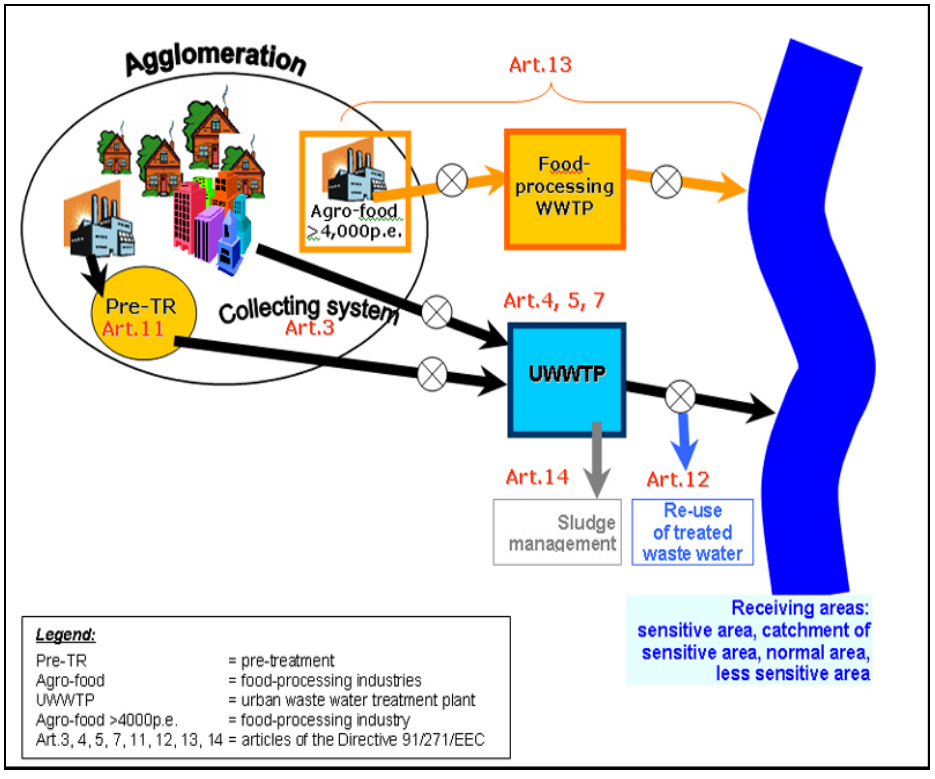
Commission of European Communities, for and on behalf of the Government of Albania,

Ref.: EuropeAid/124909/C/SER/AL

Implementation of the National Plan for Approximation of Environmental Legislation in Albania

Master plan for the management of urban waste water in Albania in compliance with Council Directive 91/271/EEC concerning urban waste water treatment, as amended by Directive 98/15/EC



18 April 2011

Grontmij | Carl Bro

in consortium with

Agrotec spa

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Implementation of the National Plan for Approximation of Environmental Legislation in Albania

Component D: Environmental Management Plans

Activity D.4: ***Master plan for the management of urban waste water in Albania in compliance with Council Directive 91/271/EEC concerning urban waste water treatment, as amended by Directive 98/15/EC***

Acknowledgement:
The project team wishes to express its gratitude to all resource persons and experts from all institutions and stakeholders involved in the collection of data and information and to all persons and bodies that have supported the development of this Report. Special thanks are extended to the Ministry of Environment, Forests and Water Administration and its expert staff.

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List of abbreviations

BOD_5	Biological Oxygen Demand (determined with incubation period of 5 days at 20^0C)
COD	Chemical Oxygen Demand
DCM	Decision of the Council of Ministers
DSIP	Directive Specific Implementation Plan
EIA	Environmental Impact Assessment
GIS	Geographical Information System
IPPC	Industrial Pollution Prevention and Control
LPA	Local Public Administration
MoEFWA	Ministry of Agriculture, Forestry and Water Management
MW	Mega Watt
N	Nitrogen
P	Phosphorus
p.e.	Person equivalent (1 p.e. = Organic waste load equal to 60 g BOD_5 per day)
RBD	River Basin District
TA	Technical Assistance
UWWTD	Urban Waste Water Treatment Directive
WFD	Water Framework Directive
WS&S	Water Supply and Sewerage
WWTP	Waste Water Treatment Plant

1. INTRODUCTION

This document presents the steps that the Republic of Albania is planning to take for the implementation of Directive 91/271/EEC concerning urban waste water treatment, including the proposed time schedule and estimated costs. This report has been prepared on the basis of the Urban Waste Water Treatment Directive Specific Implementation Plan (DSIP) Report of April 2009. The DSIP report has been updated and expanded on the basis of new and more detailed data.

The objective of the Directive is to protect the environment from the adverse effects of discharges of urban waste water and of waste water from certain industrial sectors (mainly agro-food industries).

The Directive sets out a number of requirements concerning collection systems, treatment and discharge of waste water from urban agglomerations, as well as of the biodegradable waste water from agro-food industries with a waste water load of more than 4,000 p.e., which are not connected to municipal waste water collection systems.

Member States must ensure that urban waste water from the agglomerations of more than 2,000 p.e. is collected and treated prior to discharge according to the specific standards and deadlines.

As regards the treatment objectives, secondary (i.e. biological) treatment is the general rule for the agglomerations of less than 10,000 p.e., with requirements for additional Nitrogen and Phosphorus removal in sensitive areas and for all agglomerations of more than 10,000 p.e. For certain marine areas (i.e. designated as less sensitive areas) primary treatment might be sufficient.

The deadlines for the implementation of the Directive vary depending on the size of the agglomeration and the characteristics of the receiving water.

1.1 Main Aims and Provisions of the Directive

The actions needed to secure full implementation and enforcement of this Directive are set out in chronological order wherever possible in the checklist provided in Annex I of this report.

1.1.1 Planning

Identify sensitive areas and less sensitive areas in accordance with specified criteria, and review the identification of these areas every four years (Arts. 5 and 6 and Annex II).[1] A water body must be identified as a "*sensitive area"* (Annex IIA) if:

- It is eutrophic or may become eutrophic in the near future if protective action is not taken, or
- It is surface water used for the abstraction of drinking water and the nitrate concentration could be higher than that laid down in Directive 75/440/EEC concerning the quality required of surface water intended for the abstraction of drinking water if action is not taken

Member States may also identify certain marine water bodies or areas as *"less sensitive areas*", according to criteria set out in Annex IIB. Discharges to less sensitive areas may require less stringent treatment, provided that primary treatment is provided as a minimum.

Establish a technical and financial programme for the implementation of the Directive (Art. 17).

1.1.2 Regulation

Provide for prior regulation or specific authorisation for all discharges of urban waste water (Art.12, Annex IB) and of industrial waste water from the agro-food sector (Art.13, Annex III), as well as for all discharges of industrial waste water into urban collecting systems and treatment plants (Art.11, Annex IC).
"Industrial waste water" must be subject to pre-treatment, if required to:

- Protect the health of staff
- Ensure that the collecting systems, waste water treatment plants and associated equipment are not damaged
- Ensure that the operation of the treatment plant or the treatment of sludge are not impeded
- Ensure that the discharges from the treatment plants do not adversely affect the environment
- Ensure that the sludge can be disposed of safely in an environmentally acceptable manner.

Discharges of biodegradable industrial waste water from specified agro-industries (listed in Annex III) which do not enter treatment plants must be subject to certain conditions established in prior regulations and/or specific authorisations, in respect of discharges from these industrial plants representing a waste water load of 4,000 p.e. or more.

Ensure that systems for collection of urban waste water are provided for all agglomerations with a waste water load of 2,000 p.e or more (Art. 3 and Annex IA). The collecting systems must take into account the requirements for waste water treatment. Their design, construction and maintenance must use the best technical knowledge not entailing excessive costs, the prevention of leaks and the limitation

1 The Water Framework Directive (2000/60/EC) provides requirements as to identification of such areas, establishing River basin management plans, and reporting requirements;

of pollution of receiving waters due to storm water overflows.

Ensure that waste water treatment is provided for all agglomerations with a waste water load of 2,000 p.e. or more, at the level of treatment specified and within the set deadline:

- The basic rule for the level of treatment is secondary, i.e. biological treatment (Art.4 and Annex IB, table 1).
- However, the treatment has to be more stringent, i.e. tertiary for discharges into so-called sensitive areas: in those cases, in addition to secondary treatment elimination of nitrogen and/or phosphorus and/or of any other pollutant affecting the quality or specific use of the water has to be provided (Art.5 and Annex IB, table 2).
- For certain discharges to coastal waters treatment might be less stringent, i.e. primary, under specific conditions and subject to agreement of the Commission (Art. 6 and 8).
- For agglomerations of less than 2,000 p.e., but equipped with a collecting system, 'appropriate treatment' has to be provided, i.e. treatment that ensures good quality of the receiving water (Art.7)
- The deadlines set for Member States are end-1998, end-2000 and end-2005 respectively, with more ambitious deadlines for discharges into sensitive areas and for the larger agglomerations (above 15,000 p.e.).

Ensure that the disposal of sludge from urban waste water treatment plants is subject to general rules, registration or authorisation; and impose a ban on the disposal of sludge to surface waters (Art. 14).

Ensure that treatment plants are designed, constructed, operated and maintained to meet specified performance requirements (Art. 10), so as to ensure sufficient performance under all normal climatic conditions. The points of discharge must be chosen, as far as possible, so as to minimise the effects on the receiving water. Table 1.1 summarises the effluent discharge quality standards set by the European Commission.

Table 1.1: Effluent quality limit values of UWWT Directive

Parameter	Secondary treatment	Discharge into sensitive area
BOD_5 (mg/l)	25	25
COD (mg/l)	125	125
Total Suspended Solids (mg/l)	35 (> 10000 p.e.) 60 (< 10000 p.e.)	35 (> 10000 p.e.) 60 (< 10000 p.e.)
Total P (mg P/l)		2 (10000-100000 p.e.) 1 (> 100000 p.e.)
Total N (mg N/l)		15 (10000-100000 p.e.) 10 (> 100000 p.e.)

1.1.3 Monitoring

Ensure appropriate monitoring capacity for:

- monitoring discharges from urban waste water treatment plants; and
- monitoring waters receiving discharges of waste water covered by the Directive (Art. 15 and Annex ID).

If a country considers applying for derogations (primary treatment for discharges into less sensitive areas), it must carry out comprehensive studies to determine the effect on the environment of discharges of urban waste water in less sensitive areas

(Arts. 6 and 8). Bear in mind that, inter alia, the Baltic Sea, the North Sea, the Black Sea, and the Adriatic and Ionian Seas do not qualify as 'less sensitive areas'.

1.1.4 Information and Reporting

Ensure that the relevant authorities publish reports to the public, every two years, on the disposal of urban waste water and sludge in their areas (Art. 16). Report to the Commission on:

- transposition of the Directive into national legislation, with texts of the main provisions of national law adopted in the field covered by the Directive (Art. 19).
- implementation programmes (Art. 17 and Commission Decision 93/481/EEC);
- situation reports on the disposal of urban waste water and sludge (Art. 16);
- (in the case of applications for a derogation for less sensitive areas) comprehensive studies carried out in respect of discharges in less sensitive areas (Arts. 6 and 8);
- upon request by the Commission: report on information collected through monitoring (Art. 15);

1.2 Indirect Requirements / Implications

The indirect requirements and implications of the Directive are:

- The requirements of the Sampling Drinking Water Directive (79/869/EEC) giving provisions on sampling drinking water, frequency of analysis and measurement methods, for development of measurement and analysis methods, determination of sampling points and frequency of analysis regarding the geographical properties and climate conditions, have to be taken into account when implementing the Directive.
- The requirements of the Drinking Water Abstraction Directive (75/440/EEC) concerning the quality required of surface water intended for the abstraction of drinking water in the Member States and the Groundwater Directive (80/68/EEC) on the protection of groundwater against pollution caused by certain dangerous substances in order to increase surface water and groundwater water qualities and for this case to prepare a systematic plan including time table, will have to be implemented in parallel to the Directive.
- Sensitive Area Management Plans and Action Programmes will have to be considered together with the Nitrate Directive (91/676/EEC) concerning the Protection of Waters against Pollution Caused by Nitrates from Agricultural Sources, when implementing the Directive.

1.3 Links with Other Legislation

The Directive concerning urban waste water treatment is correlated with four other Directives, within the EU water sector legislation:

- Water Framework Directive 2000/60/EC. The provisions under the UWWT Directive form an integral part of the “basic measures” of the programme of measures under Article 11 of the WFD required for each River Basin District.
- Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources.

- Directive 75/440/EEC concerning the quality required for surface water intended for the abstraction of drinking water.
- Directive 2006/11/EC and “daughters” directives on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community.

Three Directives control the disposal of the sewage sludge produced as a result of the implementation of this Directive[2]:

- Directive 86/278/EEC on the protection of the environment, and in particular of the soil, when the sewage sludge is used in the agriculture
- Directive 99/31/EC on the landfill of waste
- Waste Incineration Directive (2000/76/EC);

The Directive concerning urban waste water treatment is also correlated with the Directive 96/61/EC on Integrated Pollution Prevention and Control (IPPC). The IPPC Directive covers certain industrial installations covered by this Directive as well, setting more stringent objectives and using, as does the Water Framework Directive, a 'combined approach' of emission controls and water quality standards; in each particular case the more stringent approach applies.

1.4 Methodology and data sources

This report has been prepared in the following main steps:

1. *Investigation of the collection, treatment and discharge of urban waste water from agglomerations, investigation on the treatment and discharge of biodegradable waste water from food industry, and inventory of existing drinking water and waste water infrastructure (Preparation of working maps in scale 1:100,000 covering the whole territory of Albania*. *GIS supported inventory).* Investigation has been carried out including: a) data about cities, villages and administrative entities, b) data about existing water supply systems in the settlements, and existing urban waste water collection and treatment systems, and c) data about waste water loads from industries, in particular of the agro-food sector, and of industries connected to urban waste water collection and treatment systems. Maps including 3D model of terrain, hydrography, settlements with more than 1,000 inhabitants have been prepared. All selected agglomerations are indicated on these maps. Locations of existing WWTP´s and of WWTP´s under construction, as well as the effluent discharge points and the receiving water bodies are also shown on these maps. Protected National Ecological Network areas and sensitive areas are also shown on these maps.
2. *Identification and selection of agglomerations, resulting in a proposal for agglomerations to be included in the national UWTT implementation plan.* The agglomerations have been proposed on the basis of the available data on population numbers, industrial waste water loads and the capacities of the existing sewerage systems and waste water treatment plants. As such, in proposing the agglomerations a number of assumptions have been applied in

2 The anticipated increase in the numbers and effectiveness of UWWT plants will result in an increased amount of sewage sludge which will require disposal either by use in agriculture or by way of final disposal by incineration or landfill, and thus adequate facilities will be required.

determining the needs for sewerage and waste water treatment systems. Agglomerations were selected based upon:

- All settlements with a population of 2,000 or more require waste water collection and treatment systems. At this stage it is presumed that in general a municipality or a commune can be served by one central waste water treatment plant, to which the individual settlements are connected through pipelines.
  - Within the communes settlements with more than 1,000 inhabitants were identified as possible agglomeration centres if it is feasible to combine them with other nearby settlements into agglomerations of more than 2,000 p.e.
  - Combination of settlements in one catchment area into an agglomeration if the distance between the settlements is less than 10 km and if it seems feasible to connect the settlements with a central WWTP by gravity or pressure waste water transportation pipes (on the basis of an evaluation of the natural drainage situation in the agglomeration area). Criteria in this respect are: i) Settlements are located in the same natural drainage catchment area, ii) Absence of physical obstacles for connecting settlements to each other or of settlements with central WWTP, and iii) Proof that transportation of waste water from settlement to central WWTP is more economical than operation of an independent WWTP for the settlement.

3. *Identification of actions needed to ensure that urban waste water is collected and treated prior to discharge according to specific standards and deadlines.* Outline designs have been prepared for WWTPs of varying size with application of different waste water treatment techniques. For each treatment method the main design parameters were dimensioned for one population equivalent. Subsequently WWTPs for different numbers of p.e. were dimensioned, and the investment costs were estimated. The costs of waste water collection systems have been estimated on the following basis: systems are only for collection and transportation of waste water and costs of conveyance of storm water were not considered.

2 Present Situation

2.1 Current status of transposition

The **draft DCM on Urban Waste Water Treatment** prepared by the MoEFWA with the assistance of the INPAEL project, which is expected to be soon approved by the Government of Albania, fully transposes the provisions of Directive 91/271/EEC Concerning Urban Waste Water Treatment, as amended by Directive 98/15/EC, Regulation EC/1882/2003 and Regulation EC/1137/2008.
The scope of this Decision is to establish minimum requirements for the collection, treatment and discharge of urban waste water, with the aim of protecting the environment from the adverse effects of such discharges.

The **draft Law on Water Management**, prepared by the MoEFWA with the assistance of the INPAEL project, and which is currently under discussion at the Council of Ministries, transposes Directive 2000/60/EC establishing a framework for Community action in the field of water policy, as amended by Decision 2455/2001/EC, Directive 2008/32/EC and Directive 2008/105/EC. This draft new Law on Water Management also transposes Directive 2006/118/EC on the protection of groundwater against pollution and deterioration, and Directive 2007/60/EC on the assessment and management of flood risks.
This Law aims to define:

a. a complete frame on protecting internal surface waters, temporary waters, coastal waters, groundwater and state of waters;
b. the methods and conditions of water management, water use, water protection, regulation of watercourses and other water bodies, and protection from adverse effects of water;
c. the method of organizing and performing water management tasks and functions;
d. basic conditions on exercising water management operation;
e. powers and duties of Council of Ministers, and other bodies of local and central level, and other legal subjects, and other issues of importance to water management.

2.2 Current status of implementation

2.2.1 Competent Authorities

The following are the relevant parties and responsibilities with respect to urban waste water sector:

- **Ministry of Environment, Forestry and Water Administration** is responsible for:
  - Establishing the water quality standards and objectives
  - Controlling the compliance with the legislation in force
  - Preparing environmental permit conditions

- **General Directorate of Water Supply and Sewerage**[3] within the Ministry of Public Works has the following responsibilities:
  - prepare strategies and policies for the sector and to follow up on their implementation;
  - plan the budget and financing of the sector in Albania – from the state budget and outside investors;
  - manage and distribute subsidies from the state;
  - monitoring of the operations and functioning of the Water and Sewerage Companies.

- **Regulatory Commission for Water Supply and Sanitation** is responsible to set tariff for water services[4].

- **National Environmental Agency** is responsible for monitoring the quality of surface water and of waters into which urban or industrial waste water is discharged.

- **Local Public Administration** (LPA) is responsible for operation and maintenance of the sewerage systems and the urban waste water treatment plants.

2.2.2 Water Management

In accordance with the provision of the draft Law on Water Management, the MoEFWA draws up and implements, on hydrographical basins[5], policies, strategies, programs and projects, for the steady management of water resources, aiming their further maintenance and consolidation.

3 The Directorate has a special status. Its structure is approved by the Council of Ministers and while it reports to the MPWTT it is not formally part of the structure of the Ministry.

4 The Regulatory Commission clearly has a role to play as regards the implementation of the Urban Waste Water Directive and in particular encouraging the setting of adequate tariffs to cover at least operation and maintenance costs.

5 The Drini, Mati, Ishmi, Erzeni, Shkumbini, Semani, and Vjosa are the most important hydrographic basins of Albania. These are briefly described in Annex II to this report.

The territory of the Republic of Albania is, for water management purposes, divided into river basins and river basin districts. River Basin Councils are established as the "local authorities responsible for managing water resources in the relevant basins".

Six hydrographic river basins were established in 2002 by decision of the National Water Council[6] based on the catchment areas of the Vjosa, Semani, Shkumbini, Erzeni (and Ishmi), Mati, and Drin rivers. A description of these river basins is contained in Annex II of this report.

One key problem with the current arrangements is that some small river basins, coastal parts and lakeshore zones in the country, do not belong hydrographically to the 6 hydrographic river basins since they drain directly into the sea or into a lake.

For water management purposes it is recommended that these parts of the country be incorporated into the river basin districts of larger river basins on the basis of geographical criteria, rather then be designated as independent river basin districts.
In this respect it is proposed that the areas, that are outside the boundaries of the six main river basins, are incorporated into the adjoining river basins in order to form six River Basin Districts, which can be used as administrative entities for development and management of all water management tasks.
The division of the districts, not lying in the river basin areas, over the 6 proposed river basin districts is as follows:

- Malesi e Madhe and Shkodra districts are incorporated into the Drin-Shkoder-Buna river basin district.
- Lezha and Kurbin districts are incorporated into the Mati river basin district.
- Durres and Kavaje (part) districts are incorporated into the Ishmi and Erzeni river basin district.
- Lushnja (part), Fier (part), Mallakaster (part), Devoll, Gramsh and Korçe districts are incorporated into the Semani river basin district.
- Lushnja (part), Kavaje (part) and Pogradec districts are incorporated into the Shkumbini river basin district.
- Vlora, Saranda and Delvine districts are incorporated into the Vjosa river basin district.

Although the communes and municipalities along the coast of the Ohrid and Prespa Lakes formally belong to the Drin river basin, it is proposed that these communes and municipalities are incorporated into the nearest-by river basin district, i.e. the Shkumbini river basin district, because of administrative reasons, i.e. these areas are relatively far away from the main part of the Drin-Shkoder-Buna river basin district.
The areas of the six river basin districts are shown in Figure 2.1.

6 The National Water Council is the main decision making authority charged with the management of water resources; it is an inter-ministerial body, consisting of representatives of institutions, bodies, entities treating cases on water resources. The National Water Council is headed by the Prime Minister;

Figure 2.1: Map of River Basin Districts

2.3 Current conditions of water supply and sanitation in the River Basin Districts

The situation of water supply infrastructure in Albania is in a critical state, considering the old networks, massive leakage in all parts of the system, illegal connections, unstable supply pattern, uncontrolled rural-to-urban migration, and low maintenance due to lack of funds.
The percentage of population having access to water supply system is rather uncertain as population's uncontrolled movement creates difficulties to correlate the number of inhabitants with the service coverage provided to them. Nevertheless data of 2001 indicate that in 2001 about 2.5 million people were served by public water supply (75% of the population), varying considerably, from 90 percent in urban areas to 50 percent in rural ones.

With regard to service providers, there are currently 56 joint stock companies for water supply and sewerage services, and a number of communal water companies in Albania. Currently the organisational structure for public water supply services is being reformed.[7]

Within the service areas of the Water and Sewerage Companies live about 3.2 million people, approximately 86% of the total population of Albania.
In 2001, according to official statistical data, 549,338 households were served by public water supply systems, out of a total number of 727,715 households [Census 2001], which implies a service level of 75%. Only part of the served households have in-house connection to the water supply system, in 2001 62% of the served households. In 2001 92,847 households were relying on their own water supply systems, and 85,530 households had no water supply to their dwellings [Census 2001].

The quality of service provided by water enterprises in Albania remains very poor. The continuous supply of water of a safe quality to the population is a rarity. In general the systems are characterised by:

- Poor condition of water production facilities and their maintenance
- Insufficient water transportation and distribution capacity

7 Before the year 2000 all of the water supply and sewerage companies were state enterprises. In the year 2000 they were transformed into commercial share companies. However, while their legal status had changed their sole shareholder remained the state. Moreover the legal transformation process is not yet completed. As part of the decentralisation policy, assets held by central government have in most cases been transferred to local government bodies which will become sole shareholders of these companies.
Although ownership of the water utilities has passed to the municipalities, the latter are not yet financially responsible for them. For the moment, operating subsidies, when necessary, are still paid by MPWTT.
The transfer process is, understandably more complex in those cases where a company serves more than one commune or municipality. The Durres water company, for example, supplies three municipalities and eight communes. In these cases the transfers will be to a 'joint power authority'.
The supervisory boards of the 'decentralised' transferred companies will be modified although it is anticipated that the MPWTT will retain one appointee so as to maintain the link with central government. As regards the future of these companies various options are now seen as opening up regarding private sector involvement such as the use of management contracts. Because many of the water companies are quite small a regional approach is envisaged with several companies being 'packaged' together as regards management. In other words the assets will remain separate.

- High levels of unaccounted for water, e.g. due to water losses
- Risks of contamination of the water due to seepage of pollutants in to the distribution systems.

A number of aggregated financial and other performance indicators of water companies in Albania are presented in Table 2.1 below. These data are averages for all the water companies. Some salient points are as follows:

- non-revenue water averages = 72%
- percentage of connections metered = 41%
- collection rate on invoices to households = 73%
- mean water sales to households (for those connected) = 93.5 l/person/day
- mean water availability = 13 hours/day

Table 2.1: Main financial indicators for the Albanian water and sanitation utilities 2008[8]

Indicator	Units	2008
Staff /connection	Staff/1000 connections	6.1
Water supply coverage	%	77.8
Sewage network coverage	%	45.2
Water production	l/person/d	333.2
Energy consumption	kwh/m^3	1.43
Total water sold	l/person/d	93.5
Water sold to families	l/person/d	74.2
Non-revenue water	%	71.9
% of connections with meter	%	41.3
% of sold water metered	%	39.9
Direct operating costs/m^3 produced water	Leke/m^3	13.3
Direct operating costs/m^3 sold water	Leke/m^3	47.3
% of labour cost/total direct operating costs	%	39.8
% energy cost/total direct operating costs	%	38.5
Average price WS	Leke/m^3	40.9
Average price W	Leke/m^3	36.7
Difference between cost and average price	Leke/m^3	-25.5
Total operating costs /m^3 produced water	Leke/m^3	17.5
Total operating costs /m^3 sold water	Leke/m^3	62.2
Paid bills norm (general)	%	78.5
Paid bills norm (families)	%	72.7
Paid bills norm (private entities)	%	74.4
Paid bills norm (public entities)	%	103.4
% of the direct operating costs covered by the income	%	79.8
% of the direct operating costs covered by the paid bills	%	66.6
% of the direct operating costs covered by the subventions	%	32.3
% of the total operating costs covered by the income	%	60.4
% of the total operating costs covered by the paid bills	%	50.4
% of the total operating costs covered by the subventions	%	24.4
Continuity of supply	Hour/day	13.3

Sanitation coverage in urban areas is almost the same as water supply coverage, while in rural areas only a small portion of the areas with piped water supply are equipped with sewer networks. According to available data, nearly 1.5 million people

8 Source: DPUK benchmarking database

are connected to sewerage systems (46% of the population). However, figures on real coverage are not updated and this is a consequence of poor record keeping.

Urban areas have mostly combined sewage and storm water collection networks that discharge into nearby surface water bodies. Most of the urban waste water is presently discharged without treatment into water bodies.
Rural areas have mostly individual household waste water collection systems, principally simple pit-latrines with no drainage pipes. Villagers themselves are responsible for the construction of latrines and they do it without following appropriate technical criteria, thus, their problematic functioning is quite common.

The status of water supply and sanitation in the six river basin districts is described below:

Semani River Basin District

The Semani River Basin District is spread out over 11 districts incorporating 105 municipalities and communes. The total population of Semani RBD numbers 783,762 (Census 2001).

At present 15 Water and Sewerage Companies (PUK Sh.A) provide public water supply and sewerage services in the Semani River Basin District.

Some data for 2008 on water and sanitation coverage in the Semani River Basin are presented in Table 2.2 below.

According to data a number of 376,619 people are provided with public water supply services by these companies.

Table 2.2: Semani RBD: Water supply and sewerage services

Water Enterprise	People served by public water supply (No.)			People connected to sewerage (No.)		
	Total	Urban	Rural	Total	Urban	Rural
Korce UK Sh.A	66500	65000	1500	62432	62432	0
Korce (F) U Sh.A	20110	4412	15698	0	0	0
Lushnje (F) U Sh.A	23459	0	23459	0	0	0
Bilisht U Sh.A	6561	6561	0	0	0	0
Fier UK Sh.A	123538	81500	42038	71125	69825	1300
UK Lushnje (Q) Sh A.	41000	38000	3000	30000	30000	0
Kucove UK Sh.A	36091	27704	8388	24340	23018	1322
Polican U Sh.A	10200	9200	1000	0	0	0
Erseke UK Sh.A	5900	5900	0	5850	5850	0
Corovode U Sh.A	4133	3965	168	0	0	0
Divjake Sh.A U.	13227	0	13227	0	0	0
Ura-Vajgurore U Sh.A	9195	4582	4613	0	0	0
Patos U Sh.A	16705	12460	4245	0	0	0
Gramsh U Sh.A	21703	14812	6892	0	0	0
TOTAL	398322	274096	124228	193747	191125	2622

According to data on sewerage and waste water treatment a number of 193,747 people are connected to urban sewerage systems.

Various investment programmes for water supply and waste water management are ongoing or planned, but details on these are little known.
In the city of Korce a two stage WWTP is under construction.

There are no data on industrial waste water collection and treatment, and neither on impacts of industrial water use and waste water discharges. In general only small scale industrial activities take place, but in Korce are some larger scale industries, i.e. the Korca Brewery and 2 meat processing industries. Discharges from industries in Korce and Maliq cause some pollution problems in the Devoll River.
Industrial discharges, a.o. from oil field exploitation, near Fier and Ballsh contribute to water pollution problems in the Gjanica River and in the Semani River near Fier.

An overview of the largest agro-food industries, selected on the basis of the numbers of staff as criterion for potential waste water loads, is given in Table 2.3 below.
The Korca brewery possibly has a waste water load of 5,000 p.e. on the basis of a production output of 40,000 l beer per day.
The waste water loads of these industries are smaller than 4,000 p.e., although no sufficient data are available to estimate the waste water loads accurately.

Table 2.3: Semani RBD: Agro-food industries

Prefecture	Company	Products	City	Staff number
Fier	SHA Vajra Bimore	refined oil	Fier	32
	Mulliri I Arte	Flour	Vajkan	20
	Basha	Bread	Fier	48
	Lufra	dairy	Kolonje	20
Korca	Firma Rilindja	Alcohol	Korce	21
	Firma Fix	Meat	Korce	20
	Birre Korca	Beer	Korce	
	Atlas-1	Alcohol	Maliq	20
	Joy Fllorinas	soft-drinks	Ciflig	20

Drin-Shkoder-Buna River Basin District

The Drin-Shkoder-Buna River Basin District (further referred to as Drin RBD) is spread out over 8 districts incorporating 80 municipalities and communes. The total population of Drin RBD numbers 475,505 (Census 2001).

At present ten Water and Sewerage Companies provide public water supply and sewerage services in the Drin RBD, see Table 2.4.

Table 2.4: Drin RDB: Water supply and sewerage services[9]

Water Enterprise	People served by public water supply (No.)			People connected to sewerage (No.)		
	Total	Urban	Rural	Total	Urban	Rural
Puke UK Sh.A	2773	2148	625	1563	1500	63
Tropoje U Sh.A	12302	9138	3164	0	0	0
Vau Dejes U Sh.A	3111	3111	0	0	0	0
Shkoder UK Sh.A	85000	85000	0	65000	65000	0
Shkoder (F) U Sh.A	8508	0	8508	0	0	0
Peshkopi U Sh.A	30000	13000	17000	0	0	0
Bulqize U Sh.A	12257	9632	2626	0	0	0
Has U Sh.A	5000	3000	2000	0	0	0
Malesi e Madhe U Sh.A	33850	10500	23350	0	0	0
Kukes U Sh.A	40000	25000	15000	16667	16667	0
TOTAL	232801	160529	72273	83230	83167	63

According to these a number of 232,802 people are provided with public water supply services by these companies, while a number of 83,229 people are connected to urban sewerage systems.

Currently there are no urban waste water treatment plants in Drin RBD.

Various investment programmes for water supply and waste water management are ongoing or planned, but details on these are little known. Plans for construction of sewerage systems and a WWTP in the coastal resort town Velipoje are under preparation.

There are no data on industrial waste water collection and treatment, and neither on the impacts of industrial water use and waste water discharges. In general only small scale industrial activities take place. Only in Shkoder are some larger size industries producing leather and paper, but there is no information on the actual status.
The Drin River is the major producer of hydropower in Albania. Large hydropower plants in the river are: Koman (600 MW), Fierze and Dejas.

An overview of the largest agro-food industries, selected on the basis of the numbers of staff as criterion for potential waste water loads, is given in Table 2.5 below. The waste water loads of these industries are smaller than 4,000 p.e., although no sufficient data are available to estimate the waste water loads accurately.

Table 2.5: Drin RBD: Agro-food industries

Prefecture	Company	Products	City	Staff number
Shkodra	Mark Babani	fish	Lac	50
	Univers Figo	meat	Shkoder	40
	Kimca	meat	Shkoder	46

9 Source: Ministry of Public Works, Transportation and Telecommunication, (see also Annex III)

Mati River Basin District

The Mati River Basin District is spread out over 6 districts incorporating 37 municipalities and communes. The population of Mati RBD numbers 234,346 (Census 2001).

At present seven Water and Sewerage Companies provide public water supply and sewerage services in the Mati RBD, see Table 2.6.

Table 2.6: Mati RBD: water supply and sewerage services[10]

Water Enterprise	People served by public water supply (No.)			People connected to sewerage (No.)		
	Total	Urban	Rural	Total	Urban	Rural
Lezhe UK Sh.A	27664	26064	1600	27664	26064	1600
Rubik UK Sh.A	1852	1779	74	1723	1446	277
Mirdite UK Sh.A	6074	5261	813	5261	5261	0
Fushe Arrez UK Sh.A	1767	1767	0	1667	1667	0
Burrel UK Sh.A	22260	18200	4060	15162	15162	0
Kurbin U Sh.A	41416	39294	2122	0	0	0
Kraste UK Sh.A.	2738	2438	300	2450	2450	0
TOTAL	103771	94803	8969	53927	52050	1877

According to these a number of 103,772 people are provided with public water supply services by these companies, while a number of 53,927 people are connected to urban sewerage systems,.

Currently there are no urban waste water treatment plants in Mati RBD.
Various investment programmes for water supply and waste-water management are ongoing or planned, but details on these are little known.
Construction of a WWTP for the agglomeration of Lezhe/Shengjin will start soon. The planned WWTP system consists of aerated lagoons and constructed wetlands, and sludge treatment is reed beds.

There are no data on industrial waste water collection and treatment, and neither on the impacts of industrial water use and waste water discharges. In general only small scale industrial activities take place.
Chromium and copper mining activities may have some impacts on the status of the rivers, whereas closed chromium and copper processing plants and a closed fertilizer still may cause some water pollution problems in the Mati river, due to the seepage of polluted water from tailings ponds and waste storage sites.
In the Mati River system 2 hydro-electricity plants are in function: Ulza and Shkopet.

Ishmi & Erzeni River Basin District

The Ishmi & Erzeni River Basin District is spread out over 4 districts incorporating 42 municipalities and communes. It is the most densely populated RBD in the country. The population of Ishmi & Erzeni RBD numbers 828,494 (Census 2001)[11].

10 Source: Ministry of Public Works, Transportation and Telecommunication, (see also Annex III)

11 The actual population number is much higher, due to the rapid population growth of Tirana and other cities in this river basin district. Although reliable data on the actual number of inhabitants of the municipalities and communes are not available, the actual population number is estimated at about 1,500,000.

At present seven Water and Sewerage Companies provide public water supply and sewerage services in the Ishmi & Erzeni RBD, see Table 2.7:

Table 2.7 Ishmi & Erzeni RBD: water supply and sewerage services[12]

Water Enterprise	People served by public water supply (No.)			People connected To sewerage (No.)		
	Total	Urban	Rural	Total	Urban	Rural
Kruje UK Sh.A	15665	15360	305	10530	10530	0
Durres UK Sh.A	207336	142317	65019	142094	142094	0
Tirane UK Sh.A	846700	700000	146700	647500	647500	0
Rrogozhine UK Sh.A	11979	6065	5914	3281	2465	819
Fush-Kruje UK Sh.A	9385	8375	1010	8360	8360	0
Kavaje UK Sh.A	56989	29111	27877	20906	20906	0
Kamez Sh.a. UK	32948	6658	26290	16805	6658	10170
TOTAL	1181002	907886	273115	849476	838513	10989

According to these a number of 1,181,001 people are provided with public water supply services by these companies, while a number of 849,502 people are connected to urban sewerage systems.

The only operational urban waste water treatment plant in Ishmi & Erzeni RBD is the WWTP in Kavaje. This WWTP has a capacity of 25,000 p.e. The system comprises anaerobic ponds/trickling filters/sedimentation/maturation ponds + anaerobic sludge ponds. It is planned to expand the WWTP capacity to 125,000 p.e.

Various investment programmes for water supply and waste water management are ongoing or planned, but details on these are little known.
A WWTP for Durres is under construction.

In Tirana a project on improvement of the waste water collection and treatment facilities is ongoing. The Japanese Government finances the project through a soft loan with a value of USD 100,000,000. The project targets at provision of waste water collection and treatment for Tirana City, Kamez and Kashar. The project entails construction of a new collector and Phase I of a waste water treatment plant with an estimated capacity of 1,000,000 p.e. The plants´ effluent will be discharged into the Lana river (see Annex III).

A research and demonstration WWTP using constructed wetland and reuse technologies has been designed and is proposed for construction at the site of the SOS Children's village in the outskirts of Greater Tirana. The installation will have a capacity of about 250 p.e., and is intended to demonstrate a low-cost ecologically friendly technology that would be suitable for isolated communities of up to 2,000 – 4,000 inhabitants.

This river basin district is the most industrial area of the country and it contains the largest seaport, Durres, as well as the international airport.
There are no clear data on the industries, even not on the larger plants. The Tirana Brewery and a meat processing plant are the largest factories in the agro-food sector, but their waste water load is estimated below 4,000 p.e.

12 Source: Ministry of Public Works, Transportation and Telecommunication, (see also Annex III)

The combined discharges of urban waste water and industrial effluents cause serious pollution in the Lana and Tirana Rivers, and subsequently in the Ishmi River.

An overview of the largest agro food industries is given in Table 2.8 below.
The largest industries in Tirana are: Tirana brewery (150 workers), KMY meat processing (173 workers) and Coca Cola soft drinks (170 workers).
The waste water loads of these industries are smaller than 4,000 p.e., although no sufficient data are available to estimate the waste water loads accurately.

Table 2.8: Ishmi & Erzeni RBD: Agro-food industries

Prefecture	Company	Products	City	Staff number
Tirana	Tirana	beer	Tirana	150
	Coca Cola	soft drinks	Tirana	170
	Ferlat	dairy	Rrogozhine	35
	Exstra Milk	dairy	Tirana	30
	Sh.A. Miell	flour	Tirana	45
	Sh.A. Bloje	flour	Tirana	65
	Derbi	soft drinks	Tirana	70
	Kenedy Alb	meat	Tirana	20
	Bardhi	meat	Tirana	30
	HAKO	meat	Tirana	35
	KMY	meat	Yzbenisht	173
	EHW	meat	Kashar	85
	Aquila Liquori	alcohol	Tirana	67
	SHA	bread	Tirana	65

Shkumbini River Basin District

The Shkumbini River Basin District is spread out over 6 districts incorporating 42 municipalities and communes. The population of Shkumbini RBD numbers 376,131 (Census 2001).

At present five Water and Sewerage Companies provide public water supply and sewerage services in the Shkumbini RBD, see Table 2.9.

Table 2.9: Shkumbini RBD: water supply and sewerage services[13]

Water Enterprise	People served by public water supply (No.)			People connected to sewerage (No.)		
	Total	Urban	Rural	Total	Urban	Rural
Elbasan (F) U Sh.A	64776	16273	48503	0	0	0
Librazhd UK Sh.A	17940	15445	2495	15420	15420	0
Peqin UK Sh.A	7725	6975	750	0	0	0
Elbasan UK Sh.p k (city)	136105	109500	6500	101000	101000	0
Pogradec UK Sh.A	55005	39850	15155	37755	37755	0
TOTAL	281551	188043	73403	154175	154175	0

According to these data a number of 283,150 people are provided with public water supply services by these companies, while a number of 154,275 people are connected to urban sewerage systems.

13 Source: Ministry of Public Works, Transportation and Telecommunication, (see also Annex III)

The only operational waste water treatment plant in Shkumbini RBD is located in Pogradec. This is a two stage biological WWTP with a capacity of 75,000 p.e. in operation from 2006. Its effluent is discharged into Ohrid Lake.

Various investment programmes for water supply and waste water management are ongoing or planned, but details on these are little known.
Gravel mining is an important activity along the Shkumbini River. There are about 37 excavation sites along the river.

Vjosa River Basin District

The Vjosa River Basin District is spread out over 9 districts incorporating 68 municipalities and communes. The population of Vjosa RBD numbers 357,808 (Census 2001).

At present eleven Water and Sewerage Companies provide public water supply and sewerage services in the Vjosa RBD, see Table 2.9.

Table 2.9: Vjosa RBD: water supply and sewerage services[14]

Water Enterprise	People served by public water supply (No.)			People connected to sewerage (No.)		
	Total	Urban	Rural	Total	Urban	Rural
Sarande UK Sh.A	38791	34548	4243	34229	33088	1141
Permet U Sh.A	11525	10875	650	0	0	0
Vlore U Sh.A	132526	124146	8380	0	0	0
Novosele U Sh.A	9002	0	9002	0	0	0
Gjirokaster (F) U Sh.A	4283	0	4283	0	0	0
Mallakaster UK Sh.A	18787	10542	8245	10500	10500	0
Gjirokaster (Q) UK Sh.A	28468	28468	0	19151	19151	0
Libohove UK Sh.A.	3082	2780	302	563	563	0
Selenice UK Sh.A	6725	6725	0	0	0	0
Tepelene U Sh.A	9750	8500	1250	0	0	0
Delvine U Sh.A	5700	5700	0	0	0	0
TOTAL	268639	232284	36355	64443	63302	1141

According to these data a number of 268,639 people are provided with public water supply services by these companies, while a number of 64,443 people are connected to urban sewerage systems.
There is one waste water treatment plant in Vlore, but this plant is not yet in operation.
Various investment programmes for water supply and waste water management are ongoing or planned, but details on these are little known.
A waste water treatment plant for Sarande is under construction.

Gravel and sand mining is an important activity in the Vjosa watershed. There are about 86 excavation sites along the water courses in the catchment area.
Petrol abstraction occurs in the middle-lower part of the river, causing some water pollution problems.
Near Selenice are significant deposits of asphalt and bitumen.

14 Source: Ministry of Public Works, Transportation and Telecommunication, (see also Annex III)

2.4 Existing water monitoring programmes

The current national rivers monitoring programmes in Albania are relatively extensive and include most of the polluted areas and environmental "hot spots". The physical-chemical characteristics measured at selected monitoring stations by responsible authorities are usually confined to basic water quality and nutrient parameters with limited measurement of heavy metals, organics and selected priority substances. In general a more intensive physical-chemical monitoring is needed at selected sites to focus mainly on priority substances and priority hazardous substances. Table 2.10 provides an overview of the water quality monitoring programmes currently implemented.

Table 2.10: Water quality monitoring programmes implemented in Albania

Medium	Institution	No. of points	Frequency
Groundwater	Geological Survey	60	2x per yr
Rivers	Institute of Hydrometeorology	13	2x per yr
Rivers	Institute of Public Health	32	1 x per month
Rivers	Institute of Public Health	microbiology	
Rivers	Institute of Nuclear Physics	13	2x per yr
Lakes	Institute of Nuclear Physics	6	2x per yr
Sea	Institute of Public Health		
Sea	Institute of Biological Research		
Sea	Museum of Natural Sciences		

Currently there are 35 urban waste water impact monitoring stations, operated by the Institute of Environment. These stations are located along rivers and the coast in Durres, Vlore and Sarande. There are 38 river water quality monitoring stations, operated by the Hydro-meteorological Institute. Monitoring stations are also located at the lakes Ohrid, Macro Prespa, Shkodra and Butrinti.

In the framework of the project "Strengthening the Environmental Monitoring System in Albania" a national plan for water quality monitoring has been developed (October 2008). This plan provides for the establishment of 40 river monitoring stations for 3 different purposes, including reference monitoring stations. Selected physical-chemical parameters and biological quality parameters are monitored.

3 Requirements and tasks for implementation of the UWWT Directive

The objectives of the implementation plan are to focus the efforts and resources on the compliance with the requirements of the Directive concerning urban waste water treatment.

3.1 Priorities for the implementation of Council Directive 91/271/EEC in Albania

Implementation of the Urban Waste Water Treatment Directive ranks among the most challenging and expensive pieces of EU legislation. This is why early and careful consideration of the environmental and technical aspects of the Directive is of significant importance.

There are a number of tasks that must be carried out at a very early stage in order to be able to proceed. These relate primarily to the administration of the Directive and the collection of data to enable plans to be developed. The later stages involve construction of sewers and waste water treatment facilities and the timescale will depend upon the availability of finance, and construction engineering resources in the Candidate Country. A key issue will be the phasing of programmes to enable the construction work to be accomplished at an achievable and affordable rate.

The following phases were preliminarily identified as priorities for the implementation of Council Directive no 91/271/EEC in Albania:

Phase 1

- Identification of the agglomerations of more than 2,000 p.e. ;
- Identification of sensitive areas;
- Identification of existing infrastructure (sewerage systems and waste water treatment plants), and assess where improvements are required;
- Assessment of existing monitoring and inspection system, and provision for adaptation to the requirements of the Directive where necessary.

Phase 2

- Establish, based in particular on the findings of the first phase on numbers/locations of 'agglomerations', 'sensitive areas' and 'existing infrastructure', an implementation programme for the construction of sewerage networks and waste water treatment plants. Within such a programme the issue of reuse and/or disposal of sewage sludge will have to be addressed as well. Such an implementation programme will also be a major factor in all considerations as regards transition periods, i.e. derogations from compliance

with certain obligations by the time of Accession. Careful technical and financial assessment will be indispensable. The services of the European Commission (DG Environment) will be available for information, advice and interpretation;
- o Prepare, based on the environmental and technical requirements established, investment plans;
- o Ensure a system of cost recovery for sewerage and waste water treatment, considering inter alia construction and maintenance costs;
- o Ensure the safe disposal of treated waste water and sludge
- o Make monitoring and inspection schemes operational, as well as enforcement of the standards laid down in national legislation (pursuant to the Directive); and
- o Reviewing sensitive and less sensitive areas every four years.

Phase 3
- o Continue the building up of new urban waste water treatment plants in agglomerations; modernization of the urban waste water treatment plants; modernization of the waste water treatment plants for agro-food industry; rehabilitation of the existing sewage systems; building up and/or extension of the urban sewage systems.

The time schedule for completion including, where appropriate, transition periods, will form an important part of the negotiations on Accession. Careful technical and financial assessment will, in this context, be indispensable.

3.2 Identification of Agglomerations

Eligible agglomerations have been identified, mainly on the basis of a) population data from the Census 2001 Report[15], b) actual data that were provided by some of the municipalities and communes, and c) topographic information.
In general, these data are fairly superficial and incomplete.
As such in proposing the agglomerations many assumptions have been applied in determining the needs for sewerage and waste water treatment systems. *Detailed feasibility studies need to be carried out for each agglomeration for the preparation of final waste water management plans.*

The preliminary selection of the agglomerations has been made on the following basis:
- All settlements with a population of 2,000 inhabitants or more require waste water collection and treatment systems. At this stage it is presumed that in general a municipality or a commune can be served by one central waste water treatment plant, to which the individual settlements are connected through pipelines.
- In communes without settlements of more than 2,000 inhabitants it may be possible that close-lying urbanised settlements are combined into agglomerations with more than 2,000 inhabitants. Such agglomerations also require waste water collection and treatment systems according to the UWWT Directive. For this reason all communes with a settlement of over 1,000

15 The Census 2001 Report provides data on the population of all municipalities and communes, and of the settlements that are part of the communes.

inhabitants also have been identified as potentially eligible under the UWWT Directive.

- In the selection of the agglomerations, municipalities and communes may be combined into one agglomeration where it seems feasible to treat all waste water from the agglomeration in one centralised waste water treatment plant. In principle centralised waste water treatment may be feasible technical solution under the condition that:
  - the distance of the settlements to the central WWTP is less than 10 km;
  - the settlements and the WWTP are located in the same drainage area;
  - the topography is suitable for connection of the settlements to the WWTP;

The selection of the agglomerations was also made on the basis of topographical data. The population numbers of the agglomeration have been estimated on the basis of the Census 2001 Report and on actual population data, where available. The estimated waste loads (as number of person equivalents) are equivalent to the population number. For the larger agglomerations (> 25,000 inhabitants) the estimated waste load was calculated as the sum of the population number and 20% of the population number, accounting for industrial and institutional waste water loads.

Altogether 158 agglomerations have been identified, as follows:

River basin district	Number of agglomerations	Number of municipalities and communes	Total population (Census 2001)	Population in agglomerations *)
Semani	40	105	783,762	**611,898**
Drin	31	80	475,505	285,200
Mati	20	37	234,346	172,853
Ishmi-Erzeni **)	19	42	828,494	1,424,000
Shkumbini	26	42	376,131	**358,974**
Vjosa	22	68	357,808	331,524
Total	158	374	3,056,046	3,183,449

*) The population of the agglomerations has been estimated on the basis of actualised data
**) In Ishmi-Erzeni RBD the population has increased strongly since 2001, in particular in Tirana and Durres

The proposed agglomerations have been described in Annex III to this report.

The tables 3.1 to 3.6 below provide the list of the proposed agglomerations in the six river basin districts.

Table 3.1: Agglomerations in Semani River Basin District

Agglomeration	Settlements	Population
Berat	Berat, Uznove	69055
Kutalli – Poshnje	Kutalli, Drenovice, Rerez- Kumarak, Samatice, Gorican-Clirim, Poshnje, Banaj	12324
Lumas	Lumas	2000
Otllak	Ottlak, Dyshnik, Lapardha, Lapardha e Siperme, Morave	10343
Velabisht	Velabisht, Blice, Duhanas, Veterik, Starove	7375
Cukalat	Cukalat, Allambrez, Donofroze	3167
Kucove - Ure Vajgurore – Kozare – Perondi	Kucove, Ure Vajgurore, Pashalli, Kozare, Gege, Havaleas, Perondi, Goraj, Majgjate, Rreth Tapi, Tapi, Polovine	45000
Corovode	Corovode	5900
Polican	Polican	9200
Grekan	Grekan, Deshiran	3200
Mollas	Dasar, Linas, Selite	4000
Libofshe	Mollas, Ndernenas, Rreth-Libofshe, Vanaj	5000
Fier - Patos - Dermenas – Mbrostar – Portez – Zharrez - Qender Fier	Fier, Patos, Dukas, Lengas, Dermenas, Baltez, Darzeze e Re, Pojan, Radostine, Mbrostar-Ura, Kallm I Madh, Kallm I Vogel, Petove, Vajkan, Portez, Kraps, Patos Fshat, Zharrez, Clirim, Zhupan	135000
Roskovec - Strum – Kuman –	Roskovec, Strum, Arapaj, Suk I Poshtem, Suk I Siperm, Velmisht, Kuman, Luar, Marinez, Vidhisht, Topoje	21000
Topoje	Topoje	2000
Lushnje – Golem	Lushnje, Karbunare e Poshtem, Saver, Golem I Madh, Plug	55000
Divjake	Divjake, Mize	7200
Bubulline	Bubulline, Imsht	3500
Dushk	Dushk I Madh, Dushk Peqin, Gramsh	6000
Fier Shegan	Fier Shegan, Barbullinje	2500
Grabian	Grabian	4000
Gradishte	Gradishte, Kemishtaj, Mertish, Spolate	5000
Hysgjokaj	Hysgjokaj	2000
Karbunare	Karbunare e Siperme	2000
Kolonje	Kolonje	2200
Krutje	Krutje e Poshtme, Krutje e Siperme, Ngurrez e Madhe	4500
Ballsh - Aranitas - Q. Mallakaster	Ballsh, Aranitas, Panahor, Drenove, Visoke	15000
Korce - Qender Bulgarec – Drenove	Korce, Bulgarec, Barc, Belorta, Dishnice, Drenove, Mborje	95000
Maliq – Libonik	Maliq, Libonik, Drithas, Vashtemi, Vlocisht	12500
Mollaj	Mollaj, Kamenice	3000
Pirg	Pirg, Sovjan	4000
Pojan	Pojan, Zvezde	5600
Vreshtas	Vreshtas, Podgorie, Sheqeras	6500
Leskovik	Leskovik	2000
Erseke	Erseke	5900
Bilisht	Bilisht, Bitincke, Tren	9800
Miras	Miras, Menkulas	3100
Hocisht	Hocisht, Baban	2800
Proger	Proger, Cangonj, Vranisht	3200
Gramsh	Gramsh	14811

Table 3.2: Agglomerations in Drin-Shkoder-Buna River Basin District

Agglomeration	Settlements	Population
Peshkopi – Tomin	Peshkopi, Tomin, Dohoshisht, Ushtelenica, Zdojan	19000
Arras - Fushe Cidhen	Arras, Cidhen, Fushe Cidhen, Bllice	4200
Fushe Muhur	Fushe Muhur, Muhurri	2000
Kastriot	Kastriot, Kishavec, Sohodoll	2500
Maqellare	Maqellare, Kllobcisht, Pocest	3500
Bulqize	Bulqize, Vajkal	14275
Gjorice	Gjorice-Eperme, Gjorice-Poshtme	3500
Shupenze	Shupenze, Homesh, Okshatine	3000
Fushe Bulqize	Fushe Bulqize, Dushe	2600
Kukes – Shtiqen	Kukes, Shtiqen	27000
Bicaj	Bicaj, Nange	3200
Shishtavec	Shishtavec, Novosej	3000
Topojan	Topojan, Brekije	2500
Krume	Krume	5800
Golaj	Golaj, Nikoliq, Vlahen	3800
Bajram Curri	Bajram Curri	8200
Shkoder	Shkoder	100000
Vau Dejes	Vau Dejes, Mjede	5500
Bushat	Bushat, Kosmac, Melgush, Rranxe, Stajke	9600
Ana Malit	Ana Malit, Oblike e Madhe	2500
Berdice	Berdice e Madhe, Berdice e Siperme, Trush	5300
Gur I Zi	Gur I Zi, Renc, Vukatan	4400
Hajmel	Hajmel, Nenshat	5600
Postirbe	Postirbe, Boks, Boks, Drishte, Kullaj	5500
Rrethinat	Rrethinat, Bleran, Dobrac, Golem, Grude e Re, Hot I Ri, Shtoi I Ri, Shtoi I Veter	14000
Vig (Mnele)	Vig , Mnele e Madhe	2500
Barbullush	Barbullush	3500
Puke	Puke, Puke (Fshat)	5500
Koplik – Qender Koplik	Koplik, Koplik I Siperm	4500
Gruemire	Gruemire, Boic I Madh, Demiraj	3000
Velipoje	Velipoje	9000

Table 3.3: Agglomerations in Mati River Basin District

Agglomeration	Settlements	Population
Burrel	Burrel	18200
Klos	Klos, Bejne, Fullqet	3600
Gurre	Gurre e Madhe, Gurre e Vogel	2200
Lis	Lis	4060
Martanesh	Martanesh, Kraste	2450
Lezhe - Shengjin	Lezhe, Shengjin, Ishull Lezhe, Ishull Shengin,	36225
Balldre	Balldre	7203
Blinisht	Blinisht, Troshan	2000
Dajc	Dajc, Gjader	2500
Kallmet	Kallmet I Madh, Kallmet I Vogel, Merqi, Rraboshte	5500
Kolsh	Kolsh, Manati, Barbulloje e Re	2600
Shenkoll	Shenkoll, Barbulloje, Gryk-Lume, Rile, Tale	8300
Zejmen	Zejmen, Pllane, Spiten, Tresh	5700
Rreshen	Rreshen	8376
Rubik	Rubik	2719
Fushe Kuqe	Fushe Kuqe, Gorre, Gurez, Adriatik	5400
Lac - Mamurras	Lac, Lac (Fshat), Mamurras, Fushe-Mamurras, Gjormi, Shperdhet 1, Zheje	35000
Milot	Milot, Fushe-Milot, Mal-Bardhe, Mal-M., Shullaze	13020
Fushe Arrez	Fushe Arrez	5300
Qafe Mali	Qafe Mali, Kryezi	2500

Table 3.4: Agglomerations in Ishmi-Erzeni River Basin District

Agglomeration	Settlements	Population
Durres - Rashbull	Durres, Rashbull, Arapaj, Maliq Muco, Rromanat, Shenavlash, Shkallnur	240000
Shijak, Xhafzotaj, Katund I Ri	Shijak, Xhafzotaj, Koxhas, Rreth, Sallmonaj, Katund i Ri, Sukth, Hamallaj, Kulle, Rrushkull, Sukht i Ri, Vadardhe	38000
Manez	Manez, Rade	3800
Gjepalaj	Glepalaj, Hardhisht	2500
Kruje, Fushe Kruje	Kruje, Fushe Kruje (Qytet), Fushe Kruje (Fshat), Arrameras, Halil, Larushk, Luz	38000
Bubq	Bubq, Budulle	3000
Koder Thumane	Koder Thumane, Borizane, Derven, Dukagjin I Ri, Gramez, Thumane	13000
Nikel	Nikel, Qereke, Tapize	5500
Tirana - Kamez - Vore - Paskuqan - Berxull – Kashar - Dajt	Tirana, Kamez, Valias, Laknas, Zall Mener, Bathore, Frut-Kamez, Vore, Gjokaj, Marikaj, Marqinet, Pasqukan, Babbru Qender, Pasqukan Fush, Koder-Kuqe, Fush Kercyk, Pasqukan Koder, Babrru Shpat, Berxull, Katund I Ri, Mezez, Yrshek, Yzberish, Linze, Priske e Madhe	1000000
Farke	Farke e Madhe, Farke e Vogel	4500
Peze	Peze e Madhe, Peze e Vogel, Peze-Helmes	3200
Vaqarr	Vaqarr, Lalm, Sharre	4000
Zall Bastar	Zall Bastar, Bastar I Mesem, Vilez	3700
Zall Herr	Zall Herr, Cerkez Morine, Dritas	4000
Krrabe	Krrabe	2000
Kavaje - Golem - Synej	Kavaje, Golem, Karpen, Qerret, Synej, Bago, Rrakull	47000
Kryevidh	Kryevidh, Zhabjak	2400
Lekaj	Lekaj, Luz I Madh	4000
Luz i Vogel	Luz I Vogel, Vorrozen	5400

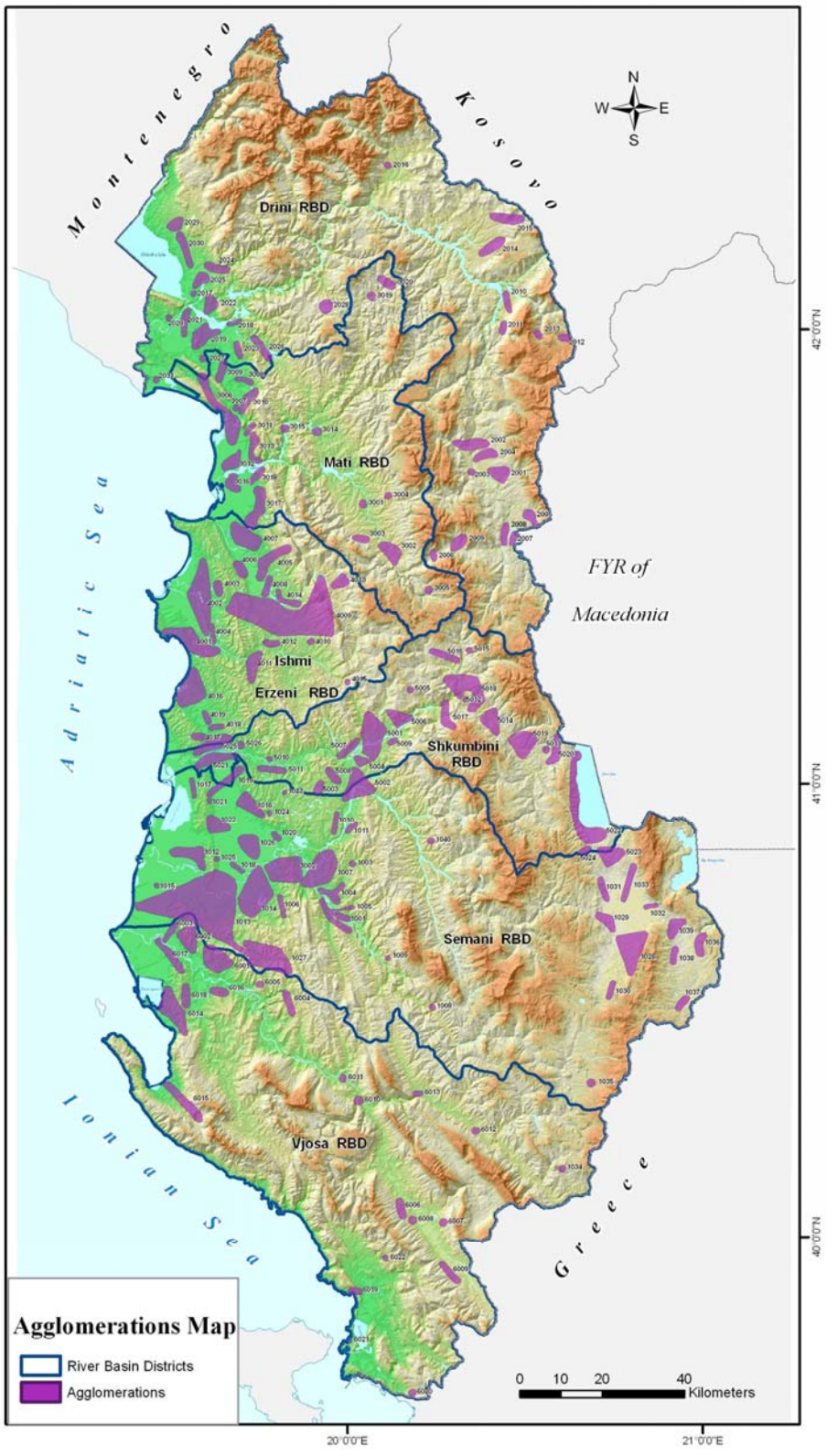
Table 3.5: Agglomerations in Shkumbini River Basin District

Agglomeration	Settlements	Population
Elbasan - Bradashesh - Shirgjan	Elbasan, Bradashesh, Balez, Katund i Ri, Shirgjan, Bujques, Jagodin, Kuqan, Mjekes	139000
Cerrik - Gostime	Cerrik, Gostime, Gjyrale, Malasenj, Shtepanje, Shtermen	23000
Belsh	Belsh, Belsh-Qender, Gradishte, Trojas	5000
Gjergjan	Gjergjan, Gjonme, Muriqani, Thana	5000
Labinot Mal	Labinot Mal	2500
Labinot Fushe	Labinot Fushe, Godolesh, Mengel	4000
Paper	Paper, Vidhas	2800
Shales	Shales, Kurtalli, Licaj, Xibrak	5200
Shushice	Shushice, Mlize	4200
Peqin	Peqin	8939
Gjocaj	Gjocaj, Vashaj	2200
Librazhd	Librazhd	16275
Prenjas	Prenjas Fshat, Perrenjas	6500
Hotolisht	Hotolisht, Dardhe, Xhyre	4500
Lunik	Lunik	2000
Orenje	Orenje, Funarez	2000
Polis	Polis, Gurshpate, Mirake	2500
Qender Librazhd	Babje, Dorez, Dragostunje, Gizavesh, Kuturman, Spathar	9000
Qukes	Fanje, Karkavec, Pishkash, Qukes Shkumbin, Skroske	7000
Rrajce	Rrajce Fushe, Katjel, Kotodesh, Sutan	8000
Terbuf	Terbuf, Cerme e Siperme, Cerme Proshke, Shenepremte, Cerme Shkumbin	12000
Pogradec – Bucimas - Udenisht	Pogradec, Bucimas, Geshtenjas, Gurras, Remenj, Verdove, Udenisht, Lin, Memelisht	61000
Cerrave	Cerrave, Blace, Leshnice, Pretushe	5700
Dardhas	Dardhas, Stropcke	2200
Gose	Gose, Gose e Madhe, Kercukaj, Gose e Vogel, Vile Ballaj	6760
Rrogozhine	Rrogozhine (Qytet), Rrogozhine (Fshat)	11700

Table 3.6: Agglomerations in Vjosa River Basin District

Agglomeration	Settlements	Population
Cakran	Cakran, Buzmadh, Kreshpan, Voribop, Vreshtas, Cakran I Ri	11000
Frakull	Frakull, Frakull e Madhe, Frakull e Vogel, Peshtan	6600
Levan	Levan, Ferras	8700
Fratar	Bejar, Dames	3600
Hekal	Hekal	2400
Gjirokaster - Lazarat	Gjirokaster, Lazarat	37000
Libohove	Libohove	3720
Dropull i Poshtem	Dervican	2000
Dropull i Siperm	Bodrishte, Jorgucat	2500
Tepelene	Tepelene	9750
Memaliaj	Memaliaj	5000
Permet	Permet	11000
Kelcyre	Kelcyre, Kelcyre Fshat	4804
Vlore, Qender Vlore	Vlore, Qender Vlore, Babice e Madhe, Kanine, Narte, Panaja	142000
Orikum	Orikum, Dukat Fushe	4000
Selenice - Armen	Selenice, Armen	8300
Novosele	Novosele, Bishan, Fitore, Trevellezer	5500
Shushice	Shushice, Llakatund, Risili	3400
Sarande	Sarande, Gjashte	42818
Konispol	Konispol	2200
Ksamil	Ksamil	2000
Delvine	Delvine	9600

Figure 3.1 Agglomerations Map



3.3 Identification of Sensitive areas

Sensitive areas are defined as areas which are sensitive for eutrophic conditions or which could become eutrophic. These are in general stagnant water bodies, such as lakes, and slowly flowing rivers and streams, which already show often high concentrations of Nitrogen and/or Phosphorus. Areas that are characterised by a high infiltration rate (e.g. karst areas) should also be considered as sensitive, since the entering of waste water into such areas may result in high N and P concentrations in the groundwater. All water bodies used for bathing, fishing, shellfish farming and nature protection are also categorised as sensitive.
All existing nature protection areas and groundwater protection zones are also considered as (highly) sensitive areas.

The Natura 2000 sites in Albania should also fall under the regime for sensitive areas.
At present the selection of sensitive areas has not been made yet, and neither a classification of water bodies into different quality category. For each of the water quality category specific targets for water quality parameters are defined.

Table 3.7 below gives some data on the protected nature areas in Albania.

Table 3.7: Overview of protected areas in Albania.

RBD	Protected Area	Category[16]	Area (ha)	Comment
Semani	Prespa	II	27750	Cross border
	Bredhi i Drenoves	II	1380	1170-1190 m asl
	Divjaka	II	1250	Karavastas lagoon
Drin-Shkoder-Buna	Valbona river valley		8000	
	Thethi	II	2630	750-2500 m asl
	Lura	II	1280	
Mati	Bjeshka e Oroshit	VI		
	Lure	II		
	Berzane	IV		
	Patok Fushe Kuge	IV		
	Quafe Shtome	II		
	Bardhet Bize	V		
Ishmi-Erzeni	Mount Dajt	II	3300	
Shkumbini				
Vjosa	Butrint	II	2500	
	Llogara	II	1010	475-2018 m asl

In Albania, water bodies, that are sensitive for eutrophication, have not yet been selected.
The MoEFWA must decide whether to identify individual sensitive areas or to apply the more stringent tertiary treatment criteria to the whole territory.

16 Category II - National Parks
Category IV - Nature management reserves/area of management of habitats and species
Category V - Protected Landscapes
Category VI - Protected areas for management of natural resources/protected area with multi-purpose utilization

Currently sufficient data is not available to designate sensitive areas as required by the UWWT Directive.
It is envisaged that this important preparatory activities will be supported by a TA project the first time (sensitive areas must be re-assessed every 4 years), which would:

- help decide whether to identify individual sensitive areas or to apply the more stringent tertiary treatment criteria to the whole territory
- if the former, develop and issue precise definition and criteria for sensitive areas; In particular, this should specify the scientific criteria used to determine the eutrophic state of watercourses and water resources;
- identify sensitive areas and their catchment limits;
- within sensitive areas, determine which of the parameters for more stringent treatment stipulated in Annex I.B have to apply in the particular situation;
- draft a regulation for re-assessment of sensitive areas and of criteria;
- develop a plan for follow-up surveys;

Within sensitive areas, a determination must be made which of the parameters for more stringent treatment (Annex I.B of UWWT Directive) have to apply (in this context, generally phosphorus is the limiting factor for freshwater). In this respect, there will be close overlap with the Nitrates Directive (91/676/EC).

It is assumed that no derogations would be sought for less sensitive areas, since the Adriatic and Ionian Seas are not regarded as a less sensitive area. All discharges from agglomerations greater than 10,000 p.e. within the whole of the sensitive area will have to be provided with more stringent waste water treatment.

3.4 Preliminary design of waste water treatment and collection systems

Many different types of waste water treatment systems exist. For development of the UWWT implementation plan, i.e. the preparation of outline designs and preliminary cost estimates, 2 different system types have been considered.
The selection of a particular system type depends primarily on the size of the plant and the local requirements for the quality of the effluent.

Outline design calculations have been prepared for WWTPs of varying size with application of 2 different waste water treatment techniques, respectively:

- Conventional activated sludge treatment (mainly applicable for agglomerations < 10,000 p.e.)
- Advanced activated sludge treatment with increased removal of Phosphorus and Nitrogen fulfilling the effluent quality requirements for N and P in sensitive areas

For small agglomerations < 4,000 p.e. alternative treatment system may be applied, e.g.:

- Land treatment (sedimentation, infiltration bed planted with reed)
- Ponds treatment (series of sedimentation, facultative and maturation ponds) .

These treatment methods are characterised by simple construction works, little mechanical equipment and relatively uncomplicated operation and maintenance. However, these systems require more land space than the other treatment methods. Hence they can only be chosen if sufficient suitable land is available.

The basic assumptions for preliminary design calculations and cost estimates have been described in Annex IV. For each treatment method the main design parameters were dimensioned for one p.e. Subsequently WWTPs for different numbers of p.e. were dimensioned, and the investment costs were estimated.

The numbers of Person Equivalents (p.e.) for dimensioning the WWTPs have been determined on the basis of the available population data.
The estimates of the numbers of p.e. that need to be connected to a sewerage system have been made on the basis of the data on the existing capacities of the sewerage systems. The preliminary design calculations for the sewerage systems and the waste water treatment plants are contained in Annexes V and VI. Data on waste water treatment and sewerage systems are also described in Table 4.2 to 4.7.

3.5 Disposal of waste water and sludge

No legal requirements on disposal of sewage sludge from WWTPs are currently in force.
It is recommended that a ban must be imposed and enforced on any disposal of sewage sludge to surface waters, coastal waters and the sea. An acceptable strategy for re-use (such as agricultural land-spreading, composting and co-incineration) or disposal (landfill) of sewage sludge must be pursued. Any approach for re-use or disposal of sewage sludge will need to be compliant with the waste sector EU legislation including the requirements of the Sewage Sludge Directive (86/278/EEC), Waste Incineration Directive (2000/76/EC), and Landfill of Waste Directive (99/31/EC).

It would be appropriate that a national Sludge Management Strategy is formulated by the regulatory authority in line with the requirements of EU legislation. The Sewage Sludge Directive (86/278/EEC) seeks to encourage the use of sewage sludge in agriculture and to regulate its use in such a way as to prevent harmful effects on soil, vegetation, animals and people.

3.6 Improve monitoring, data handling and reporting

A monitoring and inspection program for compliance assessment of discharges from urban waste water treatment plants and for assessing the amounts and composition of sludge shall be established. Even where such plants do not yet exist, the obligation is on the Republic of Albania to put in place monitoring capacity. This monitoring has to be part of the comprehensive monitoring as proscribed with the Water Framework Directive (2000/60/EC). The capacity of the monitoring institutions has to be improved and the number of monitoring points and the number of samples taken to be increased. Besides the monitoring, a comprehensive database has to be established for the purposes of compliance control, data management, and data presentation for decision making.

The Government must ensure adequate cooperation and exchange of information with other Member States in cases where discharges of waste water have a transboundary effect on water quality of shared waters.

The MoEFWA must set up adequate reporting procedures (based on the data base), as the existing system would be unable to respond to mandatory reporting obligations to, and requests from, the Commission (such as for information on efficiency of treatment plants, water quality of receiving waters, etc.). The MoEFWA must also provide public information and allow access to relevant information under the Directive on Access to Environmental Information (2003/4/EC).

4 Resources and Costs

The main types of costs arising during the implementation of the UWWT Directive are given in the checklist in Table 4.1.

Table 4.1: The UWWT Directive - Checklist of costs occurring for implementation

Initial set-up costs Identifying agglomerations, sensitive areas, less sensitive areas. Establishing administrative structure and permitting system. Establishing implementation programme including investment for new infrastructure. Capital Investment Construction of new and upgrading of existing sewerage networks. Construction of new and upgrading of existing waste water treatment plants in accordance with the set secondary treatment. Construction of tertiary treatment plants in sensitive areas. On-going costs Operation and maintenance of infrastructure (sewerage, treatment plants). Monitoring. Administrative costs.

The major factors influencing the costs of investment have been found to be:

- the initial state of the infrastructure for the collection and treatment of urban waste water before the implementation of the Directive;
- the improvements required in terms of collection of waste water within the agglomerations addressed by the Directive, including those for prevention of leaks and for reduction of pollution from overflows in combined systems;
- improvements required to urban waste water treatment plants to comply with the standards set by the Directive;
- constraints due to urban planning and site requirements, and climatic factors; and
- costs of labour and equipment.

There are also considerable preparatory costs due to the amount of assessment required to identify and select agglomerations and sensitive and less sensitive areas, and the introduction of an adequate sampling and monitoring system.

4.1 Initial set-up costs

Before starting the implementation of the plan for compliance with UWWT Directive it is necessary that the organisation, that will be responsible for implementation of

the plan, be established. The organisation should be established at national level, river basin district level and at local levels, including the water and sewerage companies, municipalities and communes. Since the responsibilities and tasks of the organisation will represent a large variety of disciplines and specialisations, it will be necessary that the agencies participating in the organisational framework recruit new staff, and that the development of staff capacities is incorporated in the programme for establishing the organisation for waste water management.

Consequently it may be required that a number of technical assistance (TA) projects be carried out to support the development of an adequate organisation. The TA projects should focus on advice in institutional development and capacity strengthening in the required skills such as overall management, project management, financial management, monitoring and laboratory operations, operation and maintenance of waste water collection and treatment systems and of sludge disposal systems. The TA projects should also assess the needs of equipment for the organisation and advise in the purchase of it.

The TA projects will focus on the requirements for the first stage of the plan, which entails the development of sewerage systems and WWTPs for the agglomerations > 20,000 p.e. During implementation of the first stage the requirements for further development of the organisation are assessed, which will form the basis for actions for its optimisation.

The envisaged costs of the TA projects are € 3,000,000, excluding purchase of equipment.

Other costs for initial set up, e.g. organisational re-arrangements, recruitment of staff, office and communications infrastructure cannot be estimated at this stage.

4.2 Capital Investment costs

4.2.1 Construction of new and upgrading of existing sewerage networks

The costs of waste water collection systems have been estimated on the following basis, see also Annex IV:
Systems are only for collection and transportation of waste water. Costs of conveyance of storm water are not considered.

Estimated average costs of waste water collection systems amount to € 873 per p.e. (of which 13.5% for electrical-mechanical equipment), including pipes, manholes, house connections, pumping stations and (pressure) pipes for waste water transportation. The estimation has been based on the following assumptions:

Population density:	53,3 p.e. per ha
Persons per connection to the sewerage network:	4 p.e. per connection
Connection costs:	€ 1400 per connection
Length of sewer pipe:	2.7 m per p.e.
Costs of sewer pipe (average) incl. manholes	€ 150 per m
Other items, e.g. pumps, pressure pipes, electrical and mechanical equipment	€ 118 per p.e.

The estimated costs of sewerage works for the agglomerations are described in Annex V to this report.

4.2.2 Construction of new and upgrading of existing waste water treatment plants

The assumptions and criteria for design of waste water treatment plants are described in Annex IV. The design calculations and cost estimates for the waste water treatment plants for the agglomerations are given in Annex VI.

4.3 Costs of operation and maintenance of sewerage systems and waste water treatment plants

The estimated costs of operation and maintenance of the sewerage systems and waste water treatment plants for the agglomerations are described in Annexes V and VI.

A summary of data on the sewerage systems and waste water treatment plants of the agglomerations is given in Tables 4.2 to 4.7.

Table 4.2: Semani River Basin District – Sewerage and waste water treatment

Agglomeration	Popu-lation	Current service level		Sewer needs	WWTP (PE)	Costs	
		Water supply	Sewerage			Investment (€)	O&M (€/yr)
	Number of persons						
Berat	69055	65721	62057	4513	75000	15714849	983470
Kutalli	12324		0	12324	12500	14883852	265290
Lumas	2000	1400	0	2000	2000	2982000	45583
Otllak	10343		0	10343	11000	12659439	228205
Velabisht	7375	1200	0	7375	7500	9085875	145066
Cukalat	3167		0	3167	3500	4647791	72420
Kucove	45000	43000	25000	20000	54000	26748000	796734
Corovode	5900	5900	0	5900	6800	7693900	122689
Polican	9200	9200	0	9200	9500	11119100	173956
Grekan	3200		0	3200	3200	4515200	69396
Mollas	4000	2500	0	4000	4000	5296000	81886
Libofshe	5000		0	5000	5000	6365000	98757
Fier	135000	100000	70000	65000	160000	79305000	2334306
Roskovec	21000	16500	0	21000	25000	24383000	462684
Topoje	2000		0	2000	2000	2982000	45583
Lushnje	55000	42000	30000	25000	65000	32680000	963745
Divjake	7200	7200	0	7200	7500	9090600	141211
Bubullime	3500		0	3500	3500	4938500	75902
Dushk	6000	4000	0	6000	6000	7482000	116558
Fier Shegan	2500		0	2500	2500	3727500	56979
Grabian	4000	4000	4000	0	4000	1804000	58140
Gradisht	5000	3000	0	5000	5000	6365000	98757

Hysgjokaj	2000		0	2000	2000	2982000	45583
Karbunare	2000		0	2000	2000	2982000	45583
Kolonje	2200		0	2200	2500	3465600	53842
Krutje	4500		0	4500	4500	5958000	92121
Ballsh	15000	15000	10500	4500	15000	8878500	258224
Korce	95000	80000	63000	32000	110000	43446000	1542705
Maliq	12500	8500	0	12500	12500	15037500	267130
Mollaj	3000		0	3000	3000	4233000	65059
Pirg	4000	3500	0	4000	4000	5296000	81886
Pojan	5600	5600	0	5600	5600	7128800	110608
Vreshtas	6500	5500	0	6500	6500	8105500	126272
Leskovik	2000	2000	0	2000	2000	2982000	45583
Erseke	5900	5900	5850	50	6000	2287650	80785
Bilisht	10023	10023	10023	0	10500	3465000	159901
Miras	3100		0	3100	3100	4374100	67228
Hocisht	2800		0	2800	2800	4174800	63816
Proger	3200	2600	0	3200	3200	4515200	69396
Gramsh	14811	14811	0	14811	15000	17880003	318580
Total	611898			328983	684700	441660259	10931617

Table 4.3: Drini River Basin District – Sewerage and waste water treatment

Agglomeration	Popu-lation	Current service level		Sewer needs	WWTP (PE)	Costs	
		Water supply	Sewerage			Investment (€)	O&M (€/yr)
	Number of persons						
Peshkopi	19000	16000	0	19000	19000	22857000	406038
Arras	4200	2500	0	4200	4200	5560800	85980
Fushe Muhur	2000		0	2000	2000	2982000	45583
Kastriot	2500	2000	0	2500	2500	3727500	56979
Maqellare	3500		0	3500	3500	4938500	75902
Bulqize	14275	9600	0	14275	15000	4.950.000	312975
Gjorice	3500		0	3500	3500	4938500	75902
Shupenze	3000		0	3000	3000	423300	65059
Fushe Bulqize	2600		0	2600	2600	3876600	59258
Kukes	27000	27000	16666	10334	32000	19581582	532635
Bicaj	3200	3200	0	3200	3200	4515200	69396
Shishtavec	3000		0	3000	3000	4233000	65059
Topojan	2500		0	2500	2500	3727500	56979
Krume-Fajze	5800	5000	0	5800	6000	7307400	114467
Golaj	3800		0	3800	3800	5361800	82408
Bajram Curri	8200	8200	0	8200	9000	10083600	159407
Shkoder	100000	85000	65000	35000	120000	47715000	1668254
Vau Dejes	5500	3100	0	5500	5500	7001500	108633
Bushat	9600	2500	0	9600	9600	11500800	178957
Ana Malit	2500		0	2500	2500	3727500	56979

Berdice	5300	2100	0	5300	5300	6746900	104682
Gur i Zi	4400		0	4400	4400	5825600	90074
Hajmel	5600		0	5600	5600	7128800	110608
Postirbe	5500	3600	0	5500	5500	7001500	108633
Rrethinat	14000		0	14000	14000	16842000	299186
Vig Mnele	2500		0	2500	2500	3727500	56979
Barbullush	3500		0	3500	3500	4938500	75902
Puke	5500	2700	1500	4000	5500	5692000	99728
Koplik	4500		3000	1500	4500	3339000	74312
Gruemire	3000		0	3000	3000	4233000	65059
Velipoje	9000	8300	0	9000		11157000	178258
Total	285200			199034	312200	240512857	5002670

Table 4.4: Mati River Basin District – Sewerage and waste water treatment

Agglomeration	**Popu-lation**	**Current service level**		**Sewer needs**	**WWTP (PE)**	**Costs**	
		Water supply	**Sewerage**			**Investment (€)**	**O&M (€/yr)**
	Number of persons						
Burrel	18200	18200	15160	3040	20000	7493920	309791
Klos	3600	3600	0	3600	3600	5079600	78071
Gurre	2200		2200	2200	2200	3280200	50141
Lis	4060	4060	0	4060	4500	5573880	87520
Martanesh	2450	2450	2450	0	2500	1545000	41912
Lezhe-Shengjin	36225	29000	27663	8562	40000	15274626	577324
Balldre	7203	2160	0	7203	7500	9093219	141242
Blinisht	2000	2000	0	2000	2000	2982000	45583
Dajc	2500		0	2500	2500	3727500	56979
Kallmet	5500		0	5500	5500	7001500	108633
Kolsh	2600		0	2600	2600	3876600	59258
Shenkoll	8300		0	8300	8400	10076700	157306
Zejmen	5700	5280	0	5700	6000	7220100	113421
Rreshen	8376	5261	5261	3115	9000	5644395	130016
Rubik	2719	1778	1445	1274	3000	2726202	53543
Fushe Kuqe	5400		0	5400	5400	6874200	106658
Lac-Mamurras	35000	20000	0	35000	44000	39135000	765010
Milot	13020	7030	0	13020	14000	15986460	288938
Fushe Arrez	5300	1767	1667	3633	5500	5371609	96645
Qafe Mali	2500		0	2500	2500	3727500	56979
Total	**172853**			119207	190700	161690211	3324970

Table 4.5: Ishmi-Erzeni River Basin District – Sewerage and waste water treatment

Agglomeration	Population	Current service level		Sewer needs	WWTP (PE)	Costs	
		Water supply	Sewerage			Investment (€)	O&M (€/yr)
	Number of persons						
Durres	240000	200000	142000	98000	280000	125034000	4008487
Shijak	38000	38000	0	38000	45000	41949000	805448
Manez	3800		0	3800	3800	5361800	82408
Gjepalaj	2500	1000	0	2500	2500	3727500	56979
Kruje	38000	25000	19000	19000	45000	25362000	692657
Bubq	3000		0	3000	3000	4233000	65059
Koder Thuman	13000		0	13000	13000	15639000	277815
Nikel	5500		0	5500	5500	7001500	108633
Tirana	1000000	850000	700000	300000	1000000	402900000	14664920
Farke	4500		0	4500	4500	5958000	92121
Peze	3200		0	3200	3200	4515200	69396
Vaqarr	4000		0	4000	4000	5296000	81886
Zall Bastar	3700		0	3700	3700	5220700	80240
Zall Herr	4000		0	4000	4000	5296000	81886
Krrabe	2000	1600	0	2000	2000	2982000	45583
Kavaje	47000	30000	21000	26000	56000	32330000	858970
Kryevidh	2400		0	2400	2400	3578400	54699
Lekaj	4000		0	4000	4000	5296000	81886
Luz i Vogel	5400		0	5400	5400	6874200	106658
Totals	**1424000**			542000	1487000	708554300	22315730

Table 4.6: Shkumbini River Basin District – Sewerage and waste water treatment

Agglomeration	Population	Current service level		Sewer needs	WWTP (PE)	Costs	
		Water supply	Sewerage			Investment (€)	O&M (€/yr)
	Number of persons						
Elbasan	139000	125000	101000	38000	160000	55734000	2192103
Cerrik	23000	12000	0	23000	23000	25645000	464149
Belsh	5000		0	5000	5000	6365000	98757
Gjergjan	5000		0	5000	5000	6365000	98757
Labinot Mal	2500		0	2500	2500	3727500	56979
Labinot Fushe	4000		0	4000	4000	5296000	81886
Paper	2800		0	2800	2800	4174800	63816
Shales	5200		0	5200	5200	6619600	102707
Shushice	4200		0	4200	4200	5560800	85980
Peqin	8939	7000	0	8939	9000	10728747	167135
Gjocaj	2200		0	2200	2200	3280200	50141
Librazhd	16275	15445	15429	846	17000	6348558	264123
Prenjas	6500		0	6500	6500	8105500	126272
Hotolisht	4500		0	4500	4500	5958000	92121

Lunik	2000	800	0	2000	2000	2982000	45583
Orenje	2000	600	0	2000	2000	2982000	45583
Polis	2500		0	2500	2500	3727500	56979
Qender Librazhd	9000	2700	0	9000	9000	10782000	167773
Qukes	7000	2800	0	7000	7000	8582000	133990
Rrajce	8000	4800	0	8000	8000	9680000	150811
Terbuf	12000	1800	12000	0	12000	3960000	185208
Pogradec	61000	55000	40000	21000	75000	30108000	1044934
Cerrave	5700		0	5700	6000	7220100	113421
Dardhas	2200		0	2200	2200	3280200	50141
Gose	6760	6760	0	6760	7000	8372480	131480
Rrogozhine	11700	6064	2464	9236	12000	12023028	238681
Total	**358974**			188081	395600	257608013	6309519

Table 4.7: Vjosa River Basin District – Sewerage and waste water treatment

Agglomeration	**Popu-lation**	**Current service level**		**Sewer needs**	**WWTP (PE)**	**Costs**	
		Water supply	**Sewerage**			**Investment (€)**	**O&M (€/yr)**
	Number of persons						
Cakran	11000		0	11000	11000	13233000	235074
Frakull	6600		0	6600	7000	8232800	129807
Levan	8700		0	8700	8700	10527000	164007
Fratar	3600		0	3600	3600	5079600	78071
Hekal	2400	1900	0	2400	2400	3578400	54699
Gjirokaster	37000	30000	19150	17850	48000	24943050	708517
Libohove	3720	2780	563	3157	2800	4486461	70094
Dropull i Poshtem	2000	2000	0	2000	2000	2982000	45583
Dropull i Siperm	2500		0	2500	2500	3727500	56979
Tepelene	9750	8500	0	9750	10000	11811750	190213
Memaliaj	5000	5000	0	5000	5000	6365000	98757
Permet	11000	11000	0	11000	7700	3154600	119563
Kelcyre	4804	4804	4500	304	5000	2265392	76219
Vlore	142000	125000	150000	42000	150000	54291000	1936669
Orikum	4000		0	4000	4000	5296000	81886
Selenice	8300	6725	0	8300	5300	9365900	136052
Novosele	5500		0	5500	5500	7001500	108633
Shushice	3400	3400	0	3400	3400	4797400	73734
Sarande	42818	40500	33000	9818	45000	17346114	661276
Konispol	2200		0	2200	2200	3280200	50141
Ksamil	2000	1400	0	2000	2000	2982000	45583
Delvine	9600	5700	0	9600	9600	11500800	178957
Totals	327892			160179	342700	216247467	5300512

5. Plan for implementation of the UWWT Directive

The plan for implementation of the UWWT Directive targets at establishment of organisational and administrative systems for complying with the requirements of the system to ensure (i) sufficient capacities and capabilities to enforce the related legislation and regulations, and (ii) effective management of the waste water collection and treatment system and sludge disposal systems, which are constructed in the framework of the UWWT implementation plan. The UWWT implementation plan implies a long term plan (duration > 15 years), which will be executed through a large number of projects. The major tasks and activities of the UWWT implementation plan are described below.

Appointment of the Competent Authorities and establishment of organisation and administrative framework for plan implementation
This is the first step in implementing the UWWT Directive, i.e. to establish an adequate organisation to be overall responsible for implementation of the UWWT plan and for the execution of the evolving sub-projects targeting at fulfilling the requirements for the organisation for effective execution of the plan.
Specific sub-projects may deal with subjects as: institutional development, capacity strengthening, training in financial management, project management, and inspection, enforcement, licensing and reporting.
Training will also be needed in operation and maintenance, process control, water and sludge quality monitoring and laboratory management.
As mentioned in Chapter 4.4 above it is proposed that a Technical Assistance project be launched for execution of this plan component.

Within the organisational framework it has to be defined clearly who is responsible for execution of which task in implementing the UWWT Directive, i.e. which Ministry, Agency, Company, Local Government or other institution is to responsible for the specific tasks to be carried out.

These tasks include:

- Financial and administrative management of waste water collection and treatment systems
- Planning and conduction of studies and investigations
- Supervision, management and co-ordination of construction works
- Inspection of sewerage systems
- Operation and maintenance of sewerage systems (including process control)
- Inspection of waste water treatment plants and sludge disposal practices
- Operation and maintenance of waste water treatment plants

- Operation and maintenance of sludge disposal facilities (possibly to be part of other environment related infrastructure, e.g. solid waste management)
- Quantitative and qualitative monitoring of influent, effluent, sludge produced and of the receiving environment, e.g. surface water, groundwater, soil
- Laboratory management
- Management of protected areas where strict regulations for environmental protection are enforced (part of the specific organisation for this purpose)
- Preparation of licences and permits for WWTPs and waste water producers and sludge producers
- Prosecution of non-compliers
- Preparation of reports for stakeholders and the public
- Extension and public participation and information.

The initial tasks and responsibilities of the UWWT organisation, led by the Competent Authority, are described below:

Identification of Sensitive areas and Agglomerations
Identification and selection of sensitive areas has not been carried out yet. The MoEFWA has to decide whether to identify individual sensitive areas or to apply the more stringent tertiary treatment criteria to the whole territory[17]. Information may be obtained by carrying out studies, and/or using currently available data on water resources, protected nature parks, (future) Natura 2000 sites, protected zones for abstraction of drinking water, etc.
The agglomerations, as proposed in this report (see Table 3.1 a.o.), have to be elaborated into more detail and officially proclaimed by the Government. Assignment of agglomerations is also important for the elaboration of Water Master Plan and for the River Basin Management Plans.
It is planned that this activity shall take place over a period of 2 years (2012 – 2013)

Identification of Agro-food industries with a waste water load > 4000 p.e.
During the preparation of this report no such industries could be identified yet, possibly due to the unavailability of essential data. However it is very well possible that industries in this category do currently not exist in Albania.

Construction and upgrading of infrastructure (waste water collection networks and urban waste water treatment plants) in the proposed agglomerations
The MoEFWA, in co-operation with the Ministry of Public Works has to establish an implementation programme for the construction of sewerage networks and waste water treatment plants.
It is suggested that the overall plan for construction and upgrading of waste water collection and treatment systems in the agglomerations be executed in 3 stages over a period of 18 years (2014 -2031).

- o During stage I the largest systems (WWTP > 20000 p.e.) are constructed (2014 - 2020). Stage I concerns 22 agglomerations.
- o During stage II the systems for the agglomerations with WWTP sizes of 5000 - 20000 p.e. are constructed (2021 - 2026). Stage II concerns 62 agglomerations.

17 In accordance with Article 5(8) of the UWWT Directive, a Member State does not have to identify the sensitive areas if more severe requirements regarding treatment are applied (laid down in paragraphs 2, 3, 4 of Article 5) on its whole territory.

- During stage III the systems for the agglomerations with a WWTP size of 2000 – 5000 p.e. are constructed (2027 - 2031). Stage III concerns 74 agglomerations.

The first step in preparing a detailed plan for construction of the waste water management works in the agglomerations is the execution of a feasibility study for each agglomeration, possibly in conjunction with an environmental impact assessment (EIA) study if this is required.

The feasibility study and the EIA study should result in a decisive description of the characteristics of the agglomeration, with respect to: population numbers, settlements incorporated in it, population not connected to central sewerage, waste water loads, location of sensitive and protected areas, preliminary design of sewerage system and WWTP with cost estimates, WWTP location, effluent recipient characteristics, waste water management for areas not connected to the sewerage system, proposed sludge disposal system. Alternative solutions are developed and assessed during the feasibility studies. Furthermore the feasibility study report will describe the existing organisation for water supply and waste water management in the agglomeration and the needs for institutional strengthening and training. Financial and economic analysis and preparation of a financing plan, as well for investments as operation and maintenance, are also part of the feasibility study.

After approval of the feasibility study report (and the EIA report) a detailed project report for execution of the plan needs to be prepared. This report describes: detailed design of the works and cost calculations, tender documents and planning for execution.

The Annexes VII and VIII contain guidelines for the implementation of feasibility studies and environmental impact assessment (EIA) studies.

The indicative planning for project execution in an agglomeration is as follows:

Month nr. 1 – 6:	Feasibility and EIA studies, financial and economic analysis
Month nr. 7 – 10:	Detailed design and tender documents preparation
Month nr. 11 – 14:	Tender procedures
Month nr. 15 – 32:	Construction works
Month nr. 33 – 38:	Commissioning and training.

Tables 5.1, 5.2 and 5.3 give an overview of the agglomerations that are respectively included in the planning Stages I, II and III.

Table 5.1: Implementation of urban waste water management plan - Stage I Construction of sewerage systems and WWTPs in agglomerations > 20,000 PE (22 agglomerations)

Agglomeration		Required capacity		Remarks
Name	Inhabitants	Sewerage	WWTP	
		Persons	PE	
Tirana	1000000	300000	1000000	WWTP planned National investment ongoing
Durres	240000	98000	280000	WWTP under construction
Fier	135000	65000	160000	
Elbasan	139000	38000	160000	Rehabilitation WS&S National investment ongoing
Vlore	142000	42000	150000	WWTP not yet in operation
Shkoder	100000	35000	120000	WWTP planned
Korce	95000	32000	110000	WWTP under construction Rehabilitation WS&S National investment ongoing
Berat	69055	4513	75000	National investment ongoing Rehabilitation WS&S
Pogradec	61000	21000	75000	WWTP in operation National investment ongoing
Lushnje	55000	25000	65000	Rehabilitation WS&S National investment ongoing
Kavaje	47000	26000	56000	WWTP in operation Rehabilitation WS&S
Kucove	45000	20000	54000	Rehabilitation WS&S
Gjirokaster	37000	17850	48000	National investment ongoing
Shijak	38000	38000	45000	National investment ongoing
Kruje	38000	19000	45000	Rehabilitation WS&S National investment ongoing
Sarande	42818	9818	45000	WWTP under construction
Lac	35000	35000	44000	National investment ongoing
Lezhe	36225	8562	40000	WWTP under construction
Kukes	27000	10334	32000	Rehabilitation WS&S National investment ongoing
Roskovec	21000	21000	25000	National investment ongoing
Cerrik	23000	23000	23000	National investment ongoing
Burrel	18200	3040	20000	National investment ongoing

Table 5.2 Implementation of urban waste water management plan - Stage II Construction of sewerage systems and WWTPs in agglomerations of 5,000 to 20,000 PE (62 agglomerations)

Agglomeration		Required capacity		Remarks
Name	Inhabitants	Sewerage	WWTP	
		Persons	PE	
Peshkopi	19000	19000	19000	National investment ongoing
Librazhd	16275	846	17000	
Ballsh	15000	4500	15000	National investment ongoing
Gramsh	14811	14811	15000	
Rrethinat	14000	14000	14000	
Milot	13020	13020	14000	National investment ongoing
Koder Thuman	13000	13000	13000	
Kutalli	12324	12324	12500	
Maliq	12500	12500	12500	
Terbuf	12000	0	12000	

Rrogozhine	11700	9236	12000	National investment ongoing
Otllak	10343	10343	11000	
Bulqize	11000	11000	11000	
Cakran	11000	11000	11000	
Bilisht	9800	11000	11000	
Bushat	9600	9800	10500	
Tepelene	9750	9750	10000	
Velipoje	9000	9000	10000	WWTP planned
Delvine	9600	9600	9600	National investment ongoing
Polican	9200	9600	9600	
Bajram Curri	8200	9200	9500	
Rreshen	8376	8200	9000	National investment ongoing
Peqin	8939	3115	9000	National investment ongoing
Qender Librazhd	9000	8939	9000	
Levan	8700	9000	9000	
Shenkoll	8300	8700	9000	
Rrajce	8000	8300	9000	
Permet	11000	8300	8400	
Velabisht	7375	8000	8000	
Divjake	7200	7375	7500	National investment ongoing
Balldre	7203	7200	7500	National investment ongoing
Qukes	7000	7203	7500	
Gose	6760	7000	7000	
Frakull	6600	6760	7000	National investment ongoing
Corovode	5900	6600	7000	
Vreshtas	6500	5900	6800	
Prenjas	6500	6500	6500	National investment ongoing
Dushk	6000	6500	6500	
Erseke	5900	6000	6000	National investment ongoing
Krume-Fajze	5800	50	6000	National investment ongoing
Zejmen	5700	5700	6000	
Cerrave	5700	5800	6000	Rehabiltation WS&S National investment ongoing
Pojan	5600	5700	6000	National investment ongoing
Hajmel	5600	5600	5600	National investment ongoing
Vau Dejes	5500	5600	5600	
Postirbe	5500	5500	5500	
Puke	5500	5500	5500	
Kallmet	5500	4000	5500	National investment ongoing
Fushe Arrez	5300	5500	5500	
Nikel	5500	3633	5500	National investment ongoing
Novosele	5500	5500	5500	
Fushe Kuqe	5400	5500	5500	
Luz i Vogel	5400	5400	5400	
Berdice	5300	5400	5400	
Selenice	8300	5300	5300	National investment ongoing
Shales	5200	5200	5200	
Libofshe	5000	5000	5000	
Gradisht	5000	5000	5000	
Belsh	5000	5000	5000	
Gjergjan	5000	5000	5000	

Memaliaj	5000	5000	5000	
Kelcyre	4804	304	5000	

Table 5.3 Implementation of urban waste water management plan - Stage III Construction of sewerage systems and WWTPs in agglomerations 2,000 – 5,000 PE (74 agglomerations)

Agglomeration		Required capacity		Remarks
Name	Inhabitants	Sewerage	WWTP	
		Persons	PE	
Krutje	4500	4500	4500	
Koplik	4500	1500	4500	National investment ongoing
Lis	4060	4060	4500	National investment ongoing
Farke	4500	4500	4500	
Hotolisht	4500	4500	4500	
Gur i Zi	4400	4400	4400	National investment ongoing
Arras	4200	4200	4200	
Shushice	4200	4200	4200	
Mollas	4000	4000	4000	National investment ongoing
Grabian	4000	0	4000	
Pirg	4000	4000	4000	
Vaqarr	4000	4000	4000	
Zall Herr	4000	4000	4000	
Lekaj	4000	4000	4000	
Labinot Fushe	4000	4000	4000	
Orikum	4000	4000	4000	
Golaj	3800	3800	3800	
Manez	3800	3800	3800	
Libohove	3720	3157	3800	
Zall Bastar	3700	3700	3700	
Klos	3600	3600	3600	National investment ongoing
Fratar	3600	3600	3600	
Cukalat	3167	3167	3500	
Bubullime	3500	3500	3500	
Maqellare	3500	3500	3500	
Gjorice	3500	3500	3500	
Barbullush	3500	3500	3500	
Shushice	3400	3400	3400	
Grekan	3200	3200	3200	
Proger	3200	3200	3200	
Bicaj	3200	3200	3200	National investment ongoing
Peze	3200	3200	3200	
Miras	3100	3100	3100	
Mollaj	3000	3000	3000	
Shupenze	3000	3000	3000	
Shishtavec	3000	3000	3000	
Gruemire	3000	3000	3000	
Rubik	2719	1274	3000	
Bubq	3000	3000	3000	

Hocisht	2800	2800	2800	
Paper	2800	2800	2800	
Fushe Bulqize	2600	2600	2600	
Kolsh	2600	2600	2600	
Fier Shegan	2500	2500	2500	
Kolonje	2200	2200	2500	
Kastriot	2500	2500	2500	National investment ongoing
Topojan	2500	2500	2500	
Ana Malit	2500	2500	2500	
Vig Mnele	2500	2500	2500	
Martanesh	2450	0	2500	
Dajc	2500	2500	2500	
Qafe Mali	2500	2500	2500	
Gjepalaj	2500	2500	2500	
Labinot Mal	2500	2500	2500	
Polis	2500	2500	2500	
Dropull i Siperm	2500	2500	2500	
Kryevidh	2400	2400	2400	
Hekal	2400	2400	2400	National investment ongoing
Dardhas	2200	2200	2200	
Gurre	2200	2200	2200	
Gjocaj	2200	2200	2200	
Konispol	2200	2200	2200	
Lumas	2000	2000	2000	
Topoje	2000	2000	2000	
Hysgjokaj	2000	2000	2000	
Karbunare	2000	2000	2000	
Leskovik	2000	2000	2000	National investment ongoing
Fushe Muhur	2000	2000	2000	
Blinisht	2000	2000	2000	National investment ongoing
Krrabe	2000	2000	2000	National investment ongoing
Lunik	2000	2000	2000	
Orenje	2000	2000	2000	
Dropull i Poshtem	2000	2000	2000	National investment ongoing
Ksamil	2000	2000	2000	National investment ongoing

Strengthening of monitoring and inspection systems

The MoEFWA must establish a monitoring and inspection programme for compliance assessment of discharges from urban waste water treatment plants (and from other sources) and for assessing the amounts and composition of sludge and its way of disposal.

The capacity of the monitoring institutions and of the Environmental Inspectorate have to be improved and the number of monitoring points and the number of samples taken to be increased. The institutions with the responsibilities for monitoring and inspection have to be equipped with the required instruments and laboratories, and they have to be trained to the levels as demanded for their tasks. Training subjects for monitoring staff could be sampling and analysis of water and sludge, laboratory procedures and management, assessment of monitoring results

and reporting. Staff of the Environmental Inspectorates should be trained in inspection and enforcement procedures, preparation of licences and permits and procedures for the prosecution of non-compliers.
The effluents of all WWTPs have to be monitored according to approved time schedules, as well as the waters into which the effluents are discharged. Industrial effluents also have to be monitored, as well the effluents that are discharged into municipal sewers as the effluents discharged directly into surface water or into the soil. Sludge disposal sites, or other methods applied for removal of sludge, need to be monitored in order to assess the impacts on the environment and to verify whether the regulations for sludge disposal are complied with.

This monitoring has to be part of the comprehensive monitoring as prescribed with the Water Framework Directive (2000/60/EC).These requirements arise under Article 15, which provides for monitoring:

- discharges from urban waste water treatment plants to verify compliance with the discharge standards in the Directive;
- amounts and composition of sludges disposed of to surface waters;
- waters subject to discharges from urban waste water treatment plants and direct discharges as described in Article 13 in cases where it can be expected that the receiving environment will be significantly affected.

Reporting to the public and the European Commission

The UWWT organisation has to report annually on the functioning of the waste water management systems to the Government, the public and the European Commission. The reports should describe the performance of the sewerage systems and the waste water treatment plants, quantitative and qualitative aspects of effluent discharge and sludge disposal and the cases of effluent discharge and sludge disposal into sensitive and otherwise protected areas. An example of a reporting format is contained in Annex IX.

Annex I: UWWT Directive – Key Implementation Tasks

1	Planning and Administrative Arrangements
1.1	Ensure a competent authority / competent authorities and institutional arrangements at national, regional and local levels for the implementation and enforcement of the Directive. These should include the authority or organisation responsible for developing programmes for construction of new urban waste water treatment infrastructure; providing public finance for construction (i.e. delivering the implementation programme under art.17); and monitoring the progress during construction of infrastructure.
1.2	Ensure adequate laboratory capacities either within the administration and/or commercial laboratories under contract. The laboratories must use the methods specified in Annex I of the Directive and be subject to regular quality control.
1.3	Decide whether to identify individual sensitive areas or to apply the more stringent tertiary treatment criteria to the whole territory.
1.4	Identify agglomerations of more than 2000 population equivalents.
1.5	Determine, in cooperation with local and regional authorities, the current state of existing sewerage networks and waste water treatment plants, and identify those which need a sewerage network to collect waste water and the provision of a waste water treatment plant.
1.6	Identify sensitive areas, i.e. those waters fitting into one or more of the criteria set in Annex II. Information may be obtained by carrying out studies and/or using available data.
1.7	Within sensitive areas determine which of the parameters for more stringent treatment stipulated in Annex I.B have to apply in the particular situation. As a general rule most marine waters have nitrogen as the limiting factor for eutrophication, whilst phosphorus is the limiting factor for most freshwaters.
1.8	Identify the catchment limits of sensitive areas. Within the whole catchment of the sensitive area all discharges from agglomerations of more than 10,000 will have to be provided with the more stringent treatment.
1.9	Establish an implementation programme for the construction of sewerage networks and waste water treatment plants, addressing both the treatment objectives and the deadline. As for the deadlines, there are three phased deadlines in the Directive: • by end 1998 sewerage systems and tertiary treatment for all agglomerations in sensitive areas with a population equivalent of more than 10000, • by end 2000 sewerage system and waste water treatment for all agglomerations with a population equivalent of more than 15000, plus appropriate treatment for discharges from the agro-food industry, • by end 2005 sewerage system and waste water treatment for all the other agglomerations covered by the Directive. *Derogations from these deadlines ('transition periods') might be part of the Accession Treaty. Careful technical and financial assessment will be an indispensable precondition for all consideration of transition periods.* As for the treatment objective: • secondary (i.e. biological) treatment is the general rule, • additional nutrient removal or further measures are mandatory in so-called sensitive areas (tertiary treatment); • in certain marine areas primary treatment (less sensitive areas) might be sufficient; less stringent objectives might also apply for agglomerations in high mountain areas. For agglomerations with a population equivalent of less than 2000, but equipped with a collecting system, 'appropriate treatment' has to be provided, i.e. a treatment that ensures good quality of the receiving water.

1.10	Assess whether there are marine waters in your territory that might qualify as less sensitive areas. *(In this context bear in mind that, inter alia, the Baltic Sea, the North Sea, the Black Sea and the Adriatic do not qualify as 'less sensitive areas')*.
1.11	Impose a ban on any disposal of sewage sludge to surface waters.
1.12	Ensure an environmentally and technically sound reuse or disposal of sewage sludge. Options may be: • agricultural re-use, subject to the requirements of the Sewage Sludge Directive (86/278/EEC); • incineration, subject to Directives 89/429/EEC and 89/369/EEC on municipal incinerators; • landfill, subject to the Directive on Landfill of Waste.
1.13	Establish treatment and effluent standards for bio-degradable waste water from the industrial sectors listed in Annex III of the Directive where waste waters do not enter sewer networks for treatment at municipal plants. These may be on a nation-wide basis or specific to the local situation. The standards must be appropriate to the particular industries concerned and will involve consultation with the industry sectors. Bear in mind in this context that the IPPC Directive (96/61/EC) covers certain industrial installations covered by the Urban Waste Water Treatment Directive as well, setting more stringent objectives and using, as does the Water Framework Directive, a 'combined approach' of emission controls and water quality standards; in each particular case the more stringent approach applies. Ensure that such industrial discharges are subject to a prior authorisation regime.
1.14	Specify requirements for industrial waste waters discharging into the sewerage network. Such requirements have to comply with the provisions for pre-treatment according to Annex I C. Ensure that such industrial discharges are subject to a prior authorisation regime.
1.15	Identify a means of recovering costs for design, construction and maintenance of sewerage systems and waste water treatment plants from the users and set up the charging system.
2	**Regulation and Monitoring**
2.1	Provide for a legally binding requirement that agglomerations in the size ranges set out in the Directive are provided with collecting systems by the dates specified.
2.2	Provide for a legally binding requirement that discharges of urban waste water are subject to secondary treatment or tertiary treatment (depending on the size of the agglomeration and the characteristics of the receiving water) before discharge.
2.3	Provide for a legally binding requirement that discharges to freshwaters and estuaries from agglomerations with sewerage systems with less than 2,000 PE, and from agglomerations of less than 10,000 PE to coastal waters are subject to appropriate treatment.
2.4	Establish a prior authorisation procedure for discharges of treated urban waste water ensuring permission by the competent authority.
2.5	Establish a prior authorisation procedure for all relevant industrial waste water discharges from the agro-food industry (Annex III) of more than 4,000 PE that are not connected to urban waste water systems.
2.6	Establish a prior authorisation procedure for the disposal of sludge under which general rules, registration or authorisation procedures are used to give the competent authority control of the disposal route.
2.7	Establish a monitoring and inspection programme for compliance assessment of discharges from urban waste water treatment plants and for assessing the amounts and composition of sludge.
2.8	Ensure quality control with the laboratories involved. Sampling and analysis methods have to comply with the Directive. Accreditation schemes for laboratories are a means of constantly ensuring such quality control.
2.9	Re-assess sensitive and less-sensitive areas at four yearly intervals. Plan for follow-up surveys of all sensitive and less-sensitive areas during this period. Review the criteria to ensure that they remain valid.
3	**Technical Standards**
3.1	The competent authority should develop and issue guidance on the precise definition of sensitive areas to be used in the territory, using the Directive standards as the basis. In particular this should specify the scientific criteria by which the eutrophic state of waters is to be judged.
3.2	Prepare, in cooperation with experts as well as local and regional authorities, guidance documents for the design, construction and maintenance of sewerage networks, based at least

	on the provisions of the Directive (Annex I.A). Such guidance documents should also address the issue of limiting pollution from overflows in combined sewage systems. Comparable technical guidance documents from other countries, prepared by national or regional authorities, technical associations or others, might be useful in this context.
3.3	Prepare, in cooperation with experts as well as local and regional authorities, guidance documents for the design, construction and maintenance of waste water treatment plants, to ensure compliance with the provisions of the Directive (Annex IB, table 2 "tertiary treatment" for sensitive areas and their catchments, table 1 "secondary treatment" for other waters). Comparable technical guidance documents from other countries, prepared by national or regional authorities, technical associations or others, might be useful in this context. Where appropriate, prepare guidance documents on suitable alternatives (art.3) to collecting systems, ensuring at least the same level of environmental protection.
3.4	Prepare a guidance document for "appropriate treatment" for particular situations, giving examples, at the same time underlining that such treatment has to ensure the necessary good quality of the receiving water.
4	**Consultation and Reporting**
4.1	Ensure adequate cooperation and exchange of information with other Member States in cases where discharges of waste water have a trans-boundary effect on water quality of shared waters.
4.2	Set up an adequate reporting procedure and data bases so that request from the Commission for information on efficiency of treatment plants and/or water quality of receiving waters as well as national reports can be addressed, and the public has access to relevant information under the Directive on Access to Environmental Information 90/313/EEC. In the case of dealing with the requests by the Commission on waste water treatment plants, an electronic questionnaire on CD-ROM has been developed by the Commission and will be available free of charge.
4.3	Report to the Commission on: • on transposition of the Directive into national legislation, with texts of the main provisions of national law adopted in the field covered by the Directive (Art. 19); • on implementation programmes (Art. 17 and Commission Decision 93/481/EEC); • on situation reports on the disposal of urban waste water and sludge (Art. 16); • In the case of applications for a derogation for less sensitive areas: on comprehensive studies carried out in respect of discharges in less sensitive areas (Art. 6 and 8); *(In this context bear in mind that, inter alia, the Baltic Sea, the North Sea, the Black Sea and the Adriatic do not qualify as 'less sensitive areas').* • Upon request by the Commission: on information collected through monitoring (Art. 15); see electronic questionnaire mentioned under 4.2.); • on standards applicable to industrial discharges from the agro-food industry (Annex III) to surface waters; • *All requests for derogations for using primary treatment only, or for delaying the completion of waste water treatment plants due to technical problems, are subject to individual applications to the Commission.*

Annex II: The hydrographic basins of Albania

The hydrographic basin of Albania has a total area of 43,305 km² of which 28,748 km² are situated within the state territory of Albania. The remainder, which belongs to the catchments of the Rivers Drini and Vjosa, is situated in Greece, FYROM, Montenegro and Kosovo.

Albania is crossed by several Rivers, in general in East - West direction. Drini, Mati, Ishmi, Erzeni, Shkumbini, Semani, Vjosa are the most important Rivers.

The average annual discharge of all Rivers of Albania is about 1300 m³/s, which corresponds to a specific discharge of 29 l/s.km², one of the highest in Europe. Surface waters include also the natural lakes of Ohrid, Prespa and Shkodra, a multitude of minor lakes, and reservoirs built along the main Rivers at: Fierza, Komani and Vau Deja along the Drini River, Ulza and Shkopeti on the Mati River, and Banja on the Devolli River.
Several lagoons are situated along the sea coast, the main ones being Karavasta, Narta and Butrinti.

Groundwater in Albania is present in various types of rocks of different ages, from Palaeozoic to Quaternary, and has a great importance for being the main source of drinking water supply. Yet not much is known about its real availability and extraction capacity. This presently leads to some problems. Well fields located near the Adriatic coast near Laç and Durres are now affected by the intrusion of saline water, probably due to overexploitation.

According to local conditions groundwater is exploited through wells, mainly in the plains and valleys, or through springs, most frequently in the hills and mountain areas. But its presence and use are fairly common throughout the country. As frequently the case, and particularly where large karst areas affect the movement of groundwater, River basins do not coincide with groundwater units. In this report, however, groundwater resources will be presented sorted by River basin unit to enable a comparison of availability and use.
There appear to be three major problems in all of the major River systems [AWAP]:

- The frequency and magnitude of flooding is believed to be on the increase
- Sediment deposition, and the occurrence of saline soils, in the lower reaches of the River basin is increasing
- Water quality is degrading

In Albania 6 major rivers basins have been defined (see Figure 1), respectively:

- Semani river basin
- Drini river basin

- Mati river basin
- Ishmi and Erzeni river basin
- Shkumbini river basin
- Vjosa river basin.

These are briefly described here below.

Drini River Basin

The Drini River drains the largest watershed area in Albania. In addition, a major tributary flows from Kosovo and another portion of the main stem flows through Macedonia. There are several power generating stations, with reservoirs, on the River, making the watershed, and the attendant sedimentation problems, extremely important to the nation's economy and energy supply. The watershed is largely forested and subjected to illegal timber harvest, a factor that can contribute to increased erosion, sedimentation, and possibly flooding.

Population is declining within the watershed as the residents are leaving the rural area for the larger cities. Although flooding and sediment deposition are critical problems, the nested reservoir system creates a virtual pond from Shkoder to Fierze with backwater extending into many of the tributaries. The "pond" makes it difficult to define or quantify sediment source, supply, and movement.

The Drini Basin comprises the watersheds of the Drini River and the Prespa, Ohrid and Shkoder Lakes. The watershed of the Drini River can be considered as the "connecting body" of this system, linking the lakes, wetlands, Rivers and other aquatic habitats into a single ecosystem of major importance. Each water body is shared by two or three of the following countries: Albania, Greece, FYR Macedonia, Montenegro and Kosovo

The total hydro-graphic catchment of the Drini River has a total area of 19,582 km² of which 14,173 km² belong to the Drini itself and 5,409 km² to the Buna River, which flows from the Shkodra Lake into the sea. The Drini is formed by two main tributaries: the Drini i Zi, with a catchment area of 5,885 km², flowing from FYROM, and the Drini i Bardhe, flowing from Kosovo. The Drini has a length of 285 km.

The Buna River drains Shkodra Lake, which is fed by Rivers originating from Montenegro and Albania. Its largest tributary is the Moraça River in Montenegro. The Buna has a length of 41 km.

In the past, the outlets of Buna and Drini Rivers have been separated. At present the old bed of the Drini, leading south to the city of Lezha, carries only a minor part of the discharge; the rest meets the Buna near Shkodra and follows its River bed along the border with Montenegro into the sea.

Hydrometry

The Drini River for the period 1951-1985 had an average annual discharge of 680 m³/s, of which 360 m³/s originates from the Drini itself and 320 m³/s from Buna.
The resulting specific discharge is about 35 l/s.km² and the runoff coefficient 0.74.
These high values are mainly due to the very high yield of the Buna, which can not be much exploited - except for navigation.

Keeping in mind the water use in Albania, the most important River is the Drini, with the following characteristics:

- annual discharge volume: 11,100 million m³
- specific discharge: 24.8 l/s.km²
- ratio wettest month (December) to driest month (August): 5.7
- one in 10 year high flow: about 13 times the River module
- storage capacity of Fierza reservoir: 2,700 million m³ (about 25% of annual flow).

Surface water status

Information on water quality is not comprehensive; however it is believed to be good water quality with low metallic content. Lowland areas possibly have a salt water intrusion problem but there is insufficient evidence.

Chemical analyses of samples taken from the Drini showed good quality water, with stable mineral composition along the River course. Metallic ions are present in small amounts except for iron in some cases. It appears that no restriction for the present uses (hydropower, irrigation) could arise from the water quality in the Drini.

A more difficult situation arises from the quality of the Kiri water, affected and possibly contaminating the local groundwater resources also. Its effects on the lake of Shkodra have not been clearly assessed.

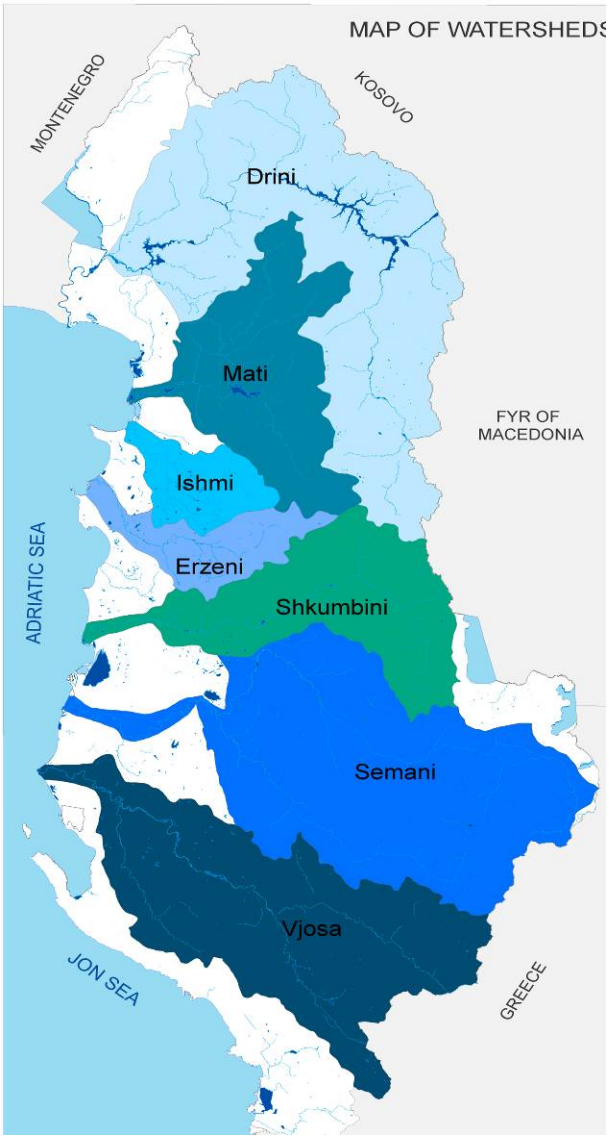
Groundwater quantitative and chemical status

In the Drini basin 3 main groundwater aquifers can be defined:

- one north from Shkodra and along the Lake of Shkodra, in the districts of Shkodra and Malesi e Madhe. It includes the wells of Dobraç, supplying water for the city of Shkodra with wells yielding 80 l/s of good quality water. No quantitative data are available for the rest of this aquifer, but qualitative information shows that, in quantity and quality, the supply obtained from this aquifer is not satisfactory for the drinking water supply for Koplik and its region; other sources of supply are presently being investigated.
- one on the left side of the Drini downstream of Shkodra; no information, either qualitative or quantitative, are available for this aquifer.
- in the district of Has water is mainly obtained from wells, but no data have been found about the resources.

Most of the groundwater in the Drini basin is taken from springs, 65 of which have a wet season discharge above 100 l/s, mainly in the district of Malesi e Madhe, Tropoje, Kukes, Diber and Bulqize. The quality of these springs is generally good. They yield a fairly stable amount of water with low hardness (5 to 8 German degrees in most cases).

Figure 1: Hydrographic basins of Albania



Mati River Basin

The Mati River basin is a moderate sized watershed with significant flooding and sedimentation problems in the lower reaches. Water quality is also a concern, especially with respect to loss of fishery. Economically, the area is very poor and the need to improve economic sustainability is a factor. Lezhe is the largest population centre near the watershed.

The catchment area of the Mati River has a surface area of 2441 km². The main tributary of the Mati is the Fani that flows from the north east, while the Mati itself from the south west down to the confluence with the Fani and then to the West. The Fani has a catchment area of 1076 km² and is formed by two tributaries: Fani i Madh and Fani i Vogel. The Mati has a length of 115 km.

Hydrometry

The Mati for the period 1951-1985 had a mean annual discharge of 103 m³/s, of which 60 m³/s originate from the Mati itself and 42 m³/s from the Fani. The resulting specific discharge is about 40 l/s.km² and the runoff coefficient 0.75; these values apply for both Mati and Fani Rivers.
Here follows some basic characteristics:

- annual discharge volume: 3,250 million m³ ,
- specific discharge: 40 l/s.km²,
- ratio wettest month (December) to driest month (August): 10,
- one in 10 year high flow: about 25 times the River module,
- storage capacity of Ulza reservoir: 240 million m³ (about 15% of annual flow of the Mati).

Surface water status

Chemical analyses of samples taken from the Mati before 1990 showed a high content of metallic ions (iron, manganese and copper), which is not surprising in an important mining area. However high concentration of heavy metals should be reducing due to reduced mining activity.
It appears that for some uses (hydropower, industry) these characteristics should not cause problems, while the impact on irrigated agriculture is not fully assessed and the implications for marine coastal waters are also not clear.
Indications of salt water intrusion in associated groundwater due to possible excessive drawdown of the water table.

Groundwater quantitative and chemical status

In the Mati basin one significant aquifer is found, around the River mouth, extending from Lezhe in the North to Mamuras in the South, in the lands reclaimed in the last 50 years from the swamps. Extraction from the wells varies from 0.1 l/s to more than 80 l/s, but quantity and quality vary much with the locations:

- wells in the North, near Lezha, have fairly high yields and a water quality ranging from good to bad (excess of chloride and high pH indicating brackish water); it can be inferred that an excessive drawdown of the water table caused an advance of the saline water into the aquifer. This is a very serious issue, and the exploitation of this aquifer should be minimised until more precise studies (probably using modern modelling techniques) define the safe extraction capacity in each point.
- wells located on the South of the Mati, near Laç, show very low yields and mostly brackish or salty water; here also studies should be carried out as soon as possible to assess the real extraction capacity.

In other parts of the basin groundwater appears in springs, with 13 of them yielding more than 100 l/s in winter, mainly in the district of Mati. The source of Uraka is one the biggest in Albania, with a discharge reaching 20 m³/s. Most springs give good quality soft water, but their yields vary heavily throughout the year or even cease in summer.

Erzeni and Ishmi River Basin

The Ishmi and Erzeni Rivers drain from two small watersheds with significant urbanization related problems. Because of their proximity to the Tirana – Durres corridor they are heavily populated and economically very important. Although gravel mining is quite extensive in both drainages, they lack the forest expanse of

the larger, higher watersheds and they have a declining agriculture base, thus limiting the suite of resource related activities that are relevant to the defined problems and the Assessment.

The Erzeni-Ishmi basin is composed of the catchments of the Erzeni and Ishmi Rivers and other minor Rivers, with a global surface of 1439 km². This basin is characterised by a mean altitude lower than in adjacent catchments; indeed springs are not at high altitude and the part of the water courses in the plain is long. The Ishmi has a length of 74 km and the Erzeni has a length of 109 km.

Hydrometry

The Ishmi catchment has a particular importance for Albania because it includes Tirana. Basic characteristics are as follows:

- annual discharge volume: 660 million m^3,
- specific discharge: 31.5 l/s.km²for the Ishmi and 24 l/s.km²,
- ratio wettest month (January-February) to driest month (August): 9 to 10,
- one in 10 year high flow : about 55 times the River module,
- storage capacity on either River: none.

Surface water status

The waters are affected by high levels of iron, manganese, nitrates, BOD due to domestic and industrial discharge from densely populated areas.
Chemical analyses taken from the Ishmi before 1990 showed high values for many parameters (iron, manganese, nitrate, suspended solids, BOD_5). This is not surprising since urban and industrial waste water from Tirana city is released into it, which limits the use of the water. The situation has somewhat improved now, but still is critical.
This does not apply to the Erzeni River in which water quality is quite acceptable for the present main use: irrigation.

Tirana is located in the catchment area of the Ishmi River. The Lana and Tirana Rivers carry off the rain water and waste water of Tirana and its suburbs and flow out into the Ishmi River at a point downstream of Tirana.

The Lana River runs from East to West through the southern part of Tirana. The Lana River has a length of 29 km. At its passage through Tirana it has 3.5 km long concrete lined embankment. Large volumes of domestic waste water are discharged into the Lana, and further downstream it receives significant quantities of industrial effluents.

The Tirana River flows through the Northern part of Tirana, parallel with the Lana River. Downstream of Tirana it joins the Lana River and further on it flows out into the Ishmi River.
The Tirana River also receives substantial quantities of waste water from domestic, industrial and commercial sources.

Groundwater quantitative and chemical status

This basin presents two main aquifers, one along the Erzeni and one along the Ishmi. The aquifer following the course of the Ishmi and its main tributaries is extensively exploited:

- downstream near Fush Kruja wells give discharges from 0.5 l/s to 20 l/s with an acceptable water quality; cases appear of excessive iron or nitrites contents, or high hardness;

- upstream around Tirana many wells were dug with discharges sometimes exceeding 100 l/s and their quality is highly variable; frequent cases of excessive iron, nitrates, sulphates have been observed, together with acceptable quality in those wells used for drinking water supply;
- the Erzeni aquifer is not used on large scale; no information is available about its quality or water availability.

Few important springs are found in the Erzeni-Ishmi basin; some near Kruje give hard water while those near Tirana give high yield of excellent quality water and are used for drinking water supply to the capital.

Shkumbini River Basin

The Thumbing River watershed contains high forest as well as coppice forest and brush land. Agricultural activity includes cropping, grazing, and orchard production. The Shkumbini watershed has three large urban areas within its boundary and it traverses the country from east to west. Industrial pollution exists from past ore activity and municipal wastes degrade water quality. Like most other River basins, gravel mining occurs in numerous places throughout the watershed and is a significant factor in River stability.

The cumulative effects of upstream activities increasingly impact lower reaches of the watershed. The population of the watershed is growing and future expansion is inevitable with the development of the East-West Corridor that passes through the watershed connecting Lake Ohrid and Macedonia with Tirana and the seaport at Durres. Those factors responsible for current watershed degradation are most likely to increase in the Shkumbini watershed. The need to understand those causal factors, as well as the urgency for developing a River Basin Development

Plan that anticipates future impacts associated with growth will soon be crucial for long term sustainability of the economy and the natural resources of the watershed.

Hydrometry

Shkumbini River has a catchment surface of 2445 km². Along its course Shkumbini receives tributaries of secondary importance like Rapuni, Gostima, Zaranika etc.
Basic characteristics are as follows:

- annual discharge volume: 1,900 million m³,
- specific discharge: 26 l/s.km²,
- ratio wettest month (February) to driest month (August-September): 7.3, a low value for a River without regulating storage, which could be explained by its important underground storage,
- one in 10 year high flow : about 21 times the River module,
- storage capacity on the River: none.

Surface water status

Chemical analyses taken from the Shkumbini showed high values for some parameters: (iron, nitrites, ammonium, suspended solids…). This was probably due to the mining areas upstream, and to the metallurgical combine of Elbasan, due to which the biodiversity in the estuary area is reported to have been seriously affected. Since the drastic reduction of activities of the compound, no complete analyses were made available, but the quality of the water is largely improved; this will need to be confirmed to ensure the suitability of the River water to agricultural uses. Another potential problem linked to bad water quality in the Shkumbini is the

quality of drinking water, extracted from its alluvial banks for Lushnja and Rrogozhine.

Groundwater quantitative and chemical status

Three main groundwater aquifers are defined in the Shkumbini basin:

- on the right bank of the River near Rrogozhina and Kavaja lies an aquifer of local interest, for which no concrete data were obtained;
- on the left bank, from the River to Lushnja, an aquifer supplies water to this city; the traditional source of Konjat gives water of good quality, but new developments in Cerma (near the bed of the Shkumbini) are not as good, with some odour problems. Water availability is good with a supply of the city of 160 l/s at the source. This aquifer extends over reclaimed areas, as the ones near Laç and Lezhe, and may require particular studies for further use.
- around Elbasan, on both banks of the River, groundwater is very abundant with several wells yielding more than 100 l/s; their quality is generally good, with some cases of high sulphate contents (compared to other aquifers) which should not hamper their use for human, industrial or agricultural uses.

Eighteen main springs are identified in the Shkumbini basin, in its upper mountain part but also near Elbasan, often with variable discharges and medium hardness.

Semani River Basin

The Semani River drains a watershed with significant sedimentation, flooding, and water quality issues. It contains forestry, agricultural, and industrial activities. The lower portion of the watershed is severely impacted by petroleum contamination from abandoned oil wells in the vicinity of Fier. The oil field pollution represents a point source for which technology exists to correct or mitigate the problem. The Semani River does not appear to have the growth and developmental potential of some of the other watersheds and therefore does not rank quite as high as the watersheds selected for assessment.

The Semani River is formed by two main tributaries: Devolli and Osumi with respective catchment areas of 3,130 km² and 2,073 km², which meet near the city of Kuçove. The Semani has a length of 281 km.

Hydrometry

Basic characteristics are as follows:

- annual discharge volume: 2,700 million m³,
- specific discharge: 16 l/s.km²,
- ratio wettest month (February to March) to driest month (August): 14.8, the highest variability for the main Rivers in Albania,
- one in 10 year high flow : about 18 times the River module,
- storage capacity on River: none now, but the Banja dam under construction, will store 700 million m³, or about 50% of the annual discharge through the Devolli River.

Surface water status

Chemical analyses of some samples taken from the Semani in the past, showed high values for some parameters (BOD5, ammonium, suspended solids, manganese, iron, etc.). The last left bank tributary, the Gjanica, drains oil fields and shows very high contents of oil, phenols …; it is possibly the most polluted River in

the country. This has already had disastrous effects on the biodiversity in the lower reach of Semani and the nearby coastal areas.

But it may also affect other uses, like drinking water supply, by contaminating groundwater. The water for irrigation purpose is taken upstream of the main polluted sources and should be safe. More recent analyses showed an improvement of the water quality in the lower reaches of the Semani, linked to the strong decreases in oil extraction and the slow down of chemical industry activities in Fier, but the quality is still far from the good.

Groundwater quantitative and chemical status

The Semani basin is known to be rather poor in groundwater resources. It includes two main aquifers:

- one covering most of the plain of Korça; the wells in that area have medium yields (a few litres per second) and their quality is often good (they supply drinking water to the city of Korça) although in some cases excessive amounts of iron, nitrites and nitrates have been found, possibly due to the intensive agricultural activity of the region.
- one in the Osumi valley near Berat and Kuçove; its yield is sufficient for the local water supply, but the water quality is poor and hardly meets the national water standards.

Eighteen main springs are identified in the Semani basin, from the upper part to the River mouth; in most cases they have variable discharges, and their hardness varies from low to fairly high (this mainly in Korça and Berat).

Vjosa River Basin

Although the Vjosa River is the closest to being the only one (at that scale) draining a “pristine” watershed in Albania it is one of the greatest sediment producers and subject to flooding in the coastal plain. Although the watershed contains several population centres, it is perceived to be the least impacted of the six watersheds.

The Vjosa watershed is relatively undisturbed and as such represents a point of reference for watershed assessment as well as an undeveloped resource available for future use. As such, it presents two significant opportunities. First and most important, it may represent the reference condition so critical to the watershed assessment process, providing the framework from which the magnitude of departure of disturbed systems can be evaluated.

Undisturbed systems represent a point of reference for assessing degree of departure in disturbed systems and give some insight into the opportunity to achieve sustainability in the disturbed system.

The Albanian catchment of the Vjosa River has an area of 4365 km ² or about 2/3 of the entire catchment area, the remainder being situated in Greece. The largest tributary of the Vjosa is the Drino. It has a catchment area of 1320 km², of which 256 km² are situated in Greece. The Vjosa has a length of 272 km.

Hydrometry

A characteristic feature of the catchment of the Vjosa is the presence of deep karst, which guarantees an abundant underground supply during the dry season. Basic characteristics are as follows:

- annual discharge volume: 5,550 million m³,
- specific discharge: 26 l/s.km²,
- ratio wettest month (April) to driest month (August): 10.8,
- one in 10 year high flow : about 24 times the River module,
- storage capacity on either River: none.

Surface water status

Chemical analyses of samples taken from the Vjosa showed that water quality is generally good.; some high values have been observed for iron or hardness in the mainstream of Vjosa, for the contents of chlorine in the torrent of Langarica, but from the global point of view this River has the best water quality of the country, adequate for all uses.

Groundwater quantitative and chemical status

The Vjosa basin is rich in groundwater resources; it includes three main aquifers:

- along the lower valley of the Vjosa. It supplies the city of Fier with more than 1 m³/s of good quality water from the wells of Kafaraj, unaffected by the polluted water carried by the nearby Semani. The well fields of Novosele near Vlora, on the other bank, have also high yield (up to 80 l/s) and good quality water, although sometimes nitrites and nitrates have been found in fairly high amounts.
- around Saranda and Butrinti. It supplies part of the drinking water to Saranda. The water is reported to be of very good quality, and extraction is around 100 l/s for Saranda only.
- in the Drino valley around Gjirokastra. It supplies part of the drinking water to Gjirokastra. The water is of very good quality and extraction is around 40-90 l/s for Gjirokastra only.

Forty-seven main springs are identified in the Vjosa basin. In most cases the discharge is fairly stable, twelve springs yield more than 1 m³/s and some of the biggest springs of the country are found there, as the Syri i Kalter (Blue eye), with a discharge of about 20 m³/s, the Spring of Kelcyra, Uji i Ftohte (Cold water) near Tepelena etc. Water is of good quality and the hardness varies from low to medium, except near the Ionian coast, where it reaches 20-30 German degrees.

Annex III Proposed agglomerations

The following tables list the selected agglomerations, which are presumed to be eligible for installation of wastewater collection and treatment systems in accordance with the requirements of the Urban Waste Water Treatment Directive.
The selection of these agglomerations took place on the basis of the following assumptions:

1. River basin districts

The territory of Albania covers 6 river basin districts, respectively:

1. Semani river basin district
2. Drin-Shkoder-Buna river basin district
3. Mati river basin district
4. Ishmi and Erzeni river basin district
5. Shkumbini river basin district
6. Vjosa river basin district

Some parts of Albania do not belong to these river basins since they drain directly into the sea or into lakes. For water management purposes it is recommended that such parts are incorporated into the river basin districts. In this respect it is proposed that the coastal and lakeshore districts are incorporated into the river basin districts, as follows:

- Malesi e Madhe and Shkodra districts are incorporated into the Drin river basin district.
- Lezha and Kurbin districts are incorporated into the Mati river basin district.
- Durres and Kavaje districts are incorporated into the Ishmi and Erzeni river basin district.
- Lushnja, Fier, Pogradec, Devoll and Korçe districts are incorporated into the Semani river basin district.
- Vlora, Saranda and Delvine districts are incorporated into the Vjosa river basin district.

2. Identification of agglomerations

Eligible agglomerations have been identified, mainly, on the basis of population data from the Census 2001 Report and actual data that were provided by some municipalities and communes. The Census 2001 Report provides data on the population of all municipalities and communes, and of the settlements that are part of the communes.

In the description of the agglomerations also data from the Ministry of Public Works, Transportation and Telecommunication (General Directorate of Water Supply and Waste Water) on the 55 Water Enterprises have been included. These data mainly concern recent population data and data on water supply and sewerage services levels.

The preliminary selection of the agglomerations has been made on the following basis:

- All settlements with a population of 2000 or more require waste water collection and treatment systems. At this stage it is presumed that in general a municipality or a commune can be served by one central waste water treatment plant, to which the individual settlements are connected through pipelines.
- In communes without settlements of more than 2000 inhabitants it may be possible that nearby urbanised settlements are combined into agglomerations with more than 2000 inhabitants. Such agglomerations also require waste water collection and treatment systems according to the UWWT Directive. For this reason all communes with a settlement of over 1000 inhabitants also have been identified as potentially eligible under the UWWT Directive. More detailed studies are required for final selection of such agglomerations.
- In selection of the agglomerations municipalities and communes may be combined into one agglomeration, where it seems feasible to treat all waste water from the agglomeration in one central waste water treatment plant. Centralised waste water treatment may be feasible if:
  - the distance of the settlement to the central WWTP is relatively short,
  - the settlement and the WWTP are located in the same drainage area,
  - the topography is suitable for connection of the settlement to the WWTP.

The selection of the agglomerations was also made on the basis of topographical data. The population numbers of the agglomeration have been estimated on the basis of the Census 2001 Report and on actual population data, if available. The estimated waste loads (as number of person equivalents) are equivalent to the population number. For the larger agglomerations (> 25000 inhabitants) the estimated waste load was calculated as the sum of the population number and 20% of the population number, accounting for industrial and institutional waste water loads.

The following tables describe the preliminarily selected agglomerations in the six river basin districts. The tables list all settlements with a population number of 1000 or more. **The names of the municipalities and communes are printed in bold, as well as their total population number**. The tables also show data that were obtained through a survey that was carried out as part of the project. For the municipalities and communes the total population figure is given, including all settlements in the municipality or commune. For the settlements the population number of the particular settlement is given.

Semani River Basin District

Agglomeration/ Settlements	District	Population		Water supply	Wastewater management			Comment
		Census 2001	Actual		Sewerage	WWTP	Water company	
				% of population served				
1. Berat	Berat	**44040**	69055	100	93		Berat-Kucove UK Sh.A	On going investment. Wastewater discharge into Osumi river
Berat		40072	58365					
Uznove		3968	5470					Water supply from the Bogove source to Mbrakull, Vertop, Fush Peshtan, Vodica and Berat.
66. Kutalli	Berat	**11755**	12314					
Kutalli		1479	1428					
Drenovice		2682	3064					
Rerez-Kumarak		1170	1158					
Samatice		1656	1729					
Gorican-Clirim		1317	1363					
Poshnje	Berat	**8649**	10022				Lushnje (F) U Sh.A	
Poshnje		1933	2343					
Banaj		1088	1239					
67. Lumas	Berat	**6196**	7080	20			Village councils	Wastewater discharge into Lapardhica river
Lumas		1369	1544					
68. Otllak	Berat	**12288**	13403				Berat UK Sh.A	See Berat – Map showing water supply to Ottlak, Dyshnik and Orizaj (Ottlak served by Berat sewerage system?) Otllak possibly incorporated in Berat Agglomeration?)
Ottlak		685	752					
Dyshnik		1826	2070					
Lapardha		2304	2487					
Lapardha e Siperme		1975	2470					
Morave		2503	2564					
69. Velabisht	Berat	**10981**	11474	10			Commune	On going investment
Velabisht		1530	1663					
Blice		1391	1559					
Duhanas		1479	1442					
Veterik		1013	1087					
Starove		1489	1624					
70. Cukalat	Berat	**4057**	4387					
Cukalat		701	796					
Allambrez		1137	1284					
Donofroze		1014	1087					
71. Kucove	Kucove	**18038**	46067	78	53		Kucove UK Sh.A	Discharge into Devoll and Semani rivers and septic holes
Kucove		18038	30197	92	76			
Ura-Vajgurore	Berat	**9181**	14205	65			Ura-Vajgurore U Sh.A	
Ura-Vajgurore		5500	11302	40				
Pashalli		1227						
Kozare	Kucove	**6609**	8029	100			Kucove UK Sh.A/ Commune	Wastewater discharge into Devoll river
Kozare		612						

	Gege		1419						
	Havaleas		1745						
	Perondi	Kucove	**10691**						
	Perondi		2257						
	Goraj		1297						
	Majgjate		1817						
	Rreth Tapi		1479						
	Tapi		1999						
	Polovine		1329						
72.	**Corovode**	Skrapar	**6755**	6102	68			Corovode U Sh.A	
	Corovode		6634	5905	68				
73.	**Polican**	Skrapar	**6623**	10200	100			Polican U Sh.A	
	Polican		6623	9200	100				
74.	**Grekan**	Elbasan	**4363**					Elbasan (F) U Sh.A	
	Grekan		1089						
	Deshiran		1979						
75.	**Mollas**	Elbasan	**7529**	7452	33			Private company "Cela"	On going investment Wastewater discharge into Shice stream, Devoll river, earth (septic holes)
	Dasar		1307						
	Linas		1269						
	Selite		1455						
76.	**Libofshe**	Fier	**8333**					Lushnje (F) U Sh.A	
	Mollas		1335						
	Ndernenas		1006						
	Rreth-Libofshe		1500						
	Vanaj		1104						
77.	**Fier**	Fier	**56164**	127087	97	56		Fier UK Sh.A	
	Fier		56164	85000	96	82			
	Patos	Fier	**21812**	34754	48			Patos U Sh.A	Wastewater discharge into Came and Dukas water streams
	Patos		14518	23470	53				
	Dukas		3229						
	Lengas		1068						
	Dermenas	Fier	**10048**					Commune	Wastewater discharge into river and sea at Njgjala and Hidrovan collection point and into septic holes
	Dermenas		1538						
	Baltez		1001						
	Darzeze e Re		1171						
	Pojan		1228						
	Radostine		1555						
	Mbrostar	Fier	**8521**						
	Mbrostar-Ura		2542						
	Kallm I Madh		1360						
	Kallm I Vogel		1069						
	Petove		1630						
	Vajkan		1030						
	Portez	Fier	**8711**	11197	10			Patos U Sh.A/ Commune	Wastewater discharge into Gjanica river

	Portez		2511						
	Kraps		1952						
	Patos Fshat		1555						
	Zharrez	Fier	**6754**						
	Zharrez		1810						
	Qender Fier	Fier	**8659**	12500	100			Commune	Wastewater discharge into water collector Roskovec-Haxhar
	Clirim		2012	2900					
	Zhupan		1685	2500					
78.	**Roskovec**	Fier	**5939**	8600	75			Fier UK Sh.A	On going investment
	Roskovec		5484						Wastewater discharge into Roskovec collector
	Strum	Fier	**7923**	7810	90			Commune	On going investment
	Strum		2427						Wastewater discharge into water collector Roscovec, Seman river
	Arapaj		1120						
	Suk I		1621						
	Poshtem								
	Suk I Siperm		1431						
	Velmisht		1324						
	Kuman	Fier	**7319**	7800	70			Commune	On going investment
									Wastewater discharge into Vidhisht village stream, septic holes
	Kuman		1847						
	Luar		1514						
	Marinez		2085						
	Vidhisht		1873						
79.	**Topoje**	Fier	**5494**	7600				Fier UK Sh.A	Wastewater discharge into streams, channels, septic holes, Adriatic sea
	Topoje		1160	1600					
80.	**Lushnje**	Lushnje	**37860**	63000	65			UK Lushnje (Q) Sh A.	On going investment
									Wastewater discharge into Karbunara line, Lushnje city stream
	Lushnje		32572	55000	69	55			
	Karbunare e		3879						
	Poshtem								
	Saver		1409						
	Golem	Lushnje	**6191**		80			Commune	On going investment
	Golem I		1052						Wastewater discharge into soil
	Madh								
	Plug		2676						
81.	**Divjake**	Lushnje	**10916**	13327	100			Municipality	On going investment
									Wastewater discharge into septic holes
	Divjake		5764						
	Mize		1391						
82.	**Bubulline**	Lushnje	**6515**					Lushnje (F) U Sh.A	
	Bubulline		1764						
	Imsht		1482						
83.	**Dushk**	Lushnje	**9111**	11117	60			Lushnje (F) U Sh.A	On going investment
	Dushk I		2048						Wastewater discharge to Terbuf
Madh									
	Dushk Peqin		1843						
	Gramsh		1775						
84.	**Fier Shegan**	Lushnje	**8327**						Lushnje (F) U Sh.A
	Fier Shegan		1047						
	Barbullinje		1334						
85.	**Grabian**	Lushnje	**4862**	6700	35	100		Commune	Wastewater discharge into channel of the upper waters, red channel, Hidrovuri channel
	Grabian		3809						

86. Gradishte	Lushnje	**8939**	10850	60			Commune	
Gradishte		1077						
Kemishtaj		1185						
Mertish		1493						
Spolate		1050						
87. Hysgjokaj	Lushnje	**3142**	3600				Commune	
Hysgjokaj		1419						
88. Karbunare	Lushnje	**5356**					Lushnje (F) U Sh.A	
Karbunare e Siperme		1186						
89. Kolonje	Lushnje	**7099**					Lushnje (F) U Sh.A	
Kolonje		2160						
90. Krutje	Lushnje	**9000**					Lushnje (F) U Sh.A	
Krutje e Poshtme		1440						
Krutje e Siperme		1483						
Ngurrez e Madhe		1285						
91. Ballsh	Mallakaster	**9154**		100			Mallakaster UK Sh.A	On going investment
Ballsh		9154						
Aranitas	Mallakaster	**4530**						Mallakaster UK Sh.A
Aranitas		1428						
Panahor		1295						
Q. Mallakaster	Mallakaster	**8776**	12041	87	87			
Drenove		1578						
Visoke		1160						
92. Korce	Korce	**55017**	125013	69			Korce UK Sh.A	2 stage under construction. Wastewater discharge into Barci water stream, Dunavec river
Korce		55017	89375	78	70			
Qender Bulga-rec	Korce	**10322**	11000	80			Korce (F) U Sh.A	On going investment Wastewater discharge into Dorci, Porodina and Bilarta water streams, Ciflik channel
Bulgarec		1795						
Barc		1066						
Belorta		1036						
Dishnice		1375						
Drenove	Korce	**5743**					Korce (F) U Sh.A	
Drenove		851						
Mborje		1887						
93. Maliq	Korce	**5655**	8100				Korce (F) U Sh.A	Wastewater discharge into Devoll river
Maliq		3894						
Libonik	Korce	**11212**	11500	70			Korce (F) U Sh.A	Wastewater discharge into Dunavec and Devolli rivers
Libonik		2028						
Drithas		2555						
Vashtemi		2064						
Vlocisht		1975						
94. Mollaj	Korce	**3863**						
Mollaj		1495						
Kamenice		1294						
95. Pirg	Korce	**8639**	9952	83			Commune	Wastewater discharge into Kakaci river, Navosele water stream, Otoni Bridge river
Pirg		1984						
Sovjan		2020						

96. Pojan	Korce	**13737**	15000	100			Commune	On going investment
Pojan		3612						Wastewater discharge into septic holes
Zvezde		1847						
97. Vreshtas	Korce	**8578**	10500	85			Korce (F) U Sh.A	On going investment
Vreshtas		1676						Wastewater discharge into Devolli and Patok rivers
Podgorie		3724						
Sheqeras		2010						
98. Leskovik	Kolonje	**2848**	2200	100			Municipality	
Leskovik		1991						
99. Erseke	Kolonje	**5499**	5900				Erseke UK Sh.A	On going investment
Erseke		5499	5900	100	100			Wastewater discharge into Pesari, Taci and Varishte streams
100. Bilisht	Devoll	**14177**					Bilisht U Sh.A	Wastewater discharge into Devoll river, with 5 discharge points
Bilisht		6729	10023	100	100			
Bitincke		2087						
Tren		1305						
101. Miras	Devoll	**9367**						
Miras		2041						
Menkulas		1059						
102. Hocisht	Devoll	**5869**					Korce (F) U Sh.A	
Hocisht		1394						
Baban		1405						
103. Proger	Devoll	**5228**	5280	80			Commune	
Proger		830						
Cangonj		1086						
Vranisht		1270						
40. Gramsh	Gramsh	**10533**	21703	100			Gramsh U Sh.A	
Gramsh		10533	14811	100				

Drin-Shkoder-Buna Basin District

Agglomeration/ Settlements	District	Population		Water supply	Wastewater management			Comment
		Census 2001	Actual		Sewerage	WWTP	Water company	
				% of population				
1. Peshkopi	Diber	**14017**	30000	100			Peshkopi U Sh.A	On going investment. Wastewater discharge into Llixha stream
Tomin	Diber	**10238**	9500	80		Primary treatment	Peshkopi U Sh.A/ Commune	Wastewater discharge into Drin i Zi river
Uznove		3968	5470					
Tomin		565						
Dohoshisht		1415						
Ushtelenica		1112						
Zdojan		1497						
2. Arras	Diber	**5168**	5180	33			Commune	
Arras		531						
Cidhen		1005						
Fushe Cidhen	Diber	**4203**					Peshkopi U Sh.A	
Fushe Cidhen		1582						
Bllice		1521						
3. FusheMuhur	Diber	**4051**					Peshkopi U Sh.A	
Fushe Muhur		892						
Muhurri		1055						
4. Kastriot	Diber	**8520**		80			x Commune	
Kastriot		297						
Kishavec		1020						
Sohodoll		1492						
5. Maqellare	Diber	**12493**					Peshkopi U Sh.A	
Maqellare		1132						
Kllobcisht		1063						
Pocest		1310						
6. Bulqize	Bulqize	**10454**	14275	86			Bulqize U Sh.A	Bulqize and Shupenze have individual water supply systems (see maps).
Bulqize		8780	9631	100				Bulqize water supply system is shown on map.
Vajkal		1674						Zerqan is not served.
7. Gjorice	Bulqize	**5335**						
Gjorice-Eperme		1957						
Gjorice-Poshtme		1344						
8. Shupenze	Bulqize	**6875**	4275				Bulqize U Sh.A	Water supply system of Shupenze is shown on map.
Shupenze		604						
Homesh		1386						
Okshatine		1085						
9. FusheBulqize	Bulqize	**4156**						
Fushe Bulqize		1443						
Dushe		1189						
10. Kukes	Kukes	**17157**	40000	100			Kukes U Sh.A	On going investment
Kukes		16621	25000	100	67			Wastewater discharge into Fierza lake
Shtiqen	Kukes	**3777**	4200	90			Kukes U Sh.A	On going investment
Shtiqen		1690						

11. Bicaj	Kukes	**7022**	7300	100			Kukes U Sh.A/	On going investment
Bicaj		1573					Commune	
Nange		1530						
12. Shishtavec	Kukes	**5871**					Kukes U Sh.A	
Shishtavec		1276						
Novosej		1543						
13. Topojan	Kukes	**3561**						
Topojan		1052						
Brekije		1161						
14. Krume	Has	**6378**	5600	90			Has U Sh.A/	On going investment. Wastewater discharge into Kruma river.
Krume		3215	3600	83			Municipality	The water supply system of Krume and Fajza serves Krume, Pazari Vjeter, Vranishti, Fajza/Dajc, Rad Llakaj, Plani Krumes and Zahrishti.
								The main pumping stations and reservoirs (3) are located near Krume.
Fajze	Has	**4132**	4201				Has U Sh.A	
Fajze		599						
Vranisht		1556						
15. Golaj	Has	**7501**						
Golaj		1498						
Nikoliq		1081						
Vlahen		1209						
16. Bajram Curri	Tropoje	**6546**	10921	100			Tropoje U Sh.A/	On going investment. Wastewater discharge into Shidenica stream, Valbona river and Koman lake
Bajram Curri		6546	8196				Municipality	Maps showing water supply plan for B. Curri, Margegaj (534 inh.), Kocanaj (710 inh.), Shoshan (568 inh.), Fushe Lumi (126 inh.) and Katundi Paqe (135 inh.)
17. Shkoder	Shkoder	**83274**	135607	70	48	Plan	Shkoder UK Sh.A	Water sources: 11 wells, all in the same field and 1 well + pumping station at another location. Sewerage network: 150 km, serving 80000 people, built in 1967. No WWTP. Discharge into Drin, Buna and Shkodra lake.
Shkoder		82131	100000	85	65			Unserved areas have septic tanks. Stormwater collection: 50 km canals. Discharge into Shkodra lake and Kiri river.
18. Vau Dejes	Shkoder	**9430**	12438				Vau Dejes U Sh.A	
Vau Dejes		3667	5490	57				
Mjede		1454						
19. Bushat	Shkoder	**13369**	19000	26			Commune	On going investment. Wastewater discharge into irrigation channels I and II and Drini river
Bushat		1678						
Kosmac		1893						
Melgush		1819						
Rranxe		2036						
Stajke		2178						
20. Ana Malit	Shkoder	**4815**					Shkoder (F) U Sh.A	
Oblike e Madhe		2327						
21. Berdice	Shkoder	**7428**	9205	40			Commune	On going investment
Berdice e Madhe		1306						
Berdice e Siperme		1230						
Trush		2657						

22. Gur I Zi Gur I Zi Renc Vukatan	Shkoder	**9597** 2307 1084 1002	12000				Commune	On going investment. Wastewater discharge into Pistalli stream and Drini river.
23. Hajmel Hajmel Nenshat	Shkoder	**5418** 1980 1509					Shkoder (F) U Sh.A	
24. Postirbe Boks Dragoc Drishte Kullaj	Shkoder	**8922** 1639 1413 1361 1067	11400	65			Commune	
25. Rrethinat Bleran Dobrac Golem Grude e Re Hot I Ri Shtoi I Ri Shtoi I Veter	Shkoder	**15337** 2292 2125 1703 2508 1525 1641 1354					Shkoder (F) U Sh.A	
26. Vig (Mnele) Vig Mnele e Madhe	Shkoder	**3146** 1082 1239						
27. Barbullush Barbullush	Shkoder	**3816** 3021					Shkoder (F) U Sh.A	
28. Puke Puke Puke (Fshat)	Puke	**4579** 3251 1128	7368 4368	38 50	21 35		Puke UK Sh.A	On going investment. Wastewater discharge into artificial lake.
29. Koplik Koplik **Qender Koplik** Koplik I Siperm	Malesi e Madhe Malesi e Madhe	**3126** 3126 **5551** 1291	11028				Malesi e Madhe U Sh.A Malesi e Madhe U Sh.A	On going investment. Wastewater discharge into Godenja reser-voir
30. Gruemire Gruemire Boic I Madh Demiraj	Malesi e Madhe	**9796** 582 1231 1255					Malesi e Madhe U Sh.A	
31. Velipoje	Shkoder	5537	8683	96			Commune	An investment plan for sewerage and wastewater treatment is under preparation. The plan includes a sequencing batch reactor WWTP with a capacity of 90000 PE in order to serve summer residents. The estimated costs are € 17,500,000, incl. € 8,000,000 for the WWTP. Effluent will be discharged into the Buna River

Mati River Basin District

Agglomeration/ Settlements	District	Population		Water supply	Wastewater management			Comment
		Census 2001	Actual		Sewerage	WWTP	Water company	
				% of population				
1. Burrel	Mat	**12123**	24500				Burrel UK Sh.A	On going investment. Wastewater discharge into Mati river. Water supply to 22260 persons in Burrel (18200) and Lis (4060). Sewerage system serves 15160 persons in Burrel. Service area is shown on map
Burrel		12123	18200	100	84			
2. Klos	Mat	**10489**	10504	42			Municipality	On going investment. Wastewater discharge into Mati river.
Klos		1330						
Bejne		1036						
Fullqet		1300						
3. Gurre	Mat	**4373**						
Gurre e Madhe		972						
Gurre e Vogel		1074						
4. Lis	Mat	**4984**	4060	100			Burrel UK Sh.A	On going investment. Water supply to 4060 people Wastewater discharge into several water streams, Mati river, septic holes.
Lis		1213	1450					
5. Martanesh	Bulqize	**3546**	3967	70			Kraste UK Sh.A.	Wastewater discharge into Liket stream.
Kraste		1207	2437	100	100			
6. Lezhe	Lezhe	**14420**	36225	76	76		Lezhe UK Sh.A	WWTP under construction. Tender for WWTP Lezhe/Shengjin in same package as Durres WWTP, 12,240 m3/d, aerated ponds/constructed wetlands + sludge treatment in reed beds.
Lezhe		14420	34625	75	75		Lezhe UK Sh.A	PUK supplies water to Lezhe, Shengjin and Balldre serving 29000 people.
Shengjin	Lezhe	**6807**						Wells are located near Lezhe and Barbulloj.
Shengjin		2172						Lezhe discharges its wastewater into the Old Drin river and Shengjin into Knala lagoon.
Ishull Lezhe		2258						A WWTP is developed with assistance from the World Bank.
Ishull Shengin		2022						
Torovice		1973						
7. Balldre	Lezhe	**7203**		30			Lezhe UK ShA	
8. Blinisht	Lezhe	**4238**	6100	90				On going investment. Wastewater discharge into Trashane, Fishte and Krajen streams amongst others.
Blinisht		844						
Troshan		1115						
9. Dajc	Lezhe	**5183**	6800					Wastewater discharge into Drin and Gjader rivers.
Dajc		1357						
Gjader		1221						
10. Kallmet	Lezhe	**5493**						
Kallmet I Madh		2065						
Kallmet I Vogel		1041						
Merqi		1196						
Rraboshte		1191						
11. Kolsh	Lezhe	**4943**						
Kolsh		290						
Manati		1266						
Barbulloje e Re		1344						

12.	**Shenkoll** Shenkoll Barbulloje Gryk-Lume Rile Tale	Lezhe	**8894** 2729 1342 1981 1187 1063						
13.	**Zejmen** Zejmen Pllane Spiten Tresh	Lezhe	**6713** 1250 1650 1298 1468	8800	60			Commune	On going investment.
14.	**Rreshen** Rreshen	Mirdite	**11447** 5456	9089 8376	67 100	 100		Mirdite UK Sh.A	On going investment. The water supply system has 3 sources near Rreshen, Kurbnesh and Sheshe.
15.	**Rubik** Rubik	Mirdite	**6842** 2675	2973 2719	62 65	58 53		Rubik UK Sh.A	
16.	**Fushe Kuqe** Fushe Kuqe Gorre Gurez Adriatik	Kurbin	**6129** 1253 1025 1653 1450	 906 202 2054				Durres UK Sh.A	
17.	**Lac** Lac Lac (Fshat) **Mamurras** Mamurras Fushe-Mamurras Gjormi Shperdhet 1 Zheje	Kurbin Kurbin	**19424** 16174 3250 **17676** 5507 4223 2878 1105 1816		100			Kurbin U Sh.A Kurbin U Sh.A	On going investment.
18.	**Milot** Milot Fushe-Milot Mal-Bardhe Mal-M. Shullaze	Kurbin	**11163** 1774 1791 1470 1459 1440	13021	54			Kurbin U Sh.A	On going investment. Wastewater discharge into Shtogu stream, Mat river, old irrigation channel, sceptic holes and local streams for villages.
19.	**Fushe Arrez**	Puke	**4090**	5300	33	31		Fushe Arrez UK Sh.A	On going investment. Wastewater discharge into Fan i Madh
20.	**Qafe Mali** Qafe Mali Kryezi	Puke	**3762** 1028 1218					Puke UK Sh.A	

Ishmi and Erzeni River Basin District

Agglomeration/ Settlements	District	Population		Water supply	Wastewater management			Comment
		Census 2001	Actual		Sewerage	WWTP	Water company	
				% of population				
1. Durres	Durres	**98792**	357958	58				WWTP under construction.
Durres		98792	222703	64	64		Durres UK Sh.A	Sewerage measures under tendering. WWTP capacity 60000 m3/d (50% storm water), preliminary design for conventional activated sludge process
Rashbull	Durres	**17719**	27258				Durres UK Sh.A	
Rashbull		1965						
Arapaj		4095						
Maliq Muco		3142						
Rromanat		1204						
Shenavlash		3768						
Shkallnur		2398						
2. Shijak	Durres	**8097**	12720	100			Durres UK Sh.A	Investment on going. Wastewater discharge into Erzeni river
Shijak		8097						
Xhafzotaj	Durres	**9007**	17127				Durres UK Sh.A	
Xhafzotaj		3423						
Koxhas		1085						
Rreth		1012						
Sallmonaj		1756						
Katund I Ri	Durres	**10942**	16700	100			Durres UK Sh.A	Investment on going. Wastewater discharge into Erzeni river, Juba Channel, septic holes
Katund i Ri		1543						
Sukth		2357						
Hamallaj		2100						
Kulle		1539						
Rrushkull		2293						
Sukht i Ri		4824						
Vadardhe		1476						
3. Manez	Durres	**7587**	10850				Durres UK Sh.A	
Manez		1752						
Rade		1191						
4. Gjepalaj	Durres	**5041**	7000	40			Durres UK Sh.A	Wastewater discharge into Erzeni river
Glepalaj		1101						
Hardhisht		1194						
5. Kruje	Kruje	**13075**	15907	98			X Kruje UK Sh.A	Investment on going.
Kruje		12333	15448	100	68			
Fushe Kruje	Kruje	**18441**	22900	41			Fush-Kruje UK Sh.A	
Fushe Kruje (Qytet)		7039	11300	74	74			
Fushe Kruje (Fshat)		2781						
Arrameras		3460						
Halil		1037						
Larushk		1796						
Luz		1579						

6.	**Bubq**	Kruje	**6173**					Durres UK Sh.A	
	Bubq		1034						
	Budulle		1657						
7.	**Koder Thumane**	Kruje	**13051**					Durres UK Sh.A	
	Koder Thumane		1706						
	Borizane		3394						
	Derven		1807						
	Dukagjin I Ri		1148						
	Gramez		1446						
	Thumane		2055						
8.	**Nikel**	Kruje	**8929**						
	Nikel		1787						
	Qereke		1707						
	Tapize		1900						
9.	**Tirana**	Tirana	**341453**	938350	90		Design	Tirane UK Sh.A	Investment on going.
	Tirana		341453	700000	100	92			
	Kamez	Tirana	**44443**	85830	38	20		Tirane UK Sh.A	Investment on going. Wastewater discharge into Terkuze and Tirana rivers
	Kamez		6104	31910	21	21		Kamez Sh.a. UK	
	Valias		4784						
	Laknas		4769						
	Zall Mener		1091						
	Bathore		16892						
	Frut-Kamez		10086						
	Vore	Tirana	**12558**					Tirane UK Sh.A	
	Vore		3591						
	Gjokaj		1020						
	Marikaj		2588						
	Marqinet		2272						
	Paskuqan	Tirana	**21055**	42000	30	20		Tirane UK Sh.A	Investment on going. Wastewater discharge into Tirana river
	Pasqukan		3978						
	Babbru Qender		3313						
	Pasqukan Fush		2994						
	Koder-Kuqe		2738						
	Fush Kercyk		1891						
	Pasqukan Koder		2953						
	Babrru Shpat		2242						
	Berxull	Tirana	**6736**	10000	40	30		Tirane UK Sh.A	Investment on going. Wastewater discharge into Lumuth water source, Old Lana river, septic holes
	Berxull		2373						
	Kashar	Tirana	**17082**					Tirane UK Sh.A	
	Katund I Ri		2053						
	Mezez		3994						
	Yrshek		2185						
	Yzberish		4672						
	Dajt	Tirana	**8486**	12065	70	20		Tirane UK Sh.A	Investment on going. Wastewater discharge into Gjeroze stream, Tirana and Erzeni rivers, septic holes
	Linze		2069						
	Priske e Madhe		1190						
10.	**Farke**	Tirana	**7100**					Tirane UK Sh.A	
	Farke e Madhe		2082						
	Farke e Vogel		2338						

11.	**Peze**	Tirana	**5059**				Tirane UK Sh.A	
	Peze e Madhe		847					
	Peze e Vogel		734					
	Peze-Helmes		1698					
12.	**Vaqarr**	Tirana	**7732**				Tirane UK Sh.A	
	Vaqarr		1520					
	Lalm		1151					
	Sharre		1162					
13.	**Zall Bastar**	Tirana	**5585**					
	Zall Bastar		966					
	Bastar I Mesem		1462					
	Vilez		1174					
14.	**Zall Herr**	Tirana	**7409**				Tirane UK Sh.A	
	Zall Herr		1388					
	Cerkez Morine		2233					
	Dritas		1270					
15.	**Krrabe**	Tirana	**2493**	3080	80		Tirane UK Sh.A	On going investment. Wastewater discharge into Krraba stream, Erzeni river
	Krrabe		1433					
16.	**Kavaje**	Kavaje	**24776**	92048	62		Kavaje UK Sh.A	Kavaja WWTP in operation, 25000 PE, anaerobic ponds/trickling filters/sedimentation/maturation ponds + anaerobic sludge ponds. The construction costs of the WWTP were € 5,000,000. An ex-pansion for 100,000 PE is under preparation.
	Kavaje		24776	38317	76	55		
	Golem	Kavaje	**7912**				Kavaje UK Sh.A	
	Golem		1437					
	Karpen		1323					
	Qerret		1445					
	Synej	Kavaje	**6645**				Kavaje UK Sh.A	
	Synej		1827					
	Bago		1387					
	Rrakull		1314					
17.	**Kryevidh**	Kavaje	**6413**				Rrogozhine UK Sh.A	
	Kryevidh		1193					
	Zhabjak		1026	902				
18.	**Lekaj**	Kavaje	**7246**				Kavaje UK Sh.A	
	Lekaj		1787					
	Luz I Madh		2076					
19.	**Luz i Vogel**	Kavaje	**6603**	7500			Kavaje UK Sh.A	
	Luz I Vogel		3105					
	Vorrozen		2212					

Shkumbini River Basin District

Agglomeration/ Settlements	District	Population		Water supply	Wastewater management			Comment
		Census 2001	Actual		Sewerage	WWTP	Water company	
				% of population				
1. Elbasan	Elbasan	**86148**	224254	80				The water supply system serves Elbasan City (126808 inh.) and parts of Kadund i Ri, Barbadesh and Mengel (part of Labinot commune). Drinking water sources are in Mengel and Kraste.
Elbasan		86148	126414	100	80		Elbasan UK sh.p k	Parts of Elbasan City have sewerages. There are 8 wastewater discharge points into the Shkumbini river. Unsewered areas are served by septic tanks.
Bradashesh	Elbasan	**10332**					Elbasan UK sh.p k	
Bradashesh		2152						
Balez		1396						
Katund i Ri		2362						
Shirgjan	Elbasan	**7848**	9460	75			Elbasan (F) U Sh.A	On going investment. Wastewater discharge into Llixha stream, Shkumbini river
Shirgjan		1577						
Bujques		1257						
Jagodin		1159						
Kuqan		1329						
Mjekes		1142						
2. Cerrik	Elbasan	**9406**					Elbasan (F) U Sh.A	
Cerrik		9406						
Gostime	Elbasan	**10604**	12640	100			Elbasan (F) U Sh.A	On going investment. Wastewater discharge into Gostima stream, Devolli river
Gostime		1788						
Gjyrale		1515						
Malasenj		1392						
Shtepanje		2504						
Shtermen		2722						
3. Belsh	Elbasan	**12162**					Elbasan (F) U Sh.A	
Belsh		905						
Belsh-Qender		1793						
Gradishte		1107						
Trojas		1105						
4. Gjergjan	Elbasan	**6386**					Elbasan (F) U Sh.A	
Gjergjan		1358						
Gjonme		1117						
Muriqani		1240						
Thana		1230						
5. Labinot Mal	Elbasan	**6829**					Elbasan (F) U Sh.A	
Labinot Mal		2088						
6. Labinot Fushe	Elbasan	**5573**					Elbasan (F) U Sh.A	
Labinot Fushe		1276						
Godolesh		1394						
Mengel		1230						

7. Paper Paper Vidhas	Elbasan	**8080** 752 1877					Elbasan (F) U Sh.A k	
8. Shales hales Kurtalli Licaj Xibrak	Elbasan	**6123** 1479 1012 1693 1011					Elbasan (F) U Sh.A	
9. Shushice Shushice Mlize	Elbasan	**8690** 3010 1118					Elbasan (F) U Sh.A	
10. Peqin Peqin	Peqin	**7267** 7267	11548 8939	67 78			Peqin UK Sh.A	Wastewater discharge into Shkumbini river, water stream next to the Teqe bridge
11. Gjocaj Gjocaj Vashaj	Peqin	**6379** 952 1164	6000				Peqin UK Sh.A	Wastewater discharge into septic holes
12. Librazhd Librazhd	Librazhd	**7216** 7216	19013 16275	94 95	95		Librazhd UK Sh.A	
13. Prenjas Prenjas Fshat Perrenjas	Librazhd	**6643** 1773 4334						
14. Hotolisht Hotolisht Dardhe Xhyre	Librazhd	**6341** 1350 1411 1561						
15. Lunik Lunik	Librazhd	**4129** 1098	4000	40				
16. Orenje Orenje Funarez	Librazhd	**6373** 761 1275	5300	30				
17. Polis Polis Gurshpate Mirake	Librazhd	**4515** 404 1152 1282						
18. Qender Li-brazhd Babje Dorez Dragostunje Gizavesh Kuturman Spathar	Librazhd	**11575** 1540 1932 1746 1384 1050 1178	11107	30				Wastewater discharge into Rrapun river, Shkumbini river
19. Qukes Fanje Karkavec Pishkash Qukes Shkumbin Skroske	Librazhd	**10402** 1028 1222 1071 1711 1565		38				Wastewater discharge into Gurra of Berzhita, Shyti water stream, Shkumbini river, earth

20. Rrajce	Librazhd	**10116**	10250	57			Elbasan (F) U Sh.A	Wastewater discharge into streams and septic holes
Rrajce Fushe		3151						
Katjel		1823						
Kotodesh		1144						
Sutan		1887						
21. Terbuf	Lushnje	**11983**	15222	15	100			Wastewater discharge into Burgu channel
Terbuf		4693						
Cerme e Siperme		2314						
Cerme Proshke		1535						
Shenepremte		1297						
CermeShkumbin		1436						
22. Pogradec	Pogradec	**23762**	40097			In operation	Pogradec UK Sh.A	Wastewater discharge into Ohrid lake. Water supply system for Pogradec, Bucimas, Verdove, Remenji and Tushemisht serves 54900 people.
Pogradec		23762	40097	100	94			Gurras, Geshtenjas and Bacallet are served by another company.
Bucimas	Pogradec	**13322**	15637				Pogradec UK Sh.A	Sewerage system serves 38430 people in Pogradec and Tushemisht.
Bucimas		3160	4704					WWTP location near Gurras. Pogradec WWTP final design completed in 2006, 75000 PE, similar treatment process as Kavaja WWTP.
Geshtenjas		2482	3155					
Gurras		1435	1798					
Remenj		2109	2694					
Verdove		3115	3286					
Udenisht	Pogradec	**6062**		55				Investment on going.
Udenisht		1911						
Lin		1054						
Memelisht		2024						
23. Cerrave	Pogradec	**8801**						
Cerrave		1611						
Blace		1208						
Leshnice		1616						
Pretushe		1242						
24. Dardhas	Pogradec	**3118**	3536				Commune	
Dardhas		1020						
Stropcke		1027						
25. Gose	Kavaje	**5258**	7962	100			Rrogozhine UK Sh.A	Investment on going. Wastewater discharge into Shkumbini river
Gose Qender		1100	1250					
Gose e Madhe		708	802					
Gose e Vogel		838	960					
Kercukaj		1672	1800					
Kalush		1131	1250					
Vile Bashtove		1110	1500					
Ballaj Ri		350	400					
26. Rrogozhine	Kavaje	**7071**	21626	55	15		Rrogozhine UK Sh.A	Investment on going. Wastewater discharge into Shkumbini river
Rrogozhine (Qytet)		3373	11700	52	21			
Rrogozhine (Fshat)		3698						

Vjosa River Basin District

Agglomeration/ Settlements	District	Population		Water supply	Wastewater management			Comment
		Census 2001	Actual		Sewerage	WWTP	Water company	
				% of population				
1. Cakran	Fier	**14799**					Fier UK Sh.A	
Cakran		1726						
Buzmadh		1417						
Kreshpan		1961						
Voribop		2233						
Vreshtas		1182						
Cakran I Ri		2180						
2. Frakull	Fier	**8679**	11100				Fier UK Sh.A	
Frakull e Madhe		1589	2100					
Frakull e Vogel		969	1300					
Peshtan		2687	3200					
3. Levan	Fier	**11549**	17500				Fier UK Sh.A	
Levan		3916	6500					
Ferras		1180	2100					
4. Fratar	Mallakaster	**4593**					Mallakaster UK Sh.A	
Bejar		1121						
Dames		1480						
5. Hekal	Mallakaster	**4412**	4735	80			Mallakaster UK Sh.A	Investment on going. Wastewater discharge into Big, Mollaj, Marushi and Barushi streams, Vjosa river, earth
Hekal		2324						
6. Gjirokaster	Gjirokaster	**20601**	38444	85			Gjirokaster (Q) UK Sh.A	Investment on going. Wastewater discharge into Drino river
Gjirokaster		20601	34162	83	56			
Lazarat	Gjirokaster	**3155**					Gjirokaster (F) U Sh.A	
Lazarat		2685						
7. Libohove	Gjirokaster	**2317**	4104	75			Gjirokaster (F) U Sh.A	
Libohove		2317	3720	75	15			
8. Dropull i Poshtem	Gjirokaster	**7558**		100			Gjirokaster (F) U Sh.A	Investment on going. Wastewater discharge into septic holes.
Dervican		1933						
9. Dropull i Siperm	Gjirokaster	**8525**					Gjirokaster (F) U Sh.A	
Bodrishte		1053						
Jorgucat		1195						
10. Tepelene	Tepelene	**6539**	9750	100			Tepelene U Sh.A	
Tepelene		6539	8500					
11. Memaliaj	Tepelene	**4748**	5100	100				Wastewater discharge into Vjosa river.
Memaliaj		4748						
12. Permet	Permet	**7726**	11000	100			Permet U Sh.A	Wastewater discharge into Vjosa.
Permet		7726	11000	100	95			

13.	**Kelcyre**	Permet	**3419**	5417	88	83		Permet U Sh.A	See Permet. Kelcyre possibly to be incorporated into Permet agglomeration. Wastewater discharge into Vjosa
	Kelcyre		2134	3667					
	Kelcyre Fshat		1021	1137					
14.	**Vlore**	Vlore	**77652**	46670	90			Vlore U Sh.A	WWTP under construction. Wastewater discharge into sea
	Vlore		77652	131550	95			Vlore U Sh.A	
	Qender Vlore	Vlore	**10496**						
	Babice e Madhe		2752	3870					
	Kanine		1313	1300					
	Narte		1013	4295					
	Zvernece			1173					
	Panaja		1048						
15.	**Orikum**	Vlore	**6676**						
	Orikum		2189						
	Dukat Fushe		1878						
16.	**Selenice**	Vlore	**3949**	8300				Selenice UK Sh.A	Wastewater discharge into Otime stream.
	Selenice		3949	8300	81				
	Armen	Vlore	**5707**					Vlore U Sh.A	
	Armen		1287						
17.	**Novosele**	Vlore	**10640**	19029	47			Novosele U Sh.A	
	Novosele		1151						
	Bishan		1790						
	Fitore		1104						
	Trevellezer		1596						
18.	**Shushice**	Vlore	**6212**	9080	100			Vlore U Sh.A	Wastewater discharge into Shushica river, natural channels.
	Shushice		1215						
	Llakatund		1106						
	Risili		1097						
19.	**Sarande**	Sarande	**15247**	42818	95	77		Sarande UK Sh.A	WWTP under construction. Design WWTP, 14,400 m3/d, similar treatment system as Lezhe. Wastewater discharge into Cuka channel.
	Sarande		12536	39500					
	Gjashte		1785	3308					
20.	**Konispol**	Sarande	**2230**						
	Konispol		2017						
21.	**Ksamil**	Sarande	**1840**	7500	70			Sarande UK Sh.A	Investment on going.
	Ksamil		1840						
22.	**Delvine**	Delvine	**6421**	9600				Delvine U Sh.A	
	Delvine		4100	9600	59				

ANNEX IV Assumptions for cost estimates

IV.1 Indicators for cost estimates

1. Wastewater treatment

The estimates of the investment costs have been based on preliminary design of wastewater treatment plants of different capacities. Subsequently the unit costs as € per PE. were calculated, see Table 1 below. The wastewater treatment processes for conventional and advanced treatment are described in Annex VI.2.

Table 1: Wastewater treatment plant investment costs (excl. design, construction supervision, commissioning and contingencies)

Conventional treatment	**Investment costs (€/PE)**		
Capacity (PE)	Civil works	Mechanical-electrical	Total
2000 – 3000	290	328	618
3000 – 4000	257	281	538
4000 - 5000	222	229	451
5000 - 6000	202	198	400
6000 - 7000	189	185	374
7000 – 8000	180	173	353
8000 – 9000	178	159	337
9000 – 10000	176	149	325
Advanced treatment	**Investment costs (€/PE)**		
Capacity (PE)	Civil works	Mechanical-electrical	Total
10000 – 20000	176	154	330
20000 – 30000	138	104	242
30000 – 40000	124	83	207
40000 – 50000	119	76	195
50000 – 60000	107	65	172
60000 – 70000	105	62	167
70000 – 80000	100	57	157
80000 – 90000	97	53	150
90000 - 100000	95	51	146
> 100000	92	49	141

The annual costs for operation and maintenance of the wastewater treatment plants are given below:

Energy consumption:

Conventional treatment: 2.5W x 24 x 365/1000 x 0.8 = 17.5 kW.h/PE per year = **€ 1.75 per PE per year**

Advanced treatment: 7.6 W x 24 x 365/1000 x 0.8 = 53.2 kW.h/PE per year = **€ 5.32 per PE per year**

Chemicals consumption:
5 kg poly-electrolyte per tonne sludge dry solids (Costs: € 5 per kg poly-electrolyte)

Sludge production:
Conventional treatment: 46.1 g sludge per PE/day
Chemicals use: 46.1 x 0.005 x 365= 84 g per PE/year (= € 0.42)
Advanced treatment: 58 g sludge per PE/day
Chemicals use: 58 x 0.005 x 365= 105 g per PE/year (= € 0.52)

Sludge disposal costs: € 10 per tonne sludge dry solids
Conventional treatment: € 0.18 per PE/year
Advanced treatment: € 0.21 per PE/year

Staffing and monitoring costs: € 2.50 per PE/year

2. Wastewater collection

The costs of wastewater collection systems have been estimated on the following basis:
Systems are only for collection and transportation of wastewater. Costs of conveyance of storm water are not considered.
Estimated average costs of waste water collection systems amount to € 873 per PE (of which 13.5% for electrical-mechanical equipment), including pipes, manholes, house connections, pumping stations and (pressure) pipes for wastewater transportation.
The estimation has been based on the following assumptions:

- Population density: 53,3 PE per ha
- Persons per connection to the sewerage network: 4 PE per connection
- Connection costs: € 350 per PE
- Length of sewer pipe: 2.7 m per PE
- Costs of sewer pipe (average) incl. manholes: € 150 per m (€ 405 per PE)
- Costs of other items (pumps, pressure pipes, control equipment): € 118 per PE

The actual costs of sewerage works depend on the local conditions. The figure above primarily serves as a basis for master plan preparation. Other uncertainties at this stage concern the costs of rehabilitation of existing sewerage systems, which have not been included in the investment costs.
The estimated operation and maintenance costs of wastewater collection and transportation networks are as follows:

Power consumption:	€ 1.17 per inhabitant per year
Staff:	€ 3,35 per inhabitant per year
Maintenance civil works:	0.5 % of investment costs per year
Maintenance mechanical-electrical works:	2 % of investment costs per year

IV.2 Wastewater treatment processes

1. Presumptions

The sewerage system is separated. Rainwater is conveyed separately. Consequently only wastewater flows into the wastewater treatment plant.
Peak flow (Qp) = 2 x Average flow (Qa)
Person Equivalent: 60 g BOD/d
12 g N/d
1.8 g P/d
120 l wastewater per day (Qa)

2. WWTP Design parameters

For the preparation of cost estimates of the wastewater treatment plants of different sizes 2 types of wastewater treatment systems have been applied. For each system the investment costs for a number of different capacities have been calculated. Below the main design parameters for 2 different wastewater treatment systems are given, respectively:

- Conventional activated sludge treatment
- Advanced activated sludge treatment.

Plant component	Conventional activated sludge treatment (no nitrification)	Advanced activated sludge treatment - (nitrification, de-nitrification, P-removal)
Inlet chamber with grease removal	Velocity = 1 m/s	Id.
Screening	Coarse screen: 80 mm Fine screen: 5 mm Velocity: 0.8 m/s	Id.
Influent pumping station	Optional 10 l/h per PE	Id.
Grit removal	Not required	Id.
Primary sedimentation tank	Loading rate at Qp = 2.4 $m^3/m^2.h$ Surface area: 0.004 m^2/PE Volume: 0.01 m^3/PE Primary sludge production = 55 g/PE/d = 1.8 l/PE/d BOD removal = 18 g/PE/d	
Anaerobic tank, P stripper and Selector (P release from sludge)		Hydraulic retention time = 2.5 h at Qp Mechanically mixed 3 compartments Volume: 25 l/PE
Aeration tank:		
Sludge loading rate	0.15 kg BOD/kg sludge/d	0.06 kg BOD/kg sludge/d
Sludge concentration	4 g/l dry solids	4 g/l dry solids
Oxygen requirement: BOD removal Sludge respiration	 1.65 g O_2/h 1.16 g O_2/h	 2.4 g O_2/h 4.33 g O_2/h

Nitrification Total Correction driving force (x 10/8.5) Alpha factor (0.7) Total O_2 requirement	 2.81 g O_2/h 3.30 g O_2/h 4.72 g O_2/h 4.72 g O_2/h per PE = 2.5 W/PE = 20.8 W/m^3	2.23 g O_2/h (35% into surplus sludge 8.96 g O_2/h 10.54 g O_2/h 15.05 g O_2/h 15.05 g O_2/h per PE = 7.6 W/PE = 63.3 W/m^3
Tank volume	70 l/PE	250 l/PE (Anoxic = 70 l; Aerated = 180 l)
Secondary sedimentation tank	Loading rate at Qp = 0.8 m^3/m^2.h Surface area: 0.0125 m^2/PE Volume: 0.03 m^3/PE	
Sludge pumping station	Primary + surplus sludge to thickener From sedimentation tank to aeration tank Thickened sludge to digester Digested sludge to dewatering	From sedimentation tank to selector Anoxic sludge to anaerobic tank Aerobic sludge to anoxic compartment Surplus sludge to thickener Thickened sludge to dewatering
Sludge growth	27.3 g/PE/d (total sludge production = 82.3 g/PE/d) 4.1 l/PE/d	58 g/PE/d = 7.25 l/PE/d
Sludge thickener	Loading rate = 50 kg ds/m^2.d Depth = 3 m Thickened sludge = 4 % ds Area = 0.00165 m^2/PE Volume = 0.005 m^3/PE Thick sludge = 2 l/PE/d	 Area = 0.00116 m^2/PE Volume = 0.0035 m^3/PE Thick sludge = 1.5 l/PE/d
Anaerobic sludge digestion	Retention time = 20 d at T = 35^0C Volume: 0.041 m^3/PE/d	
Total (digested) sludge production	46.1 g/PE/d (45 % organic) (0.00115 m^3/PE/d)	58 g/PE/d (54 % organic) (0.00145 m^3/PE/d)
Sludge dewatering	Sludge drying beds: t = 75 d Filling depth = 30 cm 0.288 m^2/PE/d	 0.362 m^2/PE/d
Service building		
Site works		
Electrical and control equipment		

Annex V Sewerage: costs estimate

Semani River Basin District

Agglomeration	Population	Existing sewerage	Sewerage needs	Total Investment Costs (€)	Total Costs Civil Works (€)	Total costs M-E works (€)	Operational and maintenance costs (€/year)
Berat	69,055	64,542	4,513	3,939,849	3,467,067	472,782	338,920
Kutalli	12,324	0	12,324	10,758,852	9,467,790	1,291,062	128,865
Lumas	2,000	0	2,000	1,746,000	1,536,480	209,520	20,913
Otllak	10,343	0	10,343	9,029,439	7,945,906	1,083,533	108,151
Velabisht	7,375	0	7,375	6,438,375	5,665,770	772,605	77,116
Cukalat	3,167	0	3,167	2,764,791	2,433,016	331,775	33,115
Kucove	45,000	25,000	20,000	17,460,000	15,364,800	2,095,200	322,128
Corovode	5,900	0	5,900	5,150,700	4,532,616	618,084	61,693
Polican	9,200	0	9,200	8,031,600	7,067,808	963,792	96,199
Grekan	3,200	0	3,200	2,793,600	2,458,368	335,232	33,460
Mollas	4,000	0	4,000	3,492,000	3,072,960	419,040	41,826
Libofshe	5,000	0	5,000	4,365,000	3,841,200	523,800	52,282
Fier	135,000	70,000	65,000	56,745,000	49,935,600	6,809,400	996,066
Roskovec	21,000	0	21,000	18,333,000	16,133,040	2,199,960	219,584
Topoje	2,000	0	2,000	1,746,000	1,536,480	209,520	20,913
Lushnje	55,000	30,000	25,000	21,825,000	19,206,000	2,619,000	397,010
Divjake	7,200	0	7,200	6,285,600	5,531,328	754,272	75,286
Bubullime	3,500	0	3,500	3,055,500	2,688,840	366,660	36,597
Dushk	6,000	0	6,000	5,238,000	4,609,440	628,560	62,738
Fier Shegan	2,500	0	2,500	2,182,500	1,920,600	261,900	26,141
Grabian	4,000	4,000	0	0	0	0	18,080
Gradisht	5,000	0	5,000	4,365,000	3,841,200	523,800	52,282
Hysgjokaj	2,000	0	2,000	1,746,000	1,536,480	209,520	20,913
Karbunare	2,000	0	2,000	1,746,000	1,536,480	209,520	20,913
Kolonje	2,200	0	2,200	1,920,600	1,690,128	230,472	23,004
Krutje	4,500	0	4,500	3,928,500	3,457,080	471,420	47,054
Ballsh	15,000	10,500	4,500	3,928,500	3,457,080	471,420	94,514
Korce	95,000	63,000	32,000	27,936,000	24,583,680	3,352,320	619,365
Maliq	12,500	0	12,500	10,912,500	9,603,000	1,309,500	130,705
Mollaj	3,000	0	3,000	2,619,000	2,304,720	314,280	31,369
Pirg	4,000	0	4,000	3,492,000	3,072,960	419,040	41,826
Pojan	5,600	0	5,600	4,888,800	4,302,144	586,656	58,556
Vreshtas	6,500	0	6,500	5,674,500	4,993,560	680,940	67,967
Leskovik	2,000	0	2,000	1,746,000	1,536,480	209,520	20,913
Erseke	5,900	5,850	50	43,650	38,412	5,238	26,965
Bilisht	10,023	10,023	0	0	0	0	45,304
Miras	3,100	0	3,100	2,706,300	2,381,544	324,756	32,415
Hocisht	2,800	0	2,800	2,444,400	2,151,072	293,328	29,278
Proger	3,200	0	3,200	2,793,600	2,458,368	335,232	33,460
Gramsh	14,811	0	14,811	12,930,003	11,378,403	1,551,600	154,870
TOTAL	**611,898**	**282,915**	**328,983**	**287,202,159**	**252,737,900**		**4,718,754**

Drin-Shkoder-Buna Basin District

Agglomeration	Population	Existing sewerage	Sewerage needs	Total Investment Costs (€)	Total Costs Civil Works (€)	Total costs M-E works (€)	Operational and maintenance costs (€/year)
Pershkopi	19,000	0	19,000	16,587,000	14,596,560	1,990,440	198,672
Arras	4,200	0	4,200	3,666,600	3,226,608	439,992	43,917
Fushe Muhur	2,000	0	2,000	1,746,000	1,536,480	209,520	20,913
Kastriot	2,500	0	2,500	2,182,500	1,920,600	261,900	26,141
Maqellare	3,500	0	3,500	3,055,500	2,688,840	366,660	36,597
Bulqize	14,275	0	14,275	12,462,075	10,966,626	1,495,449	149,265
Gjorice	3,500	0	3,500	3,055,500	2,688,840	366,660	36,597
Shupenze	3,000	0	3,000	2,619,000	2,304,720	314,280	31,369
Fushe Bulqize	2,600	0	2,600	2,269,800	1,997,424	272,376	27,187
Kukes	27,000	16,666	10,334	9,021,582	7,938,992	1,082,590	183,387
Bicaj	3,200	0	3,200	2,793,600	2,458,368	335,232	33,460
Shishtavec	3,000	0	3,000	2,619,000	2,304,720	314,280	31,369
Topojan	2,500	0	2,500	2,182,500	1,920,600	261,900	26,141
Krume-Fajze	5,800	0	5,800	5,063,400	4,455,792	607,608	60,647
Golaj	3,800	0	3,800	3,317,400	2,919,312	398,088	39,734
Bajram Curri	8,200	0	8,200	7,158,600	6,299,568	859,032	85,742
Shkoder	100,000	65,000	35,000	30,555,000	26,888,400	3,666,600	659,774
Vau Dejes	5,500	0	5,500	4,801,500	4,225,320	576,180	57,510
Bushat	9,600	0	9,600	8,380,800	7,375,104	1,005,696	100,381
Ana Malit	2,500	0	2,500	2,182,500	1,920,600	261,900	26,141
Berdice	5,300	0	5,300	4,626,900	4,071,672	555,228	55,419
Gur i Zi	4,400	0	4,400	3,841,200	3,380,256	460,944	46,008
Hajmel	5,600	0	5,600	4,888,800	4,302,144	586,656	58,556
Postirbe	5,500	0	5,500	4,801,500	4,225,320	576,180	57,510
Rrethinat	14,000	0	14,000	12,222,000	10,755,360	1,466,640	146,390
Vig Mnele	2,500	0	2,500	2,182,500	1,920,600	261,900	26,141
Barbullush	3,500	0	3,500	3,055,500	2,688,840	366,660	36,597
Puke	5,500	1,500	4,000	3,492,000	3,072,960	419,040	48,606
Koplik	4,500	3,000	1,500	1,309,500	1,152,360	157,140	29,245
Gruemire	3,000	0	3,000	2,619,000	2,304,720	314,280	31,369
Velipoje	9,000	0	9,000	7,857,000	6,914,160	942,840	94,108
TOTAL	**288,475**	**86,166**	**202,309**	**176,615,757**	**155,421,866**	**21,193,891**	**2,504,894**

Mati River Basin District

Agglomeration	Population	Existing sewerage	Sewerage needs	Total Invest-ment Costs (€)	Total Costs Civil Works (€)	Total costs M-E works (€)	Operational and mainte-nance costs (€/year)
Burrel	19,000	18,200	15,160	3,040	2,653,920	2,335,450	318,470
Klos	4,200	3,600	0	3,600	3,142,800	2,765,664	377,136
Gurre	2,000	2,200	0	2,200	1,920,600	1,690,128	230,472
Lis	2,500	4,060	0	4,060	3,544,380	3,119,054	425,326
Martanesh	3,500	2,450	2,450	0	0	0	0
Lezhe	14,275	36,225	27,663	8,562	7,474,626	6,577,671	896,955
Balldre	3,500	7,203	0	7,203	6,288,219	5,533,633	754,586
Blinisht	3,000	2,000	0	2,000	1,746,000	1,536,480	209,520
Dajc	2,600	2,500	0	2,500	2,182,500	1,920,600	261,900
Kallmet	27,000	5,500	0	5,500	4,801,500	4,225,320	576,180
Kolsh	3,200	2,600	0	2,600	2,269,800	1,997,424	272,376
Shenkoll	3,000	8,300	0	8,300	7,245,900	6,376,392	869,508
Zejmen	2,500	5,700	0	5,700	4,976,100	4,378,968	597,132
Rreshen	5,800	8,376	5,261	3,115	2,719,395	2,393,068	326,327
Rubik	3,800	2,719	1,445	1,274	1,112,202	978,738	133,464
Fushe Kuqe	8,200	5,400	0	5,400	4,714,200	4,148,496	565,704
Lac	100,000	35,000	0	35,000	30,555,000	26,888,400	3,666,600
Milot	5,500	13,020	0	13,020	11,366,460	10,002,485	1,363,975
Fushe Arrez	9,600	5,300	1,667	3,633	3,171,609	2,791,016	380,593
Qafe Mali	2,500	2,500	0	2,500	2,182,500	1,920,600	261,900
TOTAL	**288,475**	**172,853**	**53,646**	**119,207**	**104,067,711**	**91,579,586**	**12,488,125**

Ishmi and Erzeni River Basin District

Agglomeration	Population	Existing sewerage	Sewerage needs	Total Investment Costs (€)	Total Costs Civil Works (€)	Total costs M-E works (€)	Operational and maintenance costs (€/year)
Durres	240,000	142,000	98,000	85,554,000	75,287,520	10,266,480	1,666,567
Shijak	38,000	0	38,000	33,174,000	29,193,120	3,980,880	397,343
Manez	3,800	0	3,800	3,317,400	2,919,312	398,088	39,734
Gjepalaj	2,500	0	2,500	2,182,500	1,920,600	261,900	26,141
Kruje	38,000	19,000	19,000	16,587,000	14,596,560	1,990,440	284,552
Bubq	3,000	0	3,000	2,619,000	2,304,720	314,280	31,369
Koder Thuman	13,000	0	13,000	11,349,000	9,987,120	1,361,880	135,933
Nikel	5,500	0	5,500	4,801,500	4,225,320	576,180	57,510
Tirana	1,000,000	700,000	300,000	261,900,000	230,472,000	31,428,000	6,300,920
Farke	4,500	0	4,500	3,928,500	3,457,080	471,420	47,054
Peze	3,200	0	3,200	2,793,600	2,458,368	335,232	33,460
Vaqarr	4,000	0	4,000	3,492,000	3,072,960	419,040	41,826
Zall Bastar	3,700	0	3,700	3,230,100	2,842,488	387,612	38,689
Zall Herr	4,000	0	4,000	3,492,000	3,072,960	419,040	41,826
Krrabe	2,000	0	2,000	1,746,000	1,536,480	209,520	20,913
Kavaje	47,000	21,000	26,000	22,698,000	19,974,240	2,723,760	366,786
Kryevidh	2,400	0	2,400	2,095,200	1,843,776	251,424	25,095
Lekaj	4,000	0	4,000	3,492,000	3,072,960	419,040	41,826
Luz i Vogel	5,400	0	5,400	4,714,200	4,148,496	565,704	56,465
TOTAL	**1,424,000**	**882,000**	**542,000**	**473,166,000**	**416,386,080**	**56,779,920**	**9,654,009**

Shkumbini River Basin District

Agglomeration	Population	Existing sewerage	Sewerage needs	Total Invest-ment Costs (€)	Total Costs Civil Works (€)	Total costs M-E works (€)	Operational and mainte-nance costs (€/year)
Elbasan	139,000	101,000	38,000	33,174,000	29,193,120	3,980,880	853,863
Cerrik	23,000	0	23,000	20,079,000	17,669,520	2,409,480	240,497
Belsh	5,000	0	5,000	4,365,000	3,841,200	523,800	52,282
Gjergjan	5,000	0	5,000	4,365,000	3,841,200	523,800	52,282
Labinot Mal	2,500	0	2,500	2,182,500	1,920,600	261,900	26,141
Labinot Fushe	4,000	0	4,000	3,492,000	3,072,960	419,040	41,826
Paper	2,800	0	2,800	2,444,400	2,151,072	293,328	29,278
Shales	5,200	0	5,200	4,539,600	3,994,848	544,752	54,373
Shushice	4,200	0	4,200	3,666,600	3,226,608	439,992	43,917
Peqin	8,939	0	8,939	7,803,747	6,867,297	936,450	93,470
Gjocaj	2,200	0	2,200	1,920,600	1,690,128	230,472	23,004
Librazhd	16,275	15,429	846	738,558	649,931	88,627	78,585
Prenjas	6,500	0	6,500	5,674,500	4,993,560	680,940	67,967
Hotolisht	4,500	0	4,500	3,928,500	3,457,080	471,420	47,054
Lunik	2,000	0	2,000	1,746,000	1,536,480	209,520	20,913
Orenje	2,000	0	2,000	1,746,000	1,536,480	209,520	20,913
Polis	2,500	0	2,500	2,182,500	1,920,600	261,900	26,141
QenderLibrazhd	9,000	0	9,000	7,857,000	6,914,160	942,840	94,108
Qukes	7,000	0	7,000	6,111,000	5,377,680	733,320	73,195
Rrajce	8,000	0	8,000	6,984,000	6,145,920	838,080	83,651
Terbuf	12,000	12,000	0	0	0	0	54,240
Pogradec	61,000	40,000	21,000	18,333,000	16,133,040	2,199,960	400,384
Cerrave	5,700	0	5,700	4,976,100	4,378,968	597,132	59,601
Dardhas	2,200	0	2,200	1,920,600	1,690,128	230,472	23,004
Gose	6,760	0	6,760	5,901,480	5,193,302	708,178	70,685
Rrogozhine	11,700	2,464	9,236	8,063,028	7,095,465	967,563	107,713
TOTAL	**358,974**	**170,893**	**188,081**	**164,194,713**	**144,491,347**	**19,703,3663**	**2,739,086**

Vjosa River Basin District

Agglomeration	Population	Existing sewerage	Sewerage needs	Total Invest-ment Costs (€)	Total Costs Civil Works (€)	Total costs M-E works (€)	Operational and mainte-nance costs (€/year)
Cakran	11,000	0	11,000	9,603,000	8,450,640	1,152,360	115,020
Frakull	6,600	0	6,600	5,761,800	5,070,384	691,416	69,012
Levan	8,700	0	8,700	7,595,100	6,683,688	911,412	90,971
Fratar	3,600	0	3,600	3,142,800	2,765,664	377,136	37,643
Hekal	2,400	0	2,400	2,095,200	1,843,776	251,424	25,095
Gjirokaster	37,000	19,150	17,850	15,583,050	13,713,084	1,869,966	273,205
Libohove	3,720	563	3,157	2,756,061	2,425,334	330,727	35,556
Dropull i Poshtem	2,000	0	2,000	1,746,000	1,536,480	209,520	20,913
Dropull i Siperm	2,500	0	2,500	2,182,500	1,920,600	261,900	26,141
Tepelene	9,750	0	9,750	8,511,750	7,490,340	1,021,410	101,950
Memaliaj	5,000	0	5,000	4,365,000	3,841,200	523,800	52,282
Permet	11,000	10,500	500	436,500	384,120	52,380	52,688
Kelcyre	4,804	4,500	304	265,392	233,545	31,847	23,519
Vlore	142,000	100,000	42,000	36,666,000	32,266,080	4,399,920	891,169
Orikum	4,000	0	4,000	3,492,000	3,072,960	419,040	41,826
Selenice	8,300	0	8,300	7,245,900	6,376,392	869,508	86,788
Novosele	5,500	0	5,500	4,801,500	4,225,320	576,180	57,510
Shushice	3,400	0	3,400	2,968,200	2,612,016	356,184	35,552
Sarande	42,818	33,000	9,818	8,571,114	7,542,580	1,028,534	251,821
Konispol	2,200	0	2,200	1,920,600	1,690,128	230,472	23,004
Ksamil	2,000	0	2,000	1,746,000	1,536,480	209,520	20,913
Delvine	9,600	0	9,600	8,380,800	7,375,104	1,005,696	100,381
TOTAL	**327,892**	**167,713**	**160,179**	**139,836,267**	**123,055,915**	**16,780,352**	**2,432,958**

Annex VI Waste water treatment: costs estimate

Semani River Basin District

Agglomeration	Waste water load (PE)	Waste water treatment plant: Type	Costs: Unit €/PE	Investment costs (€): Total	M/E	Civil	Maintenance costs (€/yr): M/E	Civil	Operational costs (€/year): Power use	Chemicals use	Sludge disposal	Staff and monitoring	O&M total €/year
Berat	75,000	AT	157	11,775,000	4,275,000	7,500,000	85,500	37,500	279,300	39,000	15,750	187,500	644,550
Kutalli	12,500	AT	330	4,125,000	1,925,000	2,200,000	38,500	11,000	46,550	6,500	2,625	31,250	136,425
Lumas	2,000	CT	618	1,236,000	656,000	580,000	13,120	2,900	2,450	840	360	5,000	24,670
Otllak	11,000	AT	330	3,630,000	1,694,000	1,936,000	33,880	9,680	40,964	5,720	2,310	27,500	120,054
Velabisht	7,500	CT	353	2,647,500	1,485,000	1,162,500	29,700	5,813	9,188	3,150	1,350	18,750	67,950
Cukalat	3,500	CT	538	1,883,000	983,500	899,500	19,670	4,498	4,288	1,470	630	8,750	39,305
Kucove	54,000	AT	172	9,288,000	3,510,000	5,778,000	70,200	28,890	201,096	28,080	11,340	135,000	474,606
Corovode	6,800	CT	374	2,543,200	1,258,000	1,285,200	25,160	6,426	8,330	2,856	1,224	17,000	60,996
Polican	9,500	CT	325	3,087,500	1,415,500	1,672,000	28,310	8,360	11,638	3,990	1,710	23,750	77,758
Grekan	3,200	CT	538	1,721,600	899,200	822,400	17,984	4,112	3,920	1,344	576	8,000	35,936
Mollas	4,000	CT	451	1,804,000	916,000	888,000	18,320	4,440	4,900	1,680	720	10,000	40,060
Libofshe	5,000	CT	400	2,000,000	990,000	1,010,000	19,800	5,050	6,125	2,100	900	12,500	46,475
Fier	160,000	AT	141	22,560,000	7,520,000	15,040,000	150,400	75,200	595,840	83,200	33,600	400,000	1,338,240
Roskovec	25,000	AT	242	6,050,000	2,600,000	3,450,000	52,000	17,250	93,100	13,000	5,250	62,500	243,100
Topoje	2,000	CT	618	1,236,000	656,000	580,000	13,120	2,900	2,450	840	360	5,000	24,670
Lushnje	65,000	AT	167	10,855,000	4,030,000	6,825,000	80,600	34,125	242,060	33,800	13,650	162,500	566,735
Divjake	7,500	CT	374	2,805,000	1,297,500	1,507,500	25,950	7,538	9,188	3,150	1,350	18,750	65,925
Bubullime	3,500	CT	538	1,883,000	983,500	899,500	19,670	4,498	4,288	1,470	630	8,750	39,305
Dushk	6,000	CT	374	2,244,000	1,110,000	1,134,000	22,200	5,670	7,350	2,520	1,080	15,000	53,820
Fier Shegan	2,500	CT	618	1,545,000	820,000	725,000	16,400	3,625	3,063	1,050	450	6,250	30,838
Grabian	4,000	CT	451	1,804,000	916,000	888,000	18,320	4,440	4,900	1,680	720	10,000	40,060
Gradisht	5,000	CT	400	2,000,000	990,000	1,010,000	19,800	5,050	6,125	2,100	900	12,500	46,475
Hysgjokaj	2,000	CT	618	1,236,000	656,000	580,000	13,120	2,900	2,450	840	360	5,000	24,670
Karbunare	2,000	CT	618	1,236,000	656,000	580,000	13,120	2,900	2,450	840	360	5,000	24,670

Semani RBD cont'd

Agglomeration	Waste water load (PE)	Waste water treatment plant											
		Type	Costs				Maintenance		Operational costs (€/year)				
			Unit	Investment costs (€)			costs (€/yr)		Power	Chemicals	Sludge	Staff and	O&M total
			€/PE	Total	M/E	Civil	M/E	Civil	use	use	disposal	monitoring	€/year
Kolonje	2,500	CT	618	1,545,000	820,000	725,000	16,400	3,625	3,063	1,050	450	6,250	30,838
Krutje	4,500	CT	451	2,029,500	1,030,500	999,000	20,610	4,995	5,513	1,890	810	11,250	45,068
Ballsh	15,000	AT	330	4,950,000	2,310,000	2,640,000	46,200	13,200	55,860	7,800	3,150	37,500	163,710
Korce	110,000	AT	141	15,510,000	5,390,000	10,120,000	107,800	50,600	409,640	57,200	23,100	275,000	923,340
Maliq	12,500	AT	330	4,125,000	1,925,000	2,200,000	38,500	11,000	46,550	6,500	2,625	31,250	136,425
Mollaj	3,000	CT	538	1,614,000	843,000	771,000	16,860	3,855	3,675	1,260	540	7,500	33,690
Pirg	4,000	CT	451	1,804,000	916,000	888,000	18,320	4,440	4,900	1,680	720	10,000	40,060
Pojan	5,600	CT	400	2,240,000	1,108,800	1,131,200	22,176	5,656	6,860	2,352	1,008	14,000	52,052
Vreshtas	6,500	CT	374	2,431,000	1,202,500	1,228,500	24,050	6,143	7,963	2,730	1,170	16,250	58,305
Leskovik	2,000	CT	618	1,236,000	656,000	580,000	13,120	2,900	2,450	840	360	5,000	24,670
Erseke	6,000	CT	374	2,244,000	1,110,000	1,134,000	22,200	5,670	7,350	2,520	1,080	15,000	53,820
Bilisht	10,500	AT	330	3,465,000	1,617,000	1,848,000	32,340	9,240	39,102	5,460	2,205	26,250	114,597
Miras	3,100	CT	538	1,667,800	871,100	796,700	17,422	3,984	3,798	1,302	558	7,750	34,813
Hocisht	2,800	CT	618	1,730,400	918,400	812,000	18,368	4,060	3,430	1,176	504	7,000	34,538
Proger	3,200	CT	538	1,721,600	899,200	822,400	17,984	4,112	3,920	1,344	576	8,000	35,936
Gramsh	15,000	AT	330	4,950,000	2,310,000	2,640,000	46,200	13,200	55,860	7,800	3,150	37,500	163,710
TOTAL	**684,700**			**154,458,100**									**6,212,863**

Drin-Shkoder-Buna Basin District

Agglomeration	Waste water load (PE)	Waste water treatment plant											
		Type	Costs				Maintenance		Operational costs (€/year)				
			Unit	Investment costs (€)			costs (€/yr)		Power	Chemicals	Sludge	Staff and	O&M total
			€/PE	Total	M/E	Civil	M/E	Civil	use	use	disposal	monitoring	€/year
Peshkopi	19,000	AT	330	6,270,000	2,926,000	3,344,000	58,520	16,720	70,756	9,880	3,990	47,500	207,366
Arras	4,200	CT	451	1,894,200	961,800	932,400	19,236	4,662	5,145	1,764	756	10,500	42,063
Fushe Muhur	2,000	CT	618	1,236,000	656,000	580,000	13,120	2,900	2,450	840	360	5,000	24,670
Kastriot	2,500	CT	618	1,545,000	820,000	725,000	16,400	3,625	3,063	1,050	450	6,250	30,838

Drin RBD cont'd

Agglomeration	Waste water load (PE)	Waste water treatment plant											
		Type	Costs				Maintenance		Operational costs (€/year)				
			Unit	Investment costs (€)			costs (€/yr)		Power	Chemicals	Sludge	Staff and	O&M total
			€/PE	Total	M/E	Civil	M/E	Civil	use	use	disposal	monitoring	€/year
Maqellare	3,500	CT	538	1,883,000	983,500	899,500	19,670	4,498	4,288	1,470	630	8,750	39,305
Bulqize	15,000	AT	330	4,950,000	2,310,000	2,640,000	46,200	13,200	55,860	7,800	3,150	37,500	163,710
Gjorice	3,500	CT	538	1,883,000	983,500	899,500	19,670	4,498	4,288	1,470	630	8,750	39,305
Shupenze	3,000	CT	538	1,614,000	843,000	771,000	16,860	3,855	3,675	1,260	540	7,500	33,690
Fushe Bulqize	2,600	CT	618	1,606,800	852,800	754,000	17,056	3,770	3,185	1,092	468	6,500	32,071
Kukes	32,000	AT	207	10,560,000	4,928,000	5,632,000	98,560	28,160	119,168	16,640	6,720	80,000	349,248
Bicaj	3,200	CT	538	1,721,600	899,200	822,400	17,984	4,112	3,920	1,344	576	8,000	35,936
Shishtavec	3,000	CT	538	1,614,000	843,000	771,000	16,860	3,855	3,675	1,260	540	7,500	33,690
Topojan	2,500	CT	618	1,545,000	820,000	725,000	16,400	3,625	3,063	1,050	450	6,250	30,838
Krume-Fajze	6,000	CT	374	2,244,000	1,110,000	1,134,000	22,200	5,670	7,350	2,520	1,080	15,000	53,820
Golaj	3,800	CT	538	2,044,400	1,067,800	976,600	21,356	4,883	4,655	1,596	684	9,500	42,674
Bajram Curri	9,000	CT	325	2,925,000	1,341,000	1,584,000	26,820	7,920	11,025	3,780	1,620	22,500	73,665
Shkoder	120,000	AT	143	17,160,000	5,880,000	11,280,000	117,600	56,400	446,880	62,400	25,200	300,000	1,008,480
Vau Dejes	5,500	CT	400	2,200,000	1,089,000	1,111,000	21,780	5,555	6,738	2,310	990	13,750	51,123
Bushat	9,600	CT	325	3,120,000	1,430,400	1,689,600	28,608	8,448	11,760	4,032	1,728	24,000	78,576
Ana Malit	2,500	CT	618	1,545,000	820,000	725,000	16,400	3,625	3,063	1,050	450	6,250	30,838
Berdice	5,300	CT	400	2,120,000	1,049,400	1,070,600	20,988	5,353	6,493	2,226	954	13,250	49,264

Gur i Zi	4,400	CT	451	1,984,400	1,007,600	976,800	20,152	4,884	5,390	1,848	792	11,000	44,066
Hajmel	5,600	CT	400	2,240,000	1,108,800	1,131,200	22,176	5,656	6,860	2,352	1,008	14,000	52,052
Postirbe	5,500	CT	400	2,200,000	1,089,000	1,111,000	21,780	5,555	6,738	2,310	990	13,750	51,123
Rrethinat	14,000	AT	330	4,620,000	2,156,000	2,464,000	43,120	12,320	52,136	7,280	2,940	35,000	152,796
Vig Mnele	2,500	CT	618	1,545,000	820,000	725,000	16,400	3,625	3,063	1,050	450	6,250	30,838
Barbullush	3,500	CT	538	1,883,000	983,500	899,500	19,670	4,498	4,288	1,470	630	8,750	39,305
Puke	5,500	CT	400	2,200,000	1,089,000	1,111,000	21,780	5,555	6,738	2,310	990	13,750	51,123
Koplik	4,500	CT	451	2,029,500	1,030,500	999,000	20,610	4,995	5,513	1,890	810	11,250	45,068
Gruemire	3,000	CT	538	1,614,000	843,000	771,000	16,860	3,855	3,675	1,260	540	7,500	33,690
Velipoje	10,000	AT	330	3,300,000	1,540,000	1,760,000	30,800	8,800	12,250	5,200	2,100	25,000	84,150
TOTAL	**316,200**			**95,296,900**									**3,035,377**

Mati River Basin District

Agglo-meration	Waste water load (PE)	Waste water treatment plant											
		Type	Costs				Maintenance		Operational costs (€/year)				
			Unit	Investment costs (€)			costs (€/yr)		Power	Chemicals	Sludge	Staff and	O&M total
			€/PE	Total	M/E	Civil	M/E	Civil	use	use	disposal	monitoring	€/year
Burrel	20,000	AT	242	4,840,000	3,080,000	1,760,000	61,600	8,800	74,480	10,400	4,200	50,000	209,480
Klos	3,600	CT	538	1,936,800	1,011,600	925,200	20,232	4,626	4,410	1,512	648	9,000	40,428
Gurre	2,200	CT	618	1,359,600	721,600	638,000	14,432	3,190	2,695	924	396	5,500	27,137
Lis	4,500	CT	451	2,029,500	1,030,500	999,000	20,610	4,995	5,513	1,890	810	11,250	45,068
Martanesh	2,500	CT	618	1,545,000	820,000	725,000	16,400	3,625	3,063	1,050	450	6,250	30,838
Lezhe	40,000	AT	195	7,800,000	3,040,000	4,760,000	60,800	23,800	148,960	20,800	8,400	100,000	362,760
Balldre	7,500	CT	374	2,805,000	1,297,500	1,507,500	25,950	7,538	9,188	3,150	1,350	18,750	65,925
Blinisht	2,000	CT	618	1,236,000	656,000	580,000	13,120	2,900	2,450	840	360	5,000	24,670
Dajc	2,500	CT	618	1,545,000	820,000	725,000	16,400	3,625	3,063	1,050	450	6,250	30,838
Kallmet	5,500	CT	400	2,200,000	1,089,000	1,111,000	21,780	5,555	6,738	2,310	990	13,750	51,123
Kolsh	2,600	CT	618	1,606,800	852,800	754,000	17,056	3,770	3,185	1,092	468	6,500	32,071
Shenkoll	8,400	CT	337	2,830,800	1,335,600	1,495,200	26,712	7,476	10,290	3,528	1,512	21,000	70,518
Zejmen	6,000	CT	374	2,244,000	1,110,000	1,134,000	22,200	5,670	7,350	2,520	1,080	15,000	53,820
Rreshen	9,000	CT	325	2,925,000	1,341,000	1,584,000	26,820	7,920	11,025	3,780	1,620	22,500	73,665
Rubik	3,000	CT	538	1,614,000	843,000	771,000	16,860	3,855	3,675	1,260	540	7,500	33,690
Fushe Kuqe	5,400	CT	400	2,160,000	1,069,200	1,090,800	21,384	5,454	6,615	2,268	972	13,500	50,193
Lac	44,000	AT	195	8,580,000	3,344,000	5,236,000	66,880	26,180	163,856	22,880	9,240	110,000	399,036
Milot	14,000	AT	330	4,620,000	2,156,000	2,464,000	43,120	12,320	52,136	7,280	2,940	35,000	152,796
Fushe Arrez	5,500	CT	400	2,200,000	1,089,000	1,111,000	21,780	5,555	6,738	2,310	990	13,750	51,123
Qafe Mali	2,500	CT	618	1,545,000	820,000	725,000	16,400	3,625	3,063	1,050	450	6,250	30,838
TOTAL	**190,700**			**57,622,500**									**1,836,014**

Ishmi and Erzeni River Basin District

Agglo-meration	Waste water load (PE)	Waste water treatment plant										
		Type	Costs				Maintenance		Operational costs (€/year)				
			Unit	Investment costs (€)			costs (€/yr)		Power	Chemicals	Sludge	Staff and	O&M total
			€/PE	Total	M/E	Civil	M/E	Civil	use	use	disposal	monitoring	€/year
Durres	280,000	AT	141	39,480,000	13,160,000	26,320,000	263,200	131,600	1,042,720	145,600	58,800	700,000	2,341,920
Shijak	45,000	AT	195	8,775,000	3,420,000	5,355,000	68,400	26,775	167,580	23,400	9,450	112,500	408,105
Manez	3,800	CT	538	2,044,400	1,067,800	976,600	21,356	4,883	4,655	1,596	684	9,500	42,674
Gjepalaj	2,500	CT	618	1,545,000	820,000	725,000	16,400	3,625	3,063	1,050	450	6,250	30,838
Kruje	45,000	AT	195	8,775,000	3,420,000	5,355,000	68,400	26,775	167,580	23,400	9,450	112,500	408,105
Bubq	3,000	CT	538	1,614,000	843,000	771,000	16,860	3,855	3,675	1,260	540	7,500	33,690
Koder Thu-man	13,000	AT	330	4,290,000	2,002,000	2,288,000	40,040	11,440	48,412	6,760	2,730	32,500	141,882
Nikel	5,500	CT	400	2,200,000	1,089,000	1,111,000	21,780	5,555	6,738	2,310	990	13,750	51,123
Tirana	1,000,000	AT	141	141,000,000	47,000,000	94,000,000	940,000	470,000	3,724,000	520,000	210,000	2,500,000	8,364,000
Farke	4,500	CT	451	2,029,500	1,030,500	999,000	20,610	4,995	5,513	1,890	810	11,250	45,068
Peze	3,200	CT	538	1,721,600	899,200	822,400	17,984	4,112	3,920	1,344	576	8,000	35,936
Vaqarr	4,000	CT	451	1,804,000	916,000	888,000	18,320	4,440	4,900	1,680	720	10,000	40,060
Zall Bastar	3,700	CT	538	1,990,600	1,039,700	950,900	20,794	4,755	4,533	1,554	666	9,250	41,551
Zall Herr	4,000	CT	451	1,804,000	916,000	888,000	18,320	4,440	4,900	1,680	720	10,000	40,060
Krrabe	2,000	CT	618	1,236,000	656,000	580,000	13,120	2,900	2,450	840	360	5,000	24,670
Kavaje	56,000	AT	172	9,632,000	3,640,000	5,992,000	72,800	29,960	208,544	29,120	11,760	140,000	492,184
Kryevidh	2,400	CT	618	1,483,200	787,200	696,000	15,744	3,480	2,940	1,008	432	6,000	29,604
Lekaj	4,000	CT	451	1,804,000	916,000	888,000	18,320	4,440	4,900	1,680	720	10,000	40,060
Luz i Vogel	5,400	CT	400	2,160,000	1,069,200	1,090,800	21,384	5,454	6,615	2,268	972	13,500	50,193
Total	**1,487,000**			**235,388,300**									**12,661,722**

Shkumbini River Basin District

Agglomeration	Waste water load (PE)	Waste water treatment plant											
		Type	Costs				Maintenance		Operational costs (€/year)				
			Unit	Investment costs (€)			costs (€/yr)		Power	Chemicals	Sludge	Staff and	O&M total
			€/PE	Total	M/E	Civil	M/E	Civil	use	use	disposal	monitoring	€/year
Elbasan	160,000	AT	141	22,560,000	7,520,000	15,040,000	150,400	75,200	595,840	83,200	33,600	400,000	1,338,240
Cerrik	23,000	AT	242	5,566,000	2,392,000	3,174,000	47,840	15,870	85,652	11,960	4,830	57,500	223,652
Belsh	5,000	CT	400	2,000,000	990,000	1,010,000	19,800	5,050	6,125	2,100	900	12,500	46,475
Gjergjan	5,000	CT	400	2,000,000	990,000	1,010,000	19,800	5,050	6,125	2,100	900	12,500	46,475
Labinot Mal	2,500	CT	618	1,545,000	820,000	725,000	16,400	3,625	3,063	1,050	450	6,250	30,838
Labinot Fushe	4,000	CT	451	1,804,000	916,000	888,000	18,320	4,440	4,900	1,680	720	10,000	40,060
Paper	2,800	CT	618	1,730,400	918,400	812,000	18,368	4,060	3,430	1,176	504	7,000	34,538
Shales	5,200	CT	400	2,080,000	1,029,600	1,050,400	20,592	5,252	6,370	2,184	936	13,000	48,334
Shushice	4,200	CT	451	1,894,200	961,800	932,400	19,236	4,662	5,145	1,764	756	10,500	42,063
Peqin	9,000	CT	325	2,925,000	1,341,000	1,584,000	26,820	7,920	11,025	3,780	1,620	22,500	73,665
Gjocaj	2,200	CT	618	1,359,600	721,600	638,000	14,432	3,190	2,695	924	396	5,500	27,137
Gramsh	15,000	AT	330	4,950,000	2,310,000	2,640,000	46,200	13,200	55,860	7,800	3,150	37,500	163,710
Librazhd	17,000	AT	330	5,610,000	2,618,000	2,992,000	52,360	14,960	63,308	8,840	3,570	42,500	185,538
Prenjas	6,500	CT	374	2,431,000	1,202,500	1,228,500	24,050	6,143	7,963	2,730	1,170	16,250	58,305
Hotolisht	4,500	CT	451	2,029,500	1,030,500	999,000	20,610	4,995	5,513	1,890	810	11,250	45,068
Lunik	2,000	CT	618	1,236,000	656,000	580,000	13,120	2,900	2,450	840	360	5,000	24,670
Orenje	2,000	CT	618	1,236,000	656,000	580,000	13,120	2,900	2,450	840	360	5,000	24,670
Polis	2,500	CT	618	1,545,000	820,000	725,000	16,400	3,625	3,063	1,050	450	6,250	30,838
Q. Librazhd	9,000	CT	325	2,925,000	1,341,000	1,584,000	26,820	7,920	11,025	3,780	1,620	22,500	73,665
Qukes	7,000	CT	353	2,471,000	1,211,000	1,260,000	24,220	6,300	8,575	2,940	1,260	17,500	60,795
Rrajce	8,000	CT	337	2,696,000	1,272,000	1,424,000	25,440	7,120	9,800	3,360	1,440	20,000	67,160
Terbuf	12,000	AT	330	3,960,000	1,848,000	2,112,000	36,960	10,560	44,688	6,240	2,520	30,000	130,968
Pogradec	75,000	AT	157	11,775,000	4,275,000	7,500,000	85,500	37,500	279,300	39,000	15,750	187,500	644,550
Cerrave	6,000	CT	374	2,244,000	1,110,000	1,134,000	22,200	5,670	7,350	2,520	1,080	15,000	53,820
Dardhas	2,200	CT	618	1,359,600	721,600	638,000	14,432	3,190	2,695	924	396	5,500	27,137
Gose	7,000	CT	353	2,471,000	1,211,000	1,260,000	24,220	6,300	8,575	2,940	1,260	17,500	60,795
Rrogozhine	12,000	AT	330	3,960,000	1,848,000	2,112,000	36,960	10,560	44,688	6,240	2,520	30,000	130,968
TOTAL	**395,600**			**93,413,320**									**3,570,423**

Vjosa River Basin District

Agglomeration	Waste water load (PE)	Waste water treatment plant											
		Type	Costs				Maintenance		Operational costs (€/year)				
			Unit	Investment costs (€)			costs (€/yr)		Power	Chemicals	Sludge	Staff and	O&M total
			€/PE	Total	M/E	Civil	M/E	Civil	use	use	disposal	monitoring	€/year
Cakran	11,000	AT	330	3,630,000	1,694,000	1,936,000	33,880	9,680	40,964	5,720	2,310	27,500	120,054
Frakull	7,000	CT	353	2,471,000	1,211,000	1,260,000	24,220	6,300	8,575	2,940	1,260	17,500	60,795
Levan	8,700	CT	337	2,931,900	1,383,300	1,548,600	27,666	7,743	10,658	3,654	1,566	21,750	73,037
Fratar	3,600	CT	538	1,936,800	1,011,600	925,200	20,232	4,626	4,410	1,512	648	9,000	40,428
Hekal	2,400	CT	618	1,483,200	787,200	696,000	15,744	3,480	2,940	1,008	432	6,000	29,604
Gjirokaster	48,000	AT	195	9,360,000	3,648,000	5,712,000	72,960	28,560	178,752	24,960	10,080	120,000	435,312
Libohove	3,800	CT	538	2,044,400	1,067,800	976,600	21,356	4,883	4,655	1,596	684	9,500	42,674
Dropull i Poshtem	2,000	CT	618	1,236,000	656,000	580,000	13,120	2,900	2,450	840	360	5,000	24,670
Dropull i Siperm	2,500	CT	618	1,545,000	820,000	725,000	16,400	3,625	3,063	1,050	450	6,250	30,838
Tepelene	10,000	AT	330	3,300,000	1,540,000	1,760,000	30,800	8,800	37,240	5,200	2,100	25,000	101,950
Memaliaj	5,000	CT	400	2,000,000	990,000	1,010,000	19,800	5,050	6,125	2,100	900	12,500	46,475
Permet	11,000	AT	330	3,630,000	1,694,000	1,936,000	33,880	9,680	40,964	5,720	2,310	27,500	120,054
Kelcyre	5,000	CT	400	2,000,000	1,405,000	595,000	28,100	2,975	6,125	2,100	900	12,500	52,700
Vlore	150,000	AT	141	21,150,000	7,050,000	14,100,000	141,000	70,500	558,600	78,000	31,500	375,000	1,254,600
Orikum	4,000	CT	451	1,804,000	916,000	888,000	18,320	4,440	4,900	1,680	720	10,000	40,060
Selenice	5,300	CT	400	2,120,000	1,049,400	1,070,600	20,988	5,353	6,493	2,226	954	13,250	49,264
Novosele	5,500	CT	400	2,200,000	1,089,000	1,111,000	21,780	5,555	6,738	2,310	990	13,750	51,123
Shushice	3,400	CT	538	1,829,200	955,400	873,800	19,108	4,369	4,165	1,428	612	8,500	38,182
Sarande	45,000	AT	195	8,775,000	3,510,000	5,265,000	70,200	26,325	167,580	23,400	9,450	112,500	409,455
Konispol	2,200	CT	618	1,359,600	721,600	638,000	14,432	3,190	2,695	924	396	5,500	27,137
Ksamil	2,000	CT	618	1,236,000	656,000	580,000	13,120	2,900	2,450	840	360	5,000	24,670
Delvine	9,600	CT	325	3,120,000	1,430,400	1,689,600	28,608	8,448	11,760	4,032	1,728	24,000	78,576
TOTAL	**347,000**			**81,162,100**									**3,151,656**

ANNEX VII Guideline for Terms of Reference for Feasibility study for an urban sewerage and wastewater treatment project

Introduction – general description of the background, the rationale, the objectives, the scope and the context of the project, i.e. the programmes under which it will be undertaken or which are related to it.

Objectives, qualitative and quantitative
Water quality improvement, reduction of health risks, drainage improvement
Development of optimum alternative for wastewater collection and treatment systems for the agglomeration

Description of existing situation and problems to be solved
(General description of geology, land use, demography, topography, natural resources, climate, drainage, water resources, economic activities, traffic)

Description of earlier or ongoing programmes with similar related objectives

Legal setting (EU and local regulations for water supply, sewerage, wastewater treatment, sludge disposal, water quality protection, nature conservation)
Standards (effluent discharge, water quality, other)

Policy setting (EU, national, regional, municipal)

Institutional setting (water quality management, water supply, environmental protection, nature conservation, wastewater management)
Assessment of existing situation and resources
Project implementation and management
Licensing
Inspection
Monitoring (WWTP, sludge disposal, water resources)
Operation and maintenance
Reporting mechanisms and formats
Institutional development and training needs

Assessment of needs for human resources and training

Population figures and projections for the settlements in the agglomeration
Population density in urban and rural areas / maps

Public water consumption (supply and needs)
Water consumption per capita with trends
Water supply system description (sources, treatment, production, service levels, water losses, unaccounted for water, management, ongoing plans or programmes)
Potentials for sustainable water use

Economic development and forecasts
Water use by industries and other economic actors
Potentials for sustainable water use

Wastewater loads (domestic, industrial, institutional, other) and projections for future loads

Description of sewerage and storm water collection system (lay-out) (O&M costs)
(Type, age, service level – domestic/other, served and underserved areas, lengths and diameters of pipes, pumps, infiltration, leakage, overflows, discharge points, recipients)
(Technical problems to be solved)
(Environmental problems to be solved)
(Institutional problems to be solved)
(Existing plans or programmes for sewerage)

Description of wastewater treatment plant (lay-out) (O&M costs)
(System, age, capacity, current loading rate, functioning, effluent quality, sludge disposal)
(Technical problems to be solved)
(Environmental problems to be solved)
(Institutional problems to be solved)
(Existing plans or programmes for sewerage)

Description of effluent receiving water body (effluent quality and ambient water quality standards)

Description of needs for water supply, sewerage and wastewater treatment for solving existing and anticipated problems.

Formulation of alternative plans for sewerage and wastewater treatment and analysis of the consequences of these plans:
Incl. Do-nothing option and selection of the most suitable alternative in view of the targets to be achieved
Preliminary design of sewerage (and storm water drainage systems) (lay-out, dimensions, cost estimates)
Preliminary design of wastewater treatment plants (capacity, components, dimensions, cost estimates)
Cost estimates of the alternatives

Financial analysis (separate)
Cost benefits analysis (separate)
Environmental impact assessment (separate)

Planning for project implementation
Procurement strategy

ANNEX VIII Guideline for Terms of Reference for preparation of Environmental Impact Assessment reports for urban sewerage and wastewater treatment projects

Introduction (requirement for EIA [usually for new WWTPs > 150,000 PE], and scope and context of the EIA study)

Description of the project (objectives, justification, project components, institutional/legal/policy setting, environmental standards)
Alternatives (formulation thereof)

Description of the current situation of the environment and autonomous trends (climate, air, water, soil, groundwater, land use, nature, flora, fauna) (population, economic activities) (existing polluters, waste loads and trends) (descriptive analysis of existing pollution control systems and trends) (needs for additional pollution control systems)

Description of protected areas possibly affected by the project (nature, [ground]water, landscape, monuments, recreation areas)

Impacts of the proposed project alternatives on the environment including the zero option
Most environmentally friendly alternative

Selected alternative (cost estimates)

ANNEX IX Model for reporting on status of wastewater management in agglomerations

Name of agglomeration:
Reference year:
Date:

			Situation today	*Situation after realisation of measure*
			Indicators	
0	**Is this "measure" or part of it in a receiving area or catchment classified (or to be classified) as sensitive**			
(a)	receiving body river basin river basin district	Sea/lake/ river explain		
(b)	status of receiving body (coastal water, estuary, freshwater)	explain		
	is receiving body (area or catchment) declared as sensitive (cf Annex II A, CD 91/271/EEC)	yes/no		
1	**Total population in agglomeration or area covered**	persons		
(a)	total estimated p.e. of area covered (households, industries, commerce, services) – connected plus not-connected) indicative design horizon estimated p.e. before industrial pre-treatment (connected only) estimated p.e. after industrial pre-treatment (connected only)	p.e. end year p.e. p.e.		
(b)	population equivalent (p.e.) of treatment plant(s) calculation base Art. 2.6 – dir - 91/271 EEC	p.e.		
(c)	if seasonal variations (in m^3/day) origin of variations natural	peak m^3 low m^3		

	commercial			
2	**Population connected**	% of (1)		
	real number of people connected to the system	persons		
3	**Length of network (wastewater)**	km		
(a)	part of network to be rehabilitated	km		
(b)	number of pumping stations	number		
4	**Total throughput**			
(a)	hydraulic load (m^3/d)	m^3/d		
(b)	biological load (kg BOD/d)	kg BOD/d		
(c)	discharge per capita	litre per capita per day		
(d)	from households - hydraulic load (m^3/d) - biological load (kg BOD/d)	 % of (4a) % of (4b)		
(e)	from industrial and commercial users (incl. Services, public services) - hydraulic load (m^3/d) - biological load (kg BOD/d	 % of (4a) % of (4b)%		
	number of connected industrial units (industrial unit is interpreted as industries having service contract with the operator)	Number		
	industrial pre-treatment number of industries with pre-treatment type of industries *(specify)*	yes/no number type of industries		
	part of industrial effluents which is not pre-treated type of industries without pre-treatment *(specify)*	% of (4) type of industries		
5	**Measured network leakage in drinking water system** (m^3/d) *(answer also for wastewater projects)*	(m^3/d)		
(a)	losses measured (m^3/d)	(m^3/d)		
(b)	losses estimated (m^3/d)	(m^3/d)		
(c)	total unaccounted for water	% of total drinking water production		
(d)	date of last systematic water network audit	Year		
6	**Infiltration to the sewerage system**	m^3/year		
(a)	- origin of infiltration	explain		
(b)	- estimated volume	m^3/year		
(c)	- date of last systematic network audit	year		
7	**Charging and metering** (metering for drinking water)			
(a)	total coverage by metering of households and industry	% of total drinking		

	of which households of which industries (including services, commerce, administrations)	water production		
(b)	method of metering per apartment per apartment block per individual house per street block per quarter per industrial, commercial, administrative establishment none	% of total drinking water production		
(c)	does charging system for waste water take into account other parameters than consumption of drinking water (e.g. sealed area, flat rate component)) if yes: shortly describe	yes/no explain		
(d)	population (households) covered by metered charges	% of (2)		
	Charges (waste water and water) represent % of average household disposable income	%		
	has charging system in agglomeration a social component	yes/no		
	if yes			
	by income	yes/no		
	by family size	yes/no		
	or any other system to assist low income households (e.g. direct transfer by government, municipality etc)	explain		
(e)	industrial coverage			
	rates different from household rates	yes/no		
	are industrial rates decreasing with consumption	yes/no		
(f)	is for industrial charges polluter-pays principle applied (full cost recovery - capital, operation and maintenance cost for industrial part)	yes/no		
8	**Is there more than one WWTP in the agglomeration** If more than one plant, answer questions 9, 10, 11, 12. for each individual plant	yes/no		
	number of plants total design capacity	number m^3		
(a)	WWTP no. 1: design capacity used capacity	m^3 %		
(b)	WWTP no. 2: design capacity used capacity	m^3 %		
(c)	WWTP no. 3: design capacity used capacity	m^3 %		
	Total combined design capacity used capacity	m^3 %		
9	**Type of sewerage and storm water collection syatem**			
	totally separate	yes/no		
	partially separate	yes/no		
	part of separate system share of total length	% of (3)		
(a)	storage capacity of overflows	m^3		
(b)	peaking factor for flow	Q24 max		

		l/sec		
(c)	treatment of storm water discharge in treatment plant direct discharge in receiving waters	 m^3/hour m^3/hour		
10	**Quality of waste water treatment - effluent standards**	in-fluent concentration	effluent standards	effluent standads
	effluent standards for secondary treatment			
(a)	BOD_5	concentration mg/l		
(b)	COD	concentration mg/l		
(c)	Suspended solids	concentration mg/l		
	effluent standards for tertiary treatment *(only compulsory for sensitive areas)*			
(d)	Total Nitrogen	concentration mg/l		
(e)	Total Phosphorus	concentration mg/l		
(f)	Monitoring method Annual average calculated on daily, weekly monthly samples	Self control Authority		
(g)	**Re-use of effluent**	specify		
11	**Treatment technology**			
(a)	Screening	yes/no		
(b)	pre-sedimentation	yes/no		
(c)	other mechanical	yes/no		
(d)	biological treatment	type		
	patented system	yes/no		
(e)	tertiary treatment level	yes/no		
(f)	other technologies used Briefly describe	explain		
12	**Sludge Management**	yes/no		
(a)	type of sludge treatment used	explain		
	dry solids content dangerous substances, heavy metals in sludge Cadmium Copper Nickel Lead Zinc Mercury Chromium	 mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg		
(b)	disposal volume and route	Total tons / day		
	agriculture (**)	% of 10(b)		
	soils	% of 10(b)		
	landfill	% of 10(b)		
	incineration	% of 10(b)		
	other specify (**) Recultivation of Mine	% of 10(b)		
13	**Monitoring authority (for the WWTPs)**			

(a)	wastewater discharges and effluent standards	authority	
(b)	sludge disposal	authority	
		Explain	
	Sludge disposal: For other modes of sludge disposal, explain how compliance with relevant EC directives on waste disposal are respected:		
	Framework CD 75/442/EEC on waste and CD 91/689/EEC on hazardous waste		
	CD 1999/31/EC on the landfill of waste, CD 2000/76/EC on incineration of waste		
	Characteristics of the collection system: Does the collecting system take into account wastewater treatment requirements? *Are the flows of the sewers and the wastewater treatment plant (WWTP) well balanced (cf. CD 91/271/EEC Annex 1A)*		
	Is the design of the collecting system in accordance with BAT, regarding: - volume and characteristics of urban waste water, - prevention of leaks, - limitation of pollution of receiving waters due to storm water overflows		
	Pre-treatment of industrial water discharges: Is there a legal obligation for industries to pre-treat their water *(cf. Annex Ic of CD. 91/271/EEC)?* *Provide reference of the legal*		
	Discharge of dangerous substances into the aquatic environment: Have competent authorities elaborated an inventory and a programme for the pollution reduction of substances covered by list I and list II of CD 76/464/EEC and the specific directives for list I substances (CDs 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC as amended by 88/347/EEC and 90/415/EEC) and being discharged indirectly into the aquatic environment via the sewerage system and wastewater treatment plant? *These programmes should focus on the authorisation of indirect discharges of small and medium sized enterprises and the more generic pollution reduction from multiple sources, as mentioned in CD 86/280/EEC, Article 5.*		

Glossary of terms

Agglomeration
Settlement or area where the population and/or economic activities are sufficiently concentrated for urban waste water to be collected and conducted to an urban waste water treatment plant (WWTP) or to a final discharge point. An agglomeration may consist of one or more settlements, which for example are located in the same hydrological drainage basin so that discharge of the waste water from the settlements in the agglomeration to one central WWTP may result in the most economic solution.
For identification of the agglomerations all urban settlements with a population ≥ 1000 inhabitants are to be selected from data on population statistics. These settlements are marked on maps, and on the basis of assessing the natural drainage patterns in the areas, it is assessed whether settlements can be combined into agglomerations of more than 2000 PE, which can be served by one central WWTP. Cost-effectiveness is the predominant criterion in defining agglomerations, considering that the costs of several small WWTPs are higher than that of one larger WWTP, treating the same waste water load, both in terms of investment as well as in operational costs.
Criteria for the selection and formation of agglomerations are:

- Settlements of more than 1000 inhabitants are identified as potential agglomeration centres
- Combination of settlements in one catchment area into an agglomeration if the distance between the settlements is less than 10 km and if it seems feasible to connect the settlements with the central WWTP by gravity or pressure waste water transportation pipes (on the basis of an evaluation of the natural drainage situation in the agglomeration area). Criteria in this respect are:
  - Settlements are located in same natural drainage catchment area
  - Absence of physical obstacles for connecting settlements to each other or of settlements with central WWTP
  - Evidence that transportation of waste water from settlement to central WWTP is more economical than operation of an independent WWTP for the settlement.

Eutrophication
Excessive growth of algae and other plant forms in surface water due to high concentrations of nutrients (especially nitrogen and phosphorus) producing an undesirable disturbance of the balance of organisms present in the water and to the quality of the water itself; eutrophication mainly occurs in stagnant waters such as lakes and canals with a low flow velocity. Waters that are sensitive for eutrophication are to be designated as sensitive areas in the sense of the UWWT Directive.

Sensitive areas
Sensitive areas are identified as:

- water bodies (freshwater bodies, estuaries and coastal waters) which are eutrophic or sensitive for becoming eutrophic
- surface water used as a drinking water source which potentially too high nitrate concentration as prescribed by Directive 75/440/EEC (50mg/l of nitrates)

- areas where further treatment than that prescribed in Article 4 is necessary in order to fulfil other Council Directives

The definition of the UWWT Directive for sensitive areas has been broadened in this report. All protected areas, i.e. natural parks, forest reserves; classified water bodies, Natura 2000 sites, and drinking water protection zones are considered to have to fulfil the requirements of sensitive areas as minimum.

Less sensitive areas

A marine water body or area can be identified as a less sensitive area if the discharge of waste water does not adversely affect the environment. (*In this context bear in mind that, inter alia, the Baltic Sea, the North Sea, the Black Sea and the Adriatic do not qualify as 'less sensitive areas'*).

Population Equivalent

Population equivalent (PE) is used as a unit for expressing the organic biodegradable waste water load, consisting of a mixture of waste water sources of different sources, i.e. domestic, industrial, etc. One PE is defined as the organic biodegradable load having a five-day biochemical oxygen demand of 60g of oxygen per day (1 PE = 60 g BOD_5).

Sewerage system

Network of pipes and other conduits to collect waste water from households, industries, institutions, etc., and/or run-off rain water, and to transport the waste water to a central point of disposal, e.g. a waste water treatment plant. Generally the waste water flow in the sewerage system takes place by gravity, but if necessary pumps are used to lift the waste water to a higher point to enhance further transportation. In a combined sewerage system the waste water and the rain water are collected in the same network. In separate sewerage systems there are separate pipe networks for collection of waste water and for rain water.

Waste water treatment plant

In a waste water treatment plant the waste water or mixture of waste water and rain water, discharged from the sewerage system, is submitted to treatment in order to produce an effluent of a specific quality as required by the locally prevailing quality standards for discharge into the receiving environment, e.g. a surface water body or the soil. Waste water treatment, in general, takes place in the following steps:

- Screening – removal of coarse materials
- Grit removal – removal of large particles which easily settle
- Grease removal – removal of floating substance, oil and grease
- Primary sedimentation – removal of solid matter from the waste water. The settled sludge may be treated by anaerobic digestion. (In specific WWTP types the primary sedimentation step is left out.)
- Secondary treatment – biological oxidation of organic matter in the waste water with formation of a sludge of aerobic micro-organisms (activated sludge). (Partial) oxidation of organic nitrogen substances (nitrification) and reduction of nitrate to nitrogen gas (de-nitrification).
- Tertiary treatment – further treatment for removal of nitrogen and phosphorus compounds by means of biological or/and chemical processes.
- Secondary sedimentation – sedimentation of mixed liquor of activated sludge and waste water with formation of sludge and effluent.
- Effluent polishing – additional treatment of effluent prior to discharge, e.g. for removal of pathogens, volatile matter and hazardous compounds.
- Sludge treatment – thickening, dewatering and drying of sludge from primary and secondary sedimentation tanks, followed by disposal in landfills or by incineration.