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APPENDIX 1-1 REGULATORY FRAMEWORK IN BULGARIA

The Water Act (WA): The WA (SG 67/27.07.1999; last proposal for amendment April 2012) is the main legal act in Bulgaria that sets out the relations in the management of water as a nation-wide natural resource. The Act regulates the state policy, related to the activities for operation, construction, reconstruction and modernization of water systems and facilities. According to the WA, water in the country is managed at the national and basin levels. Pursuant to the law, waters within the territory of the country are managed at the national and basin district levels. It includes: surface waters, ground waters including mineral waters, inner marine waters and territorial sea, as well as the waters of Danube, Rezovska and Timok Rivers, within the state border of the Republic of Bulgaria. In all cases stipulated by law, waters and water bodies within the territory of the country are public state property, municipal property or private property. The use of waters and water bodies includes water abstraction and use of the water body with permit or not, depending on whether the law requires the issuance of an individual administrative act as a prerequisite for exercising the right to use or abstraction, or such right occurs by virtue of another legal fact.

The Water Act determines the permission arrangement for water use and water-taking from water bodies in the cases where concessions are provided under the provisions of the Law on Concessions for Extraction of Mineral Water - exclusively owned by the state. The WA also determines the land easements, related to the water bodies, the requirements for the preservation of water and water bodies, the protection from the damaging effect of water, the water management, the financial organization and the economic regulation in the water management and the administrative and citizen responsibility.

The Water Act is supported by the following ordinances for its implementation:

- Ordinance № 1 from 10.10.2007 for specific requirements for the study and use of groundwater, including mineral waters and their protection against pollution (prom. SG. 87/30.10.2007)
- Ordinance № 2 from 13.09.2007 on the order and manner for finding, restricting and preventing nitrate pollution of waters from agricultural sources and the rights and obligations of the competent authorities in this field (prom. SG. 27/11.03.2008)
- Ordinance № 3 from 16.10.2000 on the terms and conditions for research, design, approval and operation of sanitary protective zones around water sources and facilities for drinking water, and sources of mineral waters used for therapeutic, prophylactic, drinking and sanitation needs (promulgated SG. 88/2000)
- Ordinance № 4 from 20.10.2000 on requirements for quality of fresh waters – fish habitats, and the requirements for quality of coastal waters and marine waters jutted into the land, ensuring the rateal existence and reproduction of crustaceous and mollusc species (promulgated SG. 88/2000)
- Ordinance № 5 from 23.04.2007 on requirements for monitoring and classification of bathing waters quality, the management of bathing waters

quality, the provision of information to the public in relation to bathing waters quality and the terms and conditions for establishing new bathing areas (promulgated SG. 44/ 5.06.2007)

- Ordinance № 6 from 09.11.2000 on the standards for admissible contents of dangerous and harmful substances in the waste water discharged in the water bodies (promulgated SG. 97/ 28.11.2000)
- Ordinance № 7 from 8.08.1986 on the indicators and standards for determining the quality of flowing surface water (promulgated SG. 96/12/12/1986)
- Ordinance № 7 from 14.11.2000 on the terms and conditions for discharging industrial waste waters to the sewage systems and the standards for admissible contents of toxic, harmful and hazardous substances for the environment concentrated in such waste waters prior their discharge (promulgated SG. 98/ 1.12.2000)
- Ordinance № 8 from 25.01.2001 on the indicators and standards for the quality of coastal marine waters (promulgated SG. 10/2.02.2001)
- Ordinance № 9 from 16.03.2001 on the quality of water intended for human consumption. The ordinance aims to protect individual health against adverse effects of drinking water pollution, and it regulates the requirements for quality and safety of water. (promulgated SG. 30/28.03.2001)
- Ordinance № 10 from 3.07.2001 on issuing permits for waste water discharge into water bodies and setting individual emission limit values for point sources of pollution (promulgated SG. 66/27 July 2001)
- Ordinance № 12 from 18.06.2002 on the quality requirements for fresh surface waters, which after appropriate processing, are used or are perspective for obtaining waters for drinking and household purposes, their classification and measurement conditions, sampling and analysis of indicators, for drinking purposes (promulgated SG. 63/ 06/28/2002)
- Ordinance № 13 from 2.04.2007 on terms and conditions for characterization of surface water bodies (promulgated SG. 37/8.05.2007)
- Ordinance № 13 from 29.01.2004 on the procedures for carrying out the technical operation of dams and associated facilities (promulgated SG. 17/2.03.2004)

New Draft Water Law

In April 2012 a Draft Law on amendment and supplements to the Water Act has been prepared.

Amending and supplementing the Water Act proved to be necessary to regulate basic public relationships relevant to water systems and facilities and to reform the water supply and sewerage sector.

The purpose of the Draft Law on amendment and supplement of the Water Act is:

- to propose necessary legislation changes and to determine clear rules concerning the property of water infrastructure,
- to strengthen the responsibility of the State to provide the population with an access to drinking water,

- to increase the effectiveness of the WSSC by economies of scale for providing water supply and sewerage services to the population at socially affordable prices.

The main aims of reforming the water supply and sewerage sector by the proposed amendments and supplements to the Water Act are:

- to improve the quality and stability of water supply and sewerage services for consumers in the long term
- to regulate public relations related to construction planning, management and operation of water supply and sewerage systems and facilities
- to optimize WSSC operations
- to enhance water supply and sewerage services quality and effectiveness, in accordance with European practices
- to protect public interest by clear regulation of water supply and sewerage services as activities of public interest
- to facilitate the realization of projects for construction, rehabilitation and/or modernization of water supply and sewerage networks and facilities using state's investments as assets – state property.

Draft National strategy on management and development of the water sector

The National strategy on management and development of the water sector in Republic of Bulgaria was elaborated according to the requirements of art.151 of the Water Act.

The defined objectives of the above mentioned draft National Strategy are as follows:

The **long-term strategic objective** of the country in the water sector is to reach a sustainable use of water resources that meets present and future needs of the population, the ecosystems and the economic activities of the country.

- **Objective 1**: Guaranteed provision of water to the population and business, resilient to climate change (in particular during periods of droughts)

1.1. Ensuring continuous water delivery through rehabilitation of the existing and construction of new dams and reservoirs, rehabilitation of water supply networks and restoration of water bodies.

1.2. Reducing the overall water consumption through investments in water resource infrastructure and measures to improve the efficiency of water resources use.

- **Objective 2:** Preservation and improvement of surface and groundwater condition

2.1. Eliminating the discharge of untreated wastewater in artificial and natural receiving water bodies as well as in the Black Sea through building, reconstruction and renewal of wastewater disposal and treatment systems.

2.2. Strengthening the institutional system for surface and ground water monitoring and control.

2.3. Adopting an integrated water resources management approach, turning River basin management plans into a major planning document,

- **Objective 3:** Enhance the efficiency in the integrated management of water as an economic resource

3.1. Establishment of an institutional framework, which is to ensure the transfer of responsibility for decision making with regard to the water sector development at the national, regional and local levels, from business entities to public authorities – state, municipalities.

3.2. Funds from the population and businesses, EU funds and the required national co-financing should ensure self-financing in the water sector, following the "polluter - consumer pays" principle.

3.3. Increasing the capacity of all participants in the water sector management.

- **Objective 4: Mitigate the risk of flood damages**

4.1. Identifying risk zones.

4.2. Implementing measures included in flood protection plans.

The horizon/outlook of the national strategy document is 2035. It includes clear determination of property and responsibilities of the institutions for water facilities in the country. The financial needs for Obsolete water infrastructure and construction of new ones amount to BGN 13-43 billions, depending on service quality to be achieved.

In addition to the above mentioned legal documents, the following documents are relevant and described below:

Environmental Protection Act (EPA).

The Environment Protection Act (SG91/25.09.2002) is the basic act, concerning all environmental components – air, water, soils, ground, landscape, natural sites, biodiversity and their interrelation. The Act contains provisions for the access to environmental information, development of National environmental protection strategy and municipal environmental protection programs; performance of environmental assessment of plans and programs and the environmental impact assessment for investment projects; prevention and limitation of industrial pollution (issue of permits for the construction of new and operation of existing enterprises and/or facilities and integrated permits), National environmental monitoring system, control on environmental components; administrative measures and the administrative and civil responsibility. The national environmental monitoring system, developed according to the procedures of the law, includes the national networks for monitoring of all environmental components.

The main sub-law acts of the Environmental Protection Act relevant to the water management are as follows:

- Ordinance for the terms and conditions for carrying out Environmental Impact Assessment (EIA), adopted with Council of Ministers' Decree № 59 of 2003 by virtue of article 101, paragraph 1 of EPA, and article 31 of the Biodiversity Act.

The Ordinance defines the requirements to assess the impact on environment and to their consistency, as follows: Informing the competent authorities and affected population, evaluation of necessity for EIA, carrying out consultations, defining the scope, contents and form of the report for EIA, assessment of EIA report quality, organization of public discussions on EIA report, decision making for EIA, control on meeting the requirements of the EIA decision and further certification of EIA decision that is no longer legally effective.

- The requirements for environmental assessments of plans and programs are defined by the Ordinance for the terms and conditions for carrying out environmental assessment of plans and programs adopted with Council of Ministers' Decree № 139 of 2004 by virtue of article 90 of EPA.

State policy for protection of the environment

The state policy for protection of the environment is implemented by the Minister of Environment and Water. Competent authorities pursuant to the law are as follows: Minister of Environment and Water, Executive Director of Executive Environment Agency, directors of Regional Inspectorates of Environment and Water (RIEW), directors of basin directorates, directors of national park directorates, mayors of municipalities, and in towns with regional division – mayors of regions and district governors. The Minister of Environment and Water, together with the authorities competent in the relevant sector policies (transportation, energy, construction, agriculture, tourism, industry, education, etc.) develops the policy and strategy for protection of the environment in the Republic of Bulgaria, governs, through Executive Environment Agency, the National System for Monitoring of Environment, controls the condition of environment within the territory of the country, coordinates the surveillance authorities of other executive power bodies in relation to the environment, issues orders, permits, instructions and approves methodologies, prepares and submits to the European Commission reports and any other documents whatsoever, relevant to the environment, required by the European legislation, and carries out other activities relevant to protection and management of environment in compliance with special laws.

The *Executive Environment Agency* at the Minister of Environment and Water manages the National System for Monitoring of Environment. The Regional Inspectorates of Environment and Water, national parks directorates and basin directorates ensure the implementation of state policy for environment protection at regional level. The mayors of municipalities inform the population about the condition of environment pursuant to the legal requirements, develop and control, together with other authorities, plans for elimination of consequences from emergency and volley pollutions within the territory of the municipality, organize waste management within the territory of municipality, control the construction, maintenance and appropriate exploitation of waste water treatment plants in urban territories, organize and control cleanliness, maintenance, protection and expansion of green systems in settlements and in the adjacent territories, as well as the protection of biodiversity, landscape and natural and cultural heritage therein, exercise their power under the special laws in the field of environment, etc. District governors ensure the implementation of state policy for environment protection within the territory of the district, coordinate the work of executive power bodies and their administrations within the territory of the district in relation to the implementation of state environment

protection policy, and coordinate the activities for implementation of environment protection policy among the municipalities within the district. The Ministry of Environment and Water controls the environment components and the factors affecting them. At national level such control is implemented by the Minister of Environment and Water, or by any persons, authorized by him, and at regional level – by the RIEW directors, the basin directorates' directors, the national park's directors, the district governors and by the mayors of municipalities, or officials authorized thereby.

The establishment, functioning, technical facilities and information programming supply of the national automated system for environmental monitoring, and the methodical management of monitoring operations, excluding the national system for monitoring of noise in urban territories, are carried out by Executive Environment Agency. The assessments for the condition of the environment are carried out at national and regional level by the Executive Environment Agency and the Regional Inspectorates of Environment and Water, respectively.

The Regulation of Water Supply and Sewerage Services Act (RWSSSA)

The Regulation of Water Supply and Sewerage Services Act (RWSSSA) settles the regulation of prices, the accessibility and quality of water supply and sewerage services provided by the WSSC. The regulation of the water supply and sewerage services – quality, prices, control, etc., is done by the SEWRC. Several regulations have been issued setting provisions for the development of business plans of water supply and sewerage companies, the quality of water supply and sewerage, etc. In 2009, a change was introduced in the Act, according to which the SEWRC regulates the prices, at which WSSC and other companies supply water (from their own water installations or from ones, which have been granted to them for exploitation) to water supply systems of other water supply and sewerage operators.

Other relevant acts that concern the water sector include: the Spatial Planning Act, Waste Management Act, Biological Diversity Act and the respective sub-delegated legislation for their implementation.

APPENDIX 1-2 REGULATORY FRAMEWORK IN THE EUROPEAN COMMUNITY

The Water Framework Directive 2000/60/EC establishes a legal framework to protect and restore clean water across Europe and ensure its long-term, sustainable use. (Its official title is Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy).

The directive establishes an innovative approach for water management based on river basins, the natural geographical and hydrological units and sets specific deadlines for Member States to protect aquatic ecosystems. The directive addresses inland surface waters, transitional waters, coastal waters and groundwater. It establishes several innovative principles for water management, including public participation in planning and the integration of economic approaches, including the recovery of the cost of water services.

The Directive has been transposed into the Water Act, Ordinance № 13/2007 on characteristics of surface waters, Ordinance №1/2007 on exploration, use and protection of groundwater and Order № RD-321/07.05.2007 of the Minister of Environment and Waters on establishing the priority substances in the field of water policy (issued as required in Art. 118, paragraph 1 and Art. 151, paragraph 2, item. 2 of the Water Act).

Directive 91/271/EEC on urban waste-water treatment has the objective to protect the environment from the adverse effects of urban waste water discharges and discharges from certain industrial sectors and concerns the collection, treatment and discharge of : domestic waste water, mixture of waste water, waste water from certain industrial sectors. The Directive lays down four main principles: planning, regulation, monitoring, information and reporting.

The Directive has been transposed into the Water Act, Ordinance № 6/2000 on the standards for admissible contents of dangerous and harmful substances in the waste water discharged in the water bodies, Ordinance № 7/2000 on the Terms and Procedure for Discharge of Industrial Waste Waters into Settlement Sewer Systems, Ordinance № 10/2001 on Issuing Permits for Waste Water Discharge into Water Bodies and Setting Individual Emission Limit Values for Point Sources of Pollution, Ordinance on the order and the way of sludge use from waste water treatment plant through its use in the agriculture (Council of Ministers Decree № 339/2004) and Order № RD-970/2003 of the Minister of Environment and Waters concerning determination of sensitive areas in water bodies (issued as provided for in Art. 12 of Ordinance № 6/2000).

Directive 75/440/EEC concerning **surface water used or intended for the abstraction of drinking water** after appropriate treatment and supplied by public distribution networks. The Directive sets the minimum quality requirements to be met by surface fresh water: Parameters defining the physical, chemical and microbiological characteristics; limit values and guide values for these parameters; the minimum frequency of sampling and analysis; common non-mandatory reference methods for measuring the parameters.

The Directive was amended by Directive 79/869/EEC concerning the methods of measurement and frequencies of sampling and analysis of surface water intended for the abstraction of drinking water and Directive 91/692/EEC standardizing and rationalizing reports on the implementation of certain Directives related to the environment. It has been transposed into Ordinance № 12/2002 on the Quality Requirements for Surface Water Intended for Drinking Water Abstraction and Household Supply.

Directive 2006/118/EC concerning the protection of groundwater from pollution and worsening was transposed by means of the Ordinance № 1 of 2007 on the exploration, use and protection of groundwater.

Directive 2006/7/EC concerning the quality of bathing water has been transposed into Ordinance № 5/2008 on the quality of bathing water.

Directive 1975/EC concerning the bathing waters quality is transposed into Ordinance №14 of 1987 on health resorts' resources, resorts sites and resorts, Ordinance № 8 of 2001 on the quality of coastal marine waters, Ordinance № 7 /8.08.1986 on the indicators and standards for determination of the surface waters quality, Ordinance № 11 on bathing waters quality.

Directive 98/83/EC concerning the quality of water intended for human consumption, has been transposed into Ordinance № 9/ 2001 on the quality of water intended for human consumption.

Directive 2006/44/EO on the quality of fresh waters needing protection or improvement in order to support fish life and Directive 2006/113/EO on the quality required of shellfish waters have been transposed into Ordinance № 4/2000 on the quality of waters supporting fish and shellfish organisms' life.

Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources has been transposed into Ordinance № 2/2007 on the Protection of Waters against Pollution Caused by Nitrates from Agricultural Sources.

Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances, amended by Directive 91/692/EEC and Directive 2006/118/EC on the protection of groundwater against pollution and deterioration has been transposed into the Water Act and Ordinance № 1/2007 on Exploration, Use and Protection of Groundwater, Ordinance № 2 of 2007 on protection of waters against pollution caused by nitrates from agricultural sources, Ordinance № 3 of 2000 for the terms and conditions for exploration, design, approval and exploitation of sanitary security areas around water sources and drinking water supply facilities, and around mineral water sources used for therapeutic, prophylaxis, drinking and hygiene purposes, Ordinance № 10 of 2001 on issuing permits for waste water discharge into water bodies and setting individual emission limit values for point sources of pollution.

Directive 2006/11/EC on water pollution caused by certain dangerous substances discharged into the aquatic environment of the Community and seven daughter Directives have been transposed into Ordinance № 6/2000 on the Limit Values for Admissible Contents of Dangerous and Harmful Substances in the Waste Water Discharged in the Water Bodies and Ordinance №7/2000 on the Terms and Procedure for Discharge of Industrial Waste Waters into Sewer Systems, Ordinance № 8 of 2001 on the quality of coastal marine waters, Ordinance № 10 of 2001 on issuing permits for waste water discharge into water bodies and setting individual emission limit values for point sources of pollution.

Directive 85/337/EEC on Environmental Impact Assessment, amended by Directive 97/11/EC, amended by Directive 2003/35/EC concerning the public participation in the preparation of certain plans and programmes with impact on the environment, has been transposed into the Environmental Protection Act and the Ordinance on the terms and conditions for performance of environmental impact assessments (№ 59/2003).

Directive 2004/35/EO on environmental liability with regard to the prevention and remedying of environmental damages has been transposed into the Law on liability for prevention and elimination of environmental damages.

Directive 90/313/EEC repealed by Directive 2003/4/EC on public access to environmental information has been transposed into the Environmental Protection Act and the Law on Access to Public Information and the Law on the liability for elimination and prevention of environmental damages.

Directive 2001/42/EC on environmental impact assessment of certain plans and programmes has been transposed into the Environmental Protection Act and the Ordinance of the terms and conditions of performance of environmental assessment of plans and programmes (№ 139/2004).

Directive 80/777/EC on rapprochement of member states legislations concerning exploitation and selling of natural mineral waters and **Directive 2003/40/EC** on making list, concentration limits and requirements for show-cards about the natural mineral waters components and conditions for the use of ozone treated air on natural mineral and sources waters are transposed with Ordinance for requirements to mineral, sources and dinning waters intended for drinking water purposes.

Directive 2008/56/EC o**n EC action framework creation for the maritime environment policy (Framework Directive for maritime strategy)** is transposed with Ordinance of environment protection in maritime waters/2010.

Directive 2007/60/EC on evaluation and management of flood' risk is transposed with the Water Act and Regulations on activity, work organization and structure of basin directorates.

Directive 92/43/EEC on protection of natural habitations and wild flora and fauna is transposed with the Biological diversity Law, Ordinance №11/2009 for conditions and order to applying measure 214 "Agro ecological payments of the Program for development of rural areas 2007-2013, Ordinance №23/2010 on conditions and order to give a grant for measure 2.5 Fishing in internal water basins.

Directive 2009/90/EC on determination according Directive 2000/60 of technical specifications for chemical analysis and monitoring of water's status – the transposing act will be presented in the Action plan of Ministers Council

Directive 2008/105/EC on determination of standards for the environment's quality in water policy is transposed with Ordinance on environment quality standards for substances and other polluters and Regulation on activity, work organization and structure of basin directorates /2011.

Directive 86/278/EEC on environment protection and especially of earth after using sludge from waste water treatment in agriculture is transposed in the Law of wastes management.

APPENDIX 2-1: REGULATORY FRAMEWORK IN BULGARIA

Territory/Municipality, district	TERRITORY (sq. km)
Republic of Bulgaria	11 0630.9
Pazardzhik – District	4458.0
Pazardzhik Municipality	636.8
Share of the territory of Pazardzhik Municipality from the territory of Pazardzhik district	14,2%
Share of the territory of Pazardzhik Municipality from the territory of Republic of Bulgaria	0,5%
Septemvri Municipality	361,3
Share of the territory of Pazardzhik Municipality from the territory of Pazardzhik district	7,8%
Share of the territory of Pazardzhik Municipality from the territory of Republic of Bulgaria	0,3%
Lesichovo Municipality	208,9
Share of the territory of Pazardzhik Municipality from the territory of Pazardzhik district	4,7%
Share of the territory of Pazardzhik Municipality from the territory of Republic of Bulgaria	0,2%
Total designated territory	1209
Share of the territory of Pazardzhik Municipality from the territory of Pazardzhik district	27,12 %
Share of the territory of Pazardzhik Municipality from the territory of Republic of Bulgaria	1,09%

APPENDIX 3-1 WATER BODIES "RIVER" AND "LAKES" CATEGORY ALONG THE VALLEY OF THE RIVERS WITHIN THE DESIGNATED TERRITORY OF VIK PAZARDZHIK

N	Name of the river	Description of the water body	Code EU_CD	Code of the type	Type of the water body
1	Maritsa river	The Maritsa from the Topolnitsa to the mouhth of the Vacha and ГОК-9 and ГОКII	BG3MA790R157	TP 011111	Breakstone semi-mountain
2	Maritsa river	Maritsa river and Topolnitsa river to inlet of Vacha river and ГОК-9 and ГОК II	BG3MA700R143	TP 002110	Large rivers
3	Topolnitsa river	Topolnitsa river from Topolnitsa dam to discharge of Elshishka river (village of Dragor)	BG3MA800R159	TP 011111	Breakstone semi-mountain
4	Topolnitsa river	Topolnitsa river from village of Dragor to discharge and Elshishka river	BG3MA800R158	TP 011111	Breakstone semi-mountain
5	Luda Yana river	Luda Yana river from inlet of Strelchenska Luda Yana river to discharge	BG3MA700R149	TP 011111	Breakstone semi-mountain
6	Potoka river	Potoka river from the spring to the town of Saedinenie.	BG3MA500R129	TP 012111	Small and medium rivers with fine a substrate
7	Chepinska river	Chepinska river from beginning of correction to discharge and Grohocaa river	BG3MA900R184	TP 011111	Breakstone semi-mountain
8	Selska river	Selska river and tributaries and ГОК Chakasha	BG3MA700R156	TP 011111	Breakstone semi-mountain
9	Byala reka river	Byala reka river and tributaries	BG3MA700R156	TP 011111	Breakstone semi-mountain

Source: RBMP, *2009*

At the designated territory of Pazardzhik there are areas of the following built irrigation systems:

№	Irrigation system (IS)	Areas with suitable infrastructure, dka
	First region	
1.	IS Karabunar	48 010
2.	IS Topolnitsa	360 820
3.	IS Varvara	37 210
4.	IS Aleko- Pazardzhik	91 490
	Second Region	
1.	IS Aleko - Potoka	32 280

- Irrigation system Karabunar. It is part of water system Topolnitsa. Main water sources are Topolnitsa river and cascade Belmeken – Sestrimo. Transferred water by channel Momina Klisura – Lesichovo and put to the main irrigation channel Lesichovo – Stryama for irrigation.
- Irrigation System "Topolnitsa" - The main water sources are Topolnitsa dam and Pyasachnik dam, Batashki hydroelectric line and cascade Belmeken-Sestrimo with transferred to them waters. Use and local water sources - small dams, groundwater and flowing water from Luda Yana river, Stryama river and Potoka river, which are more locally important.
- Irrigation System "Aleko- Pazardzhik". The main water source is Batashki hydroelectric line by channel "Aleko-Potoka". As an additional water source are used Maritsa River and Topolnitsa riverwith water intake in Pazardzhik for water supply of channel "Pasha Arc".
- Irrigation system Varvara. Напоителна система “Варвара”. The main water sources are Chepinska river, on which Near village of Varvara is built water catchment and Aleko – Potoka catchment.
- Irrigation System "Aleko - Potoka. The main source is the IS "Topolnitsa" from which take excess water and are used.

APPENDIX 3-2 SUMMARY OF THE CONDITION OF THE WATER BODIES IN MARITSA RIVER BASIN

№	Code	Water body	Type	environmental condition	chemical status	general Condition	note
1	BG3MA500R129	Potoka river from springs near town of Saedinie	TR29	Fairly 3	Very good 2	Poor 1	Fairly
2	BG3MA700R143	The Maritsa from the Topolnitsa to the mouhth of the Vacha and ГОК-9 and ГОКII	TR27	Poor 1	Very good 2	Poor 1	
3	BG3MA700R149	The Luda Yana from the mouth of the Strelchanska Luda Yana to the mouth	TR27	Very poor 1	Very good 2	Poor 1	
4	BG3MA700R156	The Selska river and its tributaries and ГОК Chakasha	TR27	Very good 5	Very good 2	Good 2	
5	BG3MA790R157	The Maritsa from Belovo to the Topolnitsa and ГОК-13 – К1(ГК1)	TR27	Poor 2	Very good 2	Poor 1	
6	BG3MA800R158	The Topolnitsa from Dragor village to the mouth and Elshishka river	TR27	Poor 2	Very good 2	Poor 1	
7	BG3MA800R159	The Topolnitsa from Topolnitsa dam to the mouth of the Elshishka (Dragor village)	TR27	Poor 2	Very good 2	Poor 1	
8	BG3MA900R184	The Chepinska from initial correction to the mouth and Grohocha river	TR27	Poor 2	Very good 2	Poor 1	

Source: RBMP, 2009.

APPENDIX 3-3: AVERAGE ANNUAL CAPACITY OF THE WATER ABSTRACTION FACILITIES OR ABSTRACTED WATER IN 2011 – PAZARDZHIK DISTRICT

№ By order	Water supply system – type of the water taking asset	Place of water use	№ of the permit	Date of authorization	Permitted water quantity m3/year	Code of the groundwater body
I	**Pazardzhik**				**16 056 108**	
1	PS Mokrishte (East) – 7 tube wells: TW1[1], TW2[а], TW3, TW4, TW5, TW11, TW12 PS Mokrishte (West) – 6 tube wells: TW6, TW7, TW8, TW9, TW10 , TW113 PS Mokrishte (Karaman tepe) – 11 tube wells: TW1[б], TW2[в], TW2[г], TW3[б], TW4[а], TW5[а], TW5[в], TW6[а], TW 6[б], TW7, TW8	Pazardzhik, Mokrishte, Miryantsi	31510334	09.03.2012	7 900 000	BG3G00000NQ013 BG3G000000Q018
2	PS Ivaylo – TW1, TW2, TW3	Pazardzhik, Dragor, Saraya, Ivaylo, Dobrovnitsa	№ ПБ-288	14.10.2011	3 400 000	BG3G00000NQ018
3	PS Garata" – TW1a	Glavinitsa	0370	19.06.2001	476 645	BG3G00000NQ018
4	PS Glavinitsa – TW-2a (reserve)	Industrial zone of Pazardzhik, Glavinitsa	31510245	10.08.2010	174 893	BG3G00000NQ018
5	PS "Malo konare-Pishtigovo" – TW1[а] , TW2,TW1-reserve	Malo konare, Pishtigovo	31510249	24.09.2010	108 000 342 000	BG3G00000NQ018
6	PS „Ognyanovo" – TW-1, TW-2	Ognyanovo	31510253	27.10.2010	350 000	BG3G00000NQ018

[1] TW – Tube Well

№ By order	Water supply system – type of the water taking asset	Place of water use	№ of the permit	Date of authorization	Permitted water quantity m3/year	Code of the groundwater body
7	PS „Aleko Konstantinovo" – TW-1a, TW-2-reserve	Aleko Konstantinovo	31510250 Реш. PP-1510	06.10.2010 28.05.2012	250 000	BG3G00000NQ018
8	PS Pishtigovo, Chernogorovo, Krali Marko – SW1 и TW1-reserve, TW2, TW3[a]	Pishtigovo, Chernogorovo, Krali Marko	31510261	16.12.2010	430 000	BG3G00000NQ018
9	PS Hadzhievo – TW-1	Hadzhievo	31510262	22.12.2010	120 000	BG3G00000NQ013
10	PS Gelemenovo – TW-1, TW-2	Gelemenovo	31510268	28.02.2011	120 000	BG3G000000Q013 BG3G00000NQ018
11	PS Velichkovo – TW1, TW2	Velichkovo	31510362	13.07.2012	280 000	BG3G00000NQ018
12	PS Yunatsite-TW1(res.), TW1a, TW2	Yunatsite	31510363	16.07.2012	95 000	BG3G00000NQ018
13	PS Ovchepoltsi – Topoli dol – TW1, SW1[2],SW2, SW3	Ovchepoltsi, Topoli dol	0370	19.06.2001	216 500	BG3G00000NQ013 BG3G000000Q018
	PS Ovchepoltsi – Kozla catchment	Topoli dol	0370	19.06.2001	63 070	BG3G00000Pt044
14	PS Rosen – Tsar Asen - SW1, SW2	Rosen, Tsar Asen	0370	19.06.2001	271 000	BG3G000000Q013
15	PS Apriltsi – Sbor -TW1	Apriltsi, Sbor	0370	19.06.2001	145 000	BG3G00000NQ018
16	PS Zvanichevo – TW1, TW2, TW3	Zvanichevo	0370	19.06.2001	201 000	BG3G000000Q013
17	PS Lyahovo - Bratanitsa- TW1, TW2	Lyahovo, Bratanitsa	0370	19.06.2001	234 000	BG3G00000NQ018
18	PS Patalenitsa - TW1, TW2, SW1,	Patalenitsa, Tsrancha	0370	19.06.2001	400 000	BG3G00000NQ018

[2] SW – Shaft Well

№ By order	Water supply system – type of the water taking asset	Place of water use	№ of the permit	Date of authorization	Permitted water quantity m3/year	Code of the groundwater body
	SC1[3], SC2, SC3		0370	19.06.2001	131 000	BG3G00000Pt047
19	PS Tsrancha – TW1, TW2 SC1÷SC5	Tsrancha	App. 0370	07.2012 19.06.2001	190 000 87 000	BG3G00000NQ013 BG3G000000Q018 BG3G00000PgN020
20	Debrashtitsa – SC „Dobra voda”	Debrashtitsa	App.	10.2012	180 000	BG3G00000PgN020
21	PS Sinitevo – TW1a, TW2a	Sinitevo	№ ПВ-108	25.04.2012	140 000	BG3G000000Q013 BG3G00000NQ018
22	PS Govedare – TW1	Govedare	0370	19.06.2001	97 000	BG3G00000NQ018
II	**Lesichovo**				**300 000**	
1	PS Dinkata – TW1, TW2	Dinkata, Pamidovo	0370	19.06.2001	150 000	BG3G00000NQ018
2	PS Shtarkovo – TW1, TW2, TW3	Shtarkovo, Dinkata	0370	19.06.2001	150 000	BG3G00000NQ018
III	**Septemvri**				4 940 650	
1	Group Vetren – ShaftTW1[4], ShaftTW2, ShaftTW3, ShaftTW4[a], ShaftTW5, ShaftTW6, ShaftSCTW7	Vetren, Gorno Varshilo, Vinogradets, Slavovitsa- Septemvri Municipality, Kalugreovo, Borimechkovo, Lesichovo, Tserovo – Lesichovo Municipality, and Akandzhievo – Belovo Municipality	31510236	02.06.2010	1 558 850	BG3G000000Q013
2	Ps Karabunar– TW-1, TW-2, TW-3, TW-4, TW-5(not in operation)	Karabunar, Boshulya	31510271	14.03.2011	375 000	BG3G000000Q013 BG3G00000NQ018
3	Vetren, Gorna Arda - TW-1, TW-2,	Septemvri	31510273	12.04.2011	1 500 000	

[3] SC – Spring Catchment

[4] Shaft TW – Shaft Tube Well

№ By order	Water supply system – type of the water taking asset	Place of water use	№ of the permit	Date of authorization	Permitted water quantity m3/year	Code of the groundwater body
	TW-3, TW-4, TW-5					BG3G000000Q013
4	Varvara, Gadinite I Elova vrata- TW1, TW2, TW3	Varvara, Vetren dol	31510272	08.04.2011	828 000	BG3G000000Q013
5	PS Kovachevo – TW1, TW2	Lozen, Kovachevo	App.	10.2012	270 000	BG3G00000NQ018
6	PS Semchinovo- Simeonovets - SC1÷SC4 Simeonovets - SC1÷SC3 - Hanchetata - TW1, TW2,	Semchinovo, Simeonovets	App. 0370 0370	07.2012 19.06.2001 19.06.2001	250 000 63 000 89 500	BG3G00000Pt047 BG3G00000Pt0347 BG3G00000NQ018
7	SC Dolno Varshilo (not serviced by the ViK Operator	Dolno Varshilo			6 300	BG3G00000Pt044
	Total				21 296 758	

Note: Water quantities referred in blue font are License № 0370/19.06.2001 , which is expired.

APPENDIX 3-4 RESULTS OF MONITORING OF CHEMICAL COMPOSITION OF GROUNDWATER - PAZARDZHIK DISTRICT

№ by order	Water supply system, water supply assets	Parameters, mg/l (Maximum permitted value by Ordinance № 9/2001)				
		NH_4 (0,50)	NO_3 (50)	$KMnO_4$ (5)	F (0,2)	Mn (0,05)
1	PS Mokrishte	< 0,013	12-19	0,5	0,04	< 0,01
2	PS Ivaylo – Pazardzhik, Ivaylo, Dobrovnitsa, Saraya	< 0,013	52÷65÷to 2011 21,2÷64,6-2011 28,2÷46,8-2012	0,6	0,049	< 0,01
3	PS Garata	0,020	9-10	0,5	0,04	< 0,01
4	Malo Konare	< 0,013	8-9	0,5	< 0,005	< 0,01
5	Pishtigovo	0,034	13-18	0,4	0,011	< 0,01
6	Septemvri	0,016	2-4	0,5	0,008	< 0,01
7	Vetren	< 0,013	6,5-9	0,4	0,017	0,011
8	Velichkovo – TW TW2	< 0,013 < 0,013	6-8 40-50	0,9 0,6	0,012 He	< 0,01 < 0,01
9	Yunatsite	0,019	2-3	0,5	0,014	< 0,013
10	Ognyanovo	0,014	5-7	0,5	< 0,005	< 0,01
11	Hadzhievo	< 0,013	32-37	0,4	< 0,005	< 0,01
12	GOvedare	< 0,013	12-15	0,4	0,025	< 0,01
13	Tsrancha – gravity Borehole № 2	< 0,013 0,026	1 24	1,2 0,5	0,045 0,038	0,038 < 0,01
14	Patalenitsa – Mixed from PS	< 0,013 < 0,013	12 24	0,6 0,4	0,008 0,015	< 0,01 < 0,01
15	Debrashtitsa	0,029	1-2	0,5	< 0,005	< 0,01
16	Zvanichevo	0,027	9-12	0,4	0,014	< 0,01
17	Sinitovo	0,029	12-14	0,5	< 0,005	< 0,01
18	Lyahovo – Bratanitsa	0,013	34-40	0,5	0,006	< 0,01
19	Alekovo	< 0,013	13-15	0,4	0,007	< 0,01
20	Chernogorovo – Krali Marko	0,027	26-54	0,6	0,028	< 0,01
21	Ovchepoltsi – Topoli dol	0,017/< 0,013	26-27/15-32	0,5/0,5	< 0,005/ 0,005	< 0,01/ 0,01
22	Apriltsi – Sbor	0,014	45-55	0,5	< 0,005	< 0,01
23	Rosen	< 0,013	10-18	0,8	< 0,005	< 0,01
24	Tsar Assen	0,027	16-26	0,7	< 0,005	< 0,01
25	Gelemenovo	< 0,013	4-5	0,6	0,005	< 0,01
26	Vetren dol №3/Varvara 01+гр.	< 0,013/0,013	6-7/6-8	0,6/0,7	0,009/< 0,005	< 0,01/ 0,01
27	Lozen – Kovachevo	0,036	5-8	0,4	0,026	< 0,01

№ by order	Water supply system, water supply assets	Parameters, mg/l (Maximum permitted value by Ordinance № 9/2001)				
		NH_4 (0,50)	NO_3 (50)	$KMnO_4$ (5)	F (0,2)	Mn (0,05)
28	Hancheta/Semchinovo/ Simeonovets	< 0,013/< 0,013/0,027	14/2/1,5-2	0,5/0,7/0,8	<0,005/<0,005/< 0,005	<0,01/<0,01/ < 0,01
29	Karabunar-Boshulya	0,029	7-9	0,6	0,012	0,012
30	Dinkata –Shtarkovo	< 0,013	2-3	0,6	0,093-0,117	0,010
31	Pamidovo	< 0,013	4-5	0,4	0,143	0,015

Note: The results for the nitrate content in the water of Pazardzhik, Ivaylo, Dobrovnitsa and Saraya supplied by PS "Ivaylo" in 2011 and 2012 from a letter with ref. № I-1935/28.02.2013 of Regional Health Inspectorate - Pazardzhik to Consortium "Syoreka" sce, Arcadia, Hydroproekt.

APPENDIX 3-5: CURRENT WATER CONSUMPTION BY THE CATEGORY OF THE CONSUMERS

Table: Dynamics of water use in settlements in the "ViK" Pazardzhik 2011

Settlement	2011 г				% от 2011 г			
	Domestic users	Industrial and commercial customers (companies)	Public customers (schools, kindergartens, administration, etc.).	Total quantity of sold water	domestic users	Industrial and commercial customers (companies)	Public customers (schools, kindergartens, administration, etc.).	Total quantity of sold water
	m3/year	m3/year	m3/year	m3/year	%	%	%	%
Pazardzhik Municipality								
Pazardzhik	2 481 483	464 598	272 041	3 218 122	77	14	8	100
Aleko Konstantinovo	72 065	8 084	768	80 917	89	10	1	100
Apriltsi	14 857	201	47	15 105	98	1	0	100
Bratanitsa	58 083	1 899	1 041	61 023	95	3	2	100
Chernogorovo	70 783	4 668	1 470	76 921	92	6	2	100
Debrashtitsa	46 662	10 127	1 034	57 823	80,7	17,5	1,8	100
Dobrovnitsa	53 683	1 488	508	55 679	96,4	2,7	0,9	100
Dragor	37 859	534	200	38 593	98,1	1,4	0,5	100
Gelemenovo	28 236	18 191	502	46 929	60,2	38,8	1,1	100
Glavinitsa	74 189	71 220	5 344	150 753	49,2	47,2	3,5	100
Govedare	58 476	2 249	1 839	62 564	93,5	3,6	2,9	100
Hadzhievo	35 079	1 387	806	37 272	94,1	3,7	2,2	100
Ivaylo	99 099	7 519	1 050	107 668	92,0	7,0	1,0	100
Krali Marko	6 899	233	128	7 260	95,0	3,2	1,8	100
Lyahovo	13 571	383	6	13 960	97,2	2,7	0,0	100
Malo Konare	137 493	7 569	2 061	147 123	93,5	5,1	1,4	100
Miryantsi	25 695	3 705	236	29 636	86,7	12,5	0,8	100
Mokrishte	63 212	1 723	507	65 442	96,6	2,6	0,8	100
Ognyanovo	88 526	59 571	2 234	150 331	58,9	39,6	1,5	100
Ovchepoltsi	40 201	2 196	910	43 307	92,8	5,1	2,1	100
Patalenitsa	73 158	5 646	783	79 587	91,9	7,1	1,0	100
Pishtigovo	32 469	2 549	238	35 256	92,1	7,2	0,7	100
Rosen	22 289	314	37	22 640	98,4	1,4	0,2	100
Saraya	33 049	1 333	560	34 942	94,6	3,8	1,6	100
Sbor	15 634	329	32	15 995	97,7	2,1	0,2	100
Sinitovo	72 154	2 753	771	75 678	95,3	3,6	1,0	100
Topoli dol	11 202	891	267	12 360	90,6	7,2	2,2	100
Tsar Asen	15 785	429	216	16 430	96,1	2,6	1,3	100
Tsrancha	57 540	3 105	2 495	63 140	91,1	4,9	4,0	100

Settlement	2011 г				% от 2011 г			
	Domestic users	Industrial and commercial customers (companies)	Public customers (schools, kindergartens, administration, etc.).	Total quantity of sold water	domestic users	Industrial and commercial customers (companies)	Public customers (schools, kindergartens, administration, etc.).	Total quantity of sold water
	m3/year	m3/year	m3/year	m3/year	%	%	%	%
Velichkovo	48 850	24 740	872	74 462	65,6	33,2	1,2	100
Yunatsite	55 361	7 224	1 091	63 676	86,9	11,3	1,7	100
Zvanichevo	64 149	1 803	496	66 448	96,5	2,7	0,7	100
Septemvri Municipality								
Septemvri	281 466	34 397	8 890	324 753	86,7	10,6	2,7	100
Vetren	108 250	7 954	4 491	120 695	89,7	6,6	3,7	100
Boshulya	28 259	886	74	29 219	96,7	3,0	0,3	100
Gorno Varshilo	3 004	201	5	3 210	93,6	6,3	0,2	100
Karabunar	49 026	2 633	403	52 062	94,2	5,1	0,8	100
Kovachevo	68 512	2 112	1 504	72 128	95,0	2,9	2,1	100
Lozen	37 066	1 926	2 601	41 593	89,1	4,6	6,3	100
Semchonovo	56 746	3 245	1 511	61 502	92,3	5,3	2,5	100
Simeonovets	36 526	3 401	872	40 799	89,5	8,3	2,1	100
Slavovitsa	20 070	474	7 244	27 788	72,2	1,7	26,1	100
Varvara	71 481	6 680	676	78 837	90,7	8,5	0,9	100
Vetren dol	38 600	2 846	619	42 065	91,8	6,8	1,5	100
Vinogradets	46 438	12 103	3 592	62 133	74,7	19,5	5,8	100
Zlokuchene	18 041	899	1 391	20 331	88,7	4,4	6,8	100
Belovo Municipality								
Akandzhievo	15 741	493	185	16 419	95,9	3,0	1,1	100
Lesichevo Municipality								
Borimechkovo	13 494	74	238	13 806	97,7	0,5	1,7	100
Dinkata	26 134	1 250	117	27 501	95,0	4,5	0,4	100
Kalugerovo	40 382	3 738	642	44 762	90,2	8,4	1,4	100
Lesichevo	36 757	3 119	2 825	42 701	86,1	7,3	6,6	100
Pamidovo	11 749	870	108	12 727	92,3	6,8	0,8	100
Shtarkovo	12 079	47	2 503	14 629	82,6	0,3	17,1	100
Tserovo	30 033	2 707	282	33 022	90,9	8,2	0,9	100

Table: Summary Table of the water consumption for "ViK" Pazardzhik 2011

Settlement	Total population in the serviced area	population served	Coverage of services	Domestic usage	Percentage of domestic use	Non –domestic usage	Percentage of non-domestic consumption	Total consumption (domestic + non-domestic)	Specific domestic use	Total specific consumption
	Number	Number	%	m3/year	%	m3/year	%	m3/year	l/in/d	l/in/d
Pazardzhik Municipality										
Pazardzhik	71 979	71 979	100%	2 481 483	77%	736 639	23%	3 218 122	94	122
Aleko Konstantinovo	2 714	2 714	100%	72 065	89%	8 852	11%	80 917	73	82
Apriltsi	526	526	100%	14 857	98%	248	2%	15 105	77	79
Bratanitsa	2 093	2 093	100%	58 083	95%	2 940	5%	61 023	76	80
Chernogorovo	2 203	2 203	100%	70 783	92%	6 138	8%	76 921	88	96
Debrashtitsa	1 065	1 065	100%	46 662	81%	11 161	19%	57 823	120	149
Dobrovnitsa	1 380	1 380	100%	53 683	96%	1 996	4%	55 679	107	111
Dragor	1 422	1 422	100%	37 859	98%	734	2%	38 593	73	74
Gelemenovo	695	695	100%	28 236	60%	18 693	40%	46 929	111	185
Glavinitsa	2 282	2 282	100%	74 189	49%	76 564	51%	150 753	89	181
Govedare	1 634	1 634	100%	58 476	93%	4 088	7%	62 564	98	105
Hadzhievo	1 027	1 027	100%	35 079	94%	2 193	6%	37 272	94	99
Ivaylo	2 841	2 841	100%	99 099	92%	8 569	8%	107 668	96	104
Krali Marko	190	190	100%	6 899	95%	361	5%	7 260	99	105
Lyahovo	391	391	100%	13 571	97%	389	3%	13 960	95	98
Malo Konare	4 353	4 353	100%	137 493	93%	9 630	7%	147 123	87	93
Miryantsi	587	587	100%	25 695	87%	3 941	13%	29 636	120	138
Mokrishte	1 851	1 851	100%	63 212	97%	2 230	3%	65 442	94	97
Ognyanovo	2 353	2 353	100%	88 526	59%	61 805	41%	150 331	103	175
Ovchepoltsi	972	972	100%	40 201	93%	3 106	7%	43 307	113	122
Patalenitsa	1 670	1 670	100%	73 158	92%	6 429	8%	79 587	120	131
Pishtigovo	1 037	1 037	100%	32 469	92%	2 787	8%	35 256	86	93
Rosen	516	516	100%	22 289	98%	351	2%	22 640	118	120
Saraya	1 356	1 356	100%	33 049	95%	1 893	5%	34 942	67	71
Sbor	357	357	100%	15 634	98%	361	2%	15 995	120	123
Sinitovo	1 950	1 950	100%	72 154	95%	3 524	5%	75 678	101	106
Topoli dol	268	268	100%	11 202	91%	1 158	9%	12 360	115	126
Tsar Asen	360	360	100%	15 785	96%	645	4%	16 430	120	125
Tsrancha	1 314	1 314	100%	57 540	91%	5 600	9%	63 140	120	132
Velichkovo	1 115	1 115	100%	48 850	66%	25 612	34%	74 462	120	183
Yunatsite	1 522	1 522	100%	55 361	87%	8 315	13%	63 676	100	115
Zvanichevo	1 899	1 899	100%	64 149	97%	2 299	3%	66 448	93	96
Total:	115 922	115 922	100%	4 007 791	80%	1 019 251	20%	5 027	95	119

Settlement	Total population in the serviced area	population served	Coverage of services	Domestic usage	Percentage of domestic use	Non –domestic usage	Percentage of non-domestic consumption	Total consumption (domestic + non-domestic)	Specific domestic use	Total specific consumption
	Number	Number	%	m3/year	%	m3/year	%	m3/year	l/in/d	l/in/d
								042		
Septemvri Municipality										
Septemvri	7 869	7 869	100%	281 466	87%	43 287	13%	324 753	98	113
Vetren	3 221	3 221	100%	108 250	90%	12 445	10%	120 695	92	103
Boshulya	816	816	100%	28 259	97%	960	3%	29 219	95	98
Gorno Varshilo	69	69	100%	3 004	94%	206	6%	3 210	119	127
Karabunar	1 349	1 349	100%	49 026	94%	3 036	6%	52 062	100	106
Kovachevo	2 402	2 402	100%	68 512	95%	3 616	5%	72 128	78	82
Lozen	1 019	1 019	100%	37 066	89%	4 527	11%	41 593	100	112
Semchonovo	1 943	1 943	100%	56 746	92%	4 756	8%	61 502	80	87
Simeonovets	898	898	100%	36 526	90%	4 273	10%	40 799	111	124
Slavovitsa	458	458	100%	20 070	72%	7 718	28%	27 788	120	166
Varvara	2 061	2 061	100%	71 481	91%	7 356	9%	78 837	95	105
Vetren dol	1 452	1 452	100%	38 600	92%	3 465	8%	42 065	73	79
Vinogradets	1 481	1 481	100%	46 438	75%	15 695	25%	62 133	86	115
Zlokuchene	860	860	100%	18 041	89%	2 290	11%	20 331	57	65
Total:	25 898	25 898	100%	863 485	88%	113 630	12%	977 115	91	103
Belovo Municipality										
Akandzhievo	420	420	100%	15 741	96%	678	4%	16 419	103	107
Total:	420	420	100%	15 741	96%	678	4%	16 419	103	107
Lesichevo Municipality										
Borimechkovo	569	569	100%	13 494	98%	312	2%	13 806	65	66
Dinkata	1 164	1 164	100%	26 134	95%	1 367	5%	27 501	62	65
Kalugerovo	1 164	1 164	100%	40 382	90%	4 380	10%	44 762	95	105
Lesichevo	839	839	100%	36 757	86%	5 944	14%	42 701	120	139
Pamidovo	378	378	100%	11 749	92%	978	8%	12 727	85	92
Shtarkovo	394	394	100%	12 079	83%	2 550	17%	14 629	84	102
Tserovo	911	911	100%	30 033	91%	2 989	9%	33 022	90	99
Total:	5 419	5 419	100%	170 628	90%	18 520	10%	189 148	86	96
Total for ViK Pazardzhik	147 659	147659	100%	5 057 645	81%	1 152 079	19%	6 209 724	94	115

APPENDIX 3-6: IWA WATER BALANCE IN 2011

Table : IWA Water Balance for town of Pazardzhik for 2011

<table>
<tr><td rowspan="6">Total drinking water produced (system input) 7,862,238 m3/year [П]</td><td rowspan="2">Authorised consumption 3,221,122 m3/year</td><td rowspan="2">Billed authorised consumption 3 218 122 m3/year</td><td>Billed metered consumption 3 207 761 m3/year [А]</td><td rowspan="2">Revenue water (billed) 3 218 122 m3/year</td></tr>
<tr><td>Billed unmetered consumption 10 361 m3/year [Б]</td></tr>
<tr><td rowspan="2">Unbilled authorized consumption 3 000 m3/year</td><td>Unbilled metered consumption 0 m3/year [В]</td><td rowspan="4">Non-Revenue water (water losses) 4 644 116 m3/year</td></tr>
<tr><td rowspan="3">Water losses 4 641 116 m3/year</td><td>Unbilled unmetered consumption: 3 000 m3/year [Г]</td></tr>
<tr><td>Commercial losses 928 823 m3/year</td><td>Theft 607 011 m3/year [Д]</td></tr>
<tr><td rowspan="3">Technical (physical) losses 3 712 293 m3/year</td><td>Metering inaccuracies: 321 812 m3/year [Е]</td></tr>
<tr><td>Leakage on transmission and distribution lines 3 415 309 m3/year [Ж]</td></tr>
<tr><td>Leakage from overflow at storage tanks: 0 m3/year [З]</td></tr>
<tr><td colspan="3">Leakage on service connections 296 983 m3/year [И]</td></tr>
</table>

Table : IWA Water Balance for Malo konare for 2011

<table>
<tr><td rowspan="6">Total drinking water produced (system input) 267 522 m3/year [П]</td><td rowspan="2">Authorised consumption147 123 m3/year</td><td rowspan="2">Billed authorised consumption 147 123 m3/year</td><td>Billed metered consumption 146 719 m3/year [А]</td><td rowspan="2">Revenue water (billed) 147 123 m3/year</td></tr>
<tr><td>Billed unmetered consumption 404 m3/year [Б]</td></tr>
<tr><td rowspan="2">Unbilled authorised consumption 0 m3/year</td><td>Unbilled metered consumption 0 m3/year [В]</td><td rowspan="4">Non-Revenue water (water losses) 120 399 m3/year</td></tr>
<tr><td rowspan="3">Water water losses 120 399 m3/year</td><td>Unbilled unmetered consumption: 0 m3/year [Г]</td></tr>
<tr><td>Commercial water losses 24 080 m3/year</td><td>Theft 9 368 m3/year [Д]</td></tr>
<tr><td rowspan="3">Technical (physical) water losses 96 319 m3/year</td><td>Metering inaccuracies: 14 712 m3/year [Е]</td></tr>
<tr><td>Leakage on transmission and distribution lines 88 614 m3/year [Ж]</td></tr>
<tr><td>Leakage from overflow at storage tanks: 0 m3/year [З]</td></tr>
<tr><td colspan="3">Leakage on service connections 7 706 m3/year [И]</td></tr>
</table>

Table : IWA Water Balance for Ivaylo for 2011

<table>
<tr><td rowspan="6">Total drinking water produced (system input) 263 045 m3/year [П]</td><td rowspan="2">Authorised consumption 107 668 m3/year</td><td rowspan="2">Billed authorised consumption 107 668 m3/year</td><td>Billed metered consumption 107 597 m3/year [А]</td><td rowspan="2">Revenue water (billed) 107 668 m3/year</td></tr>
<tr><td>Billed unmetered consumption 71 m3/year [Б]</td></tr>
<tr><td rowspan="2">Unbilled authorised consumption 0 m3/year</td><td>Unbilled metered consumption 0 m3/year [В]</td><td rowspan="4">Non-Revenue water (water losses) 155 377 m3/year</td></tr>
<tr><td>Unbilled unmetered consumption: 0 [Г]</td></tr>
<tr><td rowspan="4">Water water losses 155 377 m3/year</td><td>Commercial water losses 31 075 m3/year</td><td>Theft 20 309 m3/year [Д]</td></tr>
<tr><td>Technical (physical) water losses 124 302 m3/year</td><td>Metering inaccuracies: 10 767 m3/year [Е]</td></tr>
<tr><td>Leakage on transmission and distribution lines 114 357 m3/year [Ж]</td></tr>
<tr><td>Leakage from overflow at storage tanks: 0 m3/year [З]</td></tr>
<tr><td colspan="3">Leakage on service connections 9 944 m3/year [И]</td></tr>
</table>

Table : IWA Water Balance for Aleko Konstantinovo for 2011

<table>
<tr><td rowspan="6">Total drinking water produced (system input) 192 776 m3/year [П]</td><td rowspan="2">Authorised consumption80 917 m3/year</td><td rowspan="2">Billed authorised consumption 80 917 m3/year</td><td>Billed metered consumption 80 917 m3/year [А]</td><td rowspan="2">Revenue water (billed) 80 917 m3/year</td></tr>
<tr><td>Billed unmetered consumption 0 m3/year [Б]</td></tr>
<tr><td rowspan="2">Unbilled authorised consumption 0 m3/year</td><td>Unbilled metered consumption 0 m3/year [В]</td><td rowspan="4">Non-Revenue water (water losses) 111 859 m3/year</td></tr>
<tr><td>Unbilled unmetered consumption: 0 [Г]</td></tr>
<tr><td rowspan="4">Water water losses 111 859 m3/year</td><td>Commercial water losses 22 372 m3/year</td><td>Theft 14 280 m3/year [Д]</td></tr>
<tr><td>Technical (physical) water losses 89 487 m3/year</td><td>Metering inaccuracies: 8 092 m3/year [Е]</td></tr>
<tr><td>Leakage on transmission and distribution lines 82 328 m3/year [Ж]</td></tr>
<tr><td>Leakage from overflow at storage tanks: 0 m3/year [З]</td></tr>
<tr><td colspan="3">Leakage on service connections 7 159 m3/year [И]</td></tr>
</table>

Table : IWA Water Balance for Ognyanovo for 2011

<table>
<tr><td rowspan="7">Total drinking water produced (system input)
300 653 m3/year
[П]</td><td rowspan="3">Authorised consumption
150 331 m3/year</td><td rowspan="2">Billed authorised consumption
150 331 m3/year</td><td>Billed metered consumption
150 260 m3/year [А]</td><td>Revenue water (billed)
150 331 m3/year</td></tr>
<tr><td>Billed unmetered consumption
71 m3/year [Б]</td><td rowspan="5">Non-Revenue water (water losses)
150 322 m3/year</td></tr>
<tr><td rowspan="2">Unbilled authorised consumption
0 m3/year</td><td>Unbilled metered consumption
0 m3/year [В]</td></tr>
<tr><td>Unbilled unmetered consumption: 0 [Г]</td></tr>
<tr><td rowspan="4">Water water losses
150 322 m3/year</td><td rowspan="2">Commercial water losses
30 064 m3/year</td><td>Theft 15 031 m3/year [Д]</td></tr>
<tr><td>Metering inaccuracies: 15 033 m3/year [Е]</td></tr>
<tr><td rowspan="3">Technical (physical) water losses
120 258 m3/year</td><td>Leakage on transmission and distribution lines 110 637 m3/year [Ж]</td></tr>
<tr><td>Leakage from overflow at storage tanks: 0 m3/year [З]</td></tr>
<tr><td>Leakage on service connections
9 621 m3/year [И]</td></tr>
</table>

Table : IWA Water Balance for Glavinitsa for 2011

<table>
<tr><td rowspan="7">Total drinking water produced (system input)
368 307 m3/year
[П]</td><td rowspan="3">Authorised consumption150 753 m3/year</td><td rowspan="2">Billed authorised consumption
150 753 m3/year</td><td>Billed metered consumption
150 753 m3/year [А]</td><td>Revenue water (billed)
150 753 m3/year</td></tr>
<tr><td>Billed unmetered consumption
0 m3/year [Б]</td><td rowspan="5">Non-Revenue water (water losses)
217 554 m3/year</td></tr>
<tr><td rowspan="2">Unbilled authorised consumption
0 m3/year</td><td>Unbilled metered consumption
0 m3/year [В]</td></tr>
<tr><td>Unbilled unmetered consumption: 0 [Г]</td></tr>
<tr><td rowspan="4">Water water losses
217 554 m3/year</td><td rowspan="2">Commercial water losses
43 511 m3/year</td><td>Theft 28 436 m3/year [Д]</td></tr>
<tr><td>Metering inaccuracies: 15 075 m3/year [Е]</td></tr>
<tr><td rowspan="3">Technical (physical) water losses
174 043 m3/year</td><td>Leakage on transmission and distribution lines 160 120 m3/year [Ж]</td></tr>
<tr><td>Leakage from overflow at storage tanks: 0 m3/year [З]</td></tr>
<tr><td>Leakage on service connections
13 923 m3/year [И]</td></tr>
</table>

Table : IWA Water Balance for Chernogorovo for 2011

<table>
<tr><td rowspan="7">Total drinking water produced (system input) 224 720 m3/year [П]</td><td rowspan="2">Authorised consumption76 921 m3/year</td><td rowspan="2">Billed authorised consumption 76 921 m3/year</td><td>Billed metered consumption 76 921 m3/year [А]</td><td rowspan="2">Revenue water (billed) 76 921 m3/year</td></tr>
<tr><td>Billed unmetered consumption 0 m3/year [Б]</td></tr>
<tr><td rowspan="2">Unbilled authorised consumption 0 m3/year</td><td>Unbilled metered consumption 0 m3/year [В]</td><td rowspan="5">Non-Revenue water (water losses) 147 799 m3/year</td></tr>
<tr><td>Unbilled unmetered consumption: 0 [Г]</td></tr>
<tr><td rowspan="5">Water water losses 147 799 m3/year</td><td rowspan="2">Commercial water losses 29 560 m3/year</td><td>Theft 21 868 m3/year [Д]</td></tr>
<tr><td>Metering inaccuracies: 7 692 m3/year [Е]</td></tr>
<tr><td rowspan="3">Technical (physical) water losses 118 239 m3/year</td><td>Leakage on transmission and distribution lines 108 780 m3/year [Ж]</td></tr>
<tr><td>Leakage from overflow at storage tanks: 0 m3/year [З]</td></tr>
<tr><td>Leakage on service connections 9 459 m3/year [И]</td></tr>
</table>

Table : IWA Water Balance for Bratanitsa for 2011

<table>
<tr><td rowspan="7">Total drinking water produced (system input) 188 567 m3/year [П]</td><td rowspan="2">Authorised consumption61 023 m3/year</td><td rowspan="2">Billed authorised consumption 61 023 m3/year</td><td>Billed metered consumption 60 167 m3/year [А]</td><td rowspan="2">Revenue water (billed) 61 023 m3/year</td></tr>
<tr><td>Billed unmetered consumption 856 m3/year [Б]</td></tr>
<tr><td rowspan="2">Unbilled authorised consumption 0 m3/year</td><td>Unbilled metered consumption 0 m3/year [В]</td><td rowspan="5">Non-Revenue water (water losses) 127 544 m3/year</td></tr>
<tr><td>Unbilled unmetered consumption: 0 [Г]</td></tr>
<tr><td rowspan="5">Water water losses 127 544 m3/year</td><td rowspan="2">Commercial water losses 25 509 m3/year</td><td>Theft 19 407 m3/year [Д]</td></tr>
<tr><td>Metering inaccuracies: 6 102 m3/year [Е]</td></tr>
<tr><td rowspan="3">Technical (physical) water losses 102 035 m3/year</td><td>Leakage on transmission and distribution lines 93 872 m3/year [Ж]</td></tr>
<tr><td>Leakage from overflow at storage tanks: 0 m3/year [З]</td></tr>
<tr><td>Leakage on service connections 8 163 m3/year [И]</td></tr>
</table>

Table : IWA Water Balance for town of Septemvri for 2011

<table>
<tr><td rowspan="8">Total drinking water produced (system input)
814 367 m3/year [П]</td><td rowspan="2">Authorised consumption324 753 m3/year</td><td rowspan="2">Billed authorised consumption 324 753 m3/year</td><td>Billed metered consumption 324 753 m3/year [А]</td><td rowspan="2">Revenue water (billed)
324 753 m3/year</td></tr>
<tr><td>Billed unmetered consumption 0 m3/year [Б]</td></tr>
<tr><td rowspan="2">Unbilled authorised consumption
0 m3/year</td><td>Unbilled metered consumption 0 m3/year [В]</td><td rowspan="6">Non-Revenue water (water losses)
489 614 m3/year</td></tr>
<tr><td>Unbilled unmetered consumption: 0 m3/year [Г]</td></tr>
<tr><td rowspan="4">Water water losses
489 614 m3/year</td><td rowspan="2">Commercial water losses 97 923 m3/year</td><td>Theft 65 448 m3/year [Д]</td></tr>
<tr><td>Metering inaccuracies: 32 475 m3/year [Е]</td></tr>
<tr><td rowspan="3">Technical (physical) water losses
391 691 m3/year</td><td>Leakage on transmission and distribution lines 360 356 m3/year [Ж]</td></tr>
<tr><td>Leakage from overflow at storage tanks: 0 m3/year [З]</td></tr>
<tr><td>Leakage on service connections
31 335 m3/year [И]</td></tr>
</table>

Table : IWA Water Balance for Vetren for 2011

<table>
<tr><td rowspan="8">Total drinking water produced (system input)
553 794 m3/year [П]</td><td rowspan="2">Authorised consumption121 095 m3/year</td><td rowspan="2">Billed authorised consumption 120 695 m3/year</td><td>Billed metered consumption 120 695 m3/year [А]</td><td rowspan="2">Revenue water (billed)
120 695 m3/year</td></tr>
<tr><td>Billed unmetered consumption 0 m3/year [Б]</td></tr>
<tr><td rowspan="2">Unbilled authorised consumption
400 m3/year</td><td>Unbilled metered consumption 0 m3/year [В]</td><td rowspan="6">Non-Revenue water (water losses)
433 099 m3/year</td></tr>
<tr><td>Unbilled unmetered consumption: 400 m3/year [Г]</td></tr>
<tr><td rowspan="4">Water water losses
432 699 m3/year</td><td rowspan="2">Commercial water losses 86 620 m3/year</td><td>Theft 74 550 m3/year [Д]</td></tr>
<tr><td>Metering inaccuracies: 12 070 m3/year [Е]</td></tr>
<tr><td rowspan="3">Technical (physical) water losses
346 079 m3/year</td><td>Leakage on transmission and distribution lines 318 393 m3/year [Ж]</td></tr>
<tr><td>Leakage from overflow at storage tanks: 0 m3/year [З]</td></tr>
<tr><td>Leakage on service connections
27 686 m3/year [И]</td></tr>
</table>

Table : IWA Water Balance for Kovachevo for 2011

<table>
<tr><td rowspan="6">Total drinking water produced (system input) 132 477 m3/year [П]</td><td rowspan="2">Authorised consumption72 228 m3/year</td><td rowspan="2">Billed authorised consumption 72 128 m3/year</td><td>Billed metered consumption 72 128 m3/year [А]</td><td rowspan="2">Revenue water (billed) 72 128 m3/year</td></tr>
<tr><td>Billed unmetered consumption 0 m3/year г [Б]</td></tr>
<tr><td rowspan="2">Unbilled authorised consumption 100 m3/year</td><td>Unbilled metered consumption 0 m3/year [В]</td><td rowspan="6">Non-Revenue water (water losses) 60 349 m3/year</td></tr>
<tr><td>Unbilled unmetered consumption: 100 m3/year [Г]</td></tr>
<tr><td rowspan="4">Water water losses 60 249 m3/year</td><td rowspan="2">Commercial water losses 12 070 m3/year</td><td>Theft 4 857 m3/year [Д]</td></tr>
<tr><td>Metering inaccuracies: 7 213 m3/year [Е]</td></tr>
<tr><td rowspan="3">Technical (physical) water losses 48 179 m3/year</td><td>Leakage on transmission and distribution lines 44 325 m3/year [Ж]</td></tr>
<tr><td>Leakage from overflow at storage tanks: 0 m3/year [З]</td></tr>
<tr><td>Leakage on service connections 3 854 m3/year [И]</td></tr>
</table>

Table : IWA Water Balance for Varvara for 2011

<table>
<tr><td rowspan="6">Total drinking water produced (system input) 508 407 m3/year [П]</td><td rowspan="2">Authorised consumption79 087 m3/year</td><td rowspan="2">Billed authorised consumption 78 837 m3/year</td><td>Billed metered consumption 78 837 m3/year [А]</td><td rowspan="2">Revenue water (billed) 78 837 m3/year</td></tr>
<tr><td>Billed unmetered consumption 0 m3/year [Б]</td></tr>
<tr><td rowspan="2">Unbilled authorised consumption 250 m3/year</td><td>Unbilled metered consumption 0 m3/year [В]</td><td rowspan="6">Non-Revenue water (water losses) 429 570 m3/year</td></tr>
<tr><td>Unbilled unmetered consumption: 250 m3/year [Г]</td></tr>
<tr><td rowspan="4">Water water losses 429 320 m3/year</td><td rowspan="2">Commercial water losses 85 914 m3/year</td><td>Theft 78 030 m3/year [Д]</td></tr>
<tr><td>Metering inaccuracies: 7 884 m3/year [Е]</td></tr>
<tr><td rowspan="3">Technical (physical) water losses 343 406 m3/year</td><td>Leakage on transmission and distribution lines 315 934 m3/year [Ж]</td></tr>
<tr><td>Leakage from overflow at storage tanks: 0 m3/year [З]</td></tr>
<tr><td>Leakage on service connections 27 472 m3/year [И]</td></tr>
</table>

Table : IWA Water Balance for the villages with population less than 2000 inhabitants for 2011

<table>
<tr><td rowspan="6">Total drinking water produced (system input)
5 037 288 m3/year [П]</td><td rowspan="3">Authorised consumption1 622 953 m3/year</td><td rowspan="2">Billed authorised consumption
1 620 453 m3/year</td><td>Billed metered consumption 1 619 716 m3/year [А]</td><td rowspan="2">Revenue water (billed)
1 620 453 m3/year</td></tr>
<tr><td>Billed unmetered consumption 737 m3/year [Б]</td></tr>
<tr><td rowspan="2">Unbilled authorised consumption
2 500 m3/year</td><td>Unbilled metered consumption 0 m3/year [В]</td><td rowspan="6">Non-Revenue water (water losses)
3 416 835 m3/year</td></tr>
<tr><td>Unbilled unmetered consumption: 2 500 m3/year [Г]</td></tr>
<tr><td rowspan="3">Water water losses
3 414 335 m3/year</td><td rowspan="2">Commercial water losses
683 367 m3/year</td><td>Theft 521 322 m3/year [Д]</td></tr>
<tr><td>Metering inaccuracies: 162 045 m3/year [Е]</td></tr>
<tr><td rowspan="3">Technical (physical) water losses
2 730 968 m3/year</td><td>Leakage on transmission and distribution lines 2 512 491 m3/year [Ж]</td></tr>
<tr><td>Leakage from overflow at storage tanks: 0 m3/year [З]</td></tr>
<tr><td>Leakage on service connections
218 477 m3/year [И]</td></tr>
</table>

APPENDIX 3-7: SUMMARY TABLE OF PRODUCED WATER, WATER CONSUMPTION AND NON-REVENUE WATER (BILLED) IN 2011

The table below shows the results of the water balance and its components for 2011

Settlement	Total produced water quantity	Residents	Temporary residents	Total population	Total cashed water quantity m3/y and rates								Non-Revenue water (billed) (total water losses)
					For population	Rate	Industry and companies	Rate	Public customers	Rate	Total quantity sold (cashed) water	Total rate	
	m3/y	number.	Number	Number	m3/y	l/r/d	m3/y	l/r/d	m3/y	l/r/d	m3/y	l/r/d	%
Pazardzhik Municipality													
Pazardzhik	7 862 238	71 979		71 979	2 481 483	94	464 598	18	272 041	10	3 218 122	122	59
Aleko Konstantinovo	192 776	2 714		2 714	72 065	73	8 084	8	768	1	80 917	82	58
Apriltsi	34 534	526		526	14 857	77	201	1	47	0	15 105	79	56
Bratanitsa	188 567	2 093		2 093	58 083	76	1 899	2	1 041	1	61 023	80	68
Chernogorovo	224 720	2 203		2 203	70 783	88	4 668	6	1 470	2	76 921	96	66
Debrashtitsa	100 350	910	155	1 065	46 662	120	10 127	26	1 034	3	57 823	149	42
Dobrovnitsa	136 030	1 380		1 380	53 683	107	1 488	3	508	1	55 679	111	59
Dragor	94 287	1 422		1 422	37 859	73	534	1	200	0	38 593	74	59
Gelemenovo	74 870	695		695	28 236	111	18 191	72	502	2	46 929	185	37
Glavinitsa	368 307	2 282		2 282	74 189	89	71 220	86	5 344	6	150 753	181	59
Govedare	82 901	1 634		1 634	58 476	98	2 249	4	1 839	3	62 564	105	25
Hadzhievo	141 114	1 027		1 027	35 079	94	1 387	4	806	2	37 272	99	74
Ivaylo	263 045	2 841		2 841	99 099	96	7 519	7	1 050	1	107 668	104	59
Krali Marko	21 210	190		190	6 899	99	233	3	128	2	7 260	105	66
Lyahovo	43 138	391		391	13 571	95	383	3	6	0	13 960	98	68
Malo Konare	267 522	4 353		4 353	137 493	87	7 569	5	2 061	1	147 123	93	45

Settlement	Total produced water quantity	Residents	Temporary residents	Total population	Total cashed water quantity m3/y and rates								Non-Revenue water (billed) (total water losses)
					For population	Rate	Industry and companies	Rate	Public customers	Rate	Total quantity sold (cashed) water	Total rate	
	m3/y	number.	Number	Number	m3/y	l/r/d	m3/y	l/r/d	m3/y	l/r/d	m3/y	l/r/d	%
Miryantsi	72 404	568	19	587	25 695	120	3 705	17	236	1	29 636	138	59
Mokrishte	159 882	1 851		1 851	63 212	94	1 723	3	507	1	65 442	97	59
Ognyanovo	300 653	2 353		2 353	88 526	103	59 571	69	2 234	3	150 331	175	50
Ovchepoltsi	121 333	972		972	40 201	113	2 196	6	910	3	43 307	122	64
Patalenitsa	306 552	1 228	442	1 670	73 158	120	5 646	9	783	1	79 587	131	74
Pishtigovo	64 108	1 037		1 037	32 469	86	2 549	7	238	1	35 256	93	45
Rosen	73 575	516		516	22 289	118	314	2	37	0	22 640	120	69
Saraya	85 367	1 356		1 356	33 049	67	1 333	3	560	1	34 942	71	59
Sbor	36 568	249	108	357	15 634	120	329	3	32	0	15 995	123	56
Sinitovo	108 860	1 950		1 950	72 154	101	2 753	4	771	1	75 678	106	30
Topoli dol	34 629	268		268	11 202	115	891	9	267	3	12 360	126	64
Tsar Asen	53 394	281	79	360	15 785	120	429	3	216	2	16 430	125	69
Tsrancha	243 202	1 107	207	1 314	57 540	120	3 105	6	2 495	5	63 140	132	74
Velichkovo	224 759	1 020	95	1 115	48 850	120	24 740	61	872	2	74 462	183	67
Yunatsite	79 517	1 522		1 522	55 361	100	7 224	13	1 091	2	63 676	115	20
Zvanichevo	160 584	1 899		1 899	64 149	93	1 803	3	496	1	66 448	96	59
Total for Pazardzhik Municipality	12 220 996	114 817	1 105	115 922	4 007 791	95	718 661	17	300 590	7	5 027 042	119	59
Septemvri Municipality													
Septemvri	814 367	7 869		7 869	281 466	98	34 397	12	8 890	3	324 753	113	60
Vetren	553 794	3 221		3 221	108 250	92	7 954	7	4 491	4	120 695	103	78
Boshulya	113 330	816		816	28 259	95	886	3	74	0	29 219	98	74

Settlement	Total produced water quantity	Residents	Temporary residents	Total population	Total cashed water quantity m3/y and rates								Non-Revenue water (billed) (total water losses)
					For population	Rate	Industry and companies	Rate	Public customers	Rate	Total quantity sold (cashed) water	Total rate	
	m3/y	number.	Number	Number	m3/y	l/r/d	m3/y	l/r/d	m3/y	l/r/d	m3/y	l/r/d	%
Gorno Varshilo	14 729	42	27	69	3 004	119	201	8	5	0	3 210	127	78
Karabunar	201 930	1 349		1 349	49 026	100	2 633	5	403	1	52 062	106	74
Kovachevo	132 477	2 402		2 402	68 512	78	2 112	2	1 504	2	72 128	82	46
Lozen	76 393	1 019		1 019	37 066	100	1 926	5	2 601	7	41 593	112	46
Semchonovo	282 362	1 943		1 943	56 746	80	3 245	5	1 511	2	61 502	87	78
Simeonovets	187 313	898		898	36 526	111	3 401	10	872	3	40 799	124	78
Slavovitsa	127 502	376	82	458	20 070	120	474	3	7 244	43	27 788	166	78
Varvara	508 407	2 061		2 061	71 481	95	6 680	9	676	1	78 837	105	84
Vetren dol	271 271	1 452		1 452	38 600	73	2 846	5	619	1	42 065	79	84
Vinogradets	285 089	1 481		1 481	46 438	86	12 103	22	3 592	7	62 133	115	78
Zlokuchene	50 983	860		860	18 041	57	899	3	1 391	4	20 331	65	60
Total for Septemvri Municipality	3 619 947	25 789	109	25 898	863 485	91	79 757	8	33 873	4	977 115	103	73
Belovo Municipality													
Akandzhievo	75 336	420		420	15 741	103	493	3	185	1	16 419	107	78
Lesichevo Municipality													
Borimechkovo	63 347	569		569	13 494	65	74	0	238	1	13 806	66	78
Dinkata	91 093	1 164		1 164	26 134	62	1 250	3	117	0	27 501	65	70
Kalugerovo	205 385	1 164		1 164	40 382	95	3 738	9	642	2	44 762	105	78
Lesichevo	195 928	828	11	839	36 757	120	3 119	10	2 825	9	42 701	139	78
Pamidovo	42 156	378		378	11 749	85	870	6	108	1	12 727	92	70
Shtarkovo	48 456	394		394	12 079	84	47	0	2 503	17	14 629	102	70

Settlement	Total produced water quantity	Residents	Temporary residents	Total population	Total cashed water quantity m3/y and rates								Non-Revenue water (billed) (total water losses)
					For population	Rate	Industry and companies	Rate	Public customers	Rate	Total quantity sold (cashed) water	Total rate	
	m3/y	number.	Number	Number	m3/y	l/r/d	m3/y	l/r/d	m3/y	l/r/d	m3/y	l/r/d	%
Tserovo	151 517	911		911	30 033	90	2 707	8	282	1	33 022	99	78
Total for Lesichevo Municipality	797 882	5 408	11	5 419	170 628	86	11 805	6	6 715	3	189 148	96	76
Total	16 714 161	146 434	1 225	147 659	5 057 645	94	810 716	15	341 363	6	6 209 724	115	63

Note: The population includes a number of permanent residents (from the census 2011) and the number of temporary residents.

APPENDIX 3-8: EXTERNAL WATER SUPPLY SYSTEMS

General Characteristics

Water supply systems on the territory of Pazardzhik Municipality

Eight of the settlements combined in groups of two form the following water supply systems – Ovchepoltsi –Topli dol, Apriltsi-Sbor, Paralenitsa-Tsrancha and Rosen-Tsar Asen. In Pazardzhik municipality the villages of Hadzhievo, Gelemenovo, Yunatsite, Govedare, Sinitovo, Zvanichevo, Velichkovo and Debrashtitsa are supplied from local water sources independently and form separate systems.

Water supply system "Topoli dol – Ovchepoltsi" covers both villages Ovchepoltsi and Topoli dol. The villages are supplied by one tube well and 3 shaft wells in the territory of Topoli dol and 1 spring catchment in the territory of Ovchepoltsi. The groundwater are transmited into exhaustive reservoir, which feeds the pump station. The pump groups run the water into two directions:

- Through the distribution network of the village of Topoli dol to the pressure reservoir of the village
- To PS II uplift where pour water from the catchment "Kozla" gravity.

Steel pipeline brings water from PS II-nd uplift to the pressure reservoirs of village of Ovchepoltsi, where it fed into the distribution network of the village.

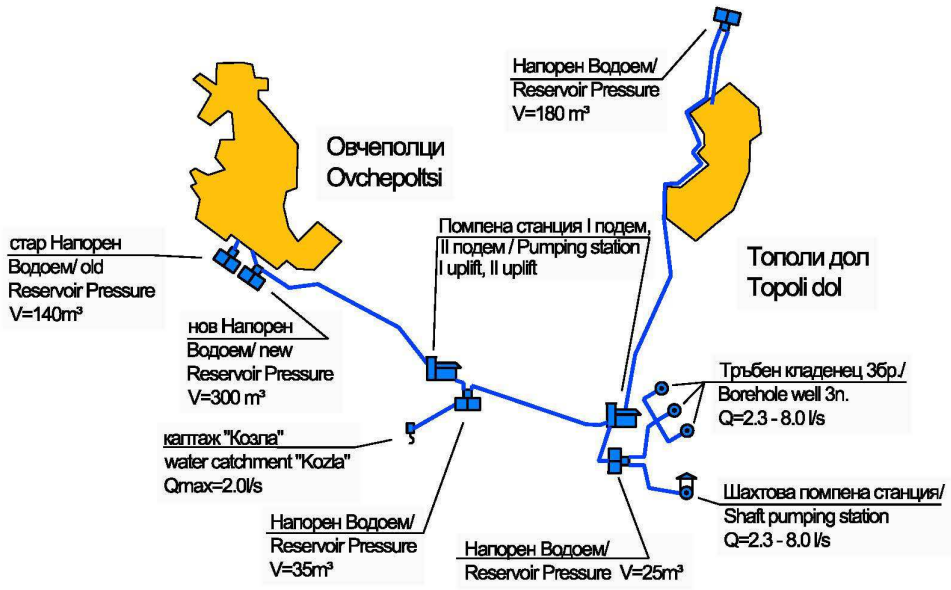


Figure: Layout of water supply system Ovchepoltsi – Topoli dol

Table : General characteristics of the water supply system Ovchepoltsi - Topoli dol in Municipality of Pazardzhik

Water supply system Ovchepoltsi - Topoli dol	
Water Sources	3 SW, 1 TW and 1 spring catchment with total capacity from 6.6 to 18 l/s
Treatment Facilities	2. dosing pumping units - chlorination with sodium hypochlorite by dispensing pump unit PROMINENT in PS I-st and II-nd uplift
Water Storage	3 PR with total capacity of 620 m³ and 2 ER with total volume of 60m³
Pump stations	2 pump stations and 4 submersible pumps
Transmission mains	8,42 km made of asbestos and PVC pipes
Connected Settlements	2 settlements
Total Population in Service Area	1 240
Connected Population	1 240
% of connected population	100%

Water supply system Apriltsi – Sbor uses the waters from one tube well, situated just to the Southeastern border of the regulated territory of village of Apriltsi. The built tube well between the villages of Sbor and Apriltsi is not in operation. The water supply scheme is pumping – the water from TK is pushed to PR V=100m^3 of village of Apriltsi which is exhaustive for PS II-nd uplift, which pushes the water through the distribution network of the village of Sbor to PR V=120м^3 .

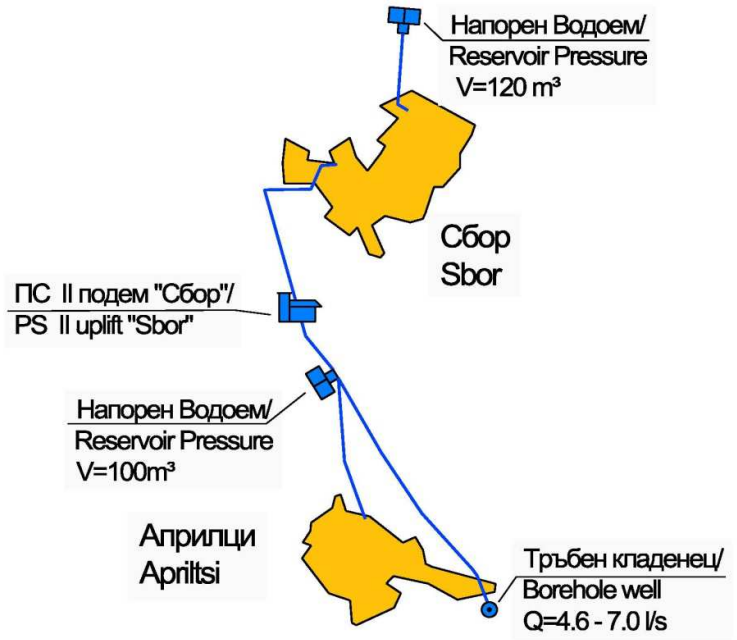


Figure: Layout of water supply system Apriltsi – Sbor

Table : General characteristics of the water supply system Apriltsi – Sbor in Pazardzhik Municipality

Water supply system Apriltsi - Sbor	
Water Sources	1 TW – 4,6l/s to 7,0 l/s
Treatment Facilities	1 dosing pumping unit - chlorination with sodium hypochlorite by dispensing pump unit PROMINENT in PR Apriltsi
Water Storage	3 PR with total volume of 220 m³
Pump stations	1 pump station and submersible pump
Transmission mains	4,4 km made of asbestos and steel pipes
Connected Settlements	2 settlements
Total Population in Service Area	775
Connected Population	775
% of connected population	100%

Water supply system Patalenitsa – Tsrancha unites the villages Patalenitsa and Tsrancha. The water sources ground water:

- 2 TW and shaft well in water catchment zone north of Patalenitsa
- 2 TW in water catchment area north of Tsrancha
- 3 spring catchments in water cathment area Southwestern of Patalenitsa
- 5 spring catchments south of Tsrancha

Water from tube wells - 2. and shaft well in general pressure collector are submitted to PS. The II uplift which charge the PR V = 120m3 of ground level of 439.50 in Patalenitza where are submitted to two reservoirs at lower level 431.00 with volume V = 135m3 and V= 450m3 .. Water from the spring catchments three of the village collected in collecting shaft which charge the other two reservoirs with volume V = 30m3 and V = 55m3 of level 431,00 m The resevoirs for Patalenitza are connected.

In the pressure reservoirs of the village of Tsrancha enters water by pumping from tube wells with two uplifts and by gravity from the 5 spring cathments for the village. Between the reservoirs of the two villages there is water supply main, which is not currently operating.

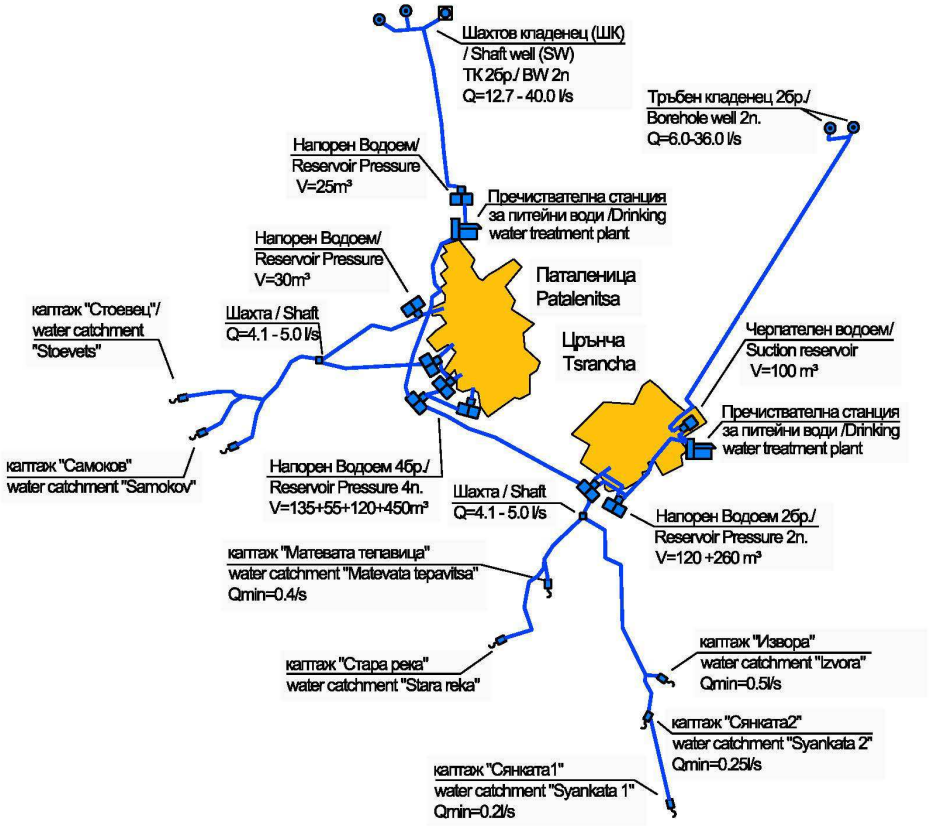


Figure: Layout of water supply system Patalenitsa - Tsrancha

Table: General characteristics of the water supply system Patalenitsa - Tsrancha in Pazardzhik Municipality

Water supply system Patalenitsa - Tsrancha	
Water Sources	1 shaft well, 4 TW and 8 catchments with total capacity of 25,6 to 83,8 l/s.
Treatment Facilities	2 dosing pumping units - chlorination with sodium hypochlorite by dispensing pump unit PROMINENT in PR Tsrancha and in ER PS II-nd uplift Patalenitsa 1 chlorination unit with chlorine gas in PS II-nd uplift
Water Storage	7 PR with total volume of 1050 m³
Pump stations	2 pump stations and 5 submersible pump
Transmission mains	23,72 km made of asbestos, mannesmann, steel and PVC pipes
Connected Settlements	2 settlements
Total Population in Service Area	2 335
Connected Population	2 335
% of connected population	100%

Water supply Rosen – Tsar Asen is water supplied from two shaft wells, in the terrace of Luda Yana river, the land of village of Rosen. The water quantity is given in two directions: to the pressure reservoir with volume of V= 200m3 of village of Rosen and to

PR V = 100 m3 of village of Tsar Asen, which keep the hydro dynamic pressures of the both villages.

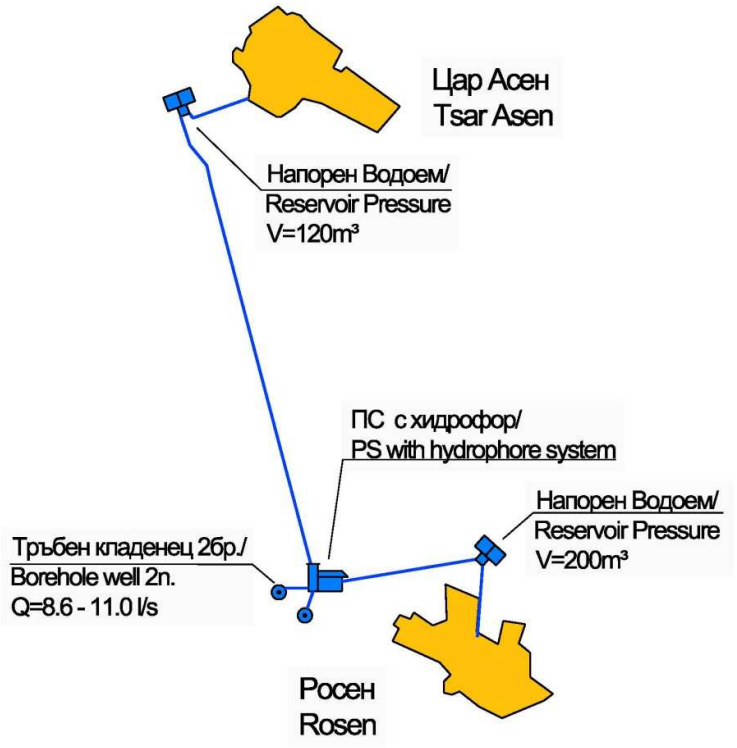


Figure: Layout of water supply system Rosen – Tsar Asen

Table : General characteristics of the water supply system Rosen - Tsar Asen, Pazardzhik Municipality

Water system Rosen - Tsar Asen	
Water Sources	2 shaft wells with total capacity of 8,6 to 11 l/s.
Treatment Facilities	2 dosing pumping units - chlorination with sodium hypochlorite by dispensing pump unit at PS
Water Storage	2 PR with total volume of 320 m³
Pump stations	1 pump station
Transmission mains	5,78 km of steel and asbestos pipes
Connected Settlements	2 settlements
Total Population in Service Area	797
Connected Population	797
% of connected population	100%

The villages of Hadzhievo, Gelemenovo, Yunatsite, Govedare, Sinitovo, Zvanichevo, Velichkovo and Debrushtitsa are supplied individually from own water sources as follows:

Water supply system Hadzhievo services Village of Hadzhievo, as the water demand is satisfied by tube well, located in the regulated part of the village. The distribution network is powered directly from the tube well with a horizontal pump equipped with a frequency

converter which maintains an average pressure of about 2 atm. of a larger part of the village and not less than 1.5 atm at the highest points.

The maximum flow rate of the well - 8l/sek covers maximum hourly consumption.

Figure : Layout of water supply system of Hadzhievo

Table: General characteristics of the water supply system Hadzhievo in Pazardzhik Municipality

Water supply system Hadzhievo	
Water Sources	1 tube well from 3,3 to 5 l/s
Treatment Facilities	1 dosing pumping UNIT - chlorination with sodium hypochlorite by dispensing pump unit at PS
Water Storage	
Pump stations	1 pump station
Transmission mains	
Connected Settlements	1 settlement
Total Population in Service Area	1 027
Connected Population	1 027
% of connected population	100%

Water supply system "Gelemenovo" uses the water from two tube wells /one is the reserve/ in the village of Gelemenovo to satisfy the water demand. From tube well GRUNDFOS-SP30-5 pump pushes water through the distribution network to PR of the village. From the reserve well with a horizontal pump mounted in PS the village can be water supplied if needed.

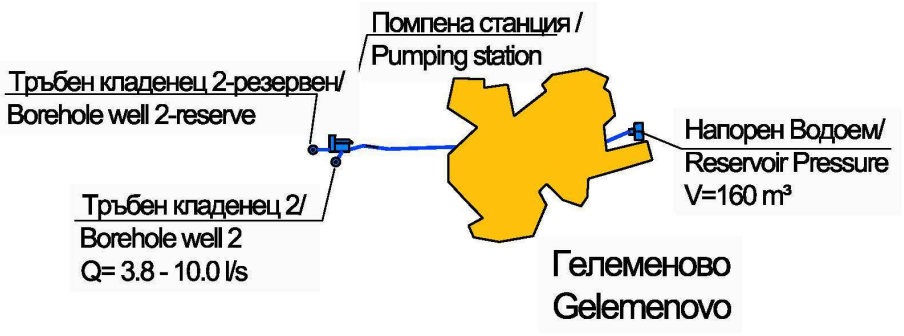


Figure:Layout of water supply system Gelemenovo

Table: General characteristics of the water supply system Gelemenovo in Pazardzhik Municipality

Водоснабдителна система Гелеменово	
Water Sources	1 tube well from 3,8 to 10 l/s
Treatment Facilities	1 dosing pumping unit - chlorination with sodium hypochlorite by dispensing pump unit at PS
Water Storage	7 PR with volume of 160 m³
Pump stations	1 pump station and submersible pump
Transmission mains	2,96 km from asbestos pipes
Connected Settlements	1 settlement
Total Population in Service Area	695
Connected Population	695
% of connected population	100%

Water supply system Yunatsite covers the consumption of the village of Yunatsite by two tube wells located at the terrace of Topolnitsa river, north of the regulatory area - TK1a and TK2. The constructed third well - TK1 is not equipped. The flow rate of the wells /3 - 28 l/s/ is fed directly into the network. The submersible pump with frequency control /constant pressure at variable flow/.

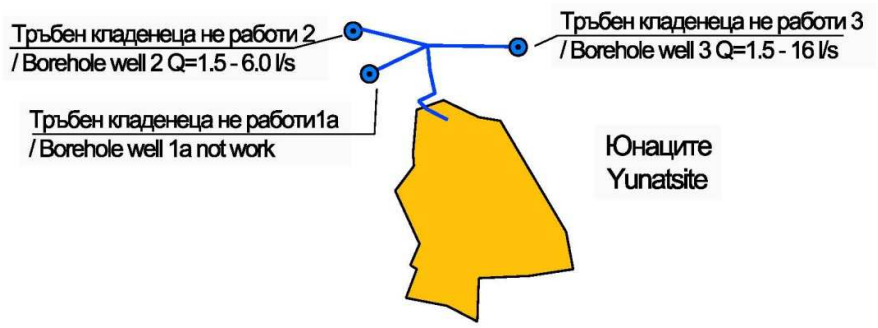


Figure: Layout of water supply system Yunatsite

Table : General characteristics of the water supply system Yunatsite in Pazardzhik Municipality

Water supply system Yunatsite	
Water Sources	1 tube well from 1,5 to 12 l/s.
Treatment Facilities	1 dosing pumping unit - chlorination with sodium hypochlorite by dispensing pump unit at PS
Water Storage	
Pump stations	submersible pump – 3
Transmission mains	
Connected Settlements	1 settlement
Total Population in Service Area	1 522
Connected Population	1 522
% of connected population	100%

Water supply system "Govedare" services individualy water to the village of Govedare by tube-well in the regulation / central part / of the village. The well is equipped with a horizontal frequency controlled pumps that push the water directly into the network.

Figure: Layout water supply system Govedare

Table: General characteristics of the water supply system Govedare in Pazardzhik Municipality

Water supply system Govedare	
Water Sources	1 tube well from 3,0 to 5,0 l/s.
Treatment Facilities	1 dosing pumping unit - chlorination with sodium hypochlorite by dispensing pump unit at PS
Water Storage	
Pump stations	1 pump station
Transmission mains	
Connected Settlements	1 settlement
Total Population in Service Area	1 634
Connected Population	1 634
% of connected population	100%

Water supply system "Sinitevo" service water supply of the village from groundwater - tube wells - 2. TK1a and TK2, located west of the regulatory area of the village in the terrace of the Maritsa River. Water is pushed to tower reservoir with V = 20m3, which breaks the pressure and fed into the network of the village.

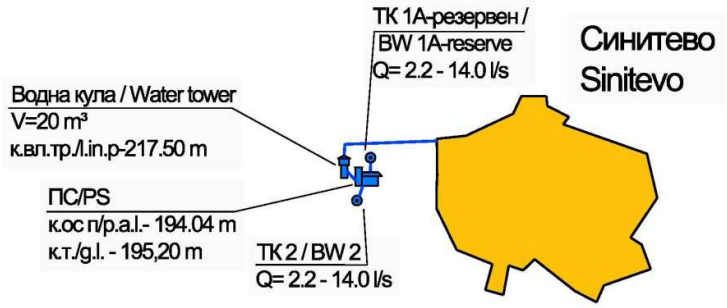


Figure: Layout of water supply system Sinitevo

Table: General characteristics of the water supply system Sinitovo in Pazardzhik Municipality

Water supply system Sinitovo	
Water Sources	1 tube well from 2,2 to 14 l/s.
Treatment Facilities	1 dosing pumping unit - chlorination with sodium hypochlorite by dispensing pump unit at PS
Water Storage	1 tower reservoir with volume of 20 m³
Pump stations	1 pump station
Transmission mains	
Connected Settlements	1 settlement
Total Population in Service Area	1 950
Connected Population	1 950
% of connected population	100%

Water supply system "Zvanichevo" includes only the village of Zvanichevo whose consumption is satisfied by tube wells in the terrace of the Maritsa River. Two of the wells are turned on only in the summer. Submersible pump in the third well is with frequency control. Pumping water supply from wells directly into the distribution network of the village.

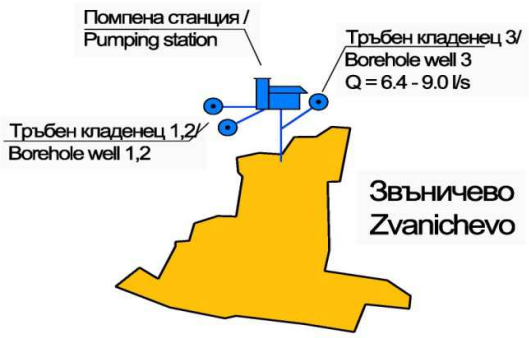


Figure: Layout of water supply system Zvanichevo

Table: General characteristics of the water supply system Zvanichevo in Pazardzhik Municipality

Water supply system Zvanichevo	
Water Sources	3 tubewells from 6,4 to 9 l/s.
Treatment Facilities	1 dosing pumping unit - chlorination with sodium hypochlorite
Water Storage	
Pump stations	1 pump station and submersible pump
Transmission mains	7,32 km from asbestos pipes
Connected Settlements	1 settlement
Total Population in Service Area	1 899
Connected Population	1 899
% of connected population	100%

Water supply system "Velichkovo" services only the village of Velichkovo. Abstraction assets TK1 and TK2 were built on the terrace of Topolnitsa River of about 2 km. east of the village. Submersible pumps push to the pressure reservoirs of the village old V = 160 m3 and new V = 500 m3.

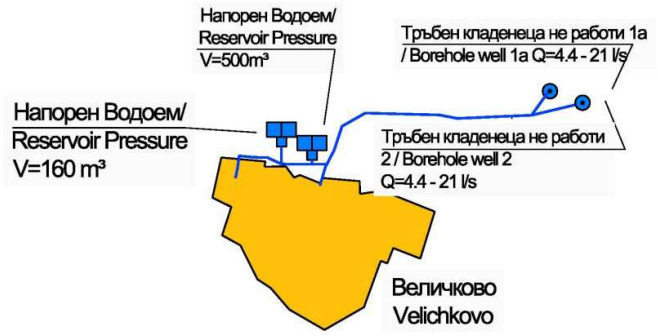


Figure: Layout water supply system Velichkovo

Table: General characteristics of the water supply system Velichkovo in Pazardzhik Municipality

Water supply system Velichkovo	
Water Sources	2 tube well from 8,8 to 42 l/s.
Treatment Facilities	1 dosing pumping unit - chlorination with sodium hypochlorite by dispensing pump unit at PS
Water Storage	2 PR total volume of 660 m³
Pump stations	submersible pumps - 2
Transmission mains	2,6 km of steel pipes
Connected Settlements	1 settlement
Total Population in Service Area	1020
Connected Population	1 020
% of connected population	100%

Water supply system Debrashtitsa water supplies individualy the village of Debrashtitsa from the open water source catchments in a mountainous area south of the village – Dimova kashta 2, Dimova kashta 1, Senkata 1, Dobra voda and Brashnala. The water from the spring catchments is transmited to collecting shaft and with relieved pressure by two parallel water mains the water is brought to the reservoirs of the village V=120 m^3 and V=300 m^3.

Figure: Layout of the water supply system Debrashtitsa

Table : General characteristics of the water supply system Debrashtitsa in Pazardzhik Municipality

Water supply system Debrashtitsa	
Water Sources	4 catchments with total capacity of 15,8 to 41 l/s
Treatment Facilities	1 dosing pumping unit - chlorination with sodium hypochlorite by dispensing pump unit at PS
Water Storage	2 PR with total volume of 420 m³
Pump stations	
Transmission mains	9,74 km made of asbestos and Mannesmann pipes
Connected Settlements	1 settlement
Total Population in Service Area	1 380
Connected Population	1 380
% of connected population	100%

Wate supply systems on the territory of Septemvri Municipality

Water supply system Semchinovo – Simeonovets covers the villages of Semchinovo and Simeonovets. The consumption is satisfied from groundwater -1 tube well and surface water – 5 spring catchments, west of village of Semchinovo and 3 spring catchments West of village of Simeonovets. The total flow of water sources is from 12.7 to the 19.5 l/s. Through the submersible pump type SAER NR 40 the water is supplied from the tube well to PS II-nd uplift , which supplies the reservoir of Simeonovets on level 443,00m for the high level. In this reservoir the water enters by gravity from one of the spring catchments near the village. The water of the other two spring catchments by gravity is brought to a reservoir for the lower zone on a level 402,00 m. From the spring catchments - 5 at the village Semchinovo by gravity the water is brought to the PR of the village.

The second constructed tube well is sealed off.

Figure: Layout of water supply network Semchinovo-Simeonovets

Table: General characteristics of the water supply system Semchinovo – Simeonovets in Septemvri Municipality

Water supply system Semchinovo - Simeonovets	
Water Sources	1 tube wells and 8 catchments from 11 to 24 l/s
Treatment Facilities	2 dosing pumping units - chlorination with sodium hypochlorite by dispensing pump unit at PR Semchinovo and PR Simeonovets
Water Storage	2 PR with volume of 1130 m³ and ER with volume of 25 m³
Pump stations	BUNKER PS
Transmission mains	5,06 km made of asbestos and Mannesmann pipes
Connected Settlements	2 settlements
Total Population in Service Area	2 841
Connected Population	2 841
% of connected population	100%

Water supply system Karabunar – Boshulya unites the villages of Karabunar and Boshulya. Consumption is covered by 4 pieces of tube wells with capacity of 12 to 44 l / s in the village of Boshulya. The water from the water sources enters at PS II-nd uplift equipped with a pump 45MT45x3. Horizontal pump supplies water to transmisstion reservoir, from wehere the water goes to the pressure reservoirs of the villages, which supply the distribution networks.

The fifth constructed tube well does not work.

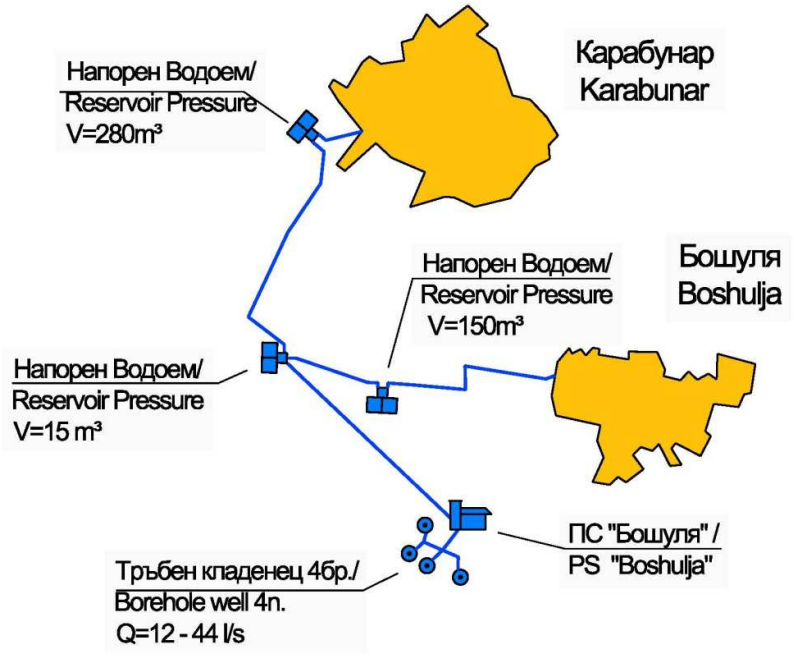


Figure: Layout of water supply system Karabunar - Boshulya

Table: General characteristics of the water supply system Karabunar – Boshulya in Septemvri Municipality

Water supply system Karabunar - Boshulya	
Water Sources	4 tube wells from 12 to 44 l/s
Treatment Facilities	1 dosing pumping unit - chlorination with sodium hypochlorite by dispensing pump unit at PS
Water Storage	2 PR with total capacity of 430 m³ and transmission reservoir wit volume 15 m³
Pump stations	1 pump station
Transmission mains	4,25 km made of asbestos and steel and PVC pipes
Connected Settlements	2 settlements
Total Population in Service Area	2 165
Connected Population	2 165
% of connected population	100%

Water supply systems on the territory of Lesichovo Municipality

The settlements from Lesichovo Municipality – Lesichovo, Tserovo, Kalugerovo and Borimechkovo includes the main water supply system Vetren, and the other 3 settlements establish water supply system.

Water supply system Dinkata – Shtarkovo – Pamidovo covers the villages Dinkata, Shtarkovo and Pamidovo. These settlements are water supplied from 2 tube wells in the terrace of Topolnitsa river, located between the villages Shtarkovo and Dinkata, equipped pump type GRUNDFOS-SP60-5 and GRUNDFOS-SP46-10. Submersible pumps push the water to the PR of village of Pamidovo, and through the distribution network of the village of Dinkata through separate water main to the reservoir of the village of Shtarkovo,

which is contra. Built pumping station is not in operation. Used as a building for the chlorination.

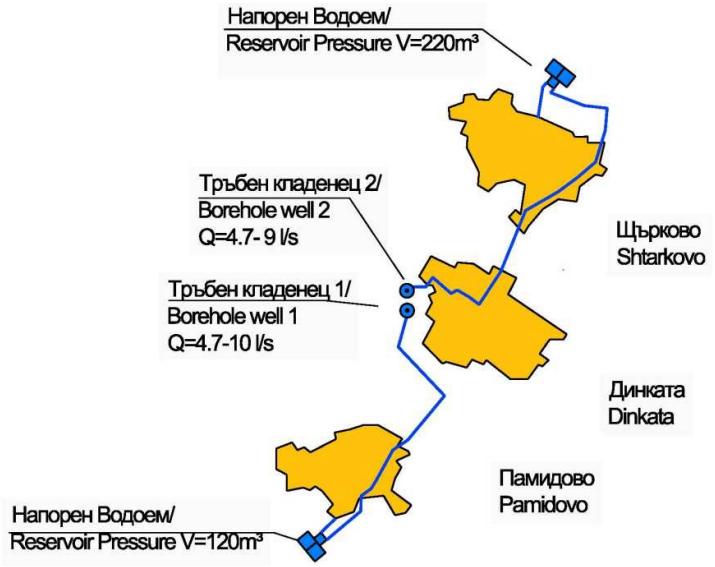


Figure: Layout of water supply system Dinkata – Shtarkovo – Pamidovo

Table: General characteristics of the water supply system Dinkata – Shtarkovo – Pamidovo in the Lesichovo Municipality

Water supply system Dinkata – Shtarkovo - Pamidovo	
Water Sources	2 tube wells from 9.4 – 19 l/s.
Treatment Facilities	2 dosing pumping units - chlorination with sodium hypochlorite by dispensing pump unit PROMINENT at PS
Water Storage	2 PR with volume of 340 m³
Pump stations	submersible pumps – 2бр.
Transmission mains	6,22 from asbestos pipes
Connected Settlements	3 settlements
Total Population in Service Area	1 936
Connected Population	1 936
% of connected population	100%

APPENDIX 3-9: WATER RESOURCES

Table: Characteristics of the water sources in Pazardzhik Municipality for 2011.

Water supply system	Water source	Debits Qav.d l/s	Debits Qmax. l/s	Produced water quantity [m³/year]	In operation	Year of construction	Observations
Pazardzhik water yielding zone	Mokrishte East water yielding zone -7 TW - 1, 2a, 3, 4, 5 , 11,12	9,6 9,6 9,6 9,6 9,6 28,0 38,0	37 32 30 30 28 30 40	2 396 736	6	1962-1 1971-3 1978-2 1999-1	In good condition
	Mokrishte West water yielding zone -6 TW - 6,7,8,9,10,13	6x5,8	31 32 34 29 30 26		6	1971 - 5 1978-1	In good condition
	Mokrishte Karaman tepe water yielding zone -11 TW – 1б, 2в, 2г,3б, 4а, 5б , 5в,6а,6б,7,8	11x8,4	31 29 38 28 24 23 28 21 30 32 32		11	1972-1 1972-1 1982-2 1988-3 1991-1 1999-1 2000-2	In good condition presence of nitrates, sulphates, calcium waters of the 3 TK
	Ivaylo water yielding zone – 3 TW – 1,2,3	3x36,0	3x45		3	1956-1 1972-2	
	Garata water yielding zone TW1a	15,1	44		1		In good condition
	Glavinitsa water yielding zone TW2a	5,6	18		reserve	2006	Reserve water supply – the tube well is not equipped
Malo Konare water yielding zone	TW1a	2,0	30 000		2	1975	In good condition
	TW 2	11,00	173 000			1975	In good condition
	TW1	10,0	105 500		reserve	1973	In good condition

Water supply system	Water source	Debits	Debits	Produced water quantity	In operation	Year of construction	Observations
		Qav.d l/s	Qmax. l/s	[m³/year]			
Ovchepoltsi – Topoli dol - Tsrancha water yielding zone	Spring catchment Ovchepoltsi		2,0		1	1943	In good condition
	Topoli dol Tube well - 1 Shaft well - 3	 6,9	 8,0 8,0		4	1996 1974	Short-term. - Duplication TK; Tube well - in good condition
Aleko Konstantinovo water yielding zone Aleko Konstantinovo	TW 1 a	8,0	23,0		1	1979	corroded suction pipe
	TW 2a				reserve	1979	corroded suction pipe
Ognyanovo water yielding zone	TW 1, TW 2	2x5,5	28,0		2	1998 2006	In good condition
Chernogorovo water yielding zone	TW 3a	8,1	8,0		2	2000	In good condition
	TW 2	5,6	15,0			1998	In good condition
	TW 1				reserve	2001	Obsolete submersible pump
	ШК					2001	In good condition
Hadzhievo water yielding zone	TW	3,8	8,0		1	1962	Midterm. - duplication
Gelemenovo water yielding zone	TW 1	3,8	10,0		1	1979	submersible pump
	TW 2				reserve	1990	With horizontal pump
Velichkovo water yielding zone	TW 1 ,TW2	2x4,4	2x21,0		2	1978 1987	In good condition
Patalenitsa - Tsrancha water yielding zone	Patalenitsa TW 2 ШК Spring catchment 3	 16,8	 30 10 5		 6	1986 1974 1952-1 1963-2	Replacement of submersible pump at tube well. Re-catchment of the catchments

Water supply system	Water source	Debits	Debits	Produced water quantity	In operation	Year of construction	Observations
		Qav.d l/s	Qmax. l/s	[m³/year]			
	Tsrancha TW 2 Spring catchment 5	 2,7	 10 4		 7	 1929-1 1943-1 1951-1 1965-2	 tube well in good condition catchments in poor condition
Lyahovo - Bratanitsa water yielding zone	TW – 2	7,4	13,0		2	1980 1988	TK.2a sand, displaced pipes
Yunatsite water yielding zone	TW1a	1,5	12,0		2	1988	In good condition
	TW 2	1,5	16,0			1988	In good condition
	TW1				reserve	1967	In good condition
Apriltsi - Sbor water yielding zone	TW1	4,6	7,0		1		difficult operation of TK / need to duplicate tube well /
Rosen – Tsar Asen water yielding zone	ШК-2	8,6	11,0		1	1965 1988	satisfactory condition
Sinitovo water yielding zone	TW 1a,TW2.	2x2,2	2x14,0		2	1987	In good condition
Govedare water yielding zone	TW1	3,0	5,0		1		In good condition
Zvanichevo water yielding zone	TW - 2	6,4	9,0		2	1976/2006	The third does not have even old permit.
Debrashtitsa water yielding zone	Spring catchments – 4	6,8	11,0		1	1966	Application only for catchment "Dobra Voda" in poor condition


Figure: Ivaylo Water yielding zone – TW 1


Figure: Garata Water yielding zone - TW 1a – for Pazardzhik and Glavinitsa


Figure: Zvanichevo Water yielding zone – TW3

Table : Characteristics of the water sources in the Municipalities of Septemvri and Lesichevo for 2011

Water supply system	Water source	Debits Qav.d l/s	Debits Qmax. l/s	Produced water quantity [m³/year]	In operation	Year of construction	Observations
Vetren water yielding zone	7 ШК - BUNKER PS	7x7,06	7x28		7	1984	In good condition
Septemvri – Zlokuchene water yielding zone	TW 1	9,5	20,0		5	1984	Difficult operation of the tube well /displaced pipes, poor performance/
	TW 2	9,5	16,0			1984	
	TW 3	9,5	16,0			1984	
	TW 4	9,5	18,0			1984	
	TW 5	9,5	16,0			1984	
Karabunar – Boshulya water yielding zone	TW 1,2,3,4 and 1a	12,0	44,0		4	1983	TK 1a has been compromised and does not work
Lozen – Kovachevo water yielding zone	TW 1,2	8,6	20,0		2	1986	TK 2 does not work TK 3 is sealed sinse1973
Semchinovo – Simeonovets water yielding zone	TW 2 , spring catchments – 3	12,7	19,5		2	1982	Fittings and pipes in poor condition
	Catchment „Sv. Ilia” ”Sv. Petka1”, „Sv. Petka2” Sv. Petka3”.	1,58 0,95 2,54 2,85			4	1983 1959	Needed overhaul of the catchments
Varvara – Vetren dol water yielding zone	TW1a	8,5	16,0		3	1987	In good condition
	TW 2	8,5	16,0			1988	In good condition
	TW1	9,2	12,0			1988	displaced pipes of the borehole
Dinkata – Shtarkovo – Pamidovo water yielding zone	Dinkata TW 2	4,7	9,0		1		Permit since 2001 for 2pcs
	Pamidovo TW	4,7	10		1	1984	Permit since 2001 for 3pcs.

Figure : Hanchetata water yielding zone – TW1 for the village of Simeonovets

Figure:Varvara – Vetren dol water yielding zone - ШК

Figure : Spring catchment for the village of Simeonovets

Figure: Spring catchment fot the village of Semchinovo

Figure: Dinkata water yielding zone – TW1

APPENDIX 3-10: CHECK OF THE VOLUME OF PRESSURE RESERVOIRS

№	Settlement	Category.	$Q_{max.day.}$ l/s	%	$V_{regulating}$ m^3	$V_{emergency}$ m^3	$V_{fire\ protection}$ m^3	V_{total} m^3	$V_{exist.}$ m^3	$V_{shortage}$ m^3	$V_{surplus}$ m^3	V_{new} m^3	Note
I	Pazardzhik Municipality												
1	Town of Pazardzhik	1	240,48	40	8 310	7272	432x2	16 014	36 000		19 986	-	
2	Ivaylo	2	9,03	55	429		54	483		483			Common new reservoir
3	Saraya	3	3,31	65	185	-	54	239		239	-		Common new reservoir
4	Dragor	3	3,58	65	201	-	54	255		255		-	Common new reservoir
	Common reservoir 2-4									977		1000	Common new reservoir - external water to the villages conducted hour max consumption and PP
5	Glavinitsa	3	12,96	55	616	-	54	763		763			
6	Miryantsi	3	2,49	70	150	-	54	204					From PR Pazardzhik
7	Dobrovnitsa	5	4,37	60	226		54	280					From PR Pazardzhik
8	Mokrishte	5	5,72	60	296		54	350					the water source covers all the consumption; new pump is needed
9	Ognyanovo	5	11,93	55	567		54 in Water Tower	621	K250	420			Pump with frequency converter
10	Hadzhievo	6	3,62	65	203		54	257				257	the water source covers all the consumption; new pump is needed

№	Settlement	Category.	$Q_{max.day.}$ l/s	%	$V_{regulating}$ m^3	$V_{emergency}$ m^3	$V_{fire\ protection}$ m^3	V_{total} m^3	$V_{exist.}$ m^3	$V_{shortage}$ m^3	$V_{surplus}$ m^3	V_{new} m^3	Note
11	Aleksandar Konstantinovo	5	7,9	60	368		54	422					the water source covers all the consumption; new pump is needed
12	Malo Konare	4	11,52	55	547	83	54	683					the water source covers maximum hourly water quantity
13	Pishtigovo	6	2,88	65	162			162					From PR Chernogorovo
14	Chernogorovo	5	6,89	60	357		54	411				100	New reservoir
15	Krali Marko	7	0,70	42	110			42					
	Common reservoir 13-15							615		615		600	New reservoir
16	Gelemenovo	6	3,58	65	201		54	255	160	95			To PR 1000 m3
17	Velichkovo	6	6,73	60	349		54	403	660			257	
18	Yunatsite	5	4,47	60	232		54	286				286	the water source covers all the consumption; new pump is needed
19	Lyahovo	6	1,38	70	83			83					
20	Bratanitsa	5	5,73	60	297		54	351					
	Common reservoir 19-20							434		434		450	New ER
21	Ovchepoltsi	6	1,16	70	70		54	124	160			36	
22	Topoli dol	7	3,78	65	212	-	54	266	140 300			174	
23	Apriltsi	7	1,34	70	82		54	136	100	36		50	new reservoir to the existing.
24	Sbor	6	1,41	70	85	-	54	139	120		19		
25	Patalenitsa	5	7,46	60	387		54	441	790		349		

№	Settlement	Category.	$Q_{max.day.}$ l/s	%	$V_{regulating}$ m^3	$V_{emergency}$ m^3	$V_{fire\ protection}$ m^3	V_{total} m^3	$V_{exist.}$ m^3	$V_{shortage}$ m^3	$V_{surplus}$ m^3	V_{new} m^3	Note
26	Tsrancha	5	5,91	60	306	-	54	360	380		20		
27	Rosen	7	2,03	70	123		54	177	200		23		
28	Tsar Asen	6	1,58	70	95		54	149	120	29			
29	Govedare	5	4,60	60	238		54	295		300			new reservoir and pump with frequency converter
30	Sinitovo	5	5,36	60	278		54	332	К 20	300			new reservoir and pump with frequency converter
31	Zvanichevo	5	5,80	60	300		54	354		350			new reservoir and pump with frequency converter
32	Debrashtitsa	6	4,42	65	248		54	302	120, 500		118		
II	Septemvri Municipality												
33	Vetren	4	11,68	55	555	84	54	693	300 500		107		
34	Gorno Varshilo	8	1,7	70	20		54	74	150		76		
35	Vinogradets	5	6,33	55	300		54	354	300	54		100	New reservoir
36	Slavovitsa	6	2,89	65	162		54	2167	250		34		
37	Karabunar	5	4,94	50	213		54	267	250	17			Volume covers 50% of the maximum constructive
38	Boshulya	6	2,80	65	157		54	211	150	61		100	new reservoir to the existing..
39	Septemvri	3	25,04	50	1081		54	1369	ЧВ 4000				
40	Zlokuchene	6	1,99	65	112		54	166					From ER 4000
41	Kovachevo	5	5,71	60	296			296					
42	Lozen	5	3,26	65	183		54	237					
	Common reservoir 41-42							533	500	33			
43	Semchinovo	5	6,34	55	301		54	355	120, 250		15		

№	Settlement	Category.	$Q_{max.day.}$ l/s	%	$V_{regulating}$ m^3	$V_{emergency}$ m^3	$V_{fire\ protection}$ m^3	V_{total} m^3	$V_{exist.}$ m^3	$V_{shortage}$ m^3	$V_{surplus}$ m^3	V_{new} m^3	Note
44	Simeonovets	5	3,93	65	220		54	274	250, 500		476		
45	Varvara	5	8,03	55	382	58	54	494	260, 300		66		
46	Vetren dol	5	4,69	50	202		54	256	75, 160	21			Volume covers 50% of the maximum constructive
III	Lesichevo Municipality												
47	Borimechkovo	7	1,50	70	90		54	144	200		56		
48	Lesichevo	5	4,08	60	211		54	265	450, 100		285		
49	Kalugerovo	5	4,44	60	230		54	284	500		216		
50	Dinkata	6	2,84	65	159		54	213					Common reservoir
51	Shtarkovo	7	1,49	70	90			90	220				Common reservoir
	Common reservoir 50-51							304	220	76		100	Common reservoir
52	Pamidovo	7	1,29	70	78		54	132	120	12			
53	Tserovo	6	1,11	35	34		54	88	K 150				
IV	Belovo Municipality												
54	Akandzhievo	7	1,63	70	98		54	152	180		28		

APPENDIX 3-11: PUMPING STATIONS

Pumping station	Type	СВН	ДВН	Pump type / Year of establishment	Q[l/s]	H	N
Pazardzhik Municipality							
PS I st uplift 7 wells Mokrishte East – water yielding zone	BUNKER PS 6	6,60	10,40				
	BUNKER PS 7	5,75	9,30				
	BUNKER PS 8	7,55	12,00	GRUNDFOS QN 81-2a/ 1995	33	16	9
	BUNKER PS 9	6,50	10,00	GRUNDFOS QN 81-2a/ 1995	33	16	9
				GRUNDFOS QN -2a/ 1995	40	18	9
	BUNKER PS10	9,00	14,80	GRUNDFOS SP 125-1-1/ 1997			
				GRUNDFOS QN -2a/ 1995	33	16	9
	ШПС 13	7,20	11,80	GRUNDFOS SP 125-1-1/ 1997	25	15	7,5
	ШПС	5,00	8,10				
PS I-st uplift 6 wells Mokrishte West – water yielding zone	BUNKER PS 1	6,60	10,40				
	BUNKER PS 2	5,75	9,30				
	BUNKER PS 3	7,55	12,00				
	BUNKER PS 4	6,50	10,00	GRUNDFOS SP 125-2-1/ 1999	33	32	
				GRUNDFOS SP 125-1-1/ 1997	30	19	7,5
	BUNKER PS 5	9,00	14,80	GRUNDFOS SP 125-1-1/ 1997	35	9	7,5
				PLUGER PN 81-3a/ 1996	44	37	11
	BUNKER PS 6	7,20	11,80	GRUNDFOS SP 160-3aa/ 2002	45	37	26
				GRUNDFOS KP 550-H-1/ 1997	120	90	250
PS I st uplift 11 wells Karamen tepe water yielding zone	BUNKER PS 1	6,60	10,40				
	BUNKER PS 2	5,75	9,30				
	BUNKER PS 3	7,55	12,00				
	BUNKER PS 4	6,50	10,00				
	BUNKER PS 5	9,00	14,80	TWU8S 125-3-22/2005			
				PLUGER PN 82-2/ 1994	35	45	22
	BUNKER PS 6	7,20	11,80	PLUGER PN 82-2/ 1994	35	30	15
				PLUGER PN 82-2/ 1994	35	30	15
	BUNKER PS 7	5,00	8,10	PLUGER PN 82-2/ 1994	35	30	15
				PLUGER PN 82-2/ 1994	35	30	15
	BUNKER PS 8	9,00	14,80	GRUNDFOS SP 160-2-1/ 1999	35	30	15
				GRUNDFOS SP 125-1-1/ 1999	42	30	7,5
	BUNKER PS 9	7,20	11,80	GRUNDFOS SP 160-2-1/ 1999	33	32	7,5
				GRUNDFOS SP 160-2-2/ 2001	42	30	7,5
	BUNKER PS 10	5,00	23	GRUNDFOS SP 125-2-a3/2009	44	33	18,5

Pumping station	Type СВН ДВН	Pump type / Year of establishment	Q[l/s]	H	N
	BUNKER PS 11 5,00 8,10				
PS II-nd uplift Mokrishte water yielding zone	PS	200 Д90 – 2 units/1987 and 2 units1990 CR 8-80/2004 .	200 3	90 67	315 3x250 3
PS II-nd uplift Mokrishte HH	PS	300Д70- 3units/1998 200 Д90 – 2units./1988 200 Д90 /1988	300 200 200	55 55 90	250 75 160
PS Garata	BUNKER PS PS	GRUNDFOS SP - 3AA/2002 18 MT 32x2/1983 – 2 units 11 MC 32x2/1996	35 18 11	40 64 64	22 223 13
PS Ivaylo Ivaylo water yielding zone	TW – 3 PS	GRUNDFOS SP 160-2-2/2007 12 ET 20/1980 3 MT 18x2/2000 г. – 2 units	42 12 3	30 20 36	7,5 7,5 3
PS Gelemenovo	TW PS	GRUNDFOS SP 30x5 7 MT 32x2/1987 11 MC 32x2/1996	10 7 11	30 64 64	 13 13
PS Hadzhievo	TW PS	CP 320A/ 2007 6 E 32 M/ 2004	8 11	32 160	5,5 37
PS Malo Konare - Pishtigovo	TW – 2 TW	GRUNDFOS SP125-1-1/1997-2. GRUNDFOS SP 125-2-2/ 1997 GRUNDFOS SP 30-6/ 2003	25 30 8	15 28 46	7,5 15 5,5
PS Chernogorovo	TW 2 TW 3 TW 1	GRUNDFOS SP 60--3/ 1999 GRUNDFOS SP 30-4/ 2000 PD 6 SR 36/6/2009	15 8 8	22 30 30	5,5 4 5,5
PS Yunatsite	TW TW PS	R 860- 02 R/2004 16 ПВ 20x3/1991 6 E 32 M/ 2005 г..- 2	8 16 6	30 60 32	7,5 4 5
PS Zvanichevo	TW PS 60,20 66,50	GRUNDFOS SP 30-4/2001 12 E 50M 6 E 50AM	8 12 6	30 50 50	 13 5,5
PS Lyahovo - Bratanitsa	PS	6 E 50M /2000 25 E 32A /2000 12 E 50M	6 23 12	50 28 50	7,5 11 13,5
PS Akeko Konstantinovo	PS	25 E 32 A/2000 12 E 50A/ 2000 – 2.units	23 12	28 50	11 13
PS Sinitovo	PS	25 E 32/1978 – 2 units	25	32	13
PS Ognyanovo	PS	25 E 50 /1987 25 E 50M /1987 Vida 3 /2002	25 25 25	50 50 32	13 22 13
PS govedare	PS	6 E 32M /2002 – 2 units	6	32	7,5
PS Velichkovo	TW – 2	H7OSO7S – 8 3x4/2009 GRUNDFOS SP 77 – 10/2000	21	120	37
PS Ovchepoltsi – Topoli Dol	TW 105,26 124,6 Shaft well – 3 units. PS	GRUNDFOS SP 46 – 9/2001 GRUNDFOS KR 550-H1/1995 – 3 units 11 MT 32x2/1987 – 2units 7 MT 32x2/1998 - 2units	11 11	85 64	15 15

Pumping station	Type СВН ДВН	Pump type / Year of establishment	Q[l/s]	H	N
	PS	80 MT 10x4/1974	7	64	13
		11 MT 32x4/1988	17,5	120	30
		11 MT 32x4/ 1995	11	128	30
			11	160	37
	TW 1 26 124,6	GRUNDFOS SP 95 – 9/2001	25	102	45
	TW 2.	GRUNDFOS SP 46 – 10/2001	11	100	11,2
	PS II uplift	GRUNDFOS CR 64 – 6-2/2001	18	124	30
PS Tsrancha		11 MT 32x4/1995	11	128	37
	Shaft well – 2 26 124,6			165	55
		GRUNDFOS SP 77 – 13	21	112	55
		WILO K86 +NU 701-2/55	32		
	TW 2.			145	132
	PS II uplift	KRG 14 – 100	40		
		28 MT 45x3/1984 and 1992 - 2 units	28	135	75
PS Patalenitsa		45 M 45x3/ 1987	45	135	110
	TW 105,26 124,6	TWI 06-50+15 KEMO	11	100	25
PS Apriltsi – Sbor	PS Sbor	4 MT 25x4/1987 - - 2 units	4	100	13
		GRUNDFOS CR 32-11-2/2000	8	158	22
PS Rosen tsar Asen	PS	18 MT32x3/1988	1	96	37

Figure: Mokrishte water yielding zone – BUNKER PS 7

Figure: PS Mokrishte – II uplift – pumps low pressure

Figure: PS Mokrishte – II uplift – pumps high pressure

Figure: PS Garata

Figure: PS Karabunar - Boshulya

Figure: PS Zvanichevo


Figure: PS Lyahovo - Bratanitsa


Figure: PS Sinitovo


Figure: BPS Ognyanovo


Figure: PS Hadzhievo


Figure: PS Govedare


Figure: PS Vetren – II uplift


Figure: PS Vetren – III uplift


Figure: PS Septemvri – II uplift


Figure: PS Varvara – Vetren dol – II uplift


Figure: PS Semchinovo - Simeonovets


Figure: PS Dinkata – not in operation

APPENDIX 3-12: TRANSMISSIONS MAINS

Table: Transmission water mains to the main water supply systems of Pazardzhik Municipality

Transmission water main	Material	Diameter [mm]	Length [km]	Year of construction	Observations
Water supply system Pazardzhik					
From the water source to PS Mokrishte and town of Pazardzhik	Steel	273	100	1979	
	Mannesmann	200	200	1964	
	Steel	159	3 100	1967	
	Asbestos-Cement	200,250,300 350,400	3 816	1981-1988	
	Asbestos-Cement	475	1 900	1983	
	Asbestos-Cement	546	1 140	1981	
	Steel	475	1 140	2000	
From PS Mokrishte to PR V=12000 m3	Reinforced concrete	1 200	7 071 4 795	1995	in very poor condition, frequent failures /high costs for their removal/
	Steel	920	1200	1995	
	Steel	820	30	1995	
PS Ivaylo	Mannesmann	300	2 396	1930	Poor condition
Town of Pazardzhik	Asbestos-Cement	300	2 200	1980	
Village of Dragor	Asbestos-Cement	100	1 000	1958	
Village of Saraya	Asbestos-Cement	125	2 000	1969	
From PS Mokrishte to the village of Mokrishte	Steel	133	2 245	1978	
From town of Pazardzhik to the village of Dobrotitsa	PE	160	3 036	2011	In good condition
From town of Pazardzhik to the village of Miryantsi	Asbestos-Cement	150	3 824	1965	
From PS Garata to the village of Glavinitsa					
Water supply system Aleko Konstantinovo					
From the water source to the village	Asbestos	200	1 098	1987	
Water supply system Sinitovo					
From the water source to the village	Asbestos	200	700	1961	
Water supply system Chernogorovo					
From the water source to the village Chernogorovo	Steel	219	1 823	1990	corroded pipes
From the village of Chernogorovo to the village of Krali Marko	Asbestos	300	1 542		
Water supply system Malo Konare					
From the water source to the village of Peshtigovo	PVC	200	2 857	2002	

Transmission water main	Material	Diameter [mm]	Length [km]	Year of construction	Observations
From the water source to the village of Malo Konare	Asbestos	100	927		
Water supply system Zvanichevo					
From the water source to the village	Asbestos	150	214	1997	
Water supply system Lyahovo - Bratanitsa					
From the water source to the villages	Asbestos	125	460	1962	large water losses of failure
	Asbestos	150	690	1962	Large water losses
Water supply system Patalenitsa - Tsrancha					
From the water source TW to PS II-nd uplift	PVC	140	3 240	2001	
From PS II-nd uplift to PR Tsrancha	Steel	159	1 250	1995	
From catchments to PR Tsrancha	Mannesmann Asbestos-Cement	70 125	1 067 980	1929	Obsolete
From catchments to PR Patalenitsa	Asbestos-Cement	100 80	4 379 948	1965 1956	water mains
From water source TW to PS II-nd uplift	Steel	377	2 267	1981	Corroded pipes
From PS II-nd uplift to PR Patalenitsa	Steel	325	1 063	1975	
From catchments to CC	Mannesmann Asbestos-Cement			1967 1954	Obsolete
From CC to PR Patalenitsa	Mannesmann	60	4 786	1937	Water mains
From PR to PR Tsrancha	Asbestos-Cement	150	2 240	1975	
Water supply system Debrashtitsa					
From water source to CC	Asbestos	80	948	1956	Obsolete
From CC to PR	Asbestos	125	1 853	1962	Water mains
From CC to PR	Mannesmann	100	1 853	1956	
Water supply system Gelemenovo					
From water source to PR	Asbestos	150	2 956	1956	Obsolete water mains
Water supply system Yunatsite					
From water source to the village				1991	
Water supply systemVelichkovo					
From water source to PR	Steel	150	2 164	1987	Corroded pipes
	Asbestos	200	1 975	1958	Not in operation since 1987
Water supply system Rosen – Tsar Asen					
From PS to PR Rosen	Asbestos	125	1 304	1986	High
From PS to PR Tsar Asen	Steel	108	2 000	1979	water losses
Water supply system Apriltsi - Sbor					
From water source to PR Apriltsi	Steel	159	2 400	1970	High
From PS to PR Sbor	Asbestos	800	3 960	1970	water losses
Water supply system Ovchepoltsi – Topoli dol					
From water source to II-nd uplift	PVC	160	898	2002	

Transmission water main	Material	Diameter [mm]	Length [km]	Year of construction	Observations
From PS II-nd uplift to PR Topoli dol	Asbestos	125	3 151	1974	Obsolete
From PS II-nd uplift to PS III-d uplift	Asbestos	125	2 090	1975	Water mains
From PS III-d uplift to PR Ovchepoltsi	Asbestos	125	2 280	1976	

Table: Transmission water mains to the main water supply systems of Septemvri Municipality

Transmission water main	Material	Diameter [mm]	Length [km]	Year of construction	Observations
Water supply system Vetren					
Ot PS II-nd uplift Vetren to PS III-d uplift	Steel	426	4 230	1987	Obsolete water mains
From water source to PS II-nd Uplift Vetren	Asbestos	150,200, 250,300	1 207	1965	
From PS III-d uplift to PR low zone Vetren	PVC	200	1 606	2001	Obsolete water mains
From PS III-d uplift to PR Vinogradets	Steel	325,377 256	4 941	1990	
	PVC	250	750	1999	
From PS III-d uplift to PR high zone Vetren	Steel	325	1 440	1996	
From PR high zone Vetren to PS Slavovitsa IV-th uplift	Steel	273	1 856	1988	
	PVC	315	2 517	1997	
From PS Slavovitsa IV-th uplift to PS G. Varshilo V-th uplift	Steel	150	1 050	1988	
From PS G. Varshilo V-th uplift to PR	Asbestos	80	25 343	1973	Obsolete water mains
From PS Vetren III-d uplift to PR Akandzhievo	Asbestos	100	2 520	1971	
Water supply system Septemvri					
From water source to to KV	Steel	159,219 325	358 1 570	1986	
From KV to the town of Septemvri	Steel	350	1 100	1986	
From town of Septemvri to village of Zlokuchene	Asbestos	125	1 845	1971	
Water supply system Karabunar - Boshulya					
From water source to TR	Steel	219	1 868	1998	
From TR to PR Boshulya	Asbestos	125	900	1958	
From TR to PR Karabunar	PVC	200	1 480	2001	
Water supply system Kovachevo - Lozen					
From water source to PR Lozen	asbestos	200	5 844	1974	obsolete water mains
Water supply system Varvara – Vetren dol					
From water source to PR Vetren dol	Steel	159	2 200	1986	
From PS to PR Varvara	Steel	219	2 000	1984	
Water supply system Semchinovo - Simeonovets					

Transmission water main	Material	Diameter [mm]	Length [km]	Year of construction	Observations
From water source to PS Semchinovo	Asbestos	200	23 781	1984	
From PS tp PR Simeonovets	Asbestos	200	1 160	1984	
From catchment to PR Semchinovo	Mannesmann	60 80	1 217 5 000	1939 80	frequent failures
From catchment to PR Simeonovets	Asbestos-Cement	150	243	1959	frequent failures

Table: Transmission water mains to the main water supply systems of Lesichovo Municipality

Transmission water main	Material	Diameter [mm]	Length [km]	Year of construction	Observations
Water supply system Vetren					
From PS Slavovitsa to DC	Steel	325	2 541	1993	
From DC to PR Lesichovo	Steel	219	4 670	1993	
	Steel	273	650	1993	
From PR Lesichovo to PS I-st uplift Borimechkovo	Steel	219 159	1 344 1 662	1993	heavily corroded pipes
From PS I-st uplift to PS II-nd uplift Borimechkovo	Steel	108	2 975	1995	
From PS II-nd uplift Borimechkovo to PR	Steel	108	1 915	1995	
Water supply system Dinkata					
From water source to PR Pamidovo	Asbestos	200	1 020	1987	
From water source to PR Shtarkovo	Asbestos	100	3 520	1971	In poor condition

Asbestos cement and steel transmission water mains constructed before 2002 are Obsolete and are subject to replacement. The laid PVC pipes are not in good condition - many failures and are eligible for replacement.

APPENDIX 3-13: DISTRIBUTION NETWORKS

Table: Distribution water supply network of town of Pazardzhik

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
Asbestos	60	8,460	4,89	1955-1981	Obsolete pipes. The failures are mainly on these pipes.
	80	44,300	25,61		
	100	28,580	16,52		
	125	1,595	0,92		
	150	8,200	4,74		
	200	15,190	8,78		
	250	3,400	1,97		
	300	4,660	2,69		
	350	2,115	1,22		
	375	2,430	1,40		
	400	1,230	0,71		
	475	1,870	1,08		
	546	1,140	0,66		
Total asbestos		123,170	71,20		
Steel	76	6,040	3,49	1977-1995	Obsolete. No cathodic protection.
	89	2,070	1,20		
	108	10,025	5,80		
	133	0,110	0,06		
	159	4,220	2,44		
	219	0,545	0,32		
	325	0,285	0,16		
	820	0,835	0,48		
	920	1,200	0,69		
Total steel		25,330	14,64		
Mannesmann	60	0,650	0,38	1931-1942	Old, Obsolete
	100	0,120	0,07		
	150	0,890	0,51		
	300	0,760	0,44		
Total Mannesmann		2,420	1,40		
Steel galvanized pipes	1“	0,090	0,05	1981	In poor condition. Corrosion. Small diameters.
Total galvanized steel pipes		0,090	0,05		
Cast iron	100	0,140	0,08	1996-2002	In good condition
	200	0,680	0,39		
	300	0,540	0,31		

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
	600	0,600	0,35		
Total cast iron		1,960	1,13		
PE	63	0,135	0,08	After 2000	In good condition
	75	0,080	0,05		
	90	2,410	1,39		
	110	3,738	2,16		
	140	0,180	0,1		
	160	8,777	5,07		
	200	1,000	0,58		
	225	0,070	0,04		
	250	0,460	0,27		
	315	2,750	1,59		
	400	0,340	0,20		
Total PE		19,940	11,53		
PVC	100	0,070	0,04	after 2000	In very good condition
Total PVC		0,070	0,04		
total:		172,980	100		
House connections	3/4“-2“ 25-125			1955-1995 after 2000	The majority of galvanized steel pipes - old and in poor condition. Corrosion. The new house connections of PE are in good condition.

Table: Water distribution network of village of Malo Konare

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
Asbestos	60	19,199	35,66	1957-1975	Obsolete pipes. The failures are mainly on these pipes.
	80	21,774	40,45		
	100	7,559	14,11		
	125	1,273	2,36		
	150	0,513	0,95		
	300	0,850	1,58		
Total asbestos		51,208	95,11		
PVC	75	0,281	0,52	1999-2001	In very good condition
	90	0,614	1,14		
	110	0,146	0,27		
	200	1,589	2,95		
Total PVC		2,630	4,89		
Total:		53,838	100		

House connections	3/4“-2“				The majority of galvanized steel pipes - old and in poor condition. Corrosion.

Table: Water distribution network of village of Ivaylo

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
етернит	60	2,777	13,47	1958-1975	Obsolete pipes. The failures are mainly on these pipes
	80	9,164	44,44		
	100	0,150	0,73		
	125	0,560	2,72		
	300	1,064	5,15		
Total asbestos		13,715	66,51		
Steel	300	1,315	6,38	1977-1982	Obsolete. No cathodic protection.
Total steel		1,315	6,38		
PE	90	3,568	17,30	1998-2005	In very good condition.
	160	1,321	6,41		
	200	0,461	2,24		
	315	0,240	1,16		
Total PE		5,590	27,11		
Total:		20,620	100		
Ouse connections	3/4“-1 1/2“				The majority of galvanized steel pipes - old and in poor condition. corrosion

Table: Water distribution network of village of Aleko Konstantinovo

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
asbestos	60	4,239	23,42	1951-1967	Obsolete pipes. The failures are mainly on these pipes.
	80	10,791	59,62		
	100	0,115	0,63		
	125	1,629	9,00		
	150	0,182	1,01		
Total asbestos		16,956	93,68		
steel	159	0,173	0,96	1977-1981	Obsolete. No cathodic protection.
Total steel		0,173	0,96		
PVC	90	0,971	5,36	1999	In very good condition.
Total PVC		0,971	5,36		
Total:		18,100	100		
House connections	3/4“-2“				The majority of galvanized steel pipes - old and in poor condition. corrosion.

Table: Water distribution network of village of Ognyanovo

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
Asbestos	60	10,028	46,75	1963-1976	Obsolete pipes. The failures are mainly on these pipes.
	80	1,389	6,48		
	100	2,135	9,95		
	125	1,166	5,43		
	150	1,164	5,43		
	200	0,673	3,14		
	300	0,057	0,27		
Total asbestos		16,612	77,45		
Mannesmann	40	0,338	1,58	1935-1939	Old, Obsolete.
	50	2,986	13,92		
Total Mannesmann		3,324	15,50		
Galvanized steel pipes	¾''	0,318	1,48	1981-1987	In bad condition. Corrosion. Small diameters
Total galvanized steel pipes.		0,318	1,48		
PE	63	0,339	1,58	2002-2006	In very good condition
	90	0,657	3,06		
	110	0,198	0,92		
Total PE		1,194	5,57		
Total:		21,448	100		
House connections	3/4"-1 1/2"				The majority of galvanized steel pipes - old and in poor condition. Corrosion.

Table: Water distribution network of village of Glavinitsa

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
Asbestos	60	0,395	2,53	1951-1973	Obsolete pipes. The failures are mainly on these pipes
	80	12,716	81,45		
	100	0,415	2,66		
	150	0,150	0,96		
Total asbestos		13,676	87,60		
Steel	108	0,110	0,70	1975-1983	Obsolete. No cathodic protection.
	159	0,925	5,93		
Total steel		1,035	6,63		
PVC	90	0,900	5,77	1998-1999	In very good condition
Total:		15,611	100		

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
House connections	3/4“-2“				The majority of galvanized steel pipes - old and in poor condition. Corrosion.

Table: Water distribution network of village of Chernogorovo

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
Asbestos	60	14,049	51,39	1967-1971	Obsolete pipes. The failures are mainly on these pipes.
	80	6,771	24,77		
	100	1,388	5,07		
	125	1,763	6,45		
	200	0,826	3,02		
	250	1,003	3,67		
Total asbestos		25,800	94,37		
Steel	219	0,995	3,63	1977-1986	Obsolete. No cathodic protection.
Total steel		0,995	3,63		
Galvanized steel pipes	¾''	0,335	1,23	1981-1987	In poor condition. Corrosion. Small diameters.
Total Galvanized steel pipes		0,335	1,23		
PE	63	0,210	0,77	след 2000	In very good condition.
Total PE		0,210	0,77		
Total:		27,340	100		
House connections	3/4“-1 1/2“				The majority of galvanized steel pipes - old and in poor condition. corrosion.

Table: Water distribution network of village of Bratanitsa

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
Asbestos	60	4,577	29,25	1963-1971	Obsolete pipes. The failures are mainly on these pipes.
	80	8,004	51,14		
	100	1,129	7,21		
	125	0,295	1,88		
Total asbestos		14,005	89,49		
PE	90	0,578	3,69	After 2000	In very good condition.
	100	1,067	6,82		
Total PE		1,645	11,51		

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
Total:		15,650	100		
House connections	3/4“-1 1/2“				The majority of galvanized steel pipes - old and in poor condition. corrosion.

Table: Water distribution network of town of Septemvri

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
Asbestos	60	0,436	0,91	1967-1987	Obsolete pipes. The failures are mainly on these pipes.
	80	12,974	27,09		
	100	24,270	50,69		
	125	0,756	1,58		
	150	2,473	5,16		
	200	2,357	4,92		
	250	1,352	2,82		
	300	0,310	0,65		
	350	1,847	3,86		
Total asbestos		46,775	98,68		
Steel	150	0,204	0,43	1987-1989	Obsolete. No cathodic protection.
Total steel		0,204	0,43		
Galvanized steel pipes	1 ½”	0,658	1,37	1981-1987	In poor condition. Corrosion. Small diameters.
Total Galvanized steel pipes		0,658	1,37		
PE	63	0,164	0,33	1999	In very good condition.
	180	0,083	0,17		
Total PE		0,247	0,52		
Total:		47,884	100		
House connections	3/4"-150				The majority of galvanized steel pipes - old and in poor condition. corrosion.

Table: Water distribution network of town of Vetren

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
Asbestos	60	3,429	14,97	1966-1973	Obsolete pipes. The failures are mainly on these pipes.
	80	12,852	56,12		
	100	1,382	6,04		

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
	125	0,821	3,58		
	150	0,230	1,00		
	200	2,051	8,95		
Total asbestos		20,765	90,66		
Steel	125	0,163	0,59	1976-1982	Obsolete. No cathodic protection
	159	2,004	8,75		
Total steel		2,140	9,34		
Total:		22,905	100		
House connections	3/4“-1 1/2“				The majority of galvanized steel pipes - old and in poor condition. corrosion.

Table: Water distribution network of village of Kovachevo

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
Asbestos	60	0,376	2,48	1965-1974	Obsolete pipes. The failures are mainly on these pipes.
	80	6,922	45,66		
	100	7,406	48,86		
	200	0,454	3,00		
Total:		15,158	100		
House connections	3/4“-1“				The majority of galvanized steel pipes - old and in poor condition. corrosion

Table: Water distribution network of village of Varvara

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
Asbestos	60	11,867	58,40	1958-1971	Obsolete pipes. The failures are mainly on these pipes.
	80	5,312	26,14		
	100	0,695	3,42		
	125	0,185	0,91		
Total asbestos		18,059	88,87		
Steel	60	0,209	1,03	1979-1983	Obsolete. No cathodic protection
	100	0,756	3,72		
	150	1,142	5,62		
Total steel		2,107	10,37		
PE	63	0,154	0,76	2006-2007	In very good condition.
Total PE		0,154	0,76		
Total:		20,320	100		

Material	Nominal diameter [mm]	Length [km]	Percentage of the total length [%]	Year of construction	Observations
House connections	3/4“-1“				The majority of galvanized steel pipes - old and in poor condition. corrosion.

Table: Water distribution networks in the villages below 2000 inhabitants in Pazardzhik Municipality

Settlement	Diameter	Asbestos		Steel		Galvanized steel		Mannesmann		PVC		PE		Total m	observations
		length km	percentage %	length km	percentage %	length km	percentage %	length km	percentage %	length km	percentage %	length km	percentage %		
Mokrishte	60-125	8 324	96,68							286	3,32			8 610	The old asbestos cement, steel and galvanized pipes are strongly Obsolete. On them failures happen, there are hidden leaks. At asbestos cement, rubber gaskets have lost elasticity. Water mains from polyethylene and PVC are in very good condition.
Dragor	60-100	5 193	78,07							402	6,04	1 057	15,89	6 652	
Krali Marko	60-100	3 987	84,97					215	4,58			490	10,44	4 692	
Apriltsi	60-125	5 673	100,00											5 673	
Zvanichevo	60-125	11 407	91,62	346	2,78							698	5,61	12 451	
Patalenitsa	60-150	18 088	96,25									705	3,75	18 793	
Tsrancha	25-125	7 745	60,84	170	1,34	800	6 28	3 930	30,87	85	0,67			12 730	
Debrashtitsa	25-150	4 610	45,17	808	7,92	566	5 55	3 875	37,97			347	3,40	10 206	
Sinitevo	60-150	11 372	95,85							492	4,15			11 864	
Hadzhievo	50-80	9 397	82,74					1 960	17,26					11 357	
Miryantsi	60-100	4 850	85,31							835	14,69			5 685	
Dobrovnitsa	60-100	15 063	97,34							412	2,66			15 475	
Dragor	60-125	4 509	67,78					710	10,67	376	5,65	1 057	15,89	6 652	
Saraya	60-125	7 442	77,64					710	7,41	376	3,92	1 057	11,03	9 585	
Pishtigovo	60-125	15 479	87,75							1 937	10,98	224	1,27	17 640	

Settlement	Diameter	Asbestos		Steel		Galvanized steel		Mannesmann		PVC		PE		Total m	observations
		length km	percentage %	length km	percentage %	length km	percentage %	length km	percentage %	length km	percentage %	length km	percentage %		
Topli dol	60-150	7 702	97,08							102	1,29	130	1,64	7 934	
Ovchepoltsi	80-200	15 459	92,46									1 260	7,54	16 719	
Rosen	80-150	6 004	100,00											6 004	
Tsar Asen	60-125	6 387	100,00											6 387	
Sbor	60-125	7 852	100,00											7 852	
Gelemenovo	60-150	9 001	96,36							340	3,64			9 341	
Velichkovo	60-150	9 385	76,49									2 885	23,51	12 270	
Yunatsite	80-150	13 522	94,22									830	5,78	14 352	
Lyahovo	60-100	6 816	96,09									277	3,91	7 093	
Govedare	60-100	10 172	91,43									954	8,57	11 126	
Total		**225 439**	**87,67**	**1 324**	**0,51**	**1 366**	**0 53**	**11 400**	**4,43**	**5 643**	**2,19**	**11 971**	**4,66**	**257 143**	

Table: Water distribution networks in the villages below 2000 inhabitants in the municipalities of Septemvri and Lesichovo

Settlement	Diameter	Asbestos		Galvanized steel		Mannesmann		PVC		PE		Total m	Observations
		length km	percentage %	length km	percentage %	length km	percentage %	length km	percentage %	length km	percentage %		
Septemvri Municipality													
Vinogradets	60-150	23 261	91,02			556	2,18			1 740	6,81	25 557	The old

Settlement	Diameter	Asbestos		Galvanized steel		Mannesmann		PVC		PE		Total m	Observations
		length km	percentage %	length km	percentage %	length km	percentage %	length km	percentage %	length km	percentage %		
Slavovitsa	50-150	4 409	81,88			976	18,12					5 385	asbestos and galvanized pipes are strongly Obsolete. On them failures are happening, there are hidden leaks. At asbestos cement, rubber gaskets have lost elasticity. Water pipes from polyethylene and PVC are in very good condition.
Boshulya	60-140	9 724	97,40							260	2,60	9 984	
Vetren dol	60-125	16 980	96,61							596	3,39	17 576	
Simeonovets	60-150	8 483	87,53			1 209	12,47					9 692	
Semchinovo	60-150	8 999	92,84							694	7,16	9 693	
Akandzhievo	60-100	6 583	99,40							40	0,60	6 623	
Gorno Varshilo	25-80	1 153	46,25	1 340	53,75							2 493	
Zlokuchene	80-125	3 210	68,01					635	13,45	875	18,54	4 720	
Karabunar	60-200	19 051	95,96							803	4,04	19 854	
Lozen	80-200	11 270	100,00									11 270	
Total for Septemvri Municipality		**113 123**	**92,08**	**1 340**	**1,09**	**2 741**	**2,23**	**635**	**0,52**	**5 008**	**4,08**	**122 847**	
Lesichovo Municipality													
Dinkata	60-125	3 615	35,94							6 444	64,06	10 059	The old asbestos and galvanized pipes are strongly
Lesichovo	60-250	11 843	89,99							1 318	10,01	13 161	
Kalugerovo	60-160	11 209	87,31							1 629	12,69	12 838	
Tserovo	25-160	9 538	81,30	832	7,09					1 362	11,61	11 732	
Borimechkovo	60-80	3 343	91,54					309	8,46			3 652	

Settlement	Diameter	Asbestos		Galvanized steel		Mannesmann		PVC		PE		Total m	Observations
		length km	percentage %	length km	percentage %	length km	percentage %	length km	percentage %	length km	percentage %		
Shtarkovo	60-150	9 441	94,73							525	5,27	9 966	Obsolete. On them failures are happening, there are hidden leaks. At asbestos cement, rubber gaskets have lost elasticity. Water pipes from polyethylene and PVC are in very good condition.
Pamidovo	60-125	4 736	92,39							390	7,61	5 126	
Total for Lesichovo Municipality		**53 725**	**80,75**	**832**	**1 .25**			**309**	**0,46**	**11 668**	**17,54**	**66 534**	

APPENDIX 3-14: CALCULATION OF THE CONSUMERS WITHIN THE TERRITORY OF VIK EOOD - PAZARDZHIK

Settlement	Number of house connections	Total number of consumers	% total number of consumers	Number of consumers without water meters	% consumers without water meters	Total number of customers with water meters in operation	% Total number of customers with water meters in operation	Number of mounted water meters
Pazardzhik Municipality								
Pazardzhik	9 819	34 084	100%	436	1,28%	33 648	98,72%	37 833
Glavinitsa	754	886	100%	0	0,00%	886	100,00%	904
Ivaylo	956	987	100%	3	0,30%	984	99,70%	1 007
Malo Konare	1 876	1 878	100%	17	0,91%	1 861	99,09%	1 887
Chernogorovo	997	997	100%	0	0,00%	997	100,00%	1 002
Bratanitsa	709	702	100%	36	5,13%	666	94,87%	706
Aleko Konstantinovo	852	832	100%	0	0,00%	832	100,00%	836
Ognyanovo	969	968	100%	3	0,31%	965	99,69%	973
Mokrishte	499	670	100%	4	0,60%	666	99,40%	673
Saraya	506	505	100%	14	2,77%	491	97,23%	508
Dragor	498	496	100%	2	0,40%	494	99,60%	498
Dobrovnitsa	651	628	100%	0	0,00%	628	100,00%	631
Miryantsi	284	628	100%	0	0,00%	628	100,00%	631
Pishtigovo	612	611	100%	0	0,00%	611	100,00%	614
Krali Marko	184	81	100%	0	0,00%	81	100,00%	81
Topoli dol	242	241	100%	0	0,00%	241	100,00%	242
Ovchepoltsi	565	548	100%	3	0,55%	545	99,45%	551
Rosen	322	319	100%	1	0,31%	318	99,69%	321
Tsar Asen	245	245	100%	0	0,00%	245	100,00%	246
Apriltsi	250	242	100%	0	0,00%	242	100,00%	243
Sbor	267	263	100%	0	0,00%	263	100,00%	264
Gelemenovo	354	351	100%	0	0,00%	351	100,00%	353
Velichkovo	672	644	100%	1	0,16%	643	99,84%	647
Yunatsite	672	690	100%	0	0,00%	690	100,00%	693
Zvanichevo	808	792	100%	1	0,13%	791	99,87%	796
Lyahovo	242	245	100%	2	0,82%	243	99,18%	246
Patalenitsa	1 002	966	100%	0	0,00%	966	100,00%	971
Tsrancha	731	651	100%	0	0,00%	651	100,00%	654
Debrashtitsa	629	604	100%	3	0,50%	601	99,50%	607
Sinitevo	744	744	100%	0	0,00%	744	100,00%	748
Hadzhievo	479	471	100%	0	0,00%	471	100,00%	473
Govedare	580	590	100%	0	0,00%	590	100,00%	593
Total:	28 970	53 559		526		53 033		57 434
Belovo Municipality								
Akandzhievo	313	313	100%	0	0,00%	313	100,00%	315
Total:	313	313		0		313		315

Settlement	Number of house connections	Total number of consumers	% total number of consumers	Number of consumers without water meters	% consumers without water meters	Total number of customers with water meters in operation	% Total number of customers with water meters in operation	Number of mounted water meters
Septemvri Municipality								
Septemvri	2 636	2 988	100%	0	0,00%	2 988	100,00%	3 197
Vetren	1 579	1 623	100%	0	0,00%	1 623	100,00%	1 631
Varvara	884	883	100%	0	0,00%	883	100,00%	887
Kovachevo	719	713	100%	0	0,00%	713	100,00%	717
Zlokuchene	243	245	100%	0	0,00%	245	100,00%	246
Boshulya	416	412	100%	0	0,00%	412	100,00%	414
Karabunar	899	890	100%	0	0,00%	890	100,00%	894
Lozen	501	495	100%	0	0,00%	495	100,00%	497
Vetren dol	663	654	100%	0	0,00%	654	100,00%	657
Semchinovo	631	630	100%	0	0,00%	630	100,00%	633
Simeonovets	408	409	100%	0	0,00%	409	100,00%	411
Vinogradets	883	899	100%	0	0,00%	899	100,00%	903
Slavovitsa	413	379	100%	0	0,00%	379	100,00%	381
Gorno Varshilo	126	126	100%	0	0,00%	126	100,00%	127
Total:	11 001	11 346		0		11 346		11 597
Lesichevo Municipality								
Borimechkovo	198	198	100%	0	0,00%	198	100,00%	199
Dinkata	446	446	100%	0	0,00%	446	100,00%	448
Kalugerovo	845	845	100%	0	0,00%	845	100,00%	849
Lesichovo	727	728	100%	0	0,00%	728	100,00%	732
Pamidovo	267	267	100%	0	0,00%	267	100,00%	268
Shtarkovo	371	371	100%	0	0,00%	371	100,00%	373
Tserovo	647	647	100%	0	0,00%	647	100,00%	650
Total:	3 501	3 502	100%	0	0,00%	3 502	100,00%	3 520
Total for ViK Pazardzhik:	43 785	68 720	100%	526	0,77%	68 194	99,23%	72 865

APPENDIX 3-15: PIPE FAILURES IN 2011

Settlement	Failures on the water supply network	Length of the internal water network km	Number failures/km	Failures of house connection, numbers	House connection, number	Number failures/ number house connections
Pazardzhik Municipality						
Pazardzhik	265	172,98	1,53	300	9 819	0,0306
Glavinitsa	6	15,61	0,38	4	754	0,0053
Ivaylo	12	20,62	0,58	16	956	0,0167
Malo Konare	14	53,84	0,26	23	1 876	0,0123
Chernogorovo	6	27,34	0,22	9	997	0,0090
Bratanitsa	9	15,65	0,58	16	709	0,0226
Aleko Konstantinovo	6	18,10	0,33	16	852	0,0188
Ognyanovo	11	21,45	0,51	17	969	0,0175
Mokrishte	4	8,61	0,46	5	499	0,0100
Saraya	5	9,59	0,52	2	506	0,0040
Dragor	7	6,65	1,05	3	498	0,0060
Dobrovnitsa	6	15,48	0,39	3	651	0,0046
Miryantsi	6	5,69	1,06	2	284	0,0070
Pishtigovo	7	17,64	0,40	5	612	0,0082
Krali Marko	3	4,69	0,64	8	184	0,0435
Topoli dol	5	7,93	0,63	5	242	0,0207
Ovchepoltsi	17	16,72	1,02	36	565	0,0637
Rosen	5	6,00	0,83	6	322	0,0186
Tsar Asen	21	6,39	3,29	22	245	0,0898
Apriltsi	16	5,67	2,82	6	250	0,0240
Sbor	11	7,85	1,40	4	267	0,0150
Gelemenovo	20	9,34	2,14	10	354	0,0282
Velichkovo	36	12,27	2,93	19	672	0,0283
Yunatsite	3	14,35	0,21	9	672	0,0134
Zvanichevo	5	12,45	0,40	18	808	0,0223
Lyahovo	4	7,09	0,56	11	242	0,0455
Patalenitsa	26	18,79	1,38	22	1 002	0,0220
Tsrancha	11	12,73	0,86	9	731	0,0123
Debrashtitsa	10	10,21	0,98	15	629	0,0238
Sinitevo	1	11,86	0,08	21	744	0,0282
Hadzhievo	7	11,36	0,62	11	479	0,0230
Govedare	2	11,13	0,18	17	580	0,0293
Total:	567	596,08	0,95	670	28 970	0,0231
Belovo Municipality						
Akandzhievo	1	6,62	0,15	0	313	0,0000
Total:	1	6,62	0,15	0	313	0,0000
Septemvri Municipality						
Septemvri	55	47,88	1,15	37	2 636	0,0140

Settlement	Failures on the water supply network	Length of the internal water network km	Number failures/km	Failures of house connection, numbers	House connection, number	Number failures/ number house connections
Vetren	49	22,91	2,14	15	1 579	0,0095
Varvara	40	20,32	1,97	7	884	0,0079
Kovachevo	15	15,16	0,99	7	719	0,0097
Zlokuchene	1	4,72	0,21	2	243	0,0082
Boshulya	13	9,98	1,30	0	416	0,0000
Karabunar	42	19,85	2,12	28	899	0,0311
Lozen	5	11,27	0,44	0	501	0,0000
Vetren dol	16	17,58	0,91	3	663	0,0045
Semchinovo	18	9,69	1,86	2	631	0,0032
Simeonovets	10	9,69	1,03	5	408	0,0123
Vinogradets	14	25,56	0,55	6	883	0,0068
Slavovitsa	3	5,39	0,56	3	413	0,0073
Gorno Varshilo	1	2,49	0,40	0	126	0,0000
Total:	282	222,49	1,27	115	11 001	0,0105
Lesichevo Municipality						
Borimechkovo	1	3,65	0,27	0	198	0,0000
Dinkata	12	10,06	1,19	3	446	0,0067
Kalugerovo	6	12,84	0,47	3	845	0,0036
Lesichevo	7	13,16	0,53	2	727	0,0028
Pamidovo	3	5,13	0,59	0	267	0,0000
Shtarkovo	3	9,97	0,30	17	371	0,0458
Tserovo	8	11,73	0,68	5	647	0,0077
Total:	40	66,53	0,60	30	3 501	0,0086
Total for ViK Pazardzhik:	890	891,73	1,00	815	43 785	0,0186

APPENDIX 3-16: LEVEL OF COMPLETION AND CONSTRUCTION STAGES OF THE SEWERAGE SYSTEM OF THE TOWN OF PAZARDZHIK

The construction of sewerage / in particular the attempts to drain the land from surface water / has begun before the liberation from the Ottoman yoke with stone masonry channel to a depth of 1.0 to 1.5 m below the present terrain and the sewerage of the buildings mass is discharged into absorbing wells in their yards. The construction of modern sewage with concrete pipes after World War II, from the city centre to the Maritsa River with small diameters - f 200, 250, 300, with minimal slopes and small depth / to 2.0-2.5 m / passing under open irrigation channel "Pasha-arc" / put into operation in the early twentieth century to irrigate the rice fields in the Plovdiv-Pazardzhik field by water of Maritsa river and Topolnitsa river / running through the city along the river Maritsa 200 300 m north of the river.

After the flood from 1957, the adjustment of both sides of the Maritsa River with concrete retaining walls in the regulation of the city, in which are suspended individual discharges into the river and began the construction a complete sewerage system as project of 1962, as main construction was carried out in a 5-year period from 1968 to 1973. Then have been built 45 km sewerage, representing 54% of the network according to data from Long term material assets of "ViK Pazardzhik" and 32% of the total length set in the present study.

In the 60s of the 20th century have been built several main branches in the direction north-south, northwest-southeast and west-east, which collect the waters of existing sewerage and lead them in a south-easterly direction out of town by collector 200/127cm, passing under the channel "Pasha-Arc" and discharging into an open drainage channel flowing into the Luda Yana River near the place the newly built WWTP. By the end of the 80s, around 95% of street sewerage network has been constructed; concrete pipes were put, apart from some streets, and large parts of rapidly growing Roma neighbourhood "East" part of the streets that are not in regulation.

Over the last 20 years have been built sewerage with a total length of 10 km. primarily with concrete pipes, such as those built after 2002 are not transferred as tangible fixed assets or protocols to use by ViK. With corrugated polyethylene pipes / GPE /, are built 2,920 m / 2% of the entire network / Sewerage - "Tsar Osvoboditel" - 685 m; quar.134 - 150 m; Main collector 10 in the industrial zone - 70 +63 m , "Iztok" - 690 m, 561-563 quarter - 830 meters, street "Kocho Chestimenski" - 162 m.

	Streets	Sewerage network										
Year.	Quarters	Material.	ф300	ф400	ф500	ф600	ф1000	У110	У120	У130	У140	Total
1993	**Struma**	**concrete**	**198**	**200**								398
1995	**Dimitar Grekov**	**concrete**	**244**									244
1995	**Tundzha**	**Concrete**	**175**									175
1996	**Ogosta**	**Concrete**	**138**									138
1996	**Topolnitsa**	**Concrete**	**130**	**157**								287
1998	**Varba**	**Concrete**	**43**	**137**								180
1998	**Maritsa**	**Concrete**		**135**								135
1998	**Yantra**	**Concrete**	**91**									91
1999	**59a**	**Concrete**	**142**	**255**								397
1999	**Br. Miladinovi**	**Concrete**	**175**									175
1999	**Krivolak**	**Concrete**	**60**									60
1999	**Osvobozhdenie**	**Concrete**	**175**									175
1999	**Osam**	**Concrete**		**150**								150
1999	**Spartak**	**Concrete**	**100**	**100**								200
2000	**Tsar Ivan Shishman**	**Concrete**			**260**							260
2001	**Vrah Bratiya/102**	**Concrete**	**105**									105
2001	**Maritsa**	**Concrete**		**150**								150
2001	**Musala**	**Concrete**	**40**									40
2001	**Petar Beron**	**Concrete**	**70**									70
2001	**Petko D. Petkov**	**Concrete**		**203**								203
2001	**Yasen**	**Concrete**	**210**									210
2002	**84**	**Concrete**	**270**									270
2002	**quar.381**	**Concrete**	**164**									164
2002	**Oreh**	**Concrete**	**113**									113
2003	**Tsanko Dyustabanov**	**Concrete**	**125**									125
2004	**quar.539/540**	**Concrete**	**589**	**223**	**178**							990
2004	**Area Yakuba**	**Concrete**	**518**	**35**		**77**	**100**	**230**		**453**	**100**	1 513
2004	**Quar.561-564**	**Concrete**							**70**		**130**	200
2009	**Garibaldi**	**Concrete**	**51**									51
2011	**Mariya Luiza**	**Concrete**	**90**	**20**								110
2003	**Quar.561-563**	**PE**	**185**	**135**	**334**	**175**						829
2007	**quar. Iztok**	**PE**	**270**	**138**	**218**	**303**						929
	quar.134	**PE**	**150**									150
2008	**Industrial zone Maritsa**	**PE**					**163**					163
2008	**Tsar Osvoboditel**	**PE**		**70**	**615**							685
2010	**Kocho Chestimenski**	**PE**		**162**								162
	Total		621	2 270	1 605	555	263	230	70	453	230	10 297

APPENDIX 3-17: SOME REQUIREMENTS FOR INCLUDING INDUSTRIAL WASTEWATER IN SETTLEMENTS' SEWERAGE SYSTEMS.

In order to connect the industrial wastewater with urban sewerage system is necessary to cover the following requirements:

- Wastewater does not contain rough insoluble impurities that can settle or float and jam and stop the city sewerage;
- Wastewater do not cause a corrosive effects of pipe material and all the assets of the system;
- Wastewater does not contain flammable substances (gasoline, oil, etc.)., poisonous and gaseous impurities that may form explosive mixtures in sewerage networks and of assets;
- the temperature of industrial waste water does not exceed specified in the regulations limit;
- The wastewater does not contain bacterial contamination - bacteria of anthrax, glanders and other pathogenic microorganisms;
- The wastewater does not contain radioactive and other toxic substances above permissible concentrations, before the inclusion of such waters; harmful impurities must be removed;
- The wastewater not containing suspended oils, resins, oil and readily degradable synthetic surfactants, which practically can not be oxidized in biological treatment assets;
- Active reaction, the pH should be in the range 6.5 to 8.5;
- The total concentration of dissolved salts must meet the standards;
- BOD and COD must be in accordance with the standards set out in the permit issued by the controlling authorities;
- Industrial waste waters that do not meet the specified conditions, are subjected to pre-treatment;

The largest industrial company in the agglomeration is BIOVET Peshtera. The company is supplied by the city ViK system with water for drinking and domestic use and from its own source for technology needs. Wastewater is treated at a local wastewater treatment and self-discharged into the receiver. The treatment plant is located in the area "Dabovik" and is designed to treat the industrial wastewater contaminated by industrial activities of "Biovet". The waters are transported from the main site to the site of the treatment plant in sewerage collector located in the bed of Stara reka River. After mechanical treatment in a grid, hydro sieve sand grit classifier and jigger, wastewater is pumped to the biological steps first and second degree. They perform biological treatment by the method of "activated sludge" with ammonification and nitrification. Excess sludge is dewatered on belt filter press and composted with other organic waste.

Under the terms of complex permission, discharged wastewater formed within the manufacturing site, are:

- Daily average amount of wastewater – Q av.d – 5 220 m3/d;
- Maximum hourly water quantity Q max.h – 320 m3/h;
- The annual quantity of discharged waste water is estimated at 2.08 million m3/year;

The composition of the water should not exceed:

- COD – 150 mg/l
- BOD5 – 30 mg/l
- suspended solids 20 mg/l

Actually established composition of discharged waste water at the point of monitoring:

- COD – 51 mg/l
- BOD5 – 15 mg/l
- suspended solids - 2 mg/l

APPENDIX 4-1 DAILY AND HOURLY PEAK COEFFICIENT AND DOMESTIC CONSUMPTION

Daily peak coefficient for water supply systems is set as follows:

- 2 for settlements with population between 0 and 499 inhabitants;
- 1.8 for settlements with population between 500 and 1,999 inhabitants;
- 1.7 for settlements with population between 2,000 and 4,999 inhabitants;
- 1.6 for settlements with population between 5,000 and 9,999 inhabitants;
- 1.5 for settlements with population between 10,000 and 49,999 inhabitants;
- 1.4 for settlements with population between 50,000 and 99,999 inhabitants;
- 1.3 for settlements with population over 100,000 inhabitants.

Hourly peak coefficient for water supply systems are set as follows, assessed by averaging the values obtained by applying Tribut formula through the considered range:

- 4.2 for settlements with population between 0 and 499 inhabitants;
- 2.9 for settlements with population between 500 and 1,999 inhabitants;
- 2.5 for settlements with population between 2,000 and 4,999 inhabitants;
- 2.2 for settlements with population between 5,000 and 9,999 inhabitants;
- 2.0 for settlements with population between 10,000 and 49,999 inhabitants;
- 1.9 for settlements with population between 50,000 and 99,999 inhabitants;
- 1.8 for settlements with population over 100,000 inhabitants.

Tribut formula, which was used, is the following:

$$K_P = K_{inf} + \frac{\lambda}{\sqrt{n}} \times \sqrt{K_{inf} \times \left(\frac{D}{c \times d} - 2 \times K_{inf}\right)} + \frac{t}{n}$$

Where:

- Kp is the hourly peak coefficient
- Kinf = 1.8
- λ= 1.5
- t = 34.5
- n is the number of customers connected to the water supply network
- D is the specific flow for one customer. Usually the value is equal to 43.200 l/day
- c is the unit consumption per capita
- d is the mean number of persons per household. The value chosen is 2.1, according to 2011 census provided by the National Statistical Institute.

APPENDIX 4-2 COMPARISON OF COMBINED AND SEPARATE SEWERAGE SYSTEMS

Combined sewer systems

Combined sewer systems tend to be larger than separate systems, because the stormwater runoff has to be transported.

During heavy rainfalls, the hydraulic limit of the network capacity is reached. Furthermore, the wastewater treatment facilities are not able to cope with extreme variations of flows and loads.

Therefore, overflows have to be integrated in the drainage system discharging the part of wastewater/stormwater, which exceeds the hydraulic capacity of the sewer network.

Advantages	Disadvantages
- Only one pipe to be laid into the trench	- Discharge of wastewater into recipient during heavy rainfalls (overflows)
- Flushing of all pipes during rainfall	- Sedimentation problems due to low flow velocity (big dimension / low flow)
- Illegal or wrong connections (wastewater/stormwater) not possible	- High investment costs for stormwater overflows and “mixed”-water treatment facilities
- Discharge and treatment of stormwater from contaminated surface areas or road sections with traffic volume	- Insufficient wastewater concentration at WWTP (biological treatment) caused by infiltration
- Lower operation costs for network maintenance	- Higher treatment and operation costs for wastewater treatment in case of long rainfall events

Separate systems

Separate systems consist of a dual pipe system, which is often laid in parallel. Underneath the road surface, the larger stormwater pipe is placed above the smaller sewer pipe. By adopting this strategy, in case of leakages, no wastewater seeps into the stormwater pipe and thus into the receiving water body.

Different drainage systems can be compared, as follows.

Advantages	Disadvantages
- No stormwater overflows to be constructed (no investment, no operation costs)	- Illegal and wrong connections (wastewater into stormwater system and vice versa) to be avoided
- Constant inflow conditions (flows and loads) to the WWTP and thus no operational problems for biological treatment process	- If no stormwater infiltration systems or stormwater discharge into ditches is possible, two pipes to be laid in the trench (higher investments)
- No sewage discharge into recipient	- Limited storage volumes for wastewater
- Good hydraulic conditions (flow velocity)	
- In case of flooding, just rainwater instead of sewage will reach the surface	

APPENDIX 4-3 DESCRIPTION OF POSSIBLE FINAL DISPOSAL WAYS

Landfilling

Landfilling is a cheap and easy-to-implement option but on the other hand landfilling the dewatered sludge takes lot of spaces.

Several EU member states have set out a restrictive regulation that generally includes the following conditions:

- Traceability (no mixing of sludge of different origins);
- No contamination with hazardous waste (heavy metals, radioactive or infectious material, etc.);
- Conditions of monitoring (sampling, visual inspection, etc.);
- Dry solid content above 30%.

It is recommended to apply these conditions for sludge landfilling in Bulgaria.

Land spreading

Sludge can also be spread over agricultural areas to enrich the soils in organic matter and nutrients, thus reducing the needs for other soil amendments. If authorities and farmers agree on such utilization, then adequate pricing and supply chain must be set up to maximize the use of this sludge.

Since this product is unknown from the agricultural stakeholders today, it is recommended to set up an information program towards the potential users and to prepare a back-up option for sludge disposal (landfilling) in case this agricultural use is eventually not possible or not accepted.

Land spreading activities should be carefully planned and monitored to optimize agricultural benefits and ensure that no health issues arise. Frequent quality controls of the sludge quality should be implemented.

Sludge composting

Sludge composting is an alternative to the direct use of sludge in agriculture. Composting implies mixing sludge with more structuring material such as wood chips (for instance, Corey woods) or residues of gardening before the composting process itself which allows for the dry aerobic degradation of the organic matter and the hygienisation of the composted material.

Composting is economically relevant, as soon as the final composted product is recognized as a valuable product, which can be certified and sold at a price that allows covering part of the relatively high CAPEX and OPEX associated with this process. These conditions are to be studied in the local context of Bulgaria.

Cement factory

Depending of the specific regulation concerning the use of sludge in cement factories in Bulgaria, local agreements can set up between the cement companies and the water companies, when both parties are interested in this option.

The technical specifications for the sludge that can be incinerated by a cement factory include the following:

- Minimum dryness: 90%;
- Lower calorific value (LCV): 3 500 kcal/kg.

The minimum sludge dryness of 90% imposes the preliminary drying of the sludge. This is traditionally achieved through thermal drying, which is an energy intensive process. Thermal drying can be coupled to the cement kilns - which would require an additional but almost no energy cost since the heat would be taken from the cement kilns for free - or be performed at the WWTP.

Incineration

Incineration is a thermal process that burns the sludge. Today, the most commonly used technology is the “fluidized bed furnace” (FBF). FBF are based on the principle of fluidizing a bed of sand with hot air heated from the bottom. This technology results in the total combustion of the sludge at a temperature between 850 – 900℃ in the span of only a few seconds of retention time.

The residues of sludge incineration and flue gas treatment consists in ashes that can be further utilized as mineral material in cement factory or concrete manufacturing process or used as building material for road construction. Ultimately, ashes can also be landfilled.

The major interest of thermal oxidation is the ability to produce energy thanks to the sludge energy potential. A huge amount of energy is recoverable through thermal oxidation processes. Practically, this energy, at high enthalpy level, is recovered on the economizer. The recovering fluid can be pressurized water, steam or diathermy oil (or air if energy is wasted). The heat can be directly used as thermal fluid for building heating, process requirements, or preheating of sludge prior to dewatering/pre-drying to improve the performances.

APPENDIX 4-4 CLIMATE CHANGE IMPACT

Introduction

Climate change is the shift in the average weather, or weather trends that are experienced over decades or longer.

Observations in the 20th century indicate rapid climatic change. A growing body of evidence indicates that the Earth's atmosphere is warming in a trend consistent with a changing climate.

Climate change affects water more than any other resource.

It leads to an **intensification of the hydrological cycle**, resulting globally in dryer dry seasons and wetter rainy seasons, and subsequently heightened risks of more extreme and frequent floods and drought.

It also has significant impacts on the **availability of water**, as well as the quality and quantity of water that is available and accessible.

Climate change projections for Central Region of Bulgaria

Date sources

In order to assess the impact of climate change on water supply and sewerage systems in Bulgaria, the following data were used:

- Current conditions:
  - Monthly and annual average precipitation (interpolations of observed data, representative of 1950-2000) – Source: WorldClim – Global Climate Data – http://www.worldclim.org/
  - Monthly and annual average temperature (interpolations of observed data, representative of 1950-2000) – Source: WorldClim – Global Climate Data – http://www.worldclim.org/
- Future conditions:

The Intergovernmental Panel on Climate Change (IPCC) brings together the available scientific and socio-economic information on climate change and on methods for its mitigation and for adaptation to its consequences. It was appointed in 1988 by the World Meteorological Organisation (WMO) and the United Nations Environmental Programme (UNEP). Since 1990, the IPCC prepared a series of reports that are now standard works of reference frequently consulted by political decision makers, researchers and other experts.

In 2000, the IPCC published The Special Report on Emissions Scenarios (SRES) that describes six emission scenarios now commonly used with global climate models (IPCC, 2000) (Exhibit CI-7). The SRES scenarios cover a wide range of the main drivers of future emissions, from demographic to technological to economic developments. None of the scenarios includes future policies that explicitly address climate change.

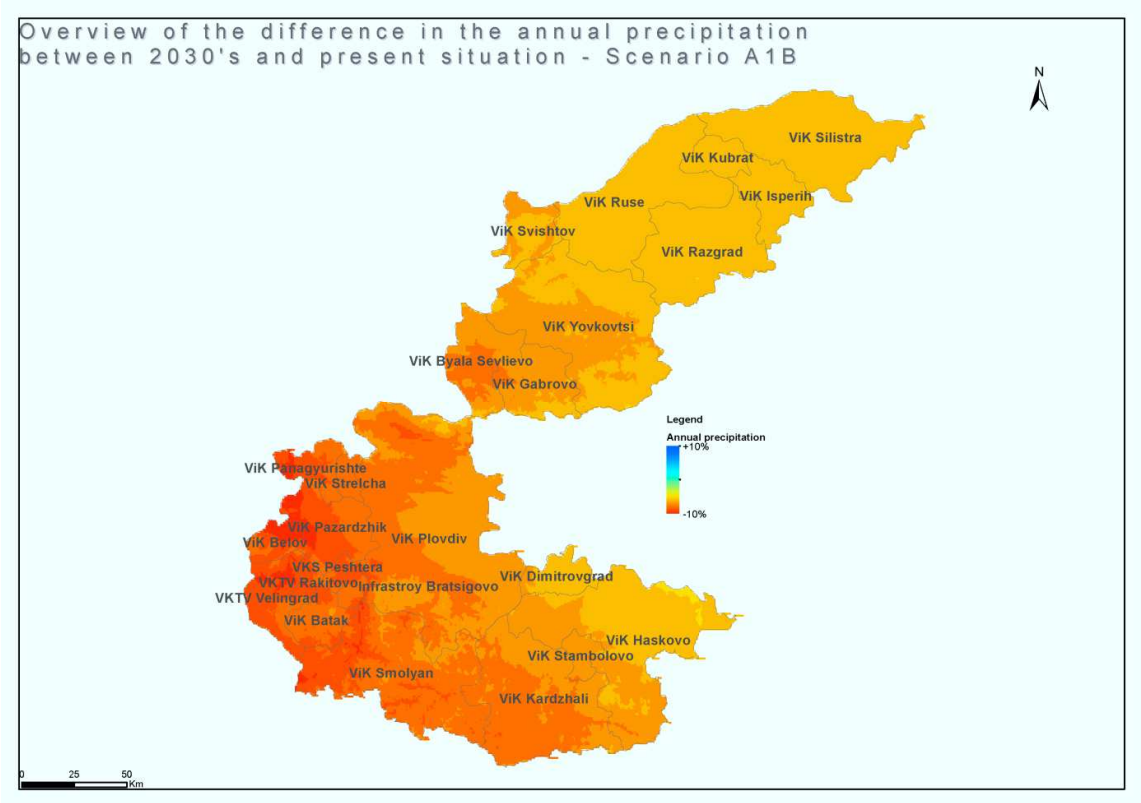
The medium (A1B) emission scenario is generally considered as representative of the climate futures we could reasonably expect to face. It represents medium emission pathways based on projected total emissions in 2100. The following analysis was performed with this scenario and the following data were collected from IPCC website:

- Monthly and annual average precipitation in 2030's – Scenario A1B – Source: IPCC 4 – CIAT – http://www.ccafs-climate.org/data/
- Monthly and annual average temperature in 2030's – Scenario A1B – Source: IPCC 4 – CIAT – http://www.ccafs-climate.org/data/

Change in precipitation

Annual precipitation and water deficit

The following figure emphasizes the variation of annual average precipitation between current and future conditions (scenario A1B – 2030's) in %.



The average **annual precipitation** in current conditions over the study area is assumed to be **613 mm**, against **573 mm** in **2030's**, equivalent to a **decrease of 6.6 %**.

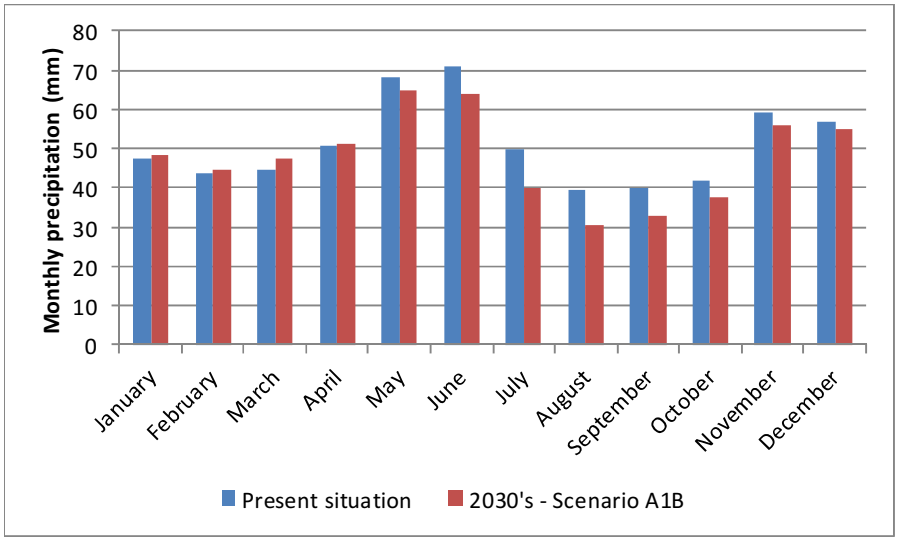
The corresponding total annual water deficit over the study area is approximately 1,500 Mm^3.

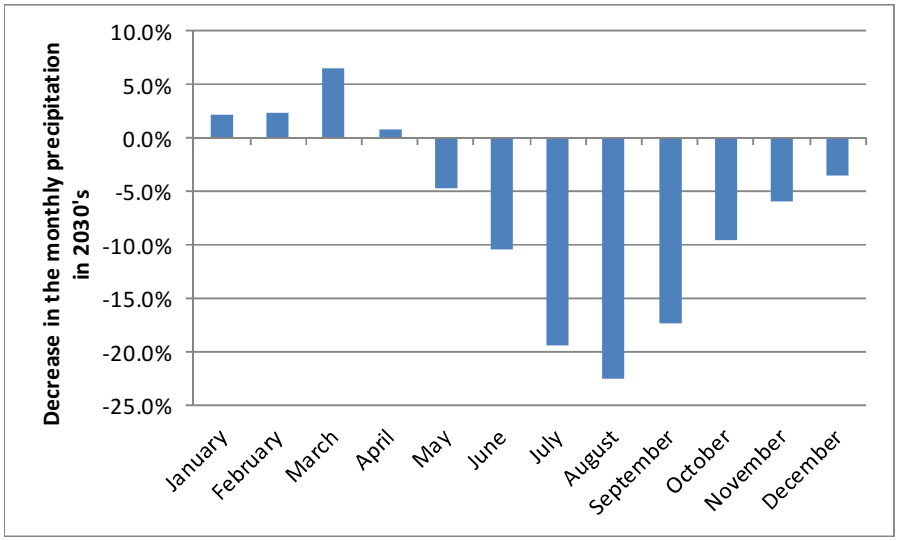
The ViKs with the higher decrease correspond to steep and high areas, such as Belovo, Velingrad or Rakitovo (more than 8% decrease). The following table emphasizes the present and future precipitation per ViK.

VIK	Area (km²)	Annual precipitation (mm)		Water deficit per year	Decrease in annual precipitation
		Present situation	2030's		
Infrastroy Bratsigovo	231	628	578	-11 Mm³/year	-7.9%
ViK Batak	604	704	649	-33 Mm³/year	-7.8%
ViK Belovo	395	645	589	-22 Mm³/year	-8.6%
ViK Byala Sevlievo	1,130	634	591	-49 Mm³/year	-6.8%
ViK Dimitrovgrad	540	566	533	-18 Mm³/year	-5.9%
ViK Gabrovo	1,096	654	612	-46 Mm³/year	-6.4%
ViK Haskovo	3,830	601	566	-136 Mm³/year	-5.9%
ViK Isperih	855	603	570	-29 Mm³/year	-5.6%
ViK Kardzhali	3,145	616	572	-138 Mm³/year	-7.1%
ViK Kubrat	473	591	559	-15 Mm³/year	-5.5%
ViK Panagyurishte	566	617	567	-28 Mm³/year	-8.1%
ViK Pazardzhik	1,141	560	514	-53 Mm³/year	-8.3%
ViK Plovdiv	6,330	603	561	-266 Mm³/year	-7.0%
ViK Razgrad	2,271	626	592	-78 Mm³/year	-5.5%
ViK Ruse	2,864	601	567	-96 Mm³/year	-5.6%
ViK Silistra	2,823	551	522	-84 Mm³/year	-5.4%
ViK Smolyan	3,336	681	628	-174 Mm³/year	-7.7%
ViK Stambolovo	276	592	554	-11 Mm³/year	-6.4%
ViK Strelcha	207	601	556	-9 Mm³/year	-7.5%
ViK Svishtov	691	585	550	-24 Mm³/year	-6.0%
ViK Yovkovtsi	4,025	615	579	-147 Mm³/year	-6.0%
VKS Peshtera	138	599	550	-7 Mm³/year	-8.2%
VKTV Rakitovo	234	646	594	-12 Mm³/year	-8.2%
VKTV Velingrad	818	656	601	-45 Mm³/year	-8.4%

Seasonal variability

Despite the general annual decrease in precipitation, the dynamic is very dependent on the season, as shown in the following figures.

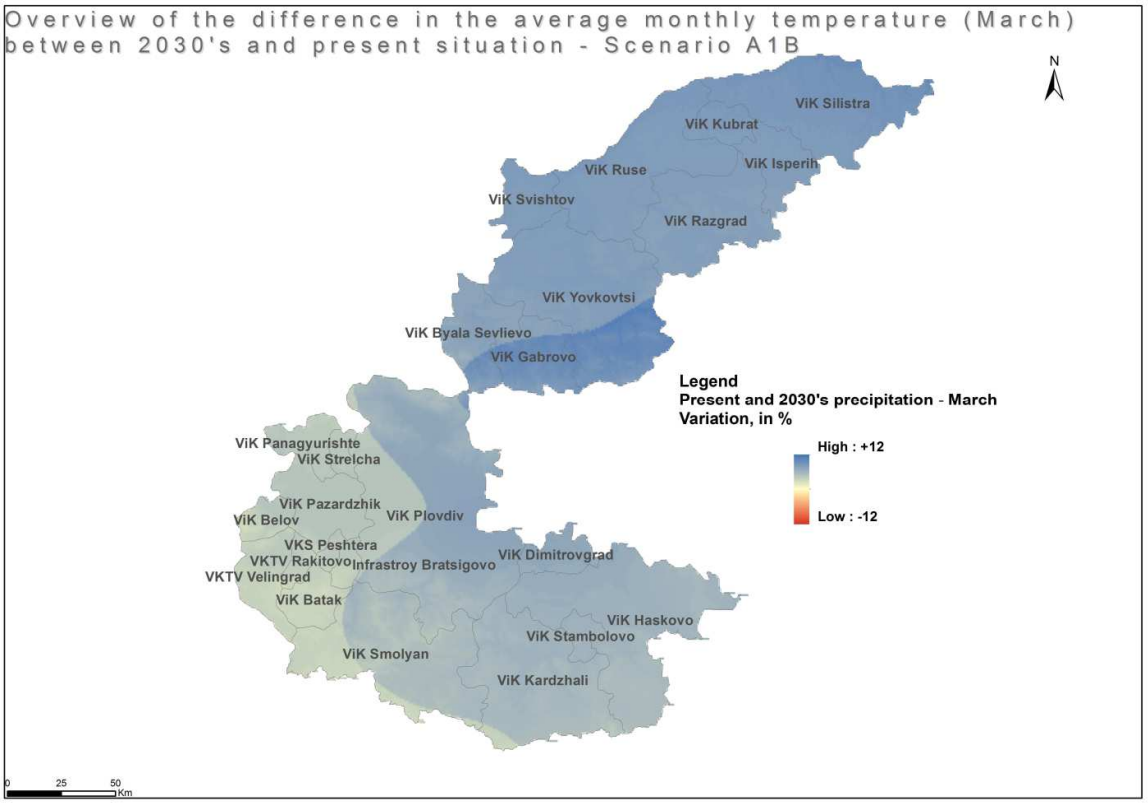




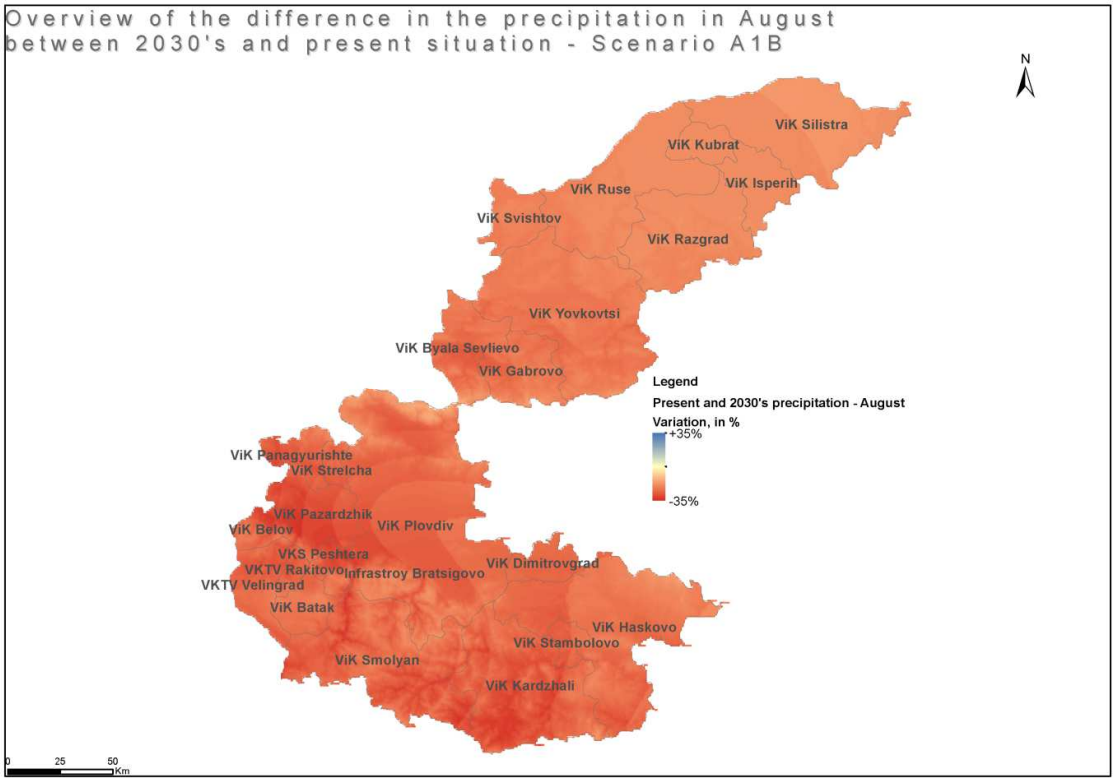
Two periods can be distinguished:

- From January until April, an increase in the monthly precipitation is expected, especially in March with more than 5% increase, and in relation with violent extreme events leading to **flood events**.
- From May until December, especially from July to September, a significant decrease is expected (more than 20% in August), which could lead to **serious drought events and consequent problems in relation with water resource quantity and quality.**

The following figure shows the repartition of the increase in the monthly precipitation in March. Lower increase is expected in high and steep areas.



The following figure shows the repartition of the decrease in the monthly precipitation in August. Higher increase is expected in high and steep areas.



Extreme events

According to IPCC, **extreme events are closely associated with changes in temperature and precipitation**, and with the frequency of events.

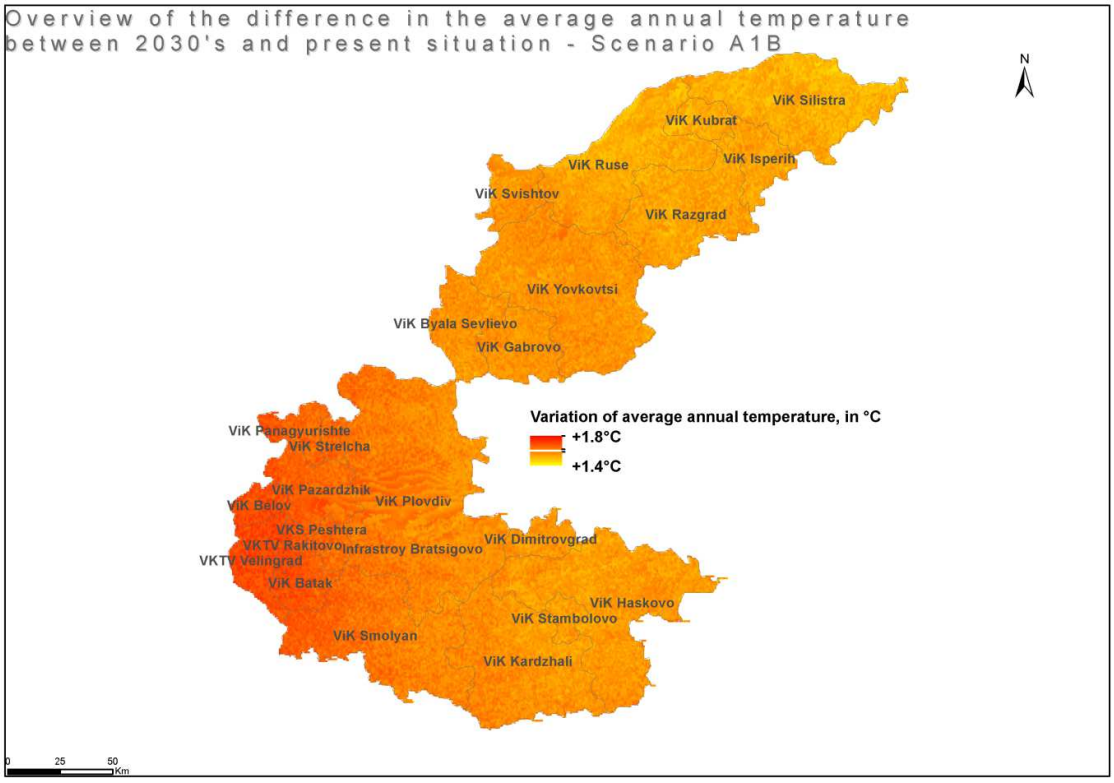
Widespread increases in heavy precipitation events (e.g., above the 95th percentile) have been observed, even in places where total amounts have decreased. These increases are associated with increased atmospheric water vapor and are consistent with observed warming.

Precipitation is therefore projected to be **concentrated in more intense events**, with longer periods of lower precipitation in between. **It is likely that heavy precipitation events will become more frequent**. Intensity of precipitation events is also projected to increase.

Change in temperature

Annual average

The following figure emphasizes the variation of average annual temperature between current and future conditions (scenario A1B – 2030's) in ℃.



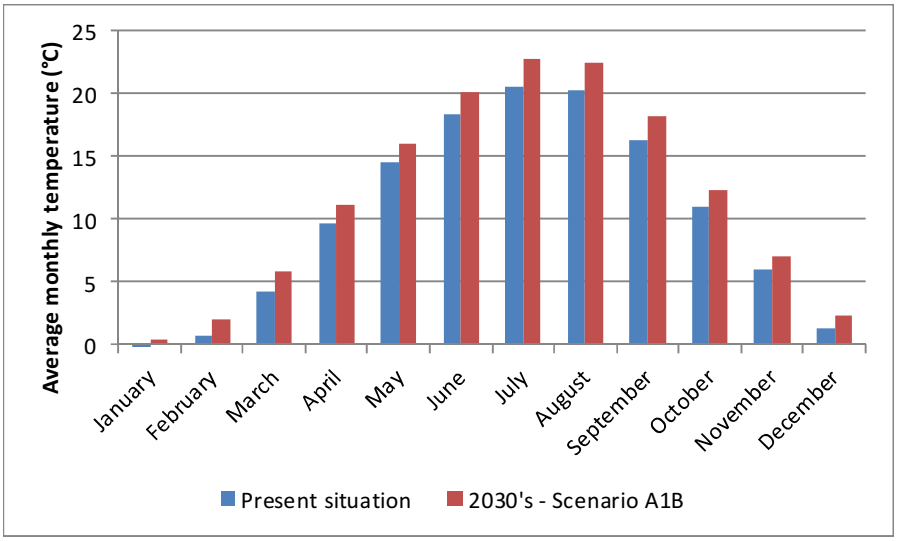
The average **annual temperature** in current conditions over the study area is assumed to be **10.1℃**, against **11.7 mm** in **2030's**, equivalent to an **increase of 1.6℃** which is quite homogeneous over the study area (see previous figure).

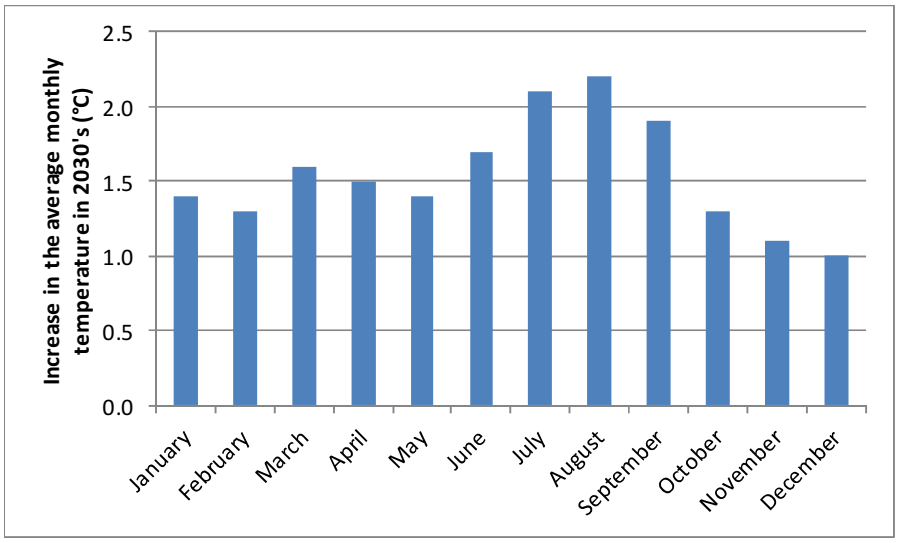
The ViKs with the higher increase correspond to steep and high areas, such as Belovo, Velingrad or Rakitovo. The following table emphasizes the present and future mean annual temperature per ViK.

VIK	Mean annual temperature (℃)		Increase in temperature (℃)
	Present situation	2030's	
Infrastroy Bratsigovo	8.5	10.1	1.6
ViK Batak	5.2	6.9	1.7
ViK Belovo	7.1	8.8	1.7
ViK Byala Sevlievo	9.5	11.1	1.6
ViK Dimitrovgrad	12.3	13.9	1.6
ViK Gabrovo	9.1	10.7	1.6
ViK Haskovo	12.2	13.7	1.6
ViK Isperih	10.2	11.7	1.5
ViK Kardzhali	11.2	12.8	1.6
ViK Kubrat	10.7	12.2	1.5
ViK Panagyurishte	9.3	10.9	1.6
ViK Pazardzhik	11.3	12.9	1.6
ViK Plovdiv	10.1	11.7	1.6
ViK Razgrad	10.1	11.7	1.5
ViK Ruse	10.7	12.3	1.5
ViK Silistra	10.9	12.4	1.5
ViK Smolyan	7.3	8.9	1.6
ViK Stambolovo	12.1	13.7	1.5
ViK Strelcha	9.9	11.6	1.6
ViK Svishtov	11.1	12.7	1.6
ViK Yovkovtsi	10.5	12.1	1.6
VKS Peshtera	9.5	11.2	1.6
VKTV Rakitovo	7.2	8.9	1.7
VKTV Velingrad	6.4	8.1	1.7
Total	**10.1**	**11.7**	**1.6**

Seasonal variability

The increase in temperature is very dependent on the season, as shown in the following figures.

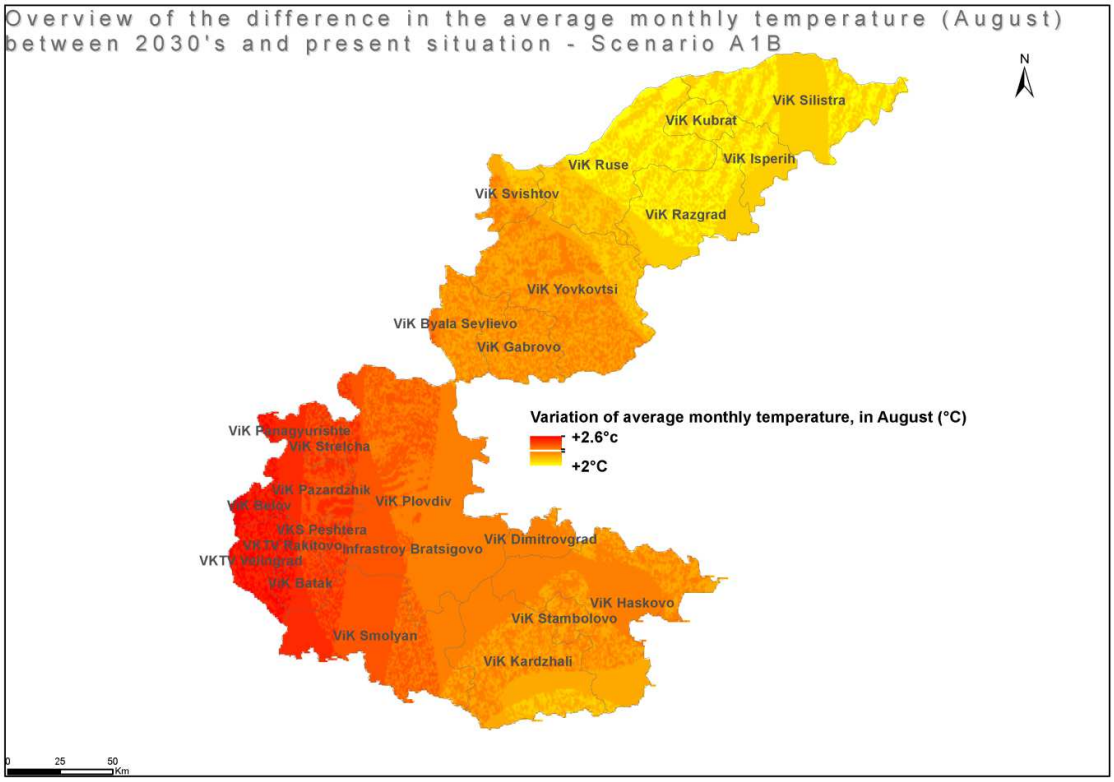




Two periods can be distinguished:

- From October until May, a quite constant increase in the average monthly temperature, between 1 and 1.5℃.
- From June until September, a significant increase is expected (from 1.5 to 2.2℃), which could lead to **serious drought events and consequent problems in relation with water resource quantity and quality.**

The following figure shows the repartition of the increase in the monthly precipitation in August. Bigger increase is expected in high and steep areas.



Impacts on water supply systems

Climate change will impact drinking water systems by altering the quantity and timing of water availability, changing water quality, and flooding related to extreme events.

Impacts on drinking water systems can be considered in two categories in the context of Central Region of Bulgaria:

- **Water availability**
  - **Changes in quantity of annual runoff**. Decreases in precipitation and increases in temperature, which were highlighted herebefore and are quite consistent from one to another climate model, are projected to lead to runoff decreases in Bulgaria. This is expected to reduce supplies in those geographies, causing drinking water utilities to seek additional water supply and management options to fill the gap between supply and demand.
  - **Changes in runoff timing**. Not only will runoff quantity change, but the timing will also shift as a result of changes in precipitation timing and the melting of snowpack. These shifts will affect the amount of water that utilities can capture in current reservoir and conveyance systems.
- **Water treatment associated with water quality changes**
  - **Changes in maximum temperature**. Temperature increases may lead to increases in disinfection by-products (DBPs) and the incidence of algal blooms, leading to toxicity and taste and odor problems.

Impacts on sewerage systems

Climate change will impact wastewater utilities on a number of fronts:

- **Extreme storm events and** overall precipitation increases will drive the need for wet weather program enhancements:
  - **Changes in precipitation quantity and timing**. Changes in the frequency and intensity of precipitation events are assumed to correlate with changes in wet weather program capital costs related to wastewater collection and treatment systems. Wet weather programs aim to reduce the volume and frequency of untreated sewer overflows, including combined sewer systems and separate sanitary sewer systems. It is important to note that in the Central Region of Bulgaria, despite the projected decrease in annual precipitation, the intensity of storm events is expected to increase, but the existing models diverge strongly and it is very difficult to assess quantitatively the impact of climate change on extreme storm events.
- **Effluent quality considerations such** as temperature will lead to investments at treatment plants:
  - **Changes in maximum temperature and other environmental variables**. Higher temperature effluent from wastewater treatment may have detrimental effects on aquatic life fisheries, requiring cooling and additional treatment of wastewater discharge. In addition, reduced summer river flows, in relation with the decrease in summer precipitation, increase the proportion of wastewater flow in a stream and may lead to stricter effluent water quality requirements for constituents such as dissolved oxygen, total dissolved solids, and nutrients. Strategies to deal with the increased degradation of receiving water quality are likely to be greater treatment of effluent prior to discharge.
- **Flood protection adaptation measures** such as levees or retention zones will be needed to address rising floods associated with increased extreme precipitation and runoff:
  - **Increased flood events**. To enable flow by gravity, many wastewater treatment plants and collection systems are in areas prone to flooding during extreme precipitation events. Anticipated increases in the frequency or magnitude of these events may put critical infrastructure at risk.

APPENDIX 4-5 INVESTMENT COSTS (WATER SUPPLY)

Description	Unit	Unit Cost (€)
Construction of well		
Q = 5 l/s	mWC	230.00 €
Q = 10 l/s	mWC	260.00 €
Q = 25 l/s	mWC	345.00 €
Q = 50 l/s	mWC	485.00 €
Q = 100 l/s	mWC	765.00 €
Construction of Drinking Water Treatment Plant5		
Capacity = 10 l/s	U	300,000 €
Capacity = 25 l/s	U	750,000 €
Capacity = 50 l/s	U	1,500,000 €
Capacity = 100 l/s	U	3,000,000 €
Capacity = 250 l/s	U	7,200,000 €
Capacity = 500 l/s	U	10,300,000 €
Capacity = 1,000 l/s	U	13,350,000 €
Capacity = 2,500 l/s	U	17,950,000 €
Supply and installation of water mains and distribution pipes		
DN75	m	75.00 €
DN90	m	80.00 €
DN110	m	90.00 €
DN125	m	95.00 €
DN140	m	100.00 €
DN160	m	110.00 €
DN180	m	115.00 €
DN200	m	125.00 €
DN225	m	135.00 €
DN250	m	145.00 €
DN280	m	160.00 €
DN315	m	175.00 €
DN355	m	200.00 €
DN400	m	225.00 €
DN450	m	255.00 €
DN500	m	285.00 €
DN560	m	325.00 €
DN630	m	380.00 €
DN710	m	440.00 €
Supply and installation of service connection		
Cost per service connection	U	400.00 €
Construction of water tower		
Capacity = 50 m^3	U	70,000.00 €
Capacity = 100 m^3	U	120,000.00 €
Capacity = 250 m^3	U	245,000.00 €
Capacity = 500 m^3	U	420,000.00 €
Capacity = 1,000 m^3	U	720,000.00 €
Capacity = 2,500 m^3	U	1,480,000.00 €

[5] *Costs refer to "classical" raw water treatment, including Flocculation/Sedimentation, filtration and disinfection*

Description	Unit	Unit Cost (€)
Capacity = 5,000 m³	U	2,550,000.00 €
Capacity = 10,000 m³	U	4,395,000.00 €
Capacity = 15,000 m³	U	6,040,000.00 €
Construction of ground reservoir		
Capacity = 50 m³	U	45,000.00 €
Capacity = 100 m³	U	70,000.00 €
Capacity = 250 m³	U	135,000.00 €
Capacity = 500 m³	U	220,000.00 €
Capacity = 1,000 m³	U	360,000.00 €
Capacity = 2,500 m³	U	685,000.00 €
Capacity = 5,000 m³	U	1,110,000.00 €
Capacity = 10,000 m³	U	1,805,000.00 €
Capacity = 15,000 m³	U	2,400,000.00 €
Construction of pumping station - H = 40 m		
Capacity = 5 l/s	U	24,000.00 €
Capacity = 10 l/s	U	32,000.00 €
Capacity = 30 l/s	U	57,000.00 €
Capacity = 55 l/s	U	69,000.00 €
Capacity = 80 l/s	U	78,000.00 €
Capacity = 100 l/s	U	110,000.00 €
Construction of pumping station - H = 80 m		
Capacity = 5 l/s	U	49,000.00 €
Capacity = 10 l/s	U	89,000.00 €
Capacity = 30 l/s	U	193,000.00 €
Capacity = 55 l/s	U	232,000.00 €
Capacity = 80 l/s	U	260,000.00 €
Capacity = 100 l/s	U	379,000.00 €
Implementation of District Metering Areas for leakage reduction and operational management		
Control Centre	U	100,000.00 €
Network	km	735.00 €
Facilities (production points, water tanks and pumping stations)	U	8,000.00 €

APPENDIX 4-6 INVESTMENT COSTS (WASTE WATER)

Description	Unit	Unit Cost
Supply and installation of gravity collectors		
DN200	ml	165.00 €
DN300	ml	200.00 €
DN315	ml	205.00 €
DN400	ml	240.00 €
DN500	ml	285.00 €
DN600	ml	340.00 €
DN700	ml	395.00 €
DN800	ml	460.00 €
DN900	ml	530.00 €
DN1000	ml	605.00 €
DN1100	ml	690.00 €
DN1200	ml	775.00 €
DN1400	ml	970.00 €
DN1600	ml	1,190.00 €
DN1800	ml	1,430.00 €
DN2000	ml	1,695.00 €
DN2200	ml	1,985.00 €
DN2400	ml	2,300.00 €
Installation of service connections		
Installation of service connection	U	700.00 €
Construction of Pumping Station		
Power = 5 kW	U	12,000.00 €
Power = 10 kW	U	16,500.00 €
Power = 20 kW	U	23,000.00 €
Power = 50 kW	U	35,500.00 €
Power = 100 kW	U	49,500.00 €
Power = 200 kW	U	69,000.00 €
Power = 500 kW	U	107,500.00 €
Power = 1,000 kW	U	150,000.00 €
Power = 2,000 kW	U	209,000.00 €
Power = 5,000 kW	U	324,500.00 €
Supply and installation of pressure pipes		
DN63	m	28.00 €
DN90	m	37.00 €
DN110	m	44.00 €
DN125	m	49.00 €
DN140	m	55.00 €
DN160	m	62.00 €
DN180	m	68.00 €
DN200	m	75.00 €
DN225	m	84.00 €
DN250	m	92.00 €
DN280	m	103.00 €
DN315	m	115.00 €
DN355	m	129.00 €
DN400	m	144.00 €

Description	Unit	Unit Cost
Construction of Wastewater Treatment Plant[6]		
Capacity = 2,000 PE	U	1,650,000.00 €
Capacity = 5,000 PE	U	2,550,000.00 €
Capacity = 10,000 PE	U	3,500,000.00 €
Capacity = 20,000 PE	U	4,800,000.00 €
Capacity = 50,000 PE	U	7,300,000.00 €
Capacity = 100,000 PE	U	10,050,000.00 €
Capacity = 150,000 PE	U	12,100,000.00 €
Implementation of flow monitoring		
Control Centre	U	60,000.00 €
Network	km	260.00 €
Facilities (overflows and pumping stations)	U	7,000.00 €

[6] *Cost refer to "classical" wastewater treatment, including pretreatment (screening, grit removal, fat and grease removal…), primary treatment and secundary treatment (activated sludge).*

APPENDIX 4-7 TENTATIVE PRIORITIZATION SYSTEM

The overall score is calculated based on the following formula:

V = Vpe X 0.25 + Vee X 0.10 + Vcc X 0.10 + Vpr X 0.10 + Vtp X 0.45

The rating system for Prioritisation of Investments uses an integrated approach, which covers water supply networks and drinking water treatment plants together, and sewerage networks and wastewater treatment plants together as well. The criteria, as defined below, will automatically give a higher priority to projects that fulfil the necessity of integration (in particular the "Economic efficiency" criterion), for example in the case where the networks or the treatment plants only partially meet the needs of the area considered.

- **Size of agglomeration** (Vpe) – Max. 100 points – **Weighting factor 0.25**

This parameter is calculated based on the following formulas:

- Below 10,000 PE: Vpe = ((PE x100) / 100,000) x 1.5
- Equal and above 10,000 PE: Vpe = ((PE x100) / 100,000) x 2

- **Economic efficiency (Vee)** – Max. 100 points – **Weighting factor 0.10:**

This parameter is calculated based on the following formulas:

- Investment costs ≤ 350 € / PE: **Vee = 100**
- Investment costs ≥ 350 € / PE: **Vee = (350 X 100) / (investment cost / PE)**

- **Service coverage (Vcc)** – Max. 100 points – **Weighting factor 0.10:**

This parameter refers to the current water supply or wastewater service coverage rate:

- 0% ≤ Coverage rate ≤ 90%: Vcc = 100 - (current coverage rate *100/90)
- Coverage rate ≥ 90%: Vcc = 0

- **Project Readiness** (Vpr) – Max. 100 points – **Weighting factor 0.10:**

The project readiness for networks and / or treatment plants is assessed on the basis of the readiness of the investment measure to be implemented. The idea behind this is to encourage the initiatives of local governments in the preparation of mature projects.

For construction projects (typically for WS&WW networks) and refurbishment of treatment plants, or pumping stations (e.g. new equipment, making tanks watertight, structural reinforcement, etc.), “YES” means legitimate[7] Detailed (Technical) Design. For Design-Build projects “YES” means legitimate Preliminary Design (typically for construction of new WWTPs and re-construction of existing WWTPs).

Following scores are considered:

- YES: **Vpr = 100**

[7] Design finally approved for financing by MoEW and/or MRDPW.

- NO: **Vpr = 0**

o **Type of Investment Measures (Vtp)** – Max. 100 points – **Weighting factor 0.45:**

Code	Scores	Measure
WW1	100	Construction of WWTPs and/or Main Feeding Collectors (to the WWTP) aiming to ensure compliance with the Urban Wastewater Treatment Directive
WS1	100	Investments in Water Supply Systems aiming to remediate major deficiencies related to water quality and water quantity.
WW2	80	Investments that ensure the effective operation of the WWTP aiming at the rehabilitation of connected sewer networks (e.g. through reduction of infiltration) and remediation of other major deficiencies (e.g. poorly functioning overflow structures)
WS2	50	Investments in Water Supply Systems aiming to increase efficiency (NRW reduction, energy efficiency, etc.)
WW3	40	Re-construction and Extension of Wastewater Systems (wastewater network and WWTPs) aiming to ensure sustainability and efficiency (replacement/ modernisation of infrastructure)
WS3	30	Rehabilitation and Extension of Water Supply Systems aiming to ensure sustainability (rehabilitation and adaptation of infrastructure)
WW4	20	Re-construction and Rehabilitation of existing WWTP aiming to reduce nutrients for agglomerations below 10,000 P.E. (compliance with Water Framework Directive)

As a next step, the project measures are grouped into **project components** (measures, which have to be combined to ensure technical feasibility). If several measures with different scores for the type of measure are combined, the highest score of these measures prevails. Example: For an agglomeration currently having a low sewerage connection rate (i.e. below 70 %) construction of a WWTP (WW1) has to be combined with an extension of the sewerage network (WW3). Both measures will be given 100 scores.

All project components in each phase will then be ranked according to their scores. This priority list of project components including investment costs is presented in the chapters below

APPENDIX 4-8 OPTIONS FOR WATER SUPPLY SYSTEMS

Strategic alternatives for water supply regarding the main water supply systems

Defining of alternatives

Alternatives for water supplying of 24 settlements of the territory of ViK OOD Pazardzhik

At the current stage, Luda Yana Dam, located on the territory of Panagyurishte Municipality, is in the process of implementation. The project for Luda Yana Dam was commenced in 2012. It is expected that the construction works will be finished in 2016. The funding for the dam and the treatment plant was provided through the International Bank for Reconstruction and Development (World Bank)

The completion works on the dam and the associated treatment plant have commenced. It is expected that the construction works will be completed in 2016

In terms of reference, the total capacity of the treatment plant is determined for 300 l/s.

Based on the decreased consumption of the villages within Panagyurishte Municipality and Strelcha Municipality (the two municipalities have their own WSS operator), it is obvious that part of the treated water from Luda Yana Dam can be supplied to the territory of the operation area of ViK EOOD Pazardzhik by gravity. The scope of the water supply system supplied from Luda Yana Dam can be extended in order to cover not only the town of Panagyurishte, the villages of Panagyurishte Municipality and the settlements of Strelcha Municipality, but also an additional 21 settlements (5 from Lesichovo Municipality, 11 from Pazardzhik Municipality and 3 settlements from Septemvri Municipality).

The scheme of water supply has been designed in compliance with all legislative technic-economical requirements at three points of the border of technicalregion of Panagyurishte and it is separated in three sections:

- After PR Elshitsa the treated water is gravity fed to 11 settlements /5 settlements from water supply system Vetren, 3 from water supply system “Dinkata-Pamidovo- Shtarkovo”, village of Velichkovo from water supply system Velichkovo and 2 settlements from water supply system Karabunar-Boshulya/.
- 3 settlements are supplied after village of Levski /2 from water supply system Apriltsi – Sbor and village of Gelemenovo from water supply system Gelemenovo. In addition to that section of "Luda Yana" are added the three settlements water supply system "Pazardzhik" - Ivaylo, Dragor and Sarah.
- after village of Svoboda water is passed for 7 villages / 2 of water supply system "Tsar Asen, the 2 villages of water supply system" Ovchepoltsi - Topoli dol, the 2 villages of water supply system "Chernogorovo" and village of Pishtigovo from Malo Konare water supply system - Pishtigovo ”/.

Total water volume is 81 l / s for 24 settlements in of ViK Pazardzhik from the three municipalities - Pazardzhik Lesichovo and September. To many settlements, respectively, and the largest quantity of water is supplied to the Municipality of Pazardzhik - 32 l / sec, followed by the municipality of Lesichovo - 19 l / sec and the municipality of Septemvri - 14 l / sec.

After implementation of the proposed alternative shall be achieved:

- water supply for the three villages, Ivaylo, Dragor and Saraya by compensating water contaminated with nitrates from existing tube wells in the village of Ivaylo.
- Replace Pumping water supply from groundwater and rise of water to elevations of 300 m to 585 m.
- Transfer released water from water supply system "Vetren" for satisfying and provide continuity of water supply to the water supply system "Septemvri".
- changing to the direction of the water supply of a large number of users located in the plain part, which are supplied from groundwater and are created conditions for construction of the missing tanks of suitable elevations.
- construction of reservoirs to provide the necessary reserve for hours of maximum consumption and fire reserve.

Alternative solutions for water supply system, Septemvri ”

The main water supply system (water system) "Vetren" unites 9 settlements with 7 sources with total capacity from 49.44 to a maximum 196 l / sec in the terrace of the Maritsa / left side / from Pazardzhik municipality, Septemvri and Lesichovo. Five settlements are included in the system from "Luda Yana dam and village of Akandzhievo goes to ViK Municipality. The other three villages - town of Vetren and villages of Slavovitsa and Gorno Varshilo will continue to be supplied with water from the shaft wells. Released is water quantity from these sources amounted to 34l/sek.

The right side of the same terrace of the Maritsa River are situated 5 tube wells for supply the town of village of Septemvri and village of Zlokuchene.

On the basis of information from operators and survey two wells are excluded from operation due to compromised flow and design of the other system decreases due to clogging or decreases in static levels - respectively dynamic levels.

As a result, of the said changes, according to the operator, the continuity of water supply for water supply system Septemvri is not guaranteed.

In the decisions at the present report an attempt is made to re-evaluate the two options for water supply of settlements in water supply system Septemvri

Alternative 1. Cover consumption of settlements of the system of 4 pcs. TW in the terrace of the left side of Maritsa river.

Alternative 2. Cover consumption of settlements from system after rehabilitation of existing water sources - 3. TW on right side of the Maritsa river

Alternative 1

In this alternative will be used built by Operator water supply connection with water sources of water supply system "Vetren" from water yielding zone left side of Maritsa river and reservoir with V = 4000 m3, which at night is full. The elevation of the reservoir allows powering low-rise building within the town of Septemvriand is therefore built pumping station that pushes water quantity from the reservoir to the tower of the town. In a flood the route of this water main under Maritsa river has been destroyed and this water main does not work with the reservoir and the pump station. After the rehabilitation of the water

supply connection and built assets - reservoir and pumping station, and the restoration of the water main in Maritsa river of water supply system "Septemvri" can be released discharges from water supply system "Vetren" after redevelopment into 4 shaft wells. The volume of water will be pushed to exhaust reservoir at PS "Vetren" the II uplift where by gravity will be received in existing reservoir 4000m3 reservoir.

Aternative 2

This alternative envisages preservation of the existing scheme for water supply of the settlements of water supply system Septemvri by a water yielding zone right side of Maritsa River. To ensure water consumption of this water yielding zone is necessary duplication of 3 TW , rehabilitation of water mains and the built assets - 4000 m3 reservoir, pumping station and reservoir tower. The water from TW will be pushed to the existing 4000m3 reservoir.

The designated parameters of the main transmission water mains by the approved Alternative 1 are presented on drawing-M 1:25000
The necessary investments are:

- Rehabilitation of existing reservoir- 4 units.
- New submersible pump for TW Garvan
- New pumps at PS Popina
- Replacement pipeline Ø125 with length 10,700 m / 10,000 m without excavation /
- replacement gravity pipeline Ø125 with length - 5,320 m

The characteristic parameters of the pumps are:

- Pump at TW-Q=7,0(11,00)l/s; H=100m; N=10,78 kW;
- Pump at the existing PS Popina - Q=3,0l/s; H=35m; N=1,62 kW;

Power – PS at TW - E=20784 kW/ryear;

Power – PS Popina - E=3118 kW/year;

APPENDIX 4-9 CALCULATIONS REGARDING OPTION ANALYSIS

Subject:	Water Supply	
Cost Item	Option 1	Option 2
Investment costs	362 827	443 609
Pipes	335 627	228 959
Civil Works	-	126 000
M&E Equipment	27 200	88 650
O&M costs	10 801	15 010
NPV 5 %	363 203	562 271

Least cost option: Option 1

Financial analysis of options

Option 1 (from the left bank of Maritsa)							Option 2 (from the right bank of Maritsa)					
Year	Investment				O&M		Year	Investment				O&M
	Pipes (50 years)	Civil Works (45 y.)*	E&M Equipment (10 y)	Total				Pipes (50 years)	Civil Works (45 y.)	E&M Equipment (10 y)	Total	
2013							2013					
2014							2014					
2015	335 627	-	27 200	362 827			2015	228 959	126 000	88 650	443 609	
2016				-	10 801		2016				-	15 010
2017				-	10 801		2017				-	15 010
2018				-	10 801		2018				-	15 010
2019				-	10 801		2019				-	15 010
2020				-	10 801		2020				-	15 010
2021				-	10 801		2021				-	15 010

Financial analysis of options

Option 1 (from the left bank of Maritsa)							Option 2 (from the right bank of Maritsa)					
Year	Investment				O&M		Year	Investment				O&M
	Pipes (50 years)	Civil Works (45 y.)*	E&M Equipment (10 y)	Total				Pipes (50 years)	Civil Works (45 y.)	E&M Equipment (10 y)	Total	
2022				-	10 801		2022				-	15 010
2023				-	10 801		2023				-	15 010
2024				-	10 801		2024				-	15 010
2025			27 200	27 200	10 801		2025			88 650	88 650	15 010
2026				-	10 801		2026				-	15 010
2027				-	10 801		2027				-	15 010
2028				-	10 801		2028				-	15 010
2029				-	10 801		2029				-	15 010
2030					10 801		2030					15 010
2031				-	10 801		2031				-	15 010
2032				-	10 801		2032				-	15 010
2033				-	10 801		2033				-	15 010
2034				-	10 801		2034				-	15 010
2035				-	10 801		2035				-	15 010
2036			27 200	27 200	10 801		2036			88 650	88 650	15 010
2037				-	10 801		2037				-	15 010
2038				-	10 801		2038				-	15 010
Resid. Value	-174 526	-	-21 760	- 196 286			Resid. Value	-119 059	- 58 800	- 70 920	-248 779	
NPV at 5%	161 344	-	56 170	217 515	145 689		NPV at 5%	110 066	66 667	183 070	359 803	202 468
Total NPV 5					363 203		Total NPV 5 %					562 271

Financial analysis of options													
Option 1 (from the left bank of Maritsa)							Option 2 (from the right bank of Maritsa)						
Year	Investment				O&M		Year	Investment				O&M	
	Pipes (50 years)	Civil Works (45 y.)*	E&M Equipment (10 y)	Total				Pipes (50 years)	Civil Works (45 y.)	E&M Equipment (10 y)	Total		
%													
* based on 33.3 years for buildings and 50 years for facilities													

APPENDIX 4-10 CALCULATIONS REGARDING OPTION ANALYSIS FOR IVAYLO GROUP

Subject:	Water Supply	
Cost Item	Option 1	Option 2
Investment costs	2 539 821	2 437 940
Pipes	2 153 750	636 695
Civil Works	328 160	1 108 354
M&E Equipment	57 911	692 891
O&M costs	9 793	139 443
NPV 5 %	1 460 682	4 204 278

Least cost option: Option 1

Financial analysis of options

Option 1 (Centralised)						Option 2 (Decentralised)					
Year	Investment				O&M	Year	Investment				O&M
	Pipes (50 years)	Civil Works (45 y.)*	E&M Equipment (10 y)	Total			Pipes (50 years)	Civil Works (45 y.)	E&M Equipment (10 y)	Total	
2013						2013					
2014						2014					
2015	2 153 750	328 160	57 911	2 539 821		2015	636 695	1 108 354	692 891	2 437 940	
2016				-	9 793	2016				-	139 443
2017				-	9 793	2017				-	139 443
2018				-	9 793	2018				-	139 443
2019				-	9 793	2019				-	139 443

Financial analysis of options												
Option 1 (Centralised)							Option 2 (Decentralised)					
Year	Investment				O&M		Year	Investment				O&M
	Pipes (50 years)	Civil Works (45 y.)*	E&M Equipment (10 y)	Total				Pipes (50 years)	Civil Works (45 y.)	E&M Equipment (10 y)	Total	
2020				-	9 793		2020				-	139 443
2021				-	9 793		2021				-	139 443
2022				-	9 793		2022				-	139 443
2023				-	9 793		2023				-	139 443
2024				-	9 793		2024				-	139 443
2025			57 911	57 911	9 793		2025			692 891	692 891	139 443
2026				-	9 793		2026				-	139 443
2027				-	9 793		2027				-	139 443
2028				-	9 793		2028				-	139 443
2029				-	9 793		2029				-	139 443
2030					9 793		2030					139 443
2031				-	9 793		2031				-	139 443
2032				-	9 793		2032				-	139 443
2033				-	9 793		2033				-	139 443
2034				-	9 793		2034				-	139 443
2035				-	9 793		2035				-	139 443
2036			57 911	57 911	9 793		2036			692 891	692 891	139 443
2037				-	9 793		2037				-	139 443
2038				-	9 793		2038				-	139 443
Resid. Value	-1 119 950	- 153 141	- 46 329	-1 319 420			Resid. Value	-331 081	-517 232	-554 313	-1 402 626	
NPV at 5%	1 035 363	173 630	119 590	1 328 583	132 098		NPV at 5%	306 076	586 431	1 430 880	2 323 386	1 880 892
Total NPV 5 %					1 460		Total NPV 5 %					4 204

Financial analysis of options													
Option 1 (Centralised)							Option 2 (Decentralised)						
Year	Investment				O&M		Year	Investment				O&M	
	Pipes (50 years)	Civil Works (45 y.)*	E&M Equipment (10 y)	Total				Pipes (50 years)	Civil Works (45 y.)	E&M Equipment (10 y)	Total		
					682							278	
* based on 33.3 years for buildings and 50 years forfacilities													

APPENDIX 4-11 TECHNICAL SPECIFICATION OF THE PROPOSED MEASURES REGARDING THE CURRENT PROJECT

№	Name	Diameter [mm]	Length [m]
I	Main sewerage collectors		11 502
		315	54
		400	143
		500	141
		600	113
		700	455
		800	549
		900	784
		1 000	1 307
		1 100	1 559
		1 200	2 564
		1 300	3 639
		1 600	194
II	Storm water sewerage collectors		5 548
		1 300	852
		1 600	810
		1 800	760
		1 900	521
		2 000	570
		2 100	465
		2 400	1 570
III	Secondary sewerage networks		6 665
		315	3 251
		400	1 001
		500	1 527
		600	593
		700	293
			23 715

APPENDIX 4-12 TECHNICAL SPECIFICATION OF THE SEWERAGE NETWORK AFTER THE IMPLEMENTATION OF PROPOSED MEASURES - THE TOWN OF SEPTEMVRI

Diameter	Main collectors			Secondary network			Total length
	Concrete	PP	Total	Concrete	PP	Total	
mm	m	m	m	m	m	m	m
250	0	-	**0**	-	-	**0**	**0**
300	0	204	**204**	22563	-	**22563**	**22767**
350	0	-	**0**	120	-	**120**	**120**
400	0	120	**120**	1087	-	**1087**	**1207**
450	0	-	**0**	0	-	**0**	**0**
500	0	-	**0**	111	-	**111**	**111**
600	0	-	**0**	0	-	**0**	**0**
800	0	-	**0**	659	-	**659**	**659**
	0	**324**	**324**	**24540**	**0**	**24540**	**24864**
300	-	173	**173**		4379	**4379**	**4552**
400	-	551	**551**		2155	**2155**	**2706**
500	-	255	**255**		428	**428**	**683**
600		1320	**1320**		824	**824**	**2144**
800		2076	**2076**		555	**555**	**2631**
1000	-	4431	**4431**		358	**358**	**4789**
1200		409	**409**			**0**	**409**
1400		531	**531**			**0**	**531**
1800	-	522	**522**			**0**	**522**
	0	**10268**	**10268**	**0**	**8699**	**8699**	**18967**
	0	**10592**	**10592**	**24540**	**8699**	**33239**	**43831**

APPENDIX 7-1 ENVIRONMENTAL ASSESSMENT PROCEDURE

Environmental Assessment (EA) of plans and programs is a preventative tool for evaluating the potential significant effects on the environment, resulting from the implementation of plans and programmes at national, regional and local level. The assessment is carried out simultaneously with its development, i.e. the approach aims to integrate processes. EA execution is fully consistent with statutory national procedures for preparation and approval of plans/programs and the authorities responsible for their endorsement should conform to EA statement.

EA gives a notion of the expected changes that will occur in the environment, as a consequence of the performance of the investment intentions set out in plans and programmes.

The goal is to provide a high level of environmental protection by determining the expected impact of the activities covered by the strategic planning.

EA execution is mandatory for the plans and programmes under Art. 85, para. 1 of the Environmental Protection Act (EPA) in the different planning areas, where those plans and programmes outline the framework of the future development of investment proposals in accordance with Annex n° 1 and 2 of EP A and have a significant impact on the environment.

Plans and programmes, concerning the areas specified in EPA, but at a local level, also on small areas, and modifications to the above-cited plans and programmes are evaluated when their application is likely to have significant impacts on the environment.

The need for EA of a proposed plan and programme or their amendment shall be determined by decision of the competent authority, which in the present case is the Ministry of Environment and Water.

In the elaboration of the environmental assessment, it is necessary to take into account the objectives of the proposed plan, the territorial scope and level of detail that can be identified at this stage in order to describe, analyse and evaluate the potential impacts on human health and environmental components that arise during the plan implementation.

EA contains the information required under Art. 86, para. 3 of EPA and is consistent with the level of detail in the plan. EA takes into account the recommendations made during the consultations with stakeholders and institutions.

The following regulatory framework and methodologies is used for preparation of EA:

- Environmental Protection Act (Promulgated, SG, No 91/ 2002; last amended and supplemented, No 53/2012);
- ORDINANCE on the terms and conditions for carrying out environmental assessment of plans and programmes - Adopted by Decree of the Council of Ministers № 139 of 24th June 2004, last amended and supplemented, No 38/11th January 2012 (transposed Directive 2001/ 42/ EC on the assessment of the impact of certain plans and programmes on the environment.).

- ORDINANCE on the terms and conditions for carrying out compatibility assessment of plans, programmes, projects and investment intentions with subject and objectives of conservation of Protection areas – (SG, No73/2007, last amended and supplemented, SG No 3/1 2011 (*According to Biodiversity Act only Plans affecting the territory of Protection Zones are subject to compatibility assessment*).
- "Guidelines on Environmental Assessment of Plans and Programmes in Bulgaria" Sofia, 2002. (http//www.moew.government.bg, key topic „Preventive activity").
- EC instructions and methodologies on strategic environmental assessment.
- The conditions of ORDINANCE on environmental assessment of plans and programmes, as well as of ORDINANCE on compatibility assessment with Protection areas are observed.

Two approaches are applied for preparation of EA:

- Approach based on the principles of integrated environmental management;
- Communication approach.

The following methodology is employed:

- Collecting and complementing the information required for elaboration of Environmental assessment and Compatibility Assessment.
- Assessment of the current situation in order to identify positive and negative aspects of interconnections in environment. It is necessary to determine potential conflicts related to the impact on individual environmental components and factors.
- Suggesting measures to reduce to the minimum the negative impacts on environment in order to meet the requirements of the effective legislation in the implementation of proposals included in the investment programmes.
- In the plan development process, the Contracting Authority shall conduct consultations with the competent authorities in accordance with Art. 19 (2) of the Ordinance on the terms and conditions for carrying out environmental assessment of plans and programmes.

EA procedure is as follows:

- Preparation of a written request for evaluating the need for EA;
- Participation in the scheme development and conduct of consultation with the public, stakeholders and third parties, which are likely to be affected by the plan;
- Preparation of Environmental assessment and Compatibility Assessment Reports, if requested by the competent authority.
- Participation in the organisation and conduct of public discussion of EA Report. Carrying out consultations with the public, stakeholders and third parties, which are likely to be affected by the plan or programme; public discussion (if required for the draft plan, under a special law or if more than

two reasoned negative statements or suggestions for alternatives have been received during the consultations);

- Including the results of the consultations in the EA report;
- Defining measures to monitor and control the implementation of the plan or programme;
- Issuance of EA statement;
- Monitoring and control during the implementation of the plan or programme.

EA shall be assigned as an independent report only by Decision of the competent authority after considering the Information on Evaluation of the need for environmental assessment.

According to Art. 2, para. 2 of Ordinance on the terms, conditions and methods for carrying out EA of plans and programmes - Decree of the Council of Ministers № 139/SG. No 57/2004, amended and supplemented, SG. 38/2012, the Regional Water and Wastewater Master Plans and investment programmes attached to them are subject of evaluation for identifying the need for EA, as they fall within the scope of item 6 Water Resources Management, item 6.1 Water Act, of Annex № 2 to Art. 2, para. 2, item 1 of the same Ordinance (Area under Art. 85, para. 1 of EPA).