance with ADB procurement policy and it could both – national or international Contractor	

Beruniy District

310. Two sessions of public consultations for residents from Beruniy district were held on May 30 in hall of district of cultural center and school number #31. Representatives of the following 16 settlements and RCAs located within the project area attended the meeting: Quyom, Merhozi, Sabboz, Bunyodkor, Khorzam, Yangiobod, Buston, Madaniyat, Tinchlik, Shimom, Navoiy, Beruniy, Istiqlol, Jayhun, A.Temur, Ozod Sarkof. Among 51 consultation participants 13 were females.

311. Presentation flow was the same as described above. During the consultation participants raised the following issues related to environmental aspects:

Table 27: Issues raised during public consultation in Amudarya district

Issues raised	Response	Addressed in IEE
Scope and area of the project activities, including type of works to be implemented within the project	More detail information on requested settlements were provided	Details provided in Chapter 3
Who will pay for installation of water meters?	Cost for water meters will be included in bills for water. It will not be one time payment since cost for water meters will be paid during the some period of time	
How water meter will work – will it calculate water for each person or per households?	One water meter will be installed into one household. The device will calculate water consumption based on real usage of water by households. It will simplify and make more transparence process of bill calculation	
You told that the project plan to use water from wells. Will desalinization facilities be installed? We could not drink that water due to high level of hardness.	Yes, results of baseline survey within given IEE also showed that water quality exceeds level of established standards. Therefore, now engineers team considering option to connect whole	After detail review of analysis of water samples provided by TN and baseline survey conducted within current IEE, discussion with engineering group, a decision on connection of

	Beruniy district only to transmission main TN.	whole district to transmission main was made. More details in Chapter 5.1
Pressure in water pipes is too low that we couldn't use water tap in multistoried buildings. How will the project eliminate this problem?	This problem will be resolved by increasing capacity of Takhiatash WTP and improvement of water distribution network through replacement of outdated pipes. It will decrease water losses in the network, increase pressure and as a result, improve water supply in whole district, including multistoried houses	Details are described in Chapter 3.2
Movement of tracks and heavy vehicles will significantly increase during implementation of the project works. It may lead to deterioration of our road. Who will be responsible for rehabilitation affected roads?	Contractor will be responsible for repairing roads and bringing them to the conditions at least as it was before commissioning works. This requirement is included in Contractors' scope of works.	More details in Chapter 5.2.3
We have the incident, when a construction company conducted works and left roads in unusable conditions. We had to repair roads by our own resources. How you can affect on contractors?	Final payment to the Contractors will be done only after acceptance of the work which includes repairing of all destroyed works. Moreover, you as community also will be involved into the monitoring of process project implementation. We introduced you GRM .	More details in Chapter 5.2.3
Soil in our settlement is very salty. Iron pipes is strongly affected by corrosion and it leads to water losses in the network. Therefore, due to track movements the pipes are braking down. How your project will respond this issues?	Only polyethylene pipes will be used in the project. A life time of such pipes is not less than 50 years.	
How construction works will be implemented? Beruniy district is big, how many contractors will work? And how the project will be commissioned? Upon completion of each WDC we will get water or later, after	Several (at least 2 Contractors) will be hired for the Beruniy district. One Contractor will work on WDCs construction and another will construct and rehabilitate water supply network.	More details in Chapter 9.4.1

full completion of the project?		

312. During each public consultation the Grievance Redress Mechanism (GRM) was discussed. Stakeholders were explained that GRM to be a continuous process that envisages a collaboration of the Implementation Agency with population during the entire project cycle. The detailed information on this mechanism will be presented in the next chapter.

313. This IEE incorporates comments and suggestions from all concerned stakeholders. The final IEE report will be made available on local language on CSA official website and in English on ADB's website.

314. As part of information disclosure, the final version of IEE will be translated into local language and will be delivered to local communities and relevant authorities (hokimiyats). The final IEE report will be sent to the Ecology and Environment Protection Committee of Republic of Karakalpakstan for further use during the construction and operation phases.

315. For the interested parties the IEE (English and Russian versions) will be available at the offices of the PCU and MHCS of RK and their websites.

316. In order to maintain the transparency of the public disclosure process, the semiannual environmental monitoring reports (EMRs) will be published on the ADB and MHCS websites as well. The hard copies of EMRs will be also sent to the Ecology and Environment Protection Committee of Republic of Karakalpakstan.

317. Future consultations for project stakeholders shall follow as mentioned below.

(i) During detailed design stage, in case of any major changes in the design/alignment/location, the IEE will be updated accordingly. The PCU will hold at least one public consultation meeting at early stages to solicit perceived impacts, issues, concerns and recommendations from affected communities.

(ii) Prior to construction, the PCU will conduct an intensive information, education and communication campaign (IEC) to ensure the sufficient level of awareness/information among the affected communities regarding the upcoming construction, its anticipated impacts, the grievance redress mechanism, contact details and location of the PCU, and status of compliance with the Government's environmental safeguard requirements. Among others, the information banners containing information about the subproject, implementation schedule and contact details of the executing agency and Contractors will be installed at the strategic locations within the subprojects' main areas of intervention. The grievance redress procedure and details will be posted at the offices of the district branches of PCU.

7. GRIEVANCE REDRESS MECHANISM

318. In accordance with ADB SPS (2009), Grievance Redress Mechanism (GRM) will be established after the project effectivity. The main goals of GRM are ensuring the free submission and timely redress of grievances and remarks submitted by aggrieved from the project person and resolve complaints at the project level and prevent escalation to the national courts or ADB Accountability Mechanism. Along with the ADB requirements on development and approval of grievance redress mechanism by implementation of investment projects, grievance redress procedure in Uzbekistan is also regulated by the national legislation of Republic of Uzbekistan, in particular by the law "On Citizens' Applications" and the law "On the order of submission of appeals of physical and legal entities" (2014). The submission procedure for grievances and citizens' applications has been discussed during the public consultations in the project districts.

319. The GRM for the current project takes into account the national legislation, the specificity of the project sites and results of public consultations.

320. PCU under Kommunkhizmat (CSA) will be responsible for establishment of GRM after the project effectivity and act as the GRM secretary to make sure that the GRM is operational to effectively handle environmental and social concerns of project affected persons. PCU will have Project Coordinator responsible for the project implementation in the Republic of Karakalpakstan. The proposing GRM was presented during the public consultations to residents of the project area, discussed with chief engineer of Inter Regional trunk main Tuyamuyun-Nukus (TN).

321. In addition, the GRM was discussed with PPTA Social Team and updated into the format applicable for both aspects – environmental and social in term of land acquisition and resettlement.

322. After discussion with all parties, the following GRM was proposed which consisted of several levels:

- **Level 1.** The aggrieved person applies to district subdivisions of TN. After registration of received complaints, district TN will review nature/specificity of the complaint and will forward it to relevant party for resolving. In parallel, district TN will inform Kommunkhizmat about received complaint and after its resolving about undertaken actions. Depending on nature of complaint it may go to Contractor, Land Cadaster, Makhalla or district branch of Nature Protection Committee. For example, complaints related to resettlement issues may be forwarded to Land Cadaster, hokimiyat and makhallas. In case of environmental issue, compliant will be forwarded to Contractor or District Nature Protection Committee. District branches of TN will be assisted by PMC and PCU's Environmental and Social Specialists in GRM implementation. At this level complaint should be resolved during 2 weeks.
- **Level 2.** In case the grievance was not redressed on the first stage or applicant is not satisfied with the decision made/solution, s/he can submit the grievance directly to Grievance Redress Committee (GRC) under Inter regional trunk main in Nukus city. The GRC will consist of PCU coordinator in the Republic of Karakalpakstan, designated officers from TN, Hokimiyat and PMC's manager. GRC will review the compliant and made decision on its redress. all complaints will be resolved in 15 days, and in case additional details are required, a maximum of 30 days will be used to resolve and close the complaint. In case this additional time is necessary, the complainant will be informed of the additional delay in writing. In case the the grievance is not related directly to the project, the further instance will be recommended to the applicant where s/he should apply for the decision making. At this stage APs also may submit their appeals to EA through the following e-government web site www.my.gov.uz.

- **Level 3.** If the issue was not solved or the applicant is dissatisfied with the decision/resolution, the aggrieved person may submit grievance to Economic Court where decision will be made in accordance with relevant national legislation.

323. Most of grievances on environmental issues are redressed at 1-2 levels. All grievances received from the population will be registered in a logbook which should be available at all levels: at the site office of Contractor, each district subdivision of TN and inter regional level (Nukus city). Even so, the information on received by Contractor grievances and applications from the aggregated persons, and undertook measures should be submitted to the district subdivisions of TN for the accounting all grievances. Consequently / Thereafter the information on all received grievances will be collected at the district subdivision of TN.

324. Contractors should include the information on grievances in their monthly progress reports submitted to the district subdivision of TN, who in their turn will include aggregated information to the semiannual reports on environmental monitoring submitted to ADB.

325. The aggrieved persons can also use the ADB Accountability Mechanism (AM) through the direct citizens' application to the Head Quarter in Manila, particularly to Complaints Receiving Officer, Accountability Mechanism Asian Development Bank Headquarters 6 ADB Avenue, Mandaluyong City 1550, Philippines Email: amcro@adb.org, Fax +63-2-636-2086

326. AM is the last resort and ADB has its availability as a recourse in case other mechanisms for dealing with harmful project effects are not successful. GRM is required by SPS and the use of project level GRM should be encouraged first.

8. ENVIRONMENTAL MANAGEMENT PLAN

327. The Environmental Management Plan (EMP) compiles the comprehensive information gathering a summary of impacts previously identified, the actions required to mitigate those impacts in accordance with the laws of the Republic of Uzbekistan and the ADB safeguard policy; and the monitoring activities that are to be undertaken as part of the project in order to confirm that they have been effective in reaching their objectives.

328. The EMP also details the institutional arrangements and capacities that currently exist, or that will be put in place during project implementation, to ensure that the IEE (including the EMP) has (i) comprehensively considered both Uzbek and ADB requirements for environmental protection, (ii) identified all likely environmental impacts, (iii) proposed appropriate mitigation measures, and (iv) put in place the necessary systems to ensure that effective procedures for environmental monitoring and control of the project impacts, and mitigation measures are implemented throughout the life of the project.

8.1. Environmental Mitigation measures

329. Mitigation measures required to address the impacts identified by this IEE have been consolidated in the following EMP (Table 28). The table provides information on anticipated impacts during the pre-construction, construction and operation phases with proposing mitigation measures, defining responsible party for their implementation. It is considered that Environmental Specialist (ES) from PCU's, Environmental Specialist of PMC and Environmental Specialist or designated staff from Contractors will be responsible people for EMP implementation.

Table 28: ENVIRONMENTAL MANAGEMENT PLAN

Impact	Mitigation measure	Responsibility	Cost
Pre-construction stage			
Selection of inefficient water treatment technology	• Develop design and process of water treatment on WTP based on quality of raw water in order to meet the national standards OzDSt 950-2011 “Drinking Water. Hygienic requirements and quality control”;	Design institute, Kommunhizmat, PCU	
Pollution of water sources due improper established sanitarian zone	• Ensure sanitarian zones for ground and surface water intakes in accordance with national standards KMK 2.04.02-97 “Water supply. External networks and facilities” (1997), para 10.8	Design institute, Kommunhizmat, PCU	
Absence of environmental experts in PMU	• Ensure that Environmental Experts with appropriate education is hired and he/she is involved in the work since the stage of bidding documents preparation.	Kommunhizmat, PCU, PMC’s Environmental Specialist	ES is part of PCU with appropriate budget
Lack of proper environmental requirements	• IA with assisting Project Management Consultant’s (PMC) environmental specialist will ensure inclusion environmental provision along with EMP in the bidding documents and the contracts for Contractors; • Ensure that EMP is included in bidding documents. • Include list of required national approval and licenses (indicated in chapter 2.2.3, para 28) are included in the bidding documents and responsible for receiving such permission are identified.	PCU, PMC’s Environmental Specialist PCU, PMC’s Environmental Specialist PCU, Environmental Specialist	No cost required
Improper assessment of bidders’ environmental capacity	• Include in working group of bidding committee environmental expert. • Ensure that awarded Contractors have proper environmental capacity, staffing and budget for EMP implementation.	UCSA, PCU	No cost is required
Non-compliance with national	• Prepare ZVOS and submit it to Provincial Nature Protection Committee for revision and approval.	TN	Will be financed from the TN budget

Impact	Mitigation measure	Responsibility	Cost
environmental legislation in term of conduction environmental impact assessment and required permission	• Include the requirements indicated in EA into the final EMP. • Receive official Permission on Special Water Use for Water treatment plants.		
Generation of different potential environmental impacts due to changes in design, layout	• Update or new IEE to be prepared with full compliance of ADB SPS (2009)	Provincial TPP, PCU with PMC	Included in the PMC contract
Non-compliance with national and international requirements during conduction bidding for purchase machinery and mechanisms	• Goods procured for project implementation will be done in compliance with ADB Prohibited Investment Activities List set forth at Appendix 5 of the Safeguard Policy Statement (2009); • Environmental specifications have to be included in bidding packages for purchase machinery within the project. Particularly, toxic level of machinery must meet "Euro 3" environmental requirements as defined by national regulations[25];		
Improper SEMP and SSEMP development	• Within 30 days after contract award and prior to commencing any physical works, Site-specific Environmental Management plans (SSEMPs) will be developed by the Contractors under the guidance of the PMC, and be endorsed by PMC before submission to PCU for approval • In addition to SSEPMs, Specific SEMPs need to be prepared by Contractors, endorsed by PMC and approved by PCU for the following activities: Traffic Management Plan for construction of WDCs and distribution network within settlements, Waste	Contractors develop SEMPs PMC review and endorses PCU approve	Included in the Contractors budget

[25] Resolution of President of RUz "On measures for further development of production at the Samarkand automobile plant and renewal automobile park", dated from December 14, 2006

Impact	Mitigation measure	Responsibility	Cost
	management Plan, Hazardous Wastes Management Plans for sites with demolishing works as described in the next sub-sections;		
Construction stage			
Air pollution	• apply watering of construction sites and roads inside settlements during dry season; • cover transported bulk materials; • control speed limitation for vehicles during movement inside of settlements - no more than 40 km/h; • all vehicles and techniques must comply with technical requirements and have to pass regular inspection as indicated into the national standards[26]; • prohibit open burning of solid wastes generated particularly from labor camps and construction activities; • Restrict demolition activities during period of the high winds or under more stabile conditions when winds could nevertheless direct dust towards adjacent communities.	Contractors implement PCU and PMC monitor implementation	Included in the Contractors budget 10000 USD for installation of noise and dust protection screen 6 contractors. Total USD 60000

[26] "O'z DSt 1057:2004 Vehicles. Safety requirements for technical conditions" and "O'z DSt 1058:2004 Vehicles. Technical inspection. Method of control".

Impact	Mitigation measure	Responsibility	Cost
Noise and vibration	• Installation of acoustic screen during construction works at the Shortanbay (Nukus district), WDC# 17 (Beruny district) and WDC in Birdem settlement (Karauzyak district). The screens have to ensure noise level in classroom no more than 35 dB; • Installation of acoustic screen during construction works at the Muynak WDC, KyzylKush and Khorezm WDCs in Kungrad, Mangit Water treatment plant (Amudarya district) to ensure noise level at the area adjusted to the closes houses no more than 70 dB; • establish limits on speed for vehicles inside of settlements (60 km/h); • schedule construction so as to minimize the multiple use of the noisiest equipment near sensitive receivers; • use of Personal Protective Equipment (PPE) by workers involving in demolishing and construction works; • inform population about anticipated works.	Contractors implement PCU and PMC monitor implementation	Included in the Contractors budget The same screen could be used
Pollution of surface and ground water	• Construction and labor camps, including storage places for lubricant, fuel and other oils will be located 100 m away from water bodies; • Conduction of refueling, oil replacement or repairing works will be banded at the area within 50 m from water streams; • Sanitary waters and solid wastes will not be released directly into water streams; • Topsoil stripped material shall not be stored where natural drainage will be disrupted; • Water samples will be taken and analyzed based on the baseline monitoring results obtained in the preconstruction stage.	Contractors implement PCU and PMC monitor implementation	Included in the Contractors budget
Soil contamination	• The top soil of about 30 cm depth shall be removed and stored separately during excavation work, and after the construction of the main trunk the same soil shall be replaced on the top, in unpaved areas;	Contractors implement	Included in the Contractors budget

Impact	Mitigation measure	Responsibility	Cost
	• The excess top soil and earth reminded after construction new WDCs will be used at other project sites or disposed at the places prior approved by local government authorities and Nature protection committee; • To minimize soil compaction, movement of all type techniques will be allowed only through identified assess roads; • Contractors will be required to use only authorized carriers with getting all necessary permissions per respective national legislation. • Remove the existing sludge from the the territory of WTPs and ensure timely disposal of sludge which will be excavated during construction	PCU and PMC monitor implementation	
Hazardous materials	• all transformers produced before 1994 have to be carefully handled and disposed without pouring oil and avoiding oil leakage. All transformers have to be labeled with sign “Content PCB” and disposed in accordance with ""Guidebook on Environmental Sound PCB Management in Electrical Equipment” (prepared under Moldova POPs Stockpiles Sustainable Management and Destruction project)". Notification on presence of such equipment will be sent to State Nature Protection Committee and Sanitarian Epidemiological Station for their further actions; • A separate Waste Management Plan needs to be developed by Contractor, endorsed by PMC and approved by PCU for the construction sites with demolishing works. The Plan has to include information about type of generating wastes, procedure of their collection and disposal; • Used oil shall be collected into containers placed at the concreted sites and disposed to national oil company designated for accepting and treatment of used oils;	Contractors implement PCU and PMC monitor implementation	Included in the Contractors budget

Impact	Mitigation measure	Responsibility	Cost
	• Refueling vehicles and replacement oils also have to be conducted in special designated and properly equipped places. Emergency facilities have to be at the place for elimination of accident of oil spills. • Prior to commencement of rehabilitation works at the WDCs, EO with NES or IES of PMC will conduct vision observation of old buildings and facilities on presence of asbestos materials. • In case of presence such materials, will developed by Contractor a detailed "Waste Asbestos-Containing Material Management Plan" is to be developed by Contractors (Appendix 11)		
Non-hazardous materials	• Segregation of wastes on recyclable and non-recyclable wastes; • Selling recyclable wastes to relevant organizations (paper, scraps, accumulators) and timely disposal of non-recyclable wastes to the landfill, determinate by local hokimyats. • Providing hydro isolated septic tank for collecting waste waters at the camp sites and bio toilets for workers at the construction sites and timely disposal of waste waters to the local waste water treatment plants.	Contractors implement PCU and PMC monitor implementation	Included in the Contractors budget
Losses of trees and crops, losses of income due to impact on business	• Construction new WDCs should be done exactly within marked area. • Conduction of a preliminary survey together with Contractor and respective representative of Provincial Nature Protection Committee (PNPC) to define trees for cutting and payments in accordance with CMR # 290 dated from 2014. • Conduct joint revision of the project sites with representatives of inspectors from relevant district branches of Goskompriroda to identify number of cutting bushes and trees if any and to pay compensations. This measures is essential to be implemented in	Contractors implement PCU and PMC monitor implementation	Included in the Contractors budget Cost for cutting trees (non-fruits) and bushes is USD 900 tree for fees is approximately for 3 ha USD

Impact	Mitigation measure	Responsibility	Cost
	the part of transmission main which will be constructed between Amudarya-Kipchak, Shege-Porlitay settlements in Muynak district, distribution network in Mangit city, Amudarya district; • Greening of WDCs as part of the project design; • Inform community in advance about planning works; • Schedule and conduct civil works in the way to minimize period with limited access to enterprises and closing roads; • Provide safe access to affected properties.		
Health and safety issues	• Contractor and PMC will inform population about anticipated works in the settlement in advance; • Contractors will require to develop a Traffic Management Plans with clear indication routes of vehicles' movements, placement special signs, and speeding allowance inside of the settlements and schedule transportation activities by avoiding peak traffic periods • The Traffic Management Plans will be approved by Traffic Police and disclosed to local communities prior commencement of construction works on respective sites; • Clear signs will be placed at construction sites in view of the public, warning people of potential dangers such as moving vehicles, hazardous materials, excavations etc. and raising awareness on safety issues. • Contractor will require to install temporary bridges and effectively organize works, which will allow avoid unreasonable delaying of construction works; • All construction sites will be properly lightened and fenced; • Development of Site Specific Plans for campsites;	Contractors implement PCU and PMC monitor implementation	Included in the Contractors budget

Impact	Mitigation measure	Responsibility	Cost
	• After completion works all roads shall be rehabilitated at least up to condition of pre-construction stage. • Development Occupation Safety and Health Plan, which covers among others the following topics: usage of PPE, working procedure with hazardous materials (such as asbestos materials, PCBs etc.), training activities and others. The workers have to be provided with appropriate living conditions: safe water supply, washing conditions. • Carry out regular awareness campaigns among work staff, including specific hazards associated with the spread of HIV/AIDS		
Construction camps	• Development of Separate Site Specific EMP for labor/construction camps (or part of general SEMP). • SSEMP for labor/construction camps will describe waste collection and disposal procedure, set up of camp facilities (such as a storage place for construction materials and techniques if any, laundry and toilets, access roads). • If washing equipment and vehicle is planning to be conducted at the labor/construction camp's site, appropriate wastewater treatment facilities have to be organized on the camp and respective permissions on water intake and waste water disposal need to be received by Contractor from Nature Protection Committee • Provide safe and adequate living conditions for workers, such as dining rooms, toilets, shower rooms etc. • Contractors shall instruct all the workers to act in a responsible manner. After completion works, construction camps	Contractors implement PCU and PMC monitor implementation	Included in the Contractors budget
Archeological heritages: Chance of finding heritage	• Excavation and other works need to be suspended immediately;	Contractors implement	No cost

Impact	Mitigation measure	Responsibility	Cost
	• Area with possible heritage shall be fenced with fencing tape; • A designated focal point from a local administration (khokimiyat) needs to be informed and invited for assessment of potential heritage and undertaken necessary actions; • Civil works at the finding place could be recommenced after obtaining permission from the focal point.	PCU and PMC monitor implementation Representative from Khokimiyat assists in assessment and undertakes necessary actions	
Construction sites and areas used for construction camps without proper cleaning and reinstatement works	• After completion of the main construction Contractor shall provide full reinstatement of the construction and camp sites by bringing them to its primary condition; • Remove all rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and • All disrupted utilities restored□All affected structures rehabilitated /compensated; • The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up; • All hardened surfaces within the construction camp area shall be ripped, all imported materials removed; • PMC will conduct post-construction audit during defect liability period to make sure that construction sites and camps are properly cleaned and restored to pre-project conditions before acceptance of works before hand-over to TN and local khokimiyats.	Contractors implement PCU and PMC monitor implementation State Nature Committee accept works	Included in the Contractors budget
Operation phase			

Impact	Mitigation measure	Responsibility	Cost
Impact on air	• Design of pump station and WDCs will be done to ensure compliance with national and IFC's standards on noise and vibration level for public and worker places; • Per national legislation assessment of working places conditions will be implemented once per three years; • During maintenance works periodically water down temporary roads on site; • Immediately replacing defective equipment and removing it from the work site;	TN	Included on TN operational costs
Impact on water resources	• Conduction of awareness program on proper and timely waste water disposal for population in the project area; • Discharging chemical's reagents residual into water stream without treatment will be prohibited. Special procedure of utilization of such reagents, indicated in OzDSt 950-2011 "Drinking Water. Hygienic requirements and quality control" has to be implemented". • Consider a development of a program on improving sewage water collecting and disposal in the nearest future	TN	Included on TN operational costs Under the state program
Impact on soil	• Timely and proper disposal of sludge excavated from clarifiers to the drying ponds; • Avoiding collection sludge next to clarifiers; • To make sure that amount of withdrawing water from wells is complies with established in the FS and confirmed in the permission on special water use.	TN	Included on TN operational costs
Health safety	• Emergency measures in the operation manual to be provided by the equipment suppliers;	TN	Included on TN operational costs

Impact	Mitigation measure	Responsibility	Cost
	• Providing required facilities: storage of chlorine gas, SHC in well ventilated rooms, washing facilities and etc. • Applying special marking for containers with this agent; • Using vehicles with increased safety measures for transportation; • Special procedure need to be developed and applied for utilization leakages		

8.2. Environmental Monitoring

330. To ensure that mitigation actions are implemented in accordance with the requirements of the EMP, monitoring shall be undertaken as follows:

- Instrumental Monitoring for environmental quality such as air, noise, vibration, water – This shall be performed monthly by a certified laboratory to be hired under the contractors' contract with guidance and approval from the PMC. Schedules, parameters, locations are indicated by the Project EMP and shall be endorsed by the PMC.
- Observational Monitoring – Throughout the Projects Construction phase PMC shall continually monitor the Contractors actions. This will be achieved through weekly inspections of the Contractors environmental performance by PMC's national environmental specialist throughout the construction period. PMC shall have the right to suspend works or payments if the Contractor is in violation of any of his obligations under the EMP and SSEMPs.

331. Developed within current IEE an Environmental Monitoring Plan provides details on required measurements, the locations of measurements points, frequency and responsibilities associated with each monitoring task (Table 29).

332. Besides instrumental environmental monitoring indicated into the Table 29, monitoring of EMP's implementation will be carried out. For efficient implementation of this activity it is proposed that several levels of supervision activities need to be undertaken: (i) daily inspection by Contractor's Environmental Specialist, (ii) monthly inspection by PMC's Environmental Specialist, and (iii) periodic audit (quarterly) by PCU's ESS.

333. Results of environmental performance including monitoring activity have to be properly documented and reported. As indicated in EMP and Chapter 7, each Contractor has to perform a log book with information about conducted training on EH&S for workers and another book for registration accidents during the civil works. Original records on results of required instrumental environmental monitoring (air and water quality) also need to be kept in the separate file for records.

334. It is recommended, that prior commencement of the civil works, PMC will develop for Contractors a format for site inspection to optimize a process of environmental supervision. The format could be in form of a checklist listed mitigation measures to be implemented at the construction sites, their performance status and some explanations as required.

Table 29: ENVIRONMENTAL MONITORING PLAN

Mitigation measures	Parameter to be monitored	Location	Frequency	Responsibility	Standards	Cost
Construction Stage						
Air quality	NO_x, SO_2, CO Dust	Construction sites located within settlements	monthly, and if complaints received during construction works	Contractor will hire certified laboratory to conduct analysis	Hygienic norms. List of Maximum Allowable Concentrations (MACs) of pollutants in ambient air of communities in the Republic of Uzbekistan including Annex 1. SanR&N RUz No.0179-04[27]	Included in Contractor's contracts. 6 sites during 12 months plus Takhiatash and Tuyamuyun WTPs. 20 USD per one analysis. Total 1480 USD
Noise level	Noise level	1. Construction sites with demolishing works 2. Living houses located next to construction sites	monthly, and if complaints received during construction works	Contractor	1. "Sanitarian Norms of allowed level of noise at the construction sites" SanR&N №0120-01 2. SanR&N No.026709 Sanitarian Rules and Norms on providing allowed noise level into the living building, public building and territory of living areas[15]	Included in Contractor's contracts. 1 devise for noise measurements for 12 contractors, 300 USD per Unit, Total 3600 USD
Water quality	1. Visual monitoring of surface water	Water bodies located next to construction	1. Visual during each visit of	1. Contractor	1. Absence of oil films on the water bodies surface.	Included in Contractor's contracts.

[27] National standards is complies with international IFC standards

Mitigation measures	Parameter to be monitored	Location	Frequency	Responsibility	Standards	Cost
	on existence oil film and turbidity 2. Oil products, dry residual, pH, ammonia, SO_4	sites (points 1 and 3)	construction site (at least weekly). 2. Monthly and per complaints from people	2-3. Contractor will hire certified laboratory to conduct analysis	2-3. "Sanitarian requirements for development and approval of maximum allowed discharges (MAD) of pollutants discharged into the water bodies with waste waters". SanR&N No 0088-99	12 points during 12 months. 50 USD per one measurement. Total 7200 USD
Oil from transformers (10 samples)	Presence of PCBs in oil from transformers	WDCs	Once before dismantling	PMC	Apply *Beilstein Method* as described in Environmental and Social Management Framework for Uzbekenergo "Modernization and Upgrade of Transmission Substations"	500 USD for one analysis, 10 samples. Total 5000 USD
Operation Stage						
Air quality	Noise level	Pump stations	1. Ones per three years as part certification of work places 2. Per complaints from people on noise disturbance due to work of pump station	TN	1. "Sanitarian Norms of allowed level of noise at the construction sites" SanR&N №0120-01 2. SanR&N No.026709 Sanitarian Rules and Norms on providing allowed noise level into the living building, public building and territory of living areas	Cost is included into the annual budget of TN

Mitigation measures	Parameter to be monitored	Location	Frequency	Responsibility	Standards	Cost
Water quality	Monitoring in accordance with 13.060.20. Drinking water. O'z DST 950:2011 – Drinking water. Hygienic requirements and quality control.					Cost is included into the annual budget of TN
Soil	Monitoring timely disposal of sludge generating during the operation of WTPs					Cost is included into the annual budget of TN

8.3. Reporting

335. Monthly Contractor's environmental reports shall consist of: filled formats from each construction site along with results of instrumental environmental monitoring, brief information on conducted training, received complains and their resolving, accidents during the civil works if any. Contractors will submit their report to PMC for endorsement before submission to TN and PCU.

336. The PMC's environmental reports will aggregate all Contractors environmental reports with adding results of own inspections of EMP implementation. The reports also have to include information on undertaking on-the job training, capacity building activities, proposed actions on improvement of EMP implementation by Contractors. The report will be submitted to TN and PCU on quarterly base.

337. The PCU's ES, assisted by PMC's environmental specialists, will develop semi-annual Environmental Monitoring Reports based on information reviewed within PMC's Environmental Reports (EMR) and own observation from site visits. The recommended format of EMR is presented in ADB SPS (2009) Toolkits distributed during the two sets of Environmental Training (2013 and 2016) where representatives of existing PCU under CSA had participated.

338. PMC will conduct post-construction audit during the liability period to check compliance with EMP requirements completed construction and camp sites. The audit has to be conducted before hand-over project's objects to TN and hokimiyats. Based on post-construction audits results, PCU's ES with PMC assistance will prepare final Environmental Monitoring Report to demonstrate that the project was properly completed.

8.4. Institutional arrangements

339. The Ministry of Housing and Communal Services (MHCS) has been recently instituted with the Decree of the President of the Republic of Uzbekistan PP-2900 dated 18 April 2017. The new Ministry incorporates the scope of former Uzbekistan Communal Services Agency (UCSA)[28]. Under the structure of the MHCS the Communal Services Agency (CSA) will endorse the tasks and of the now superseded UCSA.

340. The CSA is therefore responsible for the following tasks:

- developing and submitting to the established procedure for the approval of the Cabinet of Ministers of the draft legislative and normative-legal acts regulating the issues of economic reform utilities sector;
- contributes to the creation of a competitive environment in the provision of public services, network engineering and other organizations in the housing and utilities sector;
- monitors compliance with local governments, businesses and citizens of the legislation in the sphere of public services, technical specifications and requirements;
- studies and summarizes trends in inter-regional water supply systems; and
- creates and pursue a unified technical policy in this area.

[28] The state agency UCSA was established in 2000 by Presidential Decree No.2791 as of 19 December 2000. The UCSA organizational structure and functions were approved by Rresolution of the Cabinet of Ministers (RCM) #493 as of 21 December 2000 and the organizational structure was revised as per Decree of President #445 dated 17 August 2006. The main goal of the UCSA is to oversee and coordinate water supply services to the urban and rural population

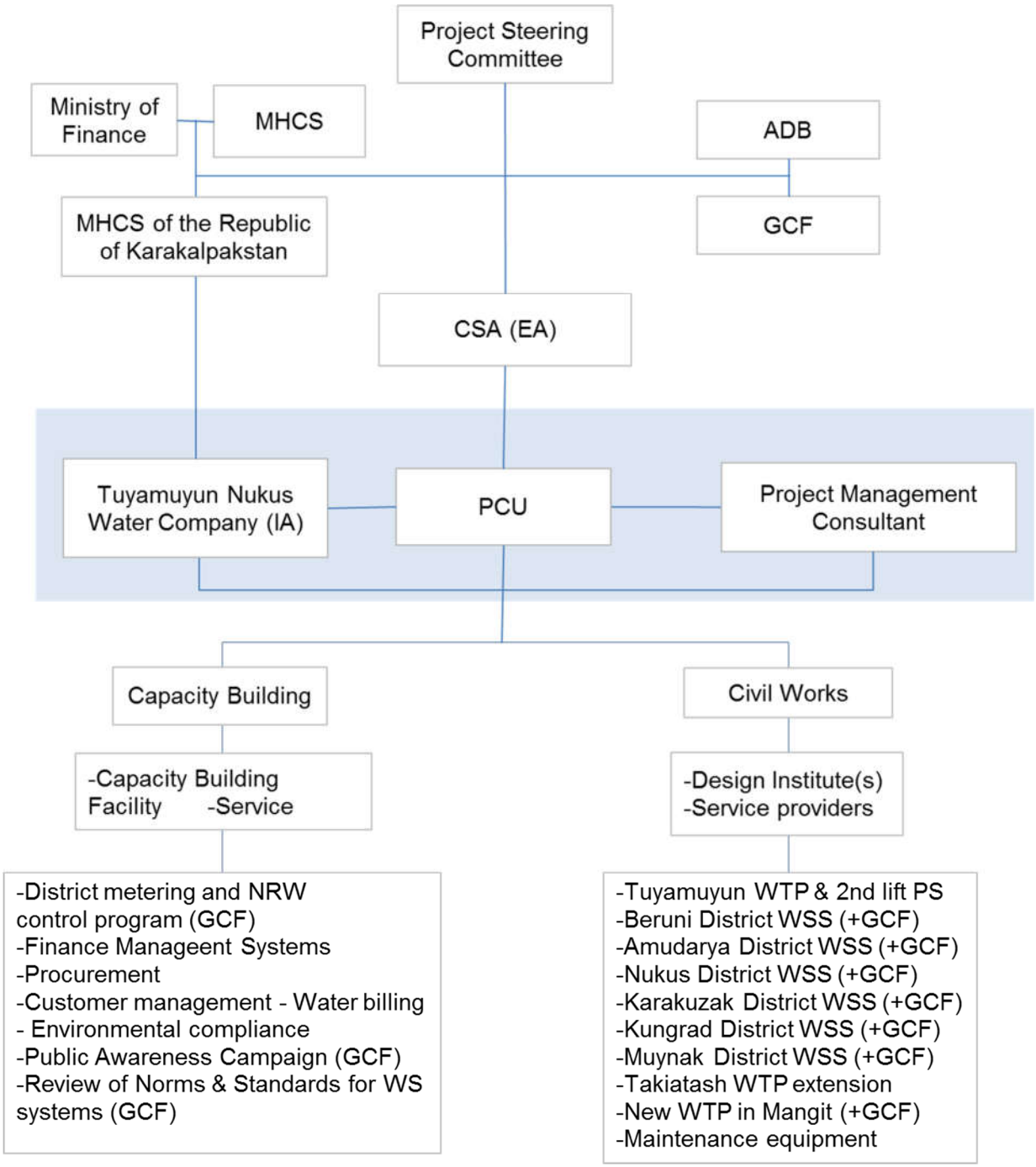
341. CSA is carrying over scope and activities previously carried out by UCSA and benefit of the considerable experience in rehabilitation, upgrading and management of water supply infrastructure facilities and projects gained by UCSA throughout. The CSA, under the MHCS, will be the Executing Agency responsible for the overall implementation and coordination of the Project co-funded by ADB and GCF. The EA, through the PCU will report to both ADB and GCF. The GCF grant funding will be administered by ADB.

342. The Implementing Agency (IA) will be the Department for Operation of Interregional Trunk Main Tuyamuyun – Nukus (DOTM-TN), hereinafter referred to as TN. Executive Agency (EA) and Project Coordination Unit (PCU) PCU will be supported by a Project Management Consultant (PMC). A project organizational structure is provided in Figure 59.

343. A consultative Project Steering Committee (PSC), appointed by the Cabinet of Ministers and chaired by the Minister of Finance will provide overall guidance on the Project implementation.

344. A project management consultant (PMC) will be selected by the EA-PCU following ADB Guidelines on the use of Consultants by the Asian Development Bank and its Borrowers dated March 2013 as amended from time to time. Advance procurement procedure is envisaged. The PMC will be staffed with 72 persons month (pm) of international and 119 pm of national experts including international and national environmental specialist among other specialists. In addition, 9 national construction supervisors for a total of 150 pm will be engaged under the PMC team.

345. The PCU will commence activities in January 2018. Recruitment of the PMC will be carried out during the second and third quarter of 2018. The PMC team is expected to be fielded in the third quarter of 2018.



MCHS: Ministry of Housing and Communal services; GCF: Green Climate Fund; +GCF: Partly funded by GCF; CSA: Communal Services Agency; PCU: Project Coordination Unit; EA: Executing Agency; IA: Implementing Agency

Picture 59: WUWSSDP organizational structure

346. The PCU will be responsible for implementation of EMP to comply with ADB's safeguards requirements and environmental national regulations. Present unit has Environmental and Social Specialist (ESS). The PCU's ESS will be assisted by the environmental specialists of the project management consultant (PMC) in overseeing the implementation of EMP. The cost for implementing EMP will be financed by the project, specifically: the costs of mitigation measures and environmental monitoring will be included in the construction contracts, and the cost for environmental supervision will be included in the

consulting service of the PMC. PCU is responsible for overall environmental compliance with SPS 2009.

347. Contractors will be responsible for implementing mitigation measures. Within 30 days after contract award and prior to commencing any physical works, Site-specific Environmental Management plans (SSEMPs) will be developed by the Contractors under the guidance of the PMC, and be endorsed by PMC before submission to PCU for approval. The SSEMP is the document that the Contractors shall prepare outlining how he intends to implement the EMP and ensure that all of the mitigation and monitoring is completed according to the implementation arrangements specified in this EMP. SSEMPs will be needed for major environmental issues and most critical sites relating to sensitive receptors. During construction, the Contractors must retain the expertise of a full-time Environmental Officer (EO) to implement and continually update the SSEMPs, and to report on the implementation of mitigation measures throughout the contract period.

348. The PMC is tasked with specific responsibility to assist PCU in ensuring safeguard compliance of civil works – with particular emphasis on the monitoring of implementation of EMP through the Contractors SSEMP and related aspects of the project. PMC shall retain the use of Environmental Specialist, both national (NES) and international (IES), to ensure that the Contractor is compliant with his environmental obligations. It is required that the IES provides a short training program to the PCU safeguard person and Contractors EO prior to the start of construction to develop their knowledge and understanding of the environmental, social, health and safety aspects of the Project. The IES will also be responsible for developing a comprehensive proposal for establishment and operations of the Environmental awareness centers. Training EHS for contractors need to be conducted throughout project implementation, at every visit of the IES. TORs for IES and NES can be found in the PMC contract.

349. In addition to the Contractor's full-time EO and the PMC's part-time NES backed up with an IES, it is required that PCU designate a full-time safeguard position to manage and coordinate the contractors and PMC in reporting to EA and ADB on safeguard performance of the project. PCU is responsible for overall EMP implementation and will be assisted by the PMC. The PCU's responsibilities include the following, but not limited to:

- Ensure the bidding documents of PMC and Contractors include all tasks as described in the approved EMP
- Supervise the PMC and Contractors in EMP implementation for overall compliance with SPS 2009 requirements and project environment-related legal covenants
- Ensure all necessary government permits and license, including ecological expertise opinion, for all civil works will be obtained.
- Approve SSEMPs which will be prepared by the Contractors and endorsed by the PMC
- With assistance of the PMC, prepare, submit to the EA and ADB, and disclose semi-annual environmental monitoring reports on ADB website and in UZB
- Report in a timely manner to ADB of any non-compliance or breaches with ADB safeguard requirements and take corrective actions promptly.
- Update the IEE in case of technical design changes or unanticipated impacts
- Establish a Grievance Redress Mechanism (GRM) after the project effectivity and act as the GRM secretary to make sure that the GRM is operational to effectively handle environmental and social concerns of project affected persons
- Build up and sustain institutional capacity in environmental management

350. TN will hire full-time Environmental Specialist who will in charge for implementation of EMP and ensure compliance with national environmental requirements. Along with implementation mitigation measures indicated in EMP, he/she will responsible for in-time development and submission environmental reports to Statistical Committee of Uzbekistan and State Nature Protection Committee; obtaining and timely updating permissions on

discharge waste water, exhausted gases in air and disposal of solid wastes; special permission on water use.

351. The Committee on Ecology and Environment Protection of the Republic of Karakalpakstan through will be also involved in the process of project implementation and further operation. Karakalpakstan Nature Protection Committee will review local Environmental Assessment (ZVOS) and approve it if the ZVOS complies with national requirements. Moreover, requirements indicated in Environmental Appraisal will be mandatory for implementation and it will be monitored by inspectors from district branches of Nature Protection Committee. Representatives of the Committee will also participate into the hand-over process as member of State Acceptance Commission.

8.5. Capacity building activity

352. It is proposed the Project's capacity building on environmental aspects will cover three main directions:

i) ***PCU's capacity*** on EMP implementation during construction stage - to enhance PCU's capacity on the EMP implementation PMC Environmental Specialist will provide respective training for PCU's ESS Specialist and further assistance in monitoring SEMP implementation and guidelines for Contractor's Environmental Specialists as required.

ii) ***TN's capacity*** on overall environmental performance during the project operation – PMC jointly with ESS Specialist will develop and conduct training program for proper disposal wastes from chemical laboratories, on general compliance with national environmental requirements such as timely receiving necessary permission, conduction monitoring of environmental performance and submission reports to respective national agencies and etc.

iii) ***awareness program for population*** in the project area – for the project sustainability it is important along with physical interventions, institutional improvements and financial enhancing, to increase people awareness about rational water resources use, hygiene practice due to the increased wastewater without sanitation system in place. The program should be targeted on two groups of people – (i) households, daily consumers and (ii) young generation (pupils, colleges' students). The program should be developed by PMC and implemented along with the project construction activities.

353. Awareness program on increasing people awareness about rational water resources use, hygiene practice due to the increased wastewater without sanitation system in place will be included in the training program, which is plan to be implemented under Green Climate Fund. There are three components in the program named: (i) Climate Vulnerability Assessment, (ii) Institutional Climate Change awareness, and (ii) Stakeholders awareness. The topics on rational water resources use and hygiene practice will be included in the third component – stakeholder awareness.

354. In case of determining a presence of PCBs in oil from old transformers and asbestos materials in demolishing buildings, separate training for handling and disposal of hazardous materials to be conducted by for PCU and Contractors by PMC. The tentative plan of required training is presented in Table 30.

Table 30: Tentative program of training for PCU, TN and Contractors staff

	Name of training	Time	Recipients	Organizer

1	Overall EMP implementation, Environmental Monitoring Reports preparation	Prior commencement of the civil works	PCU ESS Specialist	PMC
2	SEMP implementation	Prior commencement of the civil works	Contractors workers	Contractor's Environmental Specialist with support of PMC
3	Handling and disposal of hazardous materials	Before starting respective works	PCU ESS Specialist Contractors workers	PMC
4	On occupational health and safety	Regularly during construction and operation period	Contractors workers TN staff	Contractor's Environmental Specialist with support of PMC, TN safety Engineer
5	Handling and disposal chemicals from water quality laboratories of TN	Regularly during operation phase	Staff of existing and new water quality laboratories	TN

8.6. Cost estimation for EMP implementation

355. Costs required for implementing the EMP will cover the following activities:

(i) Conduction instrumental environmental monitoring of air and water by Contractors;

(ii) Conduction environmental monitoring measures and getting necessary permissions; and

356. Although some of the measures included in EMP are an integral part of the civil works (watering, storage of top soil and etc.), some measures (establishing sound-absorbing panels, temporary bridges, handling and disposal of hazardous materials) are required additional funds. Cost estimation for EMP by the main items are presented in Table 18:

Table 31: Cost estimates for EMP implementation

Item	Quantity	Unit cost, USD	Total Cost, USD	Remarks
Instrumental Monitoring				
Water quality	144	50	7200	To be conducted by Contractor on the monthly base as indicated in EMP
Air quality NO_2, CO	74	20	1480	Analysis will be conducted by external laboratory (SES). Cost is included in Contractors budget
Noise measurement devices	12[29]	300	3600	

[29] 12 devices for 12 Contractors in six districts

				Devices could be purchased for long-term use
Environmental Mitigation Measures/Permissions				
Cutting trees/bushes	3 ha	900[30]	2700	1 ha for construction Shagirli WDC and 2 ha for possible cutting trees along transmission main. Cost will be included into the Contractors budget
Asbestos Management	8	250[31]	2000	This mitigation measure will be implemented in case of identification asbestos materials during rehabilitation works at WDCs. Expenses will be included in Contractor contracts
Analysis of oil from transformers on content PCBs	10	500	5000	10 samples of oil from transformers has to checked on content PCBs
Dust and noise control barriers	6[32]	10000	60000	To be installed by Contractor at listed in EMP sites WDC
Environmental awareness program				
Training	5	3000	15000	As indicated in table 20. Budget is included in PMC contracts
Subtotal			**96980**	
Miscellaneous			**9698**	10% of subtotal
Contingency			11638 9698	12 % of subtotal + Miscellaneous
Total			**118316**	
Staffing				
PMC Environmental Specialist International, p/m National	 4 18	 18000 4000	 72000 72000	Cost is included in PMC budget
PCU National Environmental Specialist,	24	1100	26400	Cost is included in PCU budget
TN environmental staff				TN budget
Total for staffing			**288716**	

[30] cost for trees was accepted as average with diameter 16-20 cm, per RCM of RUz#290 dated 20 October 2014 and converted into the USD based on rate of Central Bank of Uzbekistan

[31] Calculation based on Asbestos materials management plan developed for Kyrgyz Republic: Issyk-Kul Sustainable Development Project (2015).

[32] Six screens will be needed for 6 contractors which will work on construction/rehabilitation of WDCs.

357. Expenses related to staffing of PCU, PMC and Contractors with Environmental Specialists are included into their budget, therefore they are excluded from total budget for EMP.

9. CONCLUSION AND RECOMMENDATION

358. Conducted IEE showed importance of the proposed project which will improve living conditions of population in 6 districts of Republic of Karakalpakstan through providing reliable water supply. It will also improve environmental situation in the project area through wide integration of metering system, awareness program and capacity building for population and staff of Interregional transmission main Tuyamuyun-Nukus. All together it will contribute a rational use of water in the region where water resources play crucial role for sustainable livelihood.

359. Along with this benefits IEE identified several aspects which need to be addressed during project preparation and implementation both in short and long terms perspectives.

360. Adequately institutional set up with proper allocating human resources and funds need to be undertaken from the project beginning stages and to be continued during the operation. Recommended capacity building program is aimed to improve TN environmental performance to meet national environmental requirements and fulfill requirements of EMP developed for this project.

361. It is important to make sure receiving of all necessary permission from national relevant agencies prior commencement the civil works and the the project commissioning, design project, particularly select water treatment process with consideration water quality indicators. It is important to ensure providing buffer zone for water intakes.

362. IEE showed that during project implementation the project will have temporary impacts on air, water quality and may cause some inconveniences for local population. Along with regular requirements to control noise level and pollution by dust during construction, installation of protection screens at the indicated sites.

363. Due to absence of facilities to conduct analysis on content of PCBs in demolishing transformers, they have to be properly marked and storage in accordance with indicated regulation

364. The project works include demolishing of old buildings as well, which contain asbestos materials. Therefore, such activities have to be implemented in accordance with recommended Asbestos Management Plan.

365. Due to implementation of significant part of the project works inside of settlements developed mitigation measures need to be strictly carried out to ensure safety for population and workers. A traffic management Plan has to be developed and special attention has to be paid traffic movement in the construction sites located close to schools.

366. Increasing delivered water for water supply services will generate additional sewage. In view of the planned improvement and extension of the urban and water supply systems it is necessary to plan development of waste water network within the project districts in the nearest future.

367. Conduction of environmental monitoring at all stages of the project is one of the crucial aspects. Monitoring of EMP implementation and adequate reporting at all levels of project cycle will provide effective mitigation of anticipated impacts. Environmental monitoring need to be carried out at the stage of operation phase as well.

368. Implementation Agency should ensure a proper functioning of a Grievance Redress Mechanism developed within current IEE and discussed with various stakeholders during Public Consultations.

369. During whole process of the project implementation it is important to be in touch with local communities, comply with all national environmental and EMP requirements, and

conduct awareness program among population which ensure sustainable operation of the rehabilitated water supply system.

10. APPENDIXES

Appendix 1: National water quality standards

Maximum permissible concentration of pollutants in the water of surface water bodies by usage categories mg/m^3						
	Uzbek standards for different type of using water body				**International Standards**	
Pollutants	**Fishery**	**Communal**	**Drinking water**	**Irrigation *)**	**WHO standards (drinking)**	**EPA standards (drinking)**
COD	15	40	30	40		
BOD20, mgO/L	3	3-6	3-7	10	3.6	
pH	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-9.5	6.5-8.5
Suspended material	15	30	30	50	**	
Mineralization	1000	1000	1000-1500	1000	1000	500
Including: sulfates	100	500	400-500		500	250
Chlorides	300	350	250-350		250	250
Ammonium nitrogen (ammonium salt) (NH4 +)	0,5	2	0,5	1,5	0.2	
Nitrite	0,08	3,3	3		3/0.2*	1
Nitrate	40	45	45		50	10
Phosphate (PO_4^{3-})	0,3	1	3,5	1		
Ether – soluble	0,05	0,8	0,8	0,8		
Oil products	0,05	0,3	0,1	0,3		
SAS	0,1	0,5	0,5	0,5		
Phenol	0,001	0,001	0,001-0,1	0,001		
Fluorine (F)	0,05	1,5	0,7	1		
Arsenic (As)	0,05	0,05	0,05	0,1	0.01	0.01
Iron (Fe)	0,05	0,5	0,3-3	5	0.3/2*	
Chromium (Cr6-)	0,001	0,1	0,05	0,1	0.05	0.1
Copper (Cu)	0,001	1	1	1	2	1,3
Zinc (Zn)	0,01	1	3	5	0.01/0.05*	5
Cyanides	0,05	0,1				
Lead (Pb)	0,03	0,1	0,03	0,2		
Nickel (Ni)	0,01	0,1	0,1		0,07	
Cadmium (Cd)	0,005	0,01			0.003	0.005

Maximum permissible concentration of pollutants in the water of surface water bodies by usage categories mg/m^3						
	Uzbek standards for different type of using water body				International Standards	
Pollutants	**Fishery**	**Communal**	**Drinking water**	**Irrigation *)**	**WHO standards (drinking)**	**EPA standards (drinking)**
Cobalt (Co)	0,1	1				
Molybdenum (Mo)	0,0012	0,5	0,25		0,07	
Strontium (Sr2+)		2	7			
Selenium (Se)	0,001		0,01		0.01	0.05
Mercury (Hg)		0,005	0,0005		0.006	0.002

* - upper figure is for surface water, lower figure is for ground water

**Reliable data on possible health effects associated with the ingestion of TDS in drinking-water are not available, and no health-based guideline value is proposed.

Appendix 2: Registration list of participants attended Public Consultation

Регистрационный лист

Общественные слушания по проекту: «Развитие и модернизация систем водоснабжения Нукусского, Муйнакского, Кунградского, Берунийского, Амударьинского и Караузякского районов, а также модернизация насосной станции 2-го подъёма «Туямуюн».

Май 30 2017

Amudarya district / Амударьинский район

No.	Full Name / Ф. И. О	Worked place / Наименование места работы	Adress / Адрес (КФЙ,МФЙ)	Signiture/ Подпись
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2	Хакимов Ж.	Амударё тумани ҳокимлиги	Урта қалъа ОФЙ	
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8	Умаров Б.	Водоканал, ш. инж.	Чайира ОФЙ	
9	Алаяров Г.	Кирпичзавод КОП	3 м Бобур ОФЙ	
10	Ариков Ф.	55-сонли мактаб	Ойдак. МФЙ	
11	Саидов И.	туман ХТМФМТТЭБ	Чордоря мфй.	
12	Уразов С.	„Бўстон" м.ф.й раиси	„Бўстон" м.ф.й	
13	Нурымбетов Б.	„Олмазор" МФЙ Раис	МФЙ Олмазор	
14	Ёрметов Г.	„Гулзор" МФЙ раиси	МФЙ Гулзор	
15	Азизбаева Р.	Чойкул ОФЙ маслаҳатчи	Чойкул ОФЙ	
16	Бойжанов З.	9 сон Б.М.С.М директор	Гулзор [illegible] бўйича	
17	Сувонов Д.	30 сонли мактаб [illegible]	Беруний МФЙ	
18	Шукурмамедова Р.	Оқолтин ОФЙ Б.М.[illegible]	Оқолтин ОФЙ	
19	Зарликов К.	Чойкул офй оқсоқол	Босув о.ф.й	
20	Уразметова Х.	мактаб ўқитувчи	Чордоря мфй	
21	К. Шамуратов	Оқолтин офй раиси	„Оқ олтин" офй	
22	Ш. Джуманиязов	16-сонли ИДУМ директор	„Бойовул" МФЙ	
23	М. Нурымбетова	1-сонли умумтаълим мактаб	„Навоий" МФЙ	
24	Н. Собуров	„Дўстлик" МФЙ раиси	„Дўстлик" МФЙ.	
25	З. Рахманов	Янгиобод МФЙ раиси	„Янгиобод" МФЙ	

ADB

Регистрационный лист

Общественные слушания по проекту: «Развитие и модернизация систем водоснабжения Нукусского, Муйнакского, Кунградского, Берунийского, Амударьинского и Караузякского районов, а также модернизация насосной станции 2-го подъёма «Туямуюн».

Май ______, 2017

ADB

Amudarya district / Амударьинский район

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27	Джаббаров М.	"Беруний" МФЙ раис	"Беруний" МФЙ	[signature]
28	Османов Ш.	43-МТМ	Янгиобод МФЙ	[signature]
29	Атажанов Б.	"Дуржики" МФЙ раис.	"Дуржики" МФЙ	[signature]
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33	[illegible] И	Жумур овул МФЙ раис	Жумур МФЙ	[signature]
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35	Абдурахимов Илхом	38-сонли мактаб	Гулзор МФЙ	[signature]
36	Матёкубова [illegible]	4-сонли мактаб	Амир-Темур	[signature]
37	Сапарбаев [illegible]	[illegible] МФЙ раиси	[illegible] МФЙ	[signature]
38	Сапарбоев [illegible]	А. Навоий МФЙ постони	А. Навоий МФЙ	[signature]
39	Досчанов Махсет	Водоканал - техник инженер Тех.	[illegible] Олмазор	[signature]
40	Рахимов [illegible]	Жумур овул МФЙ [illegible]	Жумур овул МФЙ	[signature]
41	Ганиев [illegible]	Нукус [illegible] филиали	Кескин [illegible]	[signature]
42	Матёкубова С	N3 МТМ мудира	МФЙ Хорезм	[signature]
43	Абдуллаев [illegible]	6 МТМ мудираси	МФЙ "Янгиобод"	[signature]
44	Каримов И	архитектура	Дуржики МФЙ	[signature]
45	Расулов О	иктисод [illegible]	Бустон МФЙ	[signature]
46	Ҳамидов [illegible]	БУСМ [illegible]	Сойкул [illegible]	[signature]
47	Зарипбоев И	40-МТМ бухгалтер	Дуржики МФЙ	[signature]
48	Комилова Насиба	1 сон МТМ хисобчи	Навоий МФЙ	[signature]
49	Искандаров [illegible]	Табиатни мухофаза қилиш бўлими	Хитой овул	[signature]
50	Хамидова Д	N8 МТМ [illegible]	Туркистон кучаси	[signature]

ADB

Регистрационный лист

Общественные слушания по проекту: «Развитие и модернизация систем водоснабжения Нукусского, Муйнакского, Кунградского, Берунийского, Амударьинского и Караузякского районов, а также модернизация насосной станции 2-го подъёма «Туямуюн».

Май _______, 2017

Amudarya district / Амударьинский район

ADB

No.	Full Name / Ф. И. О	Worked place / Наименование места работы	Adress / Адресс (КФЙ,МФЙ)	Signiture/ Подпись
51	Толванов Улугбек	Туман хокимияти	МФЙ. Янгиобод	[signature]
52	Сайтназарова Гулнор	Ф-МТМ	МФЙ Дустлик	[signature]
53	Уразметова Шоира	Фезни	Кумбой ОФЙ	[signature]
54	Ховупов Ильхом	Фезни	Кизилчоли МФЙ	[signature]
55	Собиров Ихом	Посбон МФЙ Ойбек	Ойбек МФЙ	[signature]
56				[signature]
57				
58				
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72				
73				
74				
75				

Appendix 3: Announcement in newspaper about planning Public Consultation

Еркин Қарақалпақстан

№65 (19995) 23-МАЙ 2017-ЖЫЛ ШИЙШЕМБИ

Елдиң бирлиги ҳәм абаданлығ…

ГАЗЕТА 1924-ЖЫЛ НОЯБРДЕН ШЫҒА БАСЛАДЫ | ҚАРАҚАЛПАҚСТАН РЕСПУБЛИКАСЫ ЖОҚАРҒЫ КЕҢЕСИ ҲӘМ МИНИСТРЛЕР КЕҢЕСИНИҢ ГАЗЕТАСЫ

229-25-23, 229-26-91.

Ҳүрметли Нөкис, Беруний, Мойнақ, Қоңырат, Әмиўдәрья ҳәм Қараөзек районлары турғынлары!

Өзбекистан Республикасы Президентиниң 18.01.2017-жылғы №ПП-2731 «Арал теңизи аймағын 2017-2021-жылларда раўажландырыў бойынша мәмлекетлик бағдарламасы ҳаққында»ғы қарарына тийкарланып, «Нөкис, Беруний, Мойнақ, Қоңырат, Әмиўдәрья ҳәм Қараөзек районларында суў тәмийнаты системасын раўажландырыў ҳәм модернизациялаў» жойбарын техникалық-экономикалық тийкарлаў (ТЭО) ҳүжжетлерин таярлаў жумыслары Азия Раўажландырыў Банки тәрепинен қаржыландырыў жолы менен әмелге асырылмақта.

Экологиялық ҳәм социаллық баҳалаў тийкарында қызығыўшы тәреплер қатнасыўында жәмийетлик тыңлаўлар өткерилиўи жобаластырылып атыр.

Жәмийетлик тыңлаўларда өткерилген экологиялық ҳәм социаллық тәсирлер ҳаққындағы тийкарғы нәтийжелер усынылады. Сондай-ақ, тыңлаўларда социаллық қорғаў барысында жер майданларын ажыратыў ҳәм мәжбүрий көширип барысындағы мәселелер талқыланады.

Жәмийетлик тыңлаўлар төмендеги мүддетлерде өткериледи.

26-май 2017-жыл саат 9.00 де-Нөкис районы турғынлары ушын район ҳәкимияты мәжилислер залында,

26-май 2017-жыл саат 15.00 де-Қараөзек районы ҳәкимияты мәжилислер залында,

27-май 2017-жыл саат 10.00 де-Мойнақ районы ҳәм «Учсай» елаты турғынлары ушын ҳәкимият залында,

27-май 2017-жыл саат 15.00 де-Мойнақ районы «Бозатаў» АПЖ (Таллық, Қыпшақ, Шағырлы аўыллары), «Мәдели» АПЖ (Шеге, Порлытаў аўыллары) турғынлары ушын «Бозатаў» АПЖ, «Қыпшақдәрья» аўылы №10 мектеп имаратында,

29-май 2017-жыл саат 10.00 де-«Ҳәким-ата» АПЖ (Али аўыл, Қызыл жар, Дослық аўыл) турғынлары ушын Али аўылы №17 орта мектеп имаратында,

29-май 2017-жыл саат 15.00 де-Қоңырат районы ҳәкимияты мәжилислер залында,

30-май 2017-жыл саат 10.00 де-Әмиўдәрья районы ҳәкимияты мәжилислер залында,

30-май 2017-жыл саат 15.00 де-Беруний районы ҳәкимияты мәжилислер залында.

Жәмийетлик тыңлаўларға ҳәмме қызығыўшыларды қатнасыўға шақырамыз.

«ТҮЙЕМОЙЫН-НӨКИС» регионаралық суў қубырынан пайдаланыў басқармасы администрациясы.

«…KAZI» ЖШЖ «Ким-зыят» саўдасына мирәт етеди:

ЛИЦЕНЗИЯ ЎАҚТЫНША ТОҚТАТЫЛАДЫ

ВЕСТИ КАРАКАЛПАКСТАНА

Пусть здравствует дружба народов!

Газета Жокаргы Кенеса и Совета Министров Республики Каракалпакстан

...ТСЯ БРАТСКИЕ УЗЫ, ...АТЫ ДАЕТ СОТРУДНИЧЕСТВО

МИР И СТАБИЛЬНОСТЬ — ВАЖНЫЙ ФАКТОР РАЗВИТИЯ

ВЕСТИ КАРА...

Вторник, 23 мая 2017 года №42 (18238)

Издается с июня 1919 г.

Газета Жо...

УЗБЕКИСТАН-ТУРКМЕНИСТАН:

...ПЕХА

И.МУСИН

УВАЖАЕМЫЕ ЖИТЕЛИ НУКУССКОГО, БЕРУНИЙСКОГО, МУЙНАКСКОГО, КУНГРАДСКОГО, АМУДАРЬИНСКОГО И КАРАУЗЯКСКОГО РАЙОНОВ!

В рамках реализации Постановления Президента Республики Узбекистан №ПП-2731 от 18.01.2017 "О государственной программе по развитию региона Приаралья на 2017-2021 годы" проводится работа по подготовке Технико-экономического обоснования проекта "Развитие и модернизация систем водоснабжения Нукусского, Берунийского, Муйнакского, Кунградского, Амударьинского и Караузякского районов" при финансовой поддержке Азиатского Банка Развития.

В рамках проведения экологической оценки планируется проведение общественных слушаний с привлечением всех заинтересованных сторон. На слушаниях будут представлены основные результаты проведенной экологической оценки воздействия проекта на окружающую среду в проектных районах. Также на слушаниях будут обсуждены вопросы социальной защиты, связанные с вынужденным отводом земли и переселением.

Общественные слушания будут проводиться по следующему графику:

26 мая 2017 г. в 9:00 — для жителей Нукусского района в зале районного хокимията.

26 мая 2017 г. в 15:00 — для жителей Караузякского района в зале хокимията.

27 мая 2017 г. в 10:00 — для жителей г.Муйнак и поселка Учсай Муйнакского района в зале хокимията.

27 мая 2017 г. в 15:00 — для жителей ССГ Бозатау (н/п Таллык, Кылшак, Шеги), ССГ Мадели (н/п Шеги, Порлытау) Муйнакского района в здании школы №10 Кылшакдарья аула ССГ Бозатау.

29 мая 2017 г. в 10:00 — для ССГ Хаким ота (н/п Али аул, Кызыл жар, Дослык аул) Муйнакского района в здании школы №17 Али аула.

29 мая 2017 г. в 15:00 — для жителей Кунградского района в зале хокимията.

30 мая 2017 г. в 10:00 — для жителей Амударьинского района в зале хокимията.

30 мая 2017 г. в 15:00 — для жителей Берунийского района в зале хокимията.

Для участия в общественных слушаниях приглашаются все заинтересованные лица.

АДМИНИСТРАЦИЯ МЕЖРЕГИОНАЛЬНОГО ВОДОПРОВОДА "ТУЯМУЮН-НУКУС".

Appendix 4: Example of presentation provided during Public Consultation

Appendix 5: Pictures from Public Consultation

	
Registration of participants before PC in Nukus district	PC in Karauzyak district
	
Participants raised question during PC in Muynak city	Aliaul settlement, Muynak district
	
Public Consultation in Mangit city, Amudarya district	PC in Beruniy city


Meeting with rural citizens in Beruniy district

PC in Kungrad district

Public consultation in Aliayl, Muynak district

Appendix 6: Examples of noise measurements analysis

ХУЛОСА

Олинган хаво намунаси таркибидаги чанг микдори СанПиН РУз 0293-11 талабига жавоб бермайди.

Чанг микдори 0,67 мг/м³ (ПДК 0,5 мг/м³)

№ 663-08

Санитария врач имзоси: ________________

Булим мудри имзоси: ________________

Узбекистон Республикаси Соглиќни саклаш вазирлиги
Муассасанинг номи

БХУТ буйича
КТРК буйича
Тиббий хужжат формаси – №329/х ш УзР ССВ 2006 йил 06 июн 287 сонли буйрук билан тасдикланган

АХОЛИ ЯШАЙДИГАН ЖОЙЛАР ХАВОСИНИ ТЕКШИРИШ
ПРОТОКОЛИ (Баёни) № 36

"6" май 2017 й.

Хаво намунаси олинган жой ________________
Намуна олишдан максад ________________
Намуна тури (бир марталик, уртача суткалик) бир марталик
Намуна олишни асословчи хужжатлар СанПиН РУз 0293-11
____
Намуна олинган куни ва вакти ________ етказилган вакт ________
Ташиш усули ________ саклаш шароитлари ________
Консервация услублари ________
Намуна олишда кулланиладиган улчов воситалари ________________
Давлат текшируви тугрисидаги маълумотлар ________________
Жой таърифи: рельефи ________, кукаламзор ________
Унинг баландлиги ________________ ифлослантирадиган манбагача
булган масофа ________________

Режалаштириш холати

____

Ифлослантирадиган манба таърифи ________________
Шу манба баландлиги ва куввати ________________
Маҳалла шакли ________________

Жойнинг ифлослантирадиган манба ва хаво намунаси олинадиган нукталар (намуна олинадиган нукта тартиб сони %) курсатилган эскизи ________________
Намуна олган шахснинг лавозими, фамилияси исми шарифи
____

________________ Имзо ________________

Протокол икки нусхада тузилди

Ракамлар		Намуналар олинадиган нукта	Об-хаво омиллари				Намуна олинган вакт, соат, минут			Оникланувчи воситанинг номи мг/м^3	Текширув натижаси мг/м^3		Текшир методика
Филтрларнинг ва ютгичларнинг	Эскиз буйича намуна олиш нукталари		Харорат С° Термометр курсаткич	Атм. босим мм.рт.ст	Нисбий намлик	Хаво харакати тезлиги	Бошланиши	тугаши	Аспирац тезлиги Л/ мин		Оникланган концентрация	ПДК	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
36	Ахолиндан № 73 кўчаси		+28°	753	36%	3 м/с	10^{30}	10^{50}	20л 20 мин	ҳаво	$x = 0,67$	0,5	СанПиН РУ 0293-11 РД 52.04.186-8

ХУЛОСА:
не превышает допустимую санитарную норму.

Санитария врачи Дауметов А

лавозими, фамилияси, исми, отасининг исми

имзо

Булим рахбари зав. стл. Турбаева М

Ф.И.О.

Имзо

Узбекистон Республикаси Согликни саклаш вазирлиги Муассасанинг номи Рес. ЦГСЭН РК

БХУТ буйича КТ КТРК буйича Тиббий хужжат формаси – 334/ х ш УзР ССВ 2006 йил 06 июн 287 сонли буйрук билан тасдиклаган

Шовкин ва силкиниш (вибрация) ни улчашлаги 291 сонли

ПРОТОКОЛ

«04» май 2017й.

1.Улчаш утказилган жой суу торматлары филиал
Объект номи, цех
Нукусский р-н ул. Дарсы б/н

2.Улчаш текширилаетган ташкилот вакили иштирокида утказилди гл. инж. Мамбетниязов А
лавозими, исми-шарифи

3.Улчаш анжомлари измеритель шума и вибрации
номи, тури, инвентар сони
ВШВ-003, зав. № 2693

4.Давлат назоратидан утказилганлиги сертификат №1034/05 от 28.06.2016г.
шу хакидаги хужжат сони ва берилган куни

5.Улчов утказиш ва хулоса беришни асословчи хужжатлар СанПиН РУз № 0263-09

6.Шовкинни (силкинишни) пайдо килаетган асосий манбалар ва шу шовкин (силкиниш) нинг характери
автотранспортный шум.

7. Ишловчи кишилар сони

8. Улчов утказилаетган жой эскизи (худудий, иш жойлари, кул асбоблари) албатта улчов микрофонлари (курсаткишлари) куйилган нукталар белгиланади ва улар улчов тартиби буйича ракамланадилар.

9. Шовкин (силкиниш)ни ўлчаш натижалари

Тартиб сони	Эскиз бўйича нуқталар рақами	Ўлчов жойи (савдо ёки қишлоқ хўжалик объектлари учун манбанинг тури, маркаси ва бўлак паспорт маълумотлари)	Қўшимча маълумотлар (ўлчов ўтказиш шарти, тавсурлоти ва вақтида қанча такрор этиш)	Шовкин характери: Спектр бўйича: Кенг йўналишли	Шовкин характери: Спектр бўйича: Бир марокли	Шовкин характери: Вақтинчалик характеристикаси: Доимий	Шовкин характери: Вақтинчалик характеристикаси: Тебранувчи	Шовкин характери: Вақтинчалик характеристикаси: Алоҳида, алоҳида тушкинли	Шовкин характери: Вақтинчалик характеристикаси: Импульсли	транспортлардан	Силкиниш турлари: Умумий: Транспорт технология асбоб-ускуналардан	Силкиниш турлари: Умумий: Технология ускуналаридан	Силкиниш турлари: Локал жойлашган
1	2	3	4	5	6	7	8	9	10	11	12	13	14
		насел. пункт 15 мтр от магистрали		+			+						

Шовкин босимининг даражаси (тербаниш тезлигида Дб ва ўртача геометрик частотали октава майдонида ГЦ-ларда): 2	4	8	16	31,5	63	125	250	500	1000	2000	4000	8000	Шовкин даражаси (шовкинни эквивалент даражаси БАЛ-ларда)	Йўл қўйилган миқдори
													ДБА	ДБА
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
общий уровень звука													55-56	55

пом. сан. врача ОКФ Бекмуротов(а)

кмэо [signature]

Appendix 7: Water quality analysis

Узбекистон Республикаси Согликни саклаш вазирлиги	БХУТ буйича КТРК буйича
Муассасанинг номи РесЦГСЭН РК	Тиббий хужжат формаси –325/х УзР ССВ 2006 йил 06 июн 287 сонли буйрук билан тасдиклаган

ОЧИК СУВ ХАВЗАЛАРИ, ОКАВА СУВЛАРНИ ТЕКШИРИШДАГИ 102 СОНЛИ

П Р О Т О К О Л (БАЁННОМА)

2017_ йил " _5_ " __май___

Манбанинг номи_____Мангит арна канали_____

Намуна олинадиган жой_____ Амударё тумани сув тармоклари корхонаси _____

Намуна олиш куни ва вакти ___03.05.2017 ж_____

Хаво харорати С даражасида_____28 градус _____

Сув харорати С даражасида_____

ХИДИ
- Интенсивлиги бал хисобида____-_____
- Характери (тасвирлансин)_____-_____
- (суюлтирилганда) йук булиб кетиш холати_____-_____

Рангдорлик даражаси_____-_____

Ранги (тасвирланган)_____-_____

(суюлтирилганда) йук булиб кетиш холати_____-_____

Лойкалиги, чукма (тасвирлансин)_____-_____ мг/дм^3

Тиниклиги _____-_____см

Сузиб юрган аралашмалар, парда коплаши_____-_____

Муаллак моддалар _____-_____мг/дм^3

РП_____-_____

Эриган кислород_____-_____ мг/дм^3

Кислородга булган талаб - 5_____-_____мгO$_2$/дм^3

Кислородга булган талаб - 20_____-_____мгO$_2$/дм^3

Оксидланувчанлик - мгO$_2$/дм^3

ХПК ___-___ $мгO_2/дм^3$

Ишкорийлик ___-___ мг/экв

Кислоталилик ___-___ мг/экв

Умумий каттиклиги ___-___ $мг/экв/дм^3$

Курук колдик ___-___ $мг/дм^3$

Нитрат ___-___ $мг/дм^3$

Нитрит ___-___ $мг/дм^3$

Умумий темир ___-___ $мг/дм^3$

Хлоридлар ___-___ $мг/дм^3$

Сульфатлар ___-___ $мг/дм^3$

Фтор ___-___ $мг/дм^3$

Махаллий шароитларга хос булган махсус моддалар

Нефть махсулотлари ___-___ $мг/дм^3$

ДДТ, ДДЕ, ДДД ___ не обн ___ МУ 012-3/0010

ГХЦГ (альфа, вета, гамма) ___ не обн ___ МУ 012-3/0010

Мис ___-___ $мг/дм^3$

Кургошин ___-___ $мг/дм^3$

Цинк ___-___ $мг/дм^3$

Хром 3 валентли ___-___ $мг/дм^3$

Хром 6 валентли ___-___ $мг/дм^3$

Аммоний тузлари ___-___ $мг/дм^3$

Зав сМ

Текширишни утказган шахс имзоси Зав. лаб Д Нуриисова

Врач хулосаси Олинган сув намунаси СанПиН 0109-05 талабига жавоб беради.

Коммунал гигиена булими бошлиги имзоси А. Даулетов

Appendix 8: Asbestos-Containing Materials Management Plan

Asbestos-Containing Materials Management Plan

The Asbestos-Containing Materials Management Plan (ACMMP) describes and evaluates the risk of contractors (and others) encountering asbestos-containing material (ACM) at the Project construction sites during the implementation stage of the project; and it provides a procedure for dealing quickly and safely with any ACM that may be found.

The ADB *Safeguard Policy Statement* (SPS) requires that ADB-funded projects apply pollution prevention and control technologies and health and safety measures that are consistent with international good practice, as reflected in international standards such as the IFC/World Bank *Environmental, Health and Safety General Guidelines* (2007). If national legislation differs from these standards, the borrower is required to achieve whichever is more stringent. There is no current legislation in the Uzbekistan governing the handling and disposal of ACM[33], so the ACMMP follows the World Bank Guidelines.

The main principles of the ACMMP are as follows:

A. Prompt recognition of ACM;

B. Prompt and effective action to contain and deal appropriately with the ACM (including safe management and disposal); and

C. Maintaining the safety of site personnel and the general public at all times.

The ACMMP is designed for use by the Project's Project Coordination Unit (PCU) to manage the ACM risk over the project as a whole, and by contractors to deal efficiently with any ACM they or their workers encounter. The procedural element of the ACMMP is therefore designed to provide straightforward instructions that can be easily and quickly understood without the need for specialist knowledge and without referring to other sources.

PROTOCOL FOR HANDLING AND DISPOSAL OF ACM AT ISDP SITES

Source

This protocol was developed from guidance given by the UK Health and Safety Executive (HSE), which complies with European Union (EU) legislation and the UK *Control of Asbestos Regulations* (2012). For further information see the HSE website: http://www.hse.gov.uk/asbestos/essentials/

Applicability

The Project ACMMP applies to all project construction sites and any related areas (eg workshops, parking lots, storage or disposal areas, etc used by Project contractors). Contractors employed by Project are legally responsible for their construction sites and related areas and must follow the provisions of the Project ACMMP within those locations. Specifically this protocol must be used to ensure the safe handling, removal and disposal of any and all ACM from those areas.

Immediate Action

On discovering ACM on an Project site the contractor must:

a) Stop all work within a 5 m radius of the ACM and evacuate all personnel from this area;

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[33] Uzbek Sanitary Norms SanPin 0233-07 "National standards "Sanitarian Norms and Rules on Work Hygiene and Environment Protection during production and usage of ACM was one of a number of pieces of legislation deregulated in the 1980's. Notwithstanding their lack of legal status, as the most recently-available local standard, the regulations were referred to in preparing the ACMMP and the protocol for handling and disposal of ACM (see Section 3) incorporates soil covering requirements from the SanPin.

b) Delimit the 5 m radius with secure fencing posts, warning tape and easily visible signs warning of the presence of asbestos;

c) If the site is in an inhabited area, place a security guard at the edge of the site with instructions to keep the general public away;

d) Notify the PMC and Environmental Supervisors and arrange an immediate site inspection; also notify the PCU.

The PCU must:

e) Notify the Territorial Department of the State Sanitary Epidemiological Service.

Equipment

To remove asbestos from a construction site, contractors must provide the following equipment:

a) Warning tape, sturdy fence posts and warning notices;

b) Shovels;

c) Water supply and hose, fitted with a garden-type spray attachment;

d) Bucket of water and rags;

e) Sacks of clear, strong polythene that can be tied to close;

f) Asbestos waste containers (empty, clean, sealable metal drums, clearly labelled as containing asbestos).

Personal Protective Equipment (PPE)

All personnel involved in handling ACM must wear the following equipment, provided by the contractor:

g) Disposable overalls fitted with a hood;

h) Boots without laces;

i) New, strong rubber gloves;

j) A respirator is not normally required if there are only a few pieces of ACM in a small area, and if the ACM is damp;

k) In large or heavily contaminated areas, a disposable respirator is needed (not a dust mask) with an Assigned Protection Factor of 20 or more (eg a respirator with a P3 filter);

l) There must be no smoking, eating or drinking on a site containing ACM.

Decontamination Procedure 1: Removing small pieces of ACM

a) Identify the location of all visible ACM and spray each lightly but thoroughly with water;

b) Once the ACM is damp, pick up all visible ACM with shovels and place in a clear plastic bag;

c) If ACM debris is partially buried in soil, remove it from the soil using a shovel and place it in the plastic bag;

d) Insert a large label inside each plastic bag stating clearly that the contents contain asbestos and are dangerous to human health and must not be handled;

e) Tie the plastic bags securely and place them into labelled asbestos waste containers (clean metal drums) and seal each drum;

f) **Soil that contained ACM debris must not be used for backfill** and must instead be shovelled by hand into asbestos waste containers;

g) At the end of the operation, clean all shovels and any other equipment with wet rags and place the rags into plastic disposal bags inside asbestos waste containers.

a) Decontamination Procedure 2: Removing ACM-contaminated backfill

a) If soil containing ACM debris has inadvertently been used for backfill this must be sprayed lightly with water and shovelled out by hand to a depth of 300 mm and placed directly into asbestos waste containers (ie not stored temporarily beside the trench);

b) Any ACM uncovered during the hand shovelling must be placed in a clear plastic bag;

c) Once the trench has been re-excavated to 300 mm, if there is no visible ACM remaining, the trench may be refilled by excavator using imported clean topsoil.

b) Decontamination Procedure 3: Removing AC pipes or large pieces of ACM

1. If AC pipes or other large pieces of ACM are uncovered during excavation in an undamaged condition and they can be re-covered by soil and left in place in the ground undisturbed, this should be done. If AC pipes or other large pieces of ACM need to be removed from site:

a) Inform the city Mahsustrans Enterprise of the nature and size of the large ACM and arrange for them to dig a suitable cavity at the disposal site to receive and bury the material;

b) Sprinkle the ACM thoroughly with water, ensuring that any broken or damaged areas in particular are thoroughly wetted;

c) Inform excavator and truck drivers of the dangers associated with ACM and instruct them to remain inside their cabs with the windows closed throughout the operation.

d) Lift the material by excavator into a dump truck, without causing additional breakage and with as little disturbance as possible;

e) Cover the bed of the truck with a secure tarpaulin and transport the ACM to the disposal site with as little disturbance of the carried material as possible;

f) Manual assistance should be limited to securing the tarpaulin if possible, and personnel providing such assistance should wear PPE as indicated in Section E;

g) At the disposal site, tip the ACM directly into the prepared cavity and arrange for it to be covered with soil immediately.

c) Disposal

2. ACM should be disposed of safely at a local hazardous-waste disposal site if available, or at the city municipal dumpsite after making prior arrangement for safe storage with the site operator.

- The Contractor must arrange for the disposal site operator to collect the sealed asbestos waste containers as soon as possible and store them undisturbed at the disposal site.

- At the end of construction Contractors must arrange for the disposal site operator to bury all ACM containers in a separate, suitably-sized pit, covered with a layer of clay that is at least 250 mm deep.

d) Personal Decontamination

3. At the end of each day, all personnel involved in handling ACM must comply with the following decontamination procedure:

- At the end of the decontamination operation, clean the boots thoroughly with damp rags;
- Peel off the disposable overalls and plastic gloves so that they are inside-out and place them in a plastic sack with the rags used to clean the boots;
- If a disposable respirator has been used, place that in the plastic sack, seal the sack and place it in an asbestos waste container;
- All personnel should wash thoroughly before leaving the site, and the washing area must be cleaned with damp rags afterwards, which are placed in plastic sacks as above.

e) Clearance and Checking-Off

206. The decontamination exercise must be supervised by DSC site supervisors (engineering or environmental).

207. After successful completion of the decontamination and disposal, the PMC should visually inspect the area and sign-off the operation if the site has been cleaned satisfactorily.

208. The contractor should send a copy of the completion notice to the PCU, with photographs of the operation in progress and the site on completion.

TRAINING

4. PMC's Environmental Specialist will conduct training on ACCMP implementation for Contractors staff and PCU. The training will include a session focusing on ACM, which covered:

a. Risks of contact with ACM (in general and the ISDP risk assessment);

b. Responsibilities for dealing with ACM on ISDP construction sites;

c. The ISDP ACMMP and the Protocol for site clean-up;

d. Awareness-raising for the contractors' workforce.

a) COST ESTIMATE

Costs incurred by contractors in implementing the ACMMP are included in their budget in EMP budget.