

Initial Environmental Examination

Semestral Report
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ARM: Water Supply and Sanitation Project – Stepanavan and Tashir Town, Villages Metsavan and Sarchapet

Prepared by Armenian Water and Sewerage Company for the Republic of Armenia and the Asian Development Bank.

**ASIAN DEVELOPMENT BANK FUNDED
WATER SUPPLY AND SANITATION SECTOR PROJECT**

**WATER SUPPLY AND SANITATION SYSTEM IMPROVEMENT
IN THE SETTLEMENTS OF THE REPUBLIC OF ARMENIA**

INITIAL ENVIRONMENTAL EXAMINATION

STEPANAVAN AND TASHIR TOWN, VILLAGES METSAVAN AND SARCHAPET



1.1 Scope of work

The purpose of this sub-project is improvement of drinking water supply to towns Stepanavan and Tashir, and villages Metsavan and Sarchapet, provide the population with sustainable water supply and safe drinking water.

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To achieve this goal, the following is planned by priority:

t. Stepanavan

- Construction of pressure regulation node in Aksyutin pumping station area, in Novoseltsovo-Stepanavan system.
- Zoning works, including repair of DRRs, construction of water mains, pumping station, installation of zoning valves.
- Construction of distribution network's water lines in emergency condition or of most importance .
- Planning of private houses' inlet lines and water metering nodes.
- Replacement of multi-apartment blocks' inlet lines
- Construction of water supply chambers
- Construction of new valve nodes and replacement of valves in the existing ones.

t. Tashir

- Replacement of hydro pump turbine and valves in Aksyutin pumping station
- Zoning works, including construction and reconstruction of water mains, installation of zoning valves
- Construction of distribution network's water lines in emergency condition or of most importance.
- Construction of water supply chambers and buried valve nodes in the distribution network
- Construction of pressure regulation chambers
- Replacement of multi-apartment blocks' inlet lines
- Planning of private houses' inlet lines and water metering nodes
- Repair of emergency segments of de200 sewerage pipelines.

v. Metsavan

- Replacement of the existing water main and construction of transit water ,aom feeding the DRR
- Planing of water metering node at the beginning of the village
- Repair of dry chamber of DRR
- Construction of new water line in the distribution network

v. Sarchapet

- Construction of water main feeding the village
- Zoning works, including construction of pumping station, water main, repair of the existing DRR
- Installation of street taps on the water main feeding the DRR.

The predominant part of the towns Stepanavan and Tashir areas is built with 1-2 storey private houses with total number of about 3561 and 3327. There are also 143 multi-apartment blocks with total number of apartments 1656 in Stepanavan and 40 multi-apartment blocks with total number of apartments 1200.

Villages Metsavan and Sarchapet are built with accordingly 1550 and 662 1-2 storey houses. As a result of the project implementation, it is planned to supply the towns' population with drinking quality water.

1.2 Description of the present water supply and sewerage systems

Stepanavan town's water supply system

External system

The water supply of Stepanavan town is provided by the means of three separate water supply systems.

– Novoseltsovo-Stepanavan gravity system starts within the area of the village of the same name from the underground sources located at the elevation of 1465-1475m, at a distance of 13km from Stepanavan town. 32 structures of the spring-intakes of Novoseltsovo are located on the left-hand side of the inflow to the Dzoraget River, alongside the hilly area. The total flow of 400l/s from the existing spring intakes is conveyed through the steel pipeline of 500mm with the total length of 9.0km into the common water collecting chamber located at the elevation of 1441m. The transmission main heading towards Stepanavan town conveys 120l/s through the regulating valve installed on the pipeline before it enters into the common water

collecting chamber. The transmission main passes alongside the left bank of the Dzoraget River and splits into two branches as it comes out from the gorge –250mm and 200mm

The transmission main continues up to the elevation of 1424m where the reservoirs with the capacity of $2 \times 400 \text{m}^3$ are located, however the mentioned reservoirs do not operate.

The total area of Novoseltsovo sanitary zone is around 18 ha.

– Getavan-Stepanavan pressure system, which operates by schedule – once in two days with 8 hours duration and supplies 85l/s water amount, from the Getavan pumping station located at the elevation of 1396m at the distance of 5km from Stepanavan. The pumping station is fed from three water collecting galleries with the total flow of approximately 400l/s. At the moment the pumps, which supply Stepanavan town with water, are fed from only one water collecting gallery and the yield of the other two are discharged into the Dzoraget River.

The total flow pumped from Getavan to Stepanavan is disinfected at the existing chlorination station located at the pumping station site.

The 500mm 9.0km long steel pressure main from the pumping station feeds $2 \times 1000 \text{m}^3$ DRR located at the elevation of 1470m and the residential district situated on the left bank of the river.

– Gyuladara-Stepanavan gravity system is fed from sources located at the distance of 6 km from the town at the elevation of 2100m, with seasonal fluctuations. The total flow fluctuates within the range of 5-10l/s. There are five existing spring-intakes, whilst three of them are in an emergency state and need repairing.

Within the territory of the sanitary zone there is a chlorination station that does not operate because of lack of power. Currently water is supplied to the town's $2 \times 300 \text{m}^3$ DRRs without disinfecting.

The gravity transmission main of Gyuladara-Stepanavan is constructed out of 150mm and 200mm diameter cast-iron and steel pipeline with the total length of 9km. 1500m long stretch of 150mm diameter of the cast-iron section of the transmission main has been frequently failing and needs replacing.

Previously there were 6 daily water regulating reservoirs servicing the water distribution network of Stepanavan town with the total capacity of 3400m^3 . However, currently the town is serviced mainly with the total capacity of 2600m^3 .

Water supply distribution network

The water supply system of Stepanavan town includes 62km of pipelines ranging between 100mm and 500mm diameter (transmission main and the water distribution network).

The network is constructed out of cast-iron, steel and polyethylene pipework.

The water supply of about 60% of the town population is implemented directly from the transmission mains, by conducting the regular short-term supply graphics via the distribution valves, without the use of the daily water regulating reservoirs.

Water amount received from the Novoseltsovo springs is provided for the residential area geographically located at the lowest elevations of the town (due to the low working pressure conditions of the main).

The Getavan pumping station provides 85l/s of flow to the residential areas situated at high elevations. And since the pumping station is operated once in two days, water supply is implemented by graphic from 07.00 am until 09.00 am, for the rest of the day it is pumping towards the DRR with the capacity of $2 \times 1000 \text{m}^3$. Such a water supply schedule forces the population fed from the mentioned DRRs to use the water from Kamenka river for irrigation (mainly by means of connections made by their own force), the Ø700mm water main of which passes through the area of the same district.

Thus, the currently operating water distribution network mainly represents a system with significant water losses, which has numerous cross-connections within the network made via the pipework and the gate valves.

Tashir town's water supply system

External system

The water supply of the town is implemented by means of two systems:

Bazum (Katnaghbyur) gravity system, which starts at the Bazum mountain chain, at Urasar mountain, at the elevation of 2000-2400m, from 17 spring-intakes have been constructed in the 1960-70s.

The water from the spring-intakes is filling the 200-250mm diameter transmission pipe with the total length of 19.3km and about 40l/s flow by gravity and without disinfection, supplied towards the Tashir town and rural settlements.

15l/s water amount is supplied from this system directly to the Tashir town distribution network, feeding about 30% of the population. The outlet pipes of 4 spring-intakes are missing, and as a result, on an initial assessment, some 10-12l/s of water is not conveyed to the town

There used to be 4 pressure break tanks constructed on the main and are now in emergency condition.

Aksyutin system starts from the spring-intakes and a water collecting gallery located on the left riverbank in the Dzoraget gorge. The total flow from the spring-intakes and the water collecting gallery is 470 l/s, which is collected into the common Water Collecting Chamber, located at the elevation of 1441m by means of two 500mm diameter steel pipelines. Then by means of the hydro pump 30-36l/s disinfected water amount (depending on Kamenka river seasonal fluctuations) is supplied through 300mm 9.5km long water main to the 1800m³ capacity DRR at 1570m built in recent years. From the distribution junction at the DRR 4 separate pipelines of 300mm, 2x250mm and 150mm start and feed separate residential areas within the town and the hospital.

The water quality in the mentioned springs is high and corresponds to the requirements of “Drinking water”.

Water distribution network

The water distribution network of the town has been constructed some 40 years ago and it is in a deteriorated state due to a lack of capital repairs done over the time. The distribution network is implemented out of cast-iron and steel pipework. However, 7.1km long 63-160mm water lines were constructed along two pavements of Kirov street in 2007, within the framework of WB funded project for water and wastewater improvement.

The distribution network is not sectorised. Because of insufficient pressures in the network, 3-5kW capacity individual pumps have been installed on the inlet lines of 5-storey buildings for making the required pressure.

The majority of the town population is supplied based on a 6-hours intermittent graphic, 3 hours in the morning and 3 hours in the evening, but the residents whose houses are located in the higher level within the town get 24-hour water supply directly from the Bazum-Tashir transmission main (e.g. Sayat-Nova, Gaydar, Dprotsakanneri streets and Kirov lower part) without the use of the regulatory volume. The water losses within the water distribution network reach a significant level and are assessed as being 86%:

Water supply system of village Metsavan

External system

Water supply to the village is carried out from Sevaberd (Hovdara) spring intakes by gravity. This system does not have a centralized chlorination station, however disinfecting of a part of the water supplied to the village is made in the existing DRR by means of chlroine capsules. 10 out of the 20 Sevaberd spring intakes need reconstruction. From spring intakes water reaches the pressure reducing chamber, from which two water mains emerge (cast iron, asbestos-cement and steel) for supplying villages Dashtadem and Metsavan, and for villages Dzyunashogh, Dzoramut, Mikhaylovka, Petrovka and Norashen. Water from the water main feeding village Metsavan is supplied to the beginning part of the village and filled into 1x250m³ capacity DRR. Though the water amount supplied to Metsavan is enough for normal water supply according to the norms and calculations, but taking into account the fact that some part of the village is fed directly from the water main before reaching the DRR, as well as the small capacity of the DRR, deteriorated condition of the distribution network and absence of zoning, water supply is carried out very unevenly.

The main part of population receives water by hourly schedule with 10-13 hours of duration. Since the DRR's elevation is not dictating to the whole area of the village, water supply to the higher located district is not implemented from the mentioned system.

There are 8 local springs with 3.0l/s total flow in the village, from which only one is used for drinking purpose (about 0.3l/s) by the population of the higher located district, and the other sprigs are used for household needs and watering of animals.

Water distribution network

The water distribution network of the village has been constructed some 40 years ago from cast iron and steel pipes. It is in a deteriorated state. However, recently the village administration constructed 3.2km long water lines in the different parts of the village.

Water supply system of village Sarchapet

External system

During Soviet times water supply to the village was carried out from Sevaberd (Hovdara) springs. The water main feeding the village was emerging from the distribution node at the beginning part of the village. Water from the mentioned main was supplied by gravity to the pumping station at the beginning part of village Sarchapet and then pumped to the distribution

network. For improvement of water supply regime a 1x100m³ DRR was constructed. The latter needs repair.

Water distribution network

It is more than 20 years that the village does not have water distribution network and is not served by AWSC presently. Because of not operating the system for a long time, it became fully deteriorated and robbed. Currently water supply is implemented by artesian wells drilled by population and local springs without disinfecting. The population carries water from artesian wells and the flows of local springs are used for household needs and cattle watering.

Wastewater system

Towns Stepanavan and Tashir have sewerage systems but do not have wastewater treatment plants. In the main sewerage collector and inter-district wastewater network there are numerous clogged parts, some observation chambers need repair and replacement of manholes.

Villages Metsavan and Sarchapet have not sewerage system and the population use pit toilets.

1.3 The geographical location and climate of the residential area

All of the residential areas covered by the project are located within the territory of the Lori Marz, on Lori plateau.

Stepanavan town is situated at the right and left banks of the Dzoraget River, in the north-western part of the Marz, at 157km distance from Yerevan. The northern peaks of the Bazum mountain range are spread in the south-west of the town and the Ledjan mountain slopes are located to the north-east of the town. The town is located at 1380-1530m altitudes and covers an area of 5311.6ha. The town is a resort zone thanks to favorable climatic conditions. There are many resort and health houses there.

Tashir is located at 174km distance from Yerevan. River Tashir, a tributary to Debed river flows through the town. The town is located at 1487-1530m altitudes. Here mainly agricultural activity is common.

Villages Metsavan and Sarchapet are located at 60-35km distance from Vanadzor – the marz center. The villages are located at 1550-1675m and 1680-1780m altitudes accordingly.

The Lori marz involves the whole basin of river Debed and has mountainous relief. It is notable for its relatively wet climate. In mid and higher altitude zones the climate is temperate, with long and cold winters. There is a stable snow cover each year. Forests are warm, relatively humid.

The regions under study are characterized by dry continental climate.

Absolute maximum air temperature is +35°C in Stepanavan and +34°C in Tashir.

Absolute minimum air temperature is -31°C in Stepanavan and -34°C in Tashir.

Annual precipitation is 687-722mm.

South-eastern (in winter) and western (in summer) winds with are predominant in Stepanavan, once in 20 years winds with 41m/sec velocity are possible. Wind pressure – 55kg/m². Snow cover pressure – 70kg/m².

South-western (in winter) and northern (in summer) winds with are predominant in Tashir. Once in 20 years winds with 29m/sec velocity are possible. Wind pressure – 45kg/m². Snow cover pressure – 70kg/m².

Maximum soil frost depth is 71cm.

According to the data from the LSGBs total number of population as of 01/01/2010 in Stepanavan was 16600, in Tashir – 12300, in Metsavan – 7300 and in Sarchapet - 3150.

1.4 Biodiversity and sensitive nature areas

From relief point of view the area is located in Lori plateau where the relief belongs to volcanic type and is a slit type mountainous relief.

From geomorphologic point of view it is located in Dzoraget and Tashir river basins (Debed basin).

From hydro-geological point of view the areas are included in the region of fracture waters of various eruptive rocks and are water abundant. Underground waters are related to both volcanic and alluvial rocks.

According to the published literature, underground waters are located at 10.0-15.0m depth, and groundwaters – at 3.0-8m depths that can generate significant flow.

Among dangerous physical-geological processes are extensive surface washing by surface waters, erosion volcanic weathering and destruction.

In the geological structure of the area the groups of volcanic rocks of Upper Eocene Oligocene age take part: andesite-basalts covered by layers of Quaternary age alluvial, eluvial, deluvial-proluvial, deluvial formations - clay, sand, fragmental soils.

According to the RA CC II-6.02.2006 the region and the area are included in the II (second) seismic zone, with 0.3g-0.4g background acceleration.

The areas under study are located within Lori floristic region that is notable for a series of peculiarities. First of all the plant community characteristic for the region is notable. At the same time, along with steppe, valley formations, tragacanth plants here also forests are represented with dominating Quercus and Fagus. There are also wild Pyrus, Malus, Prunus, as well as bushes of Rosa on cliffs. In the field of Lori there are crop plants and valley-steppe communities, in north-east – Juniperus forests. In the higher-mountainous zone there are sub-Alpine and Alpine valley communities. In general, there occur 6 endemic species in Lori floristic region, there are also around 50 rare and endangered species.

The area is notable for its rich and special biodiversity, high value of geological and landscape complexes and their separate components, unique natural and historical-cultural monuments, health and recreation resources.

Special protected natural areas

“Gyulagarak” reserve is located within the marz area. The protection object of the reserve is relict Pinus forests covering 2586 ha areas. The reserve is located at 8km south-east from Stepanavan. Here is also “Sochut” (Pinus forest) arboretum located within Stepanavan’s administrative area. It was founded in 1933 and together with its flower beds covers an area of 35ha. With its diversity, beautiful alleys, flower beds it has become a very beautiful museum site and being located in a resort zone, it serves also as a resort place.

Among specially protected natural areas in Lori marz are also “Margahovit” (protection object – forest animals, area – 5000 ha) and “Mrtavardenu” (Rhododendron) (protection object – relict Caucasian Rhododendron - 10000 ha) reserves, which are at great enough distances from the planned activity site.

In the regions under study the animal species are diverse. Among mammals are wolf, fox, rabbit, jackal, hedgehog, squirrel, etc. Among birds are Accipiter gentilis, wild duck, Perdix perdix, Alauda arvensis, Coturnix coturnix, Dendrocopos, etc. Among reptiles are Caucasian grass snake. There are many insects here. In small lakes located on Lori plateau various fish species are bred.

These data were obtained as a result of interviews with the administration heads. The information was gathered on the basis of the following survey form.

B1. Are any of the following areas located inside or around the village or project site?

		Yes	No	Not identified
<i>B1.1</i>	National park, protected area designated by the government (coast line, wetlands, reserved area for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or protected areas		2	
<i>B1.2</i>	Virgin forests, tropical forests		2	
<i>B1.3</i>	Ecological important habitat areas (coral reef, mangrove wetland, tidal flats)		2	
<i>B 1.4</i>	Habitat of valuable species protected by domestic laws or international treaties		2	

B 1.5	Likely salts cumulus or soil erosion areas on a massive scale		2	
B 1.6	Remarkable desertification trend areas		2	
B 1.7	Archaeological, historical or cultural valuable areas		2	
B 1.8	Living areas of ethnic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas		2	

1.5 Environmental Impact

The Initial environmental examination (IEE) identified that negative impact on landscapes, flora and fauna of the residential areas where improvement of water supply system will be done is not expected.

The detailed environmental examination is planned to be implemented in the course of the detailed design when all the construction or reconstruction sites will be approved.

Based on the detailed environmental examination, the sub component will be estimated by category and if needed, environmental management plan, as well as monitoring plan will be prepared.