Ramboll Barents AS

UNEP-GEF Project
Russian Federation – Support to the National Programme of Action
for Protection of the Arctic Marine Environment

PRE-INVESTMENT STUDIES

Construction of New Waste Water Treatment Facilities in Residential District Lesnaya Rechka in Arkhangelsk

FINAL REPORT

Project is financed by:
UNEP GEF

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ABBREVIATIONS

BEAC - Barents Euro-Arctic Council
BS - Balance Sheet and
EBRD - European Bank for Reconstruction and Development
EPS - Environmental Protection System
FPR - Fuel and power resources
FTP - Federal Target Program
GS - Gas station
GEF - Global Environment Facility
HSE - Heasth, safety and environment
IP - Investment project
IFC - International Finance Corporation
IS - Income Statement
MPD - Maximum Permitted Discharge
MPE - Maximum Permitted Emissions
NEFCO - Nordic Environment Finance Corporation
NDEP - Northern Dimension Environmental Programme
NCM - Nordic Council of Ministers
NIB - Nordic Investment Bank
PINS - Pre-investment studies
RR - Russian Railways
SAP - Strategic Action Programme
UNEP - United Nations Environmental Programme
WWTF - Waste Water Treatment Facilities

CONTENT

SUMMARY

Project title	Construction of new WWTF in Residential District Lesnaya Rechka in Arkhangelsk
Project owner	MUE Vodokanal, Arkhangelsk
Branch	Municipal services, water supply and sewage
Brief description of IP and its benefits	The existing WWTF in Lesnaya Rechka is a poor condition due to poor construction and outdated methods of wastewater treatment. Untreated wastewater is discharged directly into the Lesnaya River, which flows directly into the Dvina River. The existing WWTF in Lesnaya Rechka is assessed as posing a hazardous risk to the local and regional environment, including the Arctic marine environment. In addition it is assessed as posing a hazardous risk to the health of workers and local residents. The IP provides for construction of a new wastewater treatment facility in Lesnaya Rechka with capacity of 800 m^3/day based on prefabricated block modular small treatment plants. The IP provides a solution for current and future capacity for waste water treatment in Lesnaya Rechka with a level of treatment that meets the environmental requirements of discharge into fishery water bodies. Project implementation is assessed as contributing to reducing negative environmental impacts on the Arctic environment; improving the health of workers and local residents; and a positive development of wastewater treatment in the Arkhangelsk Region.
Project implementation period	**2 years**
Total investments	**772 720 EUR**

Project costs, EUR

Component	Cost
Decommissioning of existing WWTF	45 460
Engineering surveys	22 720
Procurements and assembly	681 820
Connection to the network	22 720
TOTAL	**772 720**

Financing plan, EUR

Financing sources of IP	Years of implementation		TOTAL	Share, %
	1st year	2nd year		
International Grant	309 088	-	309 088	40%
Local financing	231 816	231 816	463 632	60%
Total Planned Investment	**540 904**	**231 816**	**772 720**	**100%**

* Local financing means financing from the federal program. Necessary municipal financing will be supported by an international grant.

Financial analysis

Commercial risk	• Lack of own funds at the MUE Vodokanal for co-financing and inability of taking additional international loans. • Possibility of gaining a loan is hardly probable. A new loan shall be agreed with the EBRD. The Administration of Arkhangelsk is not ready for a new credit. • Co-financing from the federal target program cannot be guaranteed. The project owners - the Arkhangelsk Administration and Municipal Unitary Enterprise Vodokanal - have not identified the federal target program to apply to for financing.

1. INTRODUCTION

1.1 Description and Assignment

The present report summarises the work related to preparation of regional pre-investment studies (PINS) for modernisation of the waste water system in the residential district Lesnaya Rechka in Arkhangelsk. The work has been undertaken within the frames of the project "Russian Federation – Support to the National Programme of Action for Protection of the Arctic Marine Environment (NPA Arctic Project)". The overall aim of the project is to protect the global marine environment in which the Arctic plays a fundamental role. More specifically, the program shall contribute in developing and establishing a sustainable framework to reduce environmental degradation of the Russian Arctic from land-based activities on a systemic basis. NPA Arctic has been established through cooperation between the Ministry of Economic Development of the Russian Federation and United Nations Environmental Program (UNEP) and is financed by the Global Environment Facility (GEF).

The NPA Arctic Project is coordinated by the Executive Directorate of National Pollution Abatement Facility, NPA Arctic Project and consists of four main components:

1. Preparation and adoption of a Strategic Action Program (SAP)
2. Completion of a set of Pre-Investment Studies (PINS)
3. Development and implementation of the Environmental Protection System (EPS) consistent with the SAP
4. Implementation of three demonstration projects:
   i. preservation of indigenous people's traditional lifestyle
   ii. oil contamination remediation using marine alga
   iii. environmental remediation of decommissioned military bases

Ramboll Barents was given the assignment to develop pre-investment studies for 5-8 selected Investment Projects (IP) in the Central Arctic Region of Russia which includes the Arkhangelsk Region, Nenets Autonomous Okrug, Republic of Komi, and Yamalo-Nenets Autonomous Okrug. Initially, in the project selection phase, reference was given to the Hot Spot List of the Barents Region. However, the main criteria for selection of IP have been to comply with the overall and specific objective of the Project aim. Furthermore, the IPs have been proposed and supported by the regional authorities.

The following 5 IP in the Central Arctic Region of Russia have been selected and described in separate reports:

Komi Republic

1. Modernization of the Landfill for Municipal Solid Waste Disposal in Vorkuta.
2. Modernization of sewage water treatment system in Vorkuta.

Arkhangelsk region:

3. Land remediation from oil products in water protection zone of Northern Dvina River of White Sea basin near settlement Krasnoe of Primorsky district of Arkhangelsk Region.
4. Construction of new sewage treatment facilities in Lesnaya Rechka residential district of Arkhangelsk.

Nenets Autonomous Okrug:

5. Modernization of Waste Water Treatment Facilities in Settlements Kachgort and Bondarka.

Project on Construction of new sewage treatment facilities in Lesnaya Rechka residential district of Arkhangelsk is one of the priority projects for the Arkhangelsk region (Annex 1). The project was recommended by the Regional Administration (now the Government of the Arkhangelsk region) for pre-investment study development. The Regional Administration provided full support in preparation of the pre-investment studies report and intends to contribute to the further promotion of the project. Regional and local authorities are extremely interested in the implementation of the IP, as existing WWTP represent an environmental threat to the local and regional environment, including the marine Arctic environment.

The key objective of this report is to define the technical and economical parameters for modernization of the waste water system in the residential district Lesnaya Rechka in Arkhangelsk.

1.2 Report Structure

In compliance with the requirements of the Terms of Reference, the PINS should include the following information: information about the owner of the project; description of the investment project; environmental and social assessment of the project; status of the investment project and its implementation activities; project financial viability assessment; legal or any other limitations for Russian and foreign investors; assessment of potential risks and justification of selection and other additional information relevant to the investment project.

Chapter 1 – introduction. **Chapter 2** describes the residential district Lesnaya Rechka, including its geographical position, demographical situation, ecological condition and social and economical situation. **Chapter 3** contains information about the owner of the project – the Municipal Unitary Enterprise Vodokanal, a brief description and the current financial status. **Chapter 4** contains information about the current status of the investment project, description of alternative options for modernization of the waste water system and description of proposed technical solutions for implementation of the IP. Project cost estimates are presented in **Chapter 5**. **Chapter 6** includes an assessment of the environmental and social impacts of the investment project. **Chapter 7** describes project financial viability. **Chapter 8** covers project implementation status and arrangements. **Chapter 9** deals with risk assessments and selection justification. **Chapter 10** – conclusions.

In addition to the above mentioned information presented in the relevant Chapters, the Report contains additional information which gives a more complete picture of current aspects and opportunities for implementation of the investment project.

2. DESCRIPTION OF RESIDENTIAL DISTRICT LESNAYA RECHKA

2.1 Geographical Location and Demographical Situation

Arkhangelsk is the capital of the Arkhangelsk Region located in the northwest of Russia (Figure 1). The region has a wide net of rivers and lakes. All rivers (excluding Ileksa) belong to the Arctic Ocean basin. The largest rivers are the Northern Dvina (with Vychegda, Pinega and Vaga feeders), Onega, Mezen and Pechora. The Arkhangelsk region is characterized by fragmented population patterns with many small villages and towns.

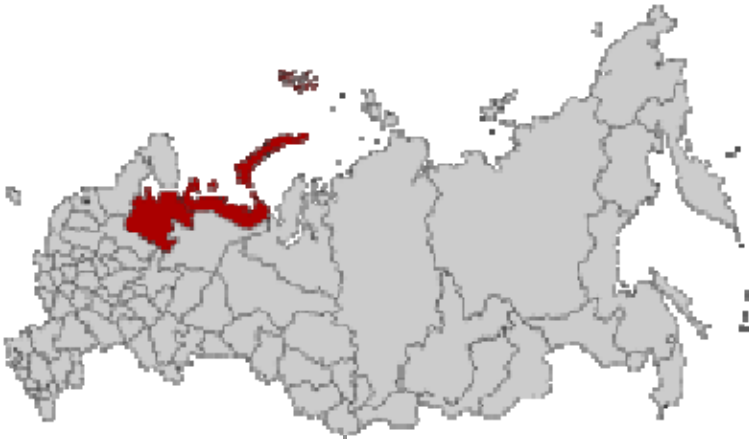

Figure 1. The location of Arkhangelsk Region in Russia

Arkhangelsk city is situated on the banks of the Northern Dvina River and on the islands of its estuary (Figure 2). The city is located 1 133 km to the north of Moscow. 6 rural residential areas are subordinated to the Administration. The area of the city is 294.4 km^2; the population according to the January 1, 2009 data is 348.3 thousand people.

The climate is relatively cold. Ocean proximity and intense air masses change contributes to the unstable weather and significant cloudiness.

Convenience of location and proximity to the White Sea contributed to the growth of Arkhangelsk – the first Russian marine port – trade centre with the Western Europe states.

Arkhangelsk is a large historical, industrial, scientific and cultural centre of the Northwest of Russia. It includes wood processing, wood chemical, pulp and paper, fishing industries, and mechanical engineering.

Figure 2. Location of town of Arkhangelsk

Arkhangelsk is divided into nine territorial districts: Varavino-Factoria, Isakogorka, Lomonosovskiy, Maimaksanskiy, Maiskaya Gorka, Oktyabrskiy, Severniy, Solombalskiy,

Tsiglomen (Annex 2). City districts are quite differentiated in respect of population content, general period of the territory development, housing stock quality and infrastructure condition.

Arkhangelsk city development was mainly formed on the basis of large industrial and transport enterprises, and as a result the city extends from the north to the south for more than 30 kilometers and 20 kilometers from the west to the east. Additional difficulty of the territorial structure of the city is the Northern Dvina River with its bed, arms and branches divide the city almost in half and significantly complicate and financially tighten transportation and household infrastructure development.

Some municipal residential areas and neighborhoods do not have terrestrial transport access and are isolated from the central household supply systems.

Lesnaya Rechka administratively belongs to the Isakogorka and Tsiglomen administration of Arkhangelsk but geographically located in Isakororka district. Lesnaya Rechka is located in the southern part of the Arkhangelsk City and consists of two settlements, "upper" and "lower" (Figure 3). The population of the district is 1 883 people (January 1st, 2009)

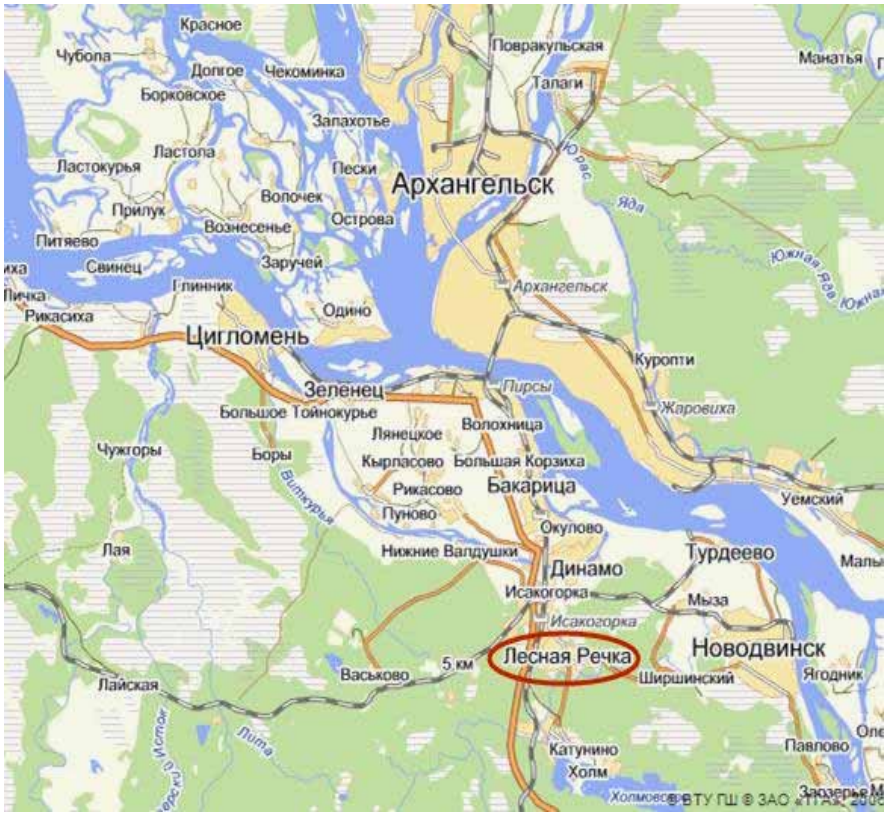

Figure 3. Geographical location of residential district Lesnaya Rechka

The main part of the population lives in the densely built-up central part of the city: in Oktyabrskiy, Lomonosovskiy and Solombalskiy districts (about 60% of the total population size of the city). Population size of Isakogorka and Tsiglomen districts is 37.72 thousand people as of 01.01.2008 (Table 1).

Population size of Isakogorka is 27.65 thousand people (7.9% of the total population size of the city), and Tsiglomen's is 10.07 thousand people (2.9% of the total population size

of the city). One of three under-populated districts is Tsiglomen, represented by rather dense settlements.

Table 1: Population size, area and density

District	Population size*, thousand	Part of the total city population size, %	Area, sq.km	Density, thousand/sq.km
Arkhangelsk City	**348.3**	**100**	**294.4**	**1.18**
Isakogorka	27.65	7.9	46.2	0.60
Tsiglomen	10.07	2.9	22.5	0.48
Lesnaya Rechka	1.883	-	-	-

* Data for Arkhangelsk and Lesnaya Rechka are as of 01.01.2009, and Isakogorka and Tsiglomen districts are as of 01.01.2008.

From the point of view of the population employment three districts are the most problematic, and Tsiglomen and Isakogorka are two of them. The share of unemployed population in the productive age (25-59) is especially high here. Such situation is caused by the lack of sufficient opportunities for employment in the area with its remoteness from the central part of the city. The situation becomes more complex due to the increase in population size of the productive age in years to come.

Distribution of unemployed people due to the age and education level in Tsiglomen and Isakogorka districts significantly differs from the average situation in Arkhangelsk. The unemployed population size here with secondary and primary vocational education is high, and a significant number of unemployed population of the youth and middle-aged regardless the level of education is observed.

The differences of the districts in living conditions and accommodation quality are quite significant. The general development of the Arkhangelsk City was carried out in 1957-1995, and more than the half of the housing stock in the districts was built in 1971-1995, excluding Isakogorka district where more than the half of domestic buildings refers to the period of construction before 1971.

Tsiglomen and Isakogorka districts are two of the three most problematic districts. In central districts the situation is better though they have their own challenges typical for the majority of the large Russian cities.

2.2 Nature and Environmental Conditions

2.2.1 Environment Status in the City of Arkhangelsk

For the time being there is a significant number of economic players of various sectors of economy on the territory of Arkhangelsk operating with the negative environmental impact. Due to the pulp and paper industrial enterprises rather high level of air contamination is specified by concentrations of benzapyrene, formaldehyde, and methylmercaptan from time to time. Motor transport also substantially contributes to the contamination of the air. As a result, the living environment of Arkhangelsk does not meet the necessary criteria now. And the solution of environmental problems is one of the necessary conditions of sustainable social and economic development of the city.

Free air

One of the main activities of the City Council over recent years is the implementation of measures aimed at the improvement of environmental situation in Arkhangelsk. In 2005 the City Council started creating the city-wide consolidated volume "Protection of atmosphere and maximum permissible emissions (MPE) of Arkhangelsk". Its development and constant data update will allow transition to the effective management of the city air basin quality control, and implementation of nature-conservative measures by the enterprises of the city will lead to the decrease in pollutants discharge to the atmosphere.

Water resources

The level of the Northern Dvina River contamination, which is the main water supply source, is specified by the anthropogenic load and hydro meteorological conditions. Drinking water quality doesn't meet regulatory requirements in respect of various parameters. The condition of water-supply network of the city is unsatisfactory therefore it contributes to contingencies and to the secondary contamination of drinking water as a consequence. In order to improve quality of drinking and waste water, protection of water bodies and resources Municipal Unitary Enterprise Vodokanal is carrying out operations under the project of "Modernization of Municipal Services System in Arkhangelsk" that include works at the central and local treatment plants and water supply and sewage facilities including island territories; construction of the first stage city treatment plants; construction and repair of household wastewater and rainwater disposal collectors.

Waste management

A closer attention to the problem of waste management of production and consumption was paid over recent years. Each year the quantity of waste generated in the territory of the city is increasing. The main problems of this sector are the lack of integrated waste registering and control system, inefficiency of the current management system, extremely insignificant waste utilization and recycling, uncontrolled and unauthorized landfills, unsatisfactory condition of the city landfill. Today a process flowsheet of the planned and regular cleanup of the city is developed.

More than 30 unauthorized landfills were eliminated over recent years. A comprehensive survey of the landfill, organization and implementation of monitoring measures are carried out in order to bring the city landfill into accordance with the specified sanitary, epidemiological and environmental requirements. Modern weighing equipment is procured and weighing control is being integrated to create an effective registration and control system for solid domestic waste brought to the landfill. A joint Russian-Finnish project of "Separate Solid Domestic Waste Collection" in Varavino-Factoria district neighborhood was fully implemented to reduce the quantity of solid domestic waste placed to the city landfill, to develop the waste processing sectors in the city separated by the waste types and to form a waste management market.

Improvement of environmental situation

Protection and reproduction of community landscape contributes a lot to the environment enhancement of the city. Number of parking zones, volumes of repair works at engineering facilities increased significantly over recent years. All this is made by means of the vegetation area reduction. Arrangement of green spaces is one of the most important activities of the municipal services, as the community landscapes positively impact the environment of the citizens and improve the environment.

2.2.2 Environmental Conditions of Residential District Lesnaya Rechka

The residential district Lesnaya Rechka is one of the remote areas of Arkhangelsk and is located 15 km South of the city centre. The district is situated in an area defined as

forest. According to the information from the Administration of the Isakogorka and Tsiglomen districts, no contaminations have been registered in the residential district of Lesnaya Rechka and the area has hence been identified as environmentally clean.

The Nature Reserve of Isakogorka Forestry is located in the district and has been identified as an environmentally protected area of regional significance.

Lake Kholmovskoe is also located in the district (Figure 4), approximately 3 km upstream the Lesnaya Rechka WWTF. The water of the lake meets the statutory requirements for fresh water and is considered clean. Local citizens use the lake as a fresh water source.

Figure 4: Map of Lesnaya Reckka. Location of the Lesnaya Rechka WWTF and Lake Kholmovskoe.

There are no industrial facilities in the district. The main sources of pollution are:

- 2 coal boiler houses
- Waste water treatment facilities (WWTF)
- Local hotspots, e.g. petrol stations
- Former military activities

Based on the current knowledge of contamination in the district, observations and preliminary assessments, the Administration of the Isakogorka and Tsiglomen districts regards the WWTF as constituting the most hazardous risk to the local residents and the local environment. Due to the fact that untreated waste water is discharged into the Lesnaya River, which flows directly into the Dvina River, the WWTF is also considered as posing a hazardous risk to the regional, including the Arctic marine environment.

Traffic in the region is assessed as being modest due to the fact that the district is located in a suburb of Arkhangelsk and there are no industrial or commercial facilities in the district (no heavy traffic). Residents are transported via public transport buses and private transport vehicles.

2.3 Economic Status and Future Perspectives

Arkhangelsk is a large science and industry centre in the North-West of Russia. Enterprises of wood processing, wood chemical, self-contained paper (Solombala self-contained mill plant), fishing, microbiological and mechanic industries are located there.

The leading industrial role belongs to the wood industry. Wood enterprises posses more than 40% of the total production volume manufactured in the town. Wood, paper, cartonboard, cellulose as well as fish are still considered the basis of trade of Arkhangelsk with other regions in Russia and western countries.

The main industry enterprises located at the Isakogorka and Tsiglomen districts are:

- Handling area Bakaritsa;
- OAO Arkhangelsk Maritime Port;
- OAO 2nd Arkhangelsk United Air Group;
- OAO Arkhangelsk Repair and Maintenance Fleet Base;
- OAO Arkhangelsk Reloading Base;
- Isakogorka Station of the Arkhangelsk Northern Railway Department – Branch of OAO RZD (Russian Railways);
- OOO Remelectromash;
- ZAO Lesozavod-25, Tsiglomen section.

At the Isakogorka and Tsiglomen districts are located:

- 7 post offices;
- 9 municipal educations institutions,
- 10 childcare institutions,
- Tsiglomen special-purpose (special education) orphanage for orphaned children,
- Health boarding school No. 2;
- Centre of children's rights protection,
- Medical institutions:
  - Municipal hospital No. 12;
  - Municipal polyclinic No. 14;
  - Departmental hospital at Isakogorka station of OAO Russian Railways;
  - Regional hospital of the Federal Penitentiary Service Administration in the Arkhangelsk region.

As it was mentioned above there are no industrial facilities in the district Lesnaya Rechka. Secondary school No. 93, kindergarten and two shops are located in the district. In the lower settlement, the FSE Correctional Labour Institution No. 7 of the Department of the Federal Penitentiary Service, included into the district since 2008, is located. The number of prisoners is 1500. The housing stock of the district consists of 12 four- and five-storied houses with all amenities and 11 two-storied wooden houses.

Engineering support facilities of the district Lesnaya Rechka housing and public utilities sector include 2 autonomous coal boiler houses, a fresh water pump station and waste water treatment plant. The water supply facility is located 7.5 km from the district in settlement Katunino. Energy is supplied from the power networks of the Ministry of Defence of the Russian Federation.

The leading employment role in the city of Arkhangelsk is played by the enterprises rendering services. According to the Federal State Statistics Service of the Arkhangelsk region approximately 70% of total employment falls within this field. The fifth part of employment is provided by the budgetary sector of the city. Small-size business enterprises of the city are not yet significant employees: a little more than 10% of the population is employed.

At present Arkhangelsk is mainly developing as a commercial and service centre. Gradual recovery of the city port has begun. Wood processing, earlier one of the major employers of the city, hasn't yet returned to stable operation.

The role of industry as a main employer of the city economics continues to decrease. The current situation with employment, on one hand, corresponds to the international tendencies (increase of share of the service sphere as compared to the goods' manufacturing industries), and, on the other hand, is a characteristic of cities which are still in the state of economic crisis or only coming out of it.

2.3.1 Regional and Municipal Development Prospects

The Arkhangelsk region bases its economical and social policy on the general development concept for the Russian Federation. At the same time, the strategy and tactic of the reforms in the Arkhangelsk region are being developed and implemented on account of local factors and the specific social and economic status. The Strategy for Social and Economic Development of the Arkhangelsk Region for the Period up to 2030 (further referred to as the Strategy) was approved in 2008.

The strategic aim of the Arkhangelsk region Government corresponds to the aims of the Russian Federation Government. The main aim of the regional Government - to achieve a high level of citizens' well-being and living standards – is divided into three aims of the second level (Table 2).

Table 2: Strategic aim of the Arkhangelsk region Government

Achieving of a high level of citizens' well-being and living standards		
1. Establishment in the sphere of effective, dynamically growing and well-balanced economy of	**2. Establishment in the region of favourable living conditions, environment for professional and creative fulfillment of the region self-population**	**3. Provision of effectiveness of the executive authorities of the region**
1.1. an economy structure that will provide employment of the population, mainly at the enterprises with high level of productivity and added value; 1.2. favourable conditions for business; 1.3. high level of productivity and modernization of the existing enterprises Высокого уровня; 1.4. investment attractiveness of the facilities to establish new enterprises in priority economy sectors.	2.1. quality housing and public utilities infrastructure; 2.2. developed medical and education systems; 2.3. effective system of social welfare; 2.4. developed infrastructure of services to the population; 2.5. developed infrastructure for culture, sports, and leisure; 2.6. physical and **environment security**; 2.7. broad opportunities for professional and creative self-fulfillment.	3.1. management according to aims and results; 3.2. effective institutional structure and business processes; 3.3. availability of competent personnel.

In course of strategic analysis were defined sectoral priorities of the development of the Arkhangelsk region which are given in Table 3.

Table 3: Sectoral priorities in economic development of the Arkhangelsk Region

1 priority	2 priority	3 priority	4 priority
• ship-building • machine-building • forestry enterprises • transport • tourism	• fuel and power production (oil refinery plant) • mining operations, apart from fuel and power resources • fisheries	• trade • food industry • electric power engineering, gas and water • scientific and educational branch	• chemistry and oil chemistry • communications and telecom • construction materials industry • construction • jewelry industry • agriculture • metallurgy • fuel and power resources production

The sectoral priorities of the Arkhangelsk Region correspond with the major directions of development of North-West Federal Okrug regions stipulated by the Concept of RF Development until 2020. Among the identified prospective directions are development of transportation services, military industrial establishment and ship-building, machine-building, extraction of oil and gas resources on the shelf, forestry as well as catch and processing of marine biological resources.

With a purpose of focus of efforts and resources on solving the priority tasks aimed at achieving the objectives the key directions of Government activities under implementation of the Development Strategy were defined: within the sphere of economy, social sphere and efficiency of state government (Table 4).

Table 4: Main areas of activity of the Arkhangelsk region Government

Main areas of activity of the Arkhangelsk region Government
Economy
1. Establishment of conditions for development of priority economy sectors 2. Development and implementation of a strategy on the development of priority economy sectors 3. Competitive growth and modernization of the existing enterprises 4. Raise of investments and increase of investment of the Arkhangelsk region 5. Development of small-sized business and private enterprises 6. Establishment and guarantee of activity of development institutions 7. Security of access to the facilities and resources of the Federal Centre 8. Support and development of the agricultural sector of the Arkhangelsk region
Social Sphere
1. Along with the implementation of the earlier planned initiatives in culture, sports, education and social insurance of the population, the Administration will focus their strengths on the three most problematic sectors in which the Arkhangelsk region falls behind to other regions in Russia 2. Improvement and implementation of the demographical policy aimed at prevention of the population departure from the region
State Administration
1. Introduction of the management system according to the aims and results 2. Optimisation of business processes and institutional structure in accordance with a long-term strategy, aims and modern principals of effective organisations establishment 3. Advanced training of the regional administration personnel

The Strategy which identifies the long-term objectives and priorities of activities of the regional Government will be revised on an annual basis with account of changes in the changes within the economic and social sphere.

2.3.2 Development Strategy of the City of Arkhangelsk

Decree of the Arkhangelsk Mayor No. 120 dated 20.03.2008 approved the Strategy of the Social and Economic Development of the Arkhangelsk Municipality till 2020 (hereinafter referred to as the Strategy). The goal of the Strategy is to define the strategic objectives of the social and economic development of the Arkhangelsk municipality, to improve quality of citizens' life, to create favourable social, economic, environmental and other conditions of their life.

The main directions of the social and economic policy of the city are given in Table 5 below.

Table 5: Main directions of the city social and economic policy

Economic policy	Goal: to create working places with high labour remuneration.
Social policy	Goal: fight against poverty and eliminate social disproportions
Cultural policy	Goal: to preserve peculiarities and cultural traditions.
Educational Policy	Goal: to form an educational cluster, which services will be highly rated in the Barents region. Improvement of the population educational level.
Public Health Policy	Goal: to form a medial cluster, which services will be highly rated in the Barents region.
Youth Policy	Goal: to form an active life position and patriotism.
Policy for Elderly People	Goal: to prolong the active life.
Areal Policy	Goal: to optimize the areal structure of the city. To eliminate and prevent formation of socially unstable areas.
City Construction Policy	Goal: to maintain possibilities of the city development.
Housing Policy	Goal: to improve the life quality of population and provide high living standards.
Infrastucture Policy	Goal: to create conditions for city development.
Environmental Policy	Goal: to bring the environmental situation in the city in compliance with allowable norms.
Development of Civil Society Institutions and Improvement of Social Activity of the Population	Goal: to more actively involve civil institutions in discussions of plans and intentions of the municipal administration and their implementation.
External Policy	Goal: to form a positive image of the city and strengthen municipal, interregional and international cooperation.
Budget Policy	Goal: to provide implementation of the city development strategy with respect to the actions funded by the municipal budget.

The goal of the Arkhangelsk municipal environmental policy is to bring the environmental situation in the city in conformity to the allowable norms:

- To contribute to reduction of environmental impact by existing enterprises, including enterprises providing communal services.

- To take into account the environmental aspect when selecting new investment projects.
- To license sanitary and protection areas of enterprises.
- To form environmental culture among population – both by increasing public awareness, starting from preschool children, and by tightening control over observance of environmental requirements.

2.3.3 Prospects of Development of the Residential District Lesnaya Rechka

Promising development of the residential district Lesnaya Rechka is pictured as a construction of new comfortable houses. During the next 10 years the Administration of Isakogorka and Tsiglomen territorial districts is planning to construct 5 new 75-apartment houses in residential district Lesnaya Rechka. Besides, development of an individual housing construction in this district is planned. The long-term plans include reconnection of the existing facilities of the district from the heat supply systems to a newly designed boiler house in the area of the Isakogorka railway station.

It is planned that dwellers from dangerous run-down houses located in Isakogorka and Tsiglomen territorial districts and partially in Lesnaya Rechka will move to new houses. Thus, it is possible to foresee the increase in the number of the district population by 375 families. According to the last population census held in the RF (2002) the average size of a family in the Arkhangelsk region is 2.6 persons. Therefore, population of the district by 2020 may increase by 1000 (or 1/3) people and will amount to approximately 2 900 people.

3. PROJECT OWNER. ASSESSMENT OF THE FINANCIAL POSITION

The main stakeholders of the project are the Arkhangelsk City Administration, the Administration of Isakogorka and Tsiglomen territorial districts, MUE Vodokanal (Arkhangelsk). The owner of the project is MUE Vodokanal.

The contact information of the stakeholders is presented in Table 6.

Table 6: Contact Information

Project owner	**MUE Vodokanal, Arkhangelsk**	
Contact person	Arkhangelsk, Kasatkinoy st., 8	
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E-mail	vodkanal@atnet.ru	
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3.1 Brief Description of MUE Vodokanal

Municipal Unitary Enterprise Vodokanal of the Arkhangelsk Municipality was established in accordance with the decision of the Executive Committee of Arkhangelsk City Council of People's Delegates dated 23.09.1991.

The company's full name is Municipal Unitary Enterprise Vodokanal of the Arkhangelsk Municipality, and the short name is MUE Vodokanal.

The legal form of the company is a unitary enterprise.

The sole founder and owner of property of the enterprise is the Arkhangelsk municipality. The enterprise owns property on the basis of the rights of economic jurisdiction. The authorized capital is 1 494 332 rubles.

The enterprise is a legal entity. The enterprise bears responsibility for its liabilities with all its property. The enterprise is established to undertake social tasks and to make profit.

The activities of the enterprise include:

- Treatment and transfer of fresh water
- Receipt and discharge of water from housing and commercial organizations via waste water systems
- Collection of payments for water supply and waste water from organizations which have contracts with the enterprise
- Collection of payments for MUE Vodokanal's communal services from citizens of Arkhangelsk who reside in the houses owned by the municipality. The payments are collected on the basis of the contracts concluded between MUE Vodokanal and the owner of municipal housing facilities.

Pursuant to the Federal Law "On Licensing", the activities of MUE Vodokanal are not subject to licensing.

The enterprise works in close cooperation with such suppliers as OAO Solombala Pulp-and-Paper Plant (treatment of waste water), OAO Arkhangelsk Energy Supply Company (electrical power), OOO NPO Plant of Chemical Agents (chemical agents).

MUE Vodokanal is a monopoly; the main functions of the enterprise are vital for the city: treatment of river water to the condition of fresh water (this is the main process flow of the enterprise), collection of waste water from citizens and organizations, as well as maintenance of its systems and facilities. The key figures of economic activities for 2008 are presented in Annex 33.

Prospects of MUE Vodokanal include activities to decrease operating expenses (change to system of water disinfection using sodium hypochlorite, refusal from unprofitable production, energy efficiency activities, etc.) which will lead to improvement in the enterprise financial results.

3.2 Water Supply and Sewage Facilities

Problems within the housing and utilities are most urgently reflected in the work of water supply and sewage facilities of the city. The overall length of the water supply and sewage network of the city is 1 094 km, 210 of which are dilapidated. 5-10 emergency situations break out every day on the water supply and sewage facilities of the city. Lack of funds with the operators of utilities enterprises and in the city budget does not allow providing the required volumes of repairs and reconstruction of the water supply and sewage network: only 11.1 km of dilapidated networks were replaced during four years (no less than 20 km per year are to be replaced each year in accordance with the standard requirement).

Average depreciation of water supply networks of the city as well as sewage networks is over 60%. Over 35% of potable water is lost on the way from the treatment plant to consumers due to poor condition of supply pipelines. Practically all storm water is

discharged into water bodies without treatment. Only part of the sewage waters which get into the sewage system undergo treatment at city sewage treatment facilities.

At the same time there are significant reserves to improve the situation. Based on the estimate of the Mayor's Office experts the reduction of potable water consumption by only 1% would save over 4 mln. rubles per year. Therefore the reduction of potable water loss by 35% would save 140 mln. rubles. At the moment MUE Vodokanal are implementing the project of automation of works, replacement of water supply systems and pumping equipment, water passage for the account of the loan from EBRD. Implementation of this project would facilitate the improvement of situation with water supply in the central part of the city. At the same time a number of issues, especially in the peripheral areas of the city, are yet to be solved. In particular, some residential areas are supplied with water from a tank-car as there is no centralized water supply and available sources of potable water.

3.3 Financial Situation at MUE Vodokanal

On the basis of the enterprise's accounting policy the income (profit) is defined according to the issued invoices. Calculations of value-added tax for the budget are performed based on issued invoices.

In 2008 sale proceeds (products, works and services) amounted to 638 858 thousand rubles, including:

- Enterprise main activities - 637 068 thousand rubles
- Auxiliary activities (canteen) - 1 790 thousand rubles.

Compared to 2007 the revenue increased by 112 594 thousand rubles (2007 - 526 264 thousand rubles).

Net cost of the goods sold (products, works, services) amounted to 737 985 thousand rubles, including:

- Enterprise main activities - 735 835 thousand rubles
- Auxiliary activities (canteen) - 2 150 thousand rubles.

Compared to 2007 net cost increased by 157 621 thousand rubles (2007 - 580 364 thousand rubles).

Considering abovementioned data it is obvious that during the accounting period the enterprise' activities resulted in loss in the amount of 99 127 thousand rubles, including:

- Enterprise main activities - 98 767 thousand rubles.
- Auxiliary activities (canteen) - 360 thousand rubles.

Compared to 2007 loss from the main activities of the enterprise increased by 45 027 thousand rubles (2007 - 53 746 thousand rubles).

On the whole, loss of the enterprise for 2008 amounted to **95 378** thousand rubles. Financial showing of enterprise activity are presented in Table 7.

Table 7 Financial showing of MUE Vodokanal activity of 2008, thousand RUB

№	Items	Sum
1.	Gross loss from the main activities	98 767
2.	Gross loss from canteen	360
3.	Other income, including	36 750
	- Interest receivable	282
	- Other operating income	2 737
	- Received from the budget	15 470
	- Donors' aid	5 700

	- Writing-off of accounts payable	433
	- Miscellaneous	12 128
4.	Other expenses, including	53 182
	- Interest payable	14 830
	- State duty	733
	- Execution fee	1 050
	- Expenses connected to procurement of loans and receipt of credits	1 306
	- For exceeding the environment pollution limit	11 712
	- Interest for contract terms violation	2 525
	- Writing-off of accounts payable	178
	- Loss of previous years	3 633
	- Bank services	3 849
	- Miscellaneous	13 356
5.	Deferred tax assets (DTA)	24 799
6.	Deferred tax liabilities (DTL)	764
7.	Tax penalties	3 853

The main reason of the enterprise running at a loss is approval of tariffs for water supply and waste water services which are lower than economically viable. Tariffs that were in force in 2005-2008, as well as approved for 2009. are lower than economically viable and do not fully cover the enterprise's expenses on the main activity.

Approved tariffs do not give the enterprise a possibility to develop, to perform major repairs, to upgrade equipment or to introduce more state-of-the-art technologies.

Enterprise's loss:

- 2005 – 21.9 mln.rubles.
- 2006 – 67.9 mln.rubles.
- 2007 – 62.2 mln.rubles.
- 2008 – 95.4 mln.rubles.

TOTAL – 247.4 mln.rubles.

Due to approval of tariffs lower than economically viable, the Enterprise Production Plan, which is developed based on the approved tariffs, states the level of water loss at 25%. In reality this figure significantly exceeds the planned one:

- 2005 – **42.2%**
- 2006 – **42.9%**
- 2007 – **41.6%**
- 2008 – **43.1%.**

The high level of water loss is a consequence of worn-out state of systems and pumping stations' equipment. On the average, the systems tear-and-wear percent as of 1 January 2009 is 75% (and at the periphery – 100%).

Besides, according to data of MUE Vodokanal one of the main reasons for loss is maintenance and service of periphery and island sectors of water and wastewater facilities.

Due to the bankruptcy of municipal enterprises on islands and at periphery starting from 2005, the Arkhangelsk City Council transferred 14 sections of water supply and waste water facilities to MUE Vodokanal for maintenance.

The expenses for maintenance of these sections in 2008 amounted to **245.6** million rubles. Therewith, due to paucity of population and underdevelopment of industry at the

periphery and on islands, the total sum of issued invoices in 2008 was **79.4** million rubles.

Thus, the total loss from the operation of these sections for 2008 amounted to **166.2** million rubles.

4. DESCRIPTION OF THE INVESTMENT PROJECT

4.1 Project Information

The matter of pre-investment studies is to investigate the existing situation in waste water treatment in the Lesnaya Rechka district and to give advice based on investigation assessments on the best suitable technologies for modernizing the waste water treatment facilities.

Within the frames of the project the main problem that is now acute for the City Administration and MUE Vodokanal is considered, i.e. unsatisfactory waste water treatment that do not meet the environmental requirements at the waste water treatment facilities (WWTF) in the Lesnaya Rechka district. Landscape peculiarities allow collecting and transporting waste water in natural flow to the treating facilities without construction of additional pumping stations. However, due to the complete tear-and-wear of the equipment at the water treatment facilities their efficiency is low and requires modernization.

Implementation of this project will provide waste water treatment in compliance with regulatory parameters and in addition improve the environmental condition on a local and regional scale.

4.1.1 Regulatory Documents for Water Supply and Waste Water Management

This section includes the list of regulatory documents that regulate water supply and water discharge (waste water) activities in the Russian Federation:

- Federal Law No. 89-FZ dated 24.06.1998 "On industrial and consumer waste".
- Federal Law No. 52-FZ dated 30.03.1999 "On sanitary and epidemiological wellbeing of the population".
- Federal Law No. 210-FZ dated 30.12.2004 "On the regulation basis of the rates of companies providing communal services".
- RF Government Decree No. 310 dated 31.12.1995 "On the charges for discharge of waste water and contaminating substances into the sewage systems of residential areas".
- SanPiN 42-128-4690-88 "Sanitary rules for maintenance of residential territories".
- SanPiN 2.1.5.980-00 "Waste water handling in residential areas. Sanitary protection of water facilities. Hygienic requirements for the protection of surface waters".

A more detailed list of regulatory documents which MUE Vodokanal follows in its activities is presented in Annex 4.

4.1.2 Brief Description of Waste Water Treatment in the Lesnaya Rechka district

Waste water treatment facilities

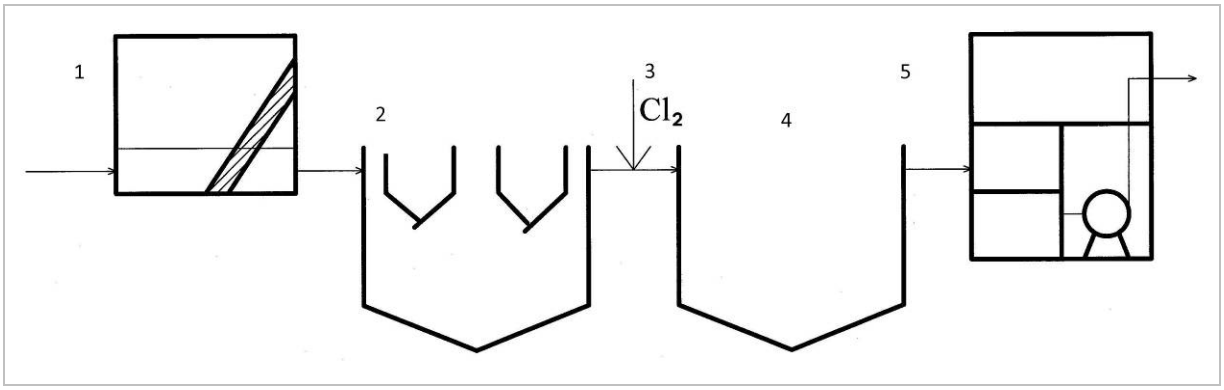
WWTF of the Lesnaya Rechka district with a designed capacity of 400m^3/day are intended to treat domestic waste water from dwelling houses of the district and the correction labour institution. The WWTF were constructed in the beginning of 1970s to treat

wastewater of the military town and dwelling settlement near it which was originally located in the Lesnaya Rechka district.

After closing of the military unit in 1994, the treatment facilities were transferred in the ownership of MUE Vodokanal, Arkhangelsk (Annex 55). By that time they were already in a poor condition due to construction defects and unsatisfactory operation. At present the WWTF equipment is considerably worn-out and treatment facilities cannot provide treatment of waste water even with minimum effect.

WWTF treatment process flowchart includes the following facilities:

1. Receiving chamber with approximately 60mm crevice screen for large-size waste removal.
2. 2-level settling tanks (Emscher tanks) for waste water mechanical treatment (2 pieces, diameter 6 meters).
3. Chlorinated lime disinfection unit with contact tanks.
4. Wastewater pumping station for pumping wastewater to the discharge point.



1. Receiving chamber with crevice screen. 2. 2-level settling tanks (Emscher tanks). 3. Injection of chlorinated lime for disinfection. 4. Contact tanks. 5. Pumping station for pumping wastewater to the discharge point.

Figure 5. Process flowchart of the existing WWTF of the Lesnaya Rechka district in Arkhangelsk

Measurement of wastewater received at the WWTF is not performed. Daily inflow of wastewater can be roughly estimated according to the water rate in the domestic water supply pipeline to the network of the Lesnaya Rechka district. Pursuant to MUE Vodokanal data, the monthly water consumption in the district is 20 000 – 29 000 m3 which is equivalent to the daily consumption in the range of 645-935 m3 per day.

The survey of WWTF in the Lesnaya Rechka district (Annex 6) gave the following results:

1. One of the 2-level settling tanks is put out of operation due to its complete infilling with sedimentation.

2. The second settling tank is in a similar critical condition but waste water still continues to flow into the settling tank. As a consequence, settling of wastewater in the settling tank is not performed.

   According to the MUE Vodokanal, the quality of discharged waste water is for several properties (suspended materials, BOD5) at a similar or worse level as inflowing waste water at the WWTF.

3. The chlorinated lime disinfection unit is in a critical condition. The WWTF personnel prepare solutions to disinfect water manually and add them into the received waste water.

   MUE Vodokanal has not provided data on the efficiency of such disinfection and hence it is possible to assume that it is not very high owing to low doses of chemical agents, their irregular distribution into waste water, as well as failure to treat waste water prior to disinfection. Moreover, application of chlorinated chemical agents to disinfect insufficiently treated waste water leads to generation of highly toxic chlorates, which significantly intensifies negative impact of WWTF onto the environment.

4. Discharge of waste water into a receiving basin (the Lesnaya River) is performed directly at the WWTF area as pumping of water to the discharge point – swamp (the nearest swamp according to design) is not reasonable due too negative environmental effect of accumulation of pollutants in the swamp and higher cost of pumping station operation. There are also signs of discharge of untreated waste water in circumvention of WWTF into the Lesnaya River (by-passing lines).

Waste Water Pipeline System

During the visit of the project team to the Lesnaya Rechka district a section of the waste water pipeline system was examined. As informed by the representatives of MUE Vodokanal and the Administration of Isakogorka and Tsiglomen territorial districts, separate sections of the waste water pipeline system were transferred by former owners in poor condition which is the most noticeable in the section of the system laid over the overpass and connecting two parts of the district. To receive accurate data on the condition of the district networks a comprehensive survey of the waste water systems including video diagnosis is required. This action is not considered in the report below; its implementation can be envisaged for the next (second) stage of this IP.

Operation and Maintenance

During meetings with MUE Vodokanal it was defined that the enterprise faces some difficulties in maintenance of the waste water systems of this remote district which are due to the lack of personnel and increased expenditures for maintenance of the expanded area. In the 1990s the most periphery waste water networks were simultaneously transferred into municipal ownership because former owners of the systems failed to maintain them or terminated their activities. Therefore, the municipal property increased significantly during a short period, but financial opportunities remained at the same level and are limited until present. MUE Vodokanal takes possible actions to improve the situation connected to operation and maintenance of the waste water systems in the city including remote districts, but a complete/integrated solution of this issue cannot be made without relevant/sufficient funding.

4.2 Technical Description

This section includes the various technical aspects of the waste water treatment system modernization in the Lesnaya Rechka district of Arkhangelsk, based on which technological solutions for implementation of the present investment project will be proposed.

4.2.1 Possible Options of Modernization

MUE Vodokanal of Arkhangelsk will require the following results of the project:

1. To provide treatment of received waste water according to the following standards:

   - Suspended materials - 5.08 mg/l
   - BOD_{20} - 5.3 mg/l
   - Ammonium ion - 0.55 mg/l
   - Phosphate ion - 0.2 mg/l
   - Oil products - 0.05 mg/l
   - Synthetic surface-active substance - 0.5 mg/l

2. To meet the requirements for the water receiver of 2nd class of water use according to SanPiN 2.1.5.980-00 "Water discharge of residential areas. Sanitary protection of water facilities. Hygienic requirements for the protection of surface waters."

3. To accept WWTF capacity equal to 800m^3 per day.

The capacity has been chosen according to the actual daily water consumption of the area and monthly water sales in Lesnaya Rechka (Annex 7). Monthly water sales in 2009 show average daily water sales at 602 m^3/day with maximum at 913 m^3/day (due to re-accounting in January 2009). Monthly bulk water supply in 2009 show average daily supply at 904 m^3/day with maximum at 971 m^3/day. Therefore if water losses are excluded (over 30% of bulk water supply) and future area development is planned it is necessary to set WWTP capacity at 800 m^3/day. The planned capacity can be corrected according to the water sales and water supply in 2010. MUE Vodokanal maintenance service should prevent surface waters from discharge into the household sewerage network because this will lead to wastewater dilution, low wastewater treatment efficiency, networks flooding and WWTP overloading.

For the pre-investment studies on modernization of the waste water treatment system it is proposed to review the following alternative options for improving the current situation in the sphere of waste water treatment:

1. Reconstruction of WWTF in the Lesnaya Rechka district
2. Construction of new WWTF in the Lesnaya Rechka district.
3. Application of prefabricated block-modular small-size plant to treat wastewater.

4.2.2 Technical Assessment of the Options

As mentioned above, the WWTF were constructed to treat waste water in the military town and a nearby dwelling settlement. After closing of the military unit, the water treatment facilities were transferred in the ownership of MUE Vodokanal, Arkhangelsk. The WWTF are in a miserable condition due to the defects in construction and unsatisfactory operation. At present the WWTF cannot provide treatment of waste water even with minimum effect.

Reconstruction of WWTF in the Lesnaya Rechka district

Reconstruction of the WWTF should provide technical improvements to meet the current environmental standards and regulations and should contribute in reducing the future negative impacts on the environment. These objectives may be hard to meet within the

legal framework of the area. The reconstruction of the existing WWTF does not provide a sustainable and long-term solution for waste water treatment in Lesnaya Rechka.

Construction of a new WWTF in the Lesnaya Rechka district

Construction of a new WWTF offers the possibility of designing WWTF based on modern technologies, the amount of waste water, the content of waste water and environmental requirements of the treated waste water. Since Lesnaya Rechka is situated in an area of natural landscape identifying a new location for the WWTF should not represent an unsolvable challenge for the local administration. The construction of a new WWTF will have to be combined with proper environmental decommissioning of the existing WWTF.

Application of prefabricated block-modular small-size plant to treat wastewater

Prefabricated block-modular plants to treat waste water provide high efficiency of water treatment and at the same time they have a possibility for expansion (installation of parallel treatment lines), dense dimensions and high quality of manufacture obtained due to the centrally-controlled production.

Ready-to-operate block-modular water treatment plant is easy-to-work and designed to treat household wastewater and water of similar composition as well as works in automatic mode. Plants provide treatment of household waste water to the characteristics corresponding to the maximum permissible concentration of discharge into fishery water bodies.

The application of prefabricated block-modular water treatment plant will have to be combined with proper environmental decommissioning of the existing WWTF.

Preliminary assessment of the most appropriate technology

In order to choose the most appropriate technical solution at the given time and situation, a preliminary assessment and evaluation of the 3 suggested solutions has been made. A screening of the 3 solutions regarding social, environmental, technical, financial and legal liability is presented in

Table 8. The screening includes a preliminary evaluation in 3 classes A, B and C. 'A' symbolises a condition with no or few difficulties, 'B' symbolises a condition with medium difficulties/challenges and 'C' symbolises a condition with many difficulties/challenges.

Table 8: Preliminary assessments and evaluation of the 3 alternative technical solutions. The evaluations are classified in classes A, B and C, where A has the highest denotation and C the lowest

Social liability	Environmental liability	Technical liability	Financial liability	Legal liability	Assessment
Solution 1:Reconstruction of WWTF					
Project owner positive Local administration sceptical Environmental authorities expected to be sceptical Public expected to be positive	Increased risk that the reconstruction does not provide a solution that meets environmental requirements. The solution should be combined with upgrading actions	The original settlement tanks were built with faults. The general condition of the WWTF is in a poor state and reconstruction should be combined with upgrading actions in order to meet requirements	High implementation costs Low - moderate operational costs	Upgrading the WWTF is not allowed in accordance with the area planning	
B	C	C	B	C	B/C
Solution 2: Construction of a new WWTF					
Project owner positive Local administration positive Environmental authorities expected to be positive Public expected to be positive	Modern technology to meet current and future environmental requirements	Requires some external experts	High implementation costs Low - moderate operational costs Existing WWTF closure costs	Site location to be decided	
A	A	B	C	B	B
Solution 3: Application of prefabricated block-modular small-size plant to treat wastewater					
Project owner positive Local administration positive Environmental authorities expected to be positive Public expected to be positive	Modern technology to meet current and future environmental requirements	Requires some external experts	Low implementation costs Low operational costs Existing WWTF closure costs	Site location to be decided	
A	A	B	A	B	A/B

Social liability

In general the 3 solutions are expected to provide positive attitudes from all stakeholders. Since solution 1 provides an environmental liability risk, a sceptical attitude from the environmental authorities is expected.

Environmental liability

Solutions 2 and 3 provide technologies that meet current and future environmental requirements.

Solution 1 is not environmentally liable, as the reconstruction of the existing WWTF will not meet the environmental requirements. The reconstruction does not include a step for biological treatment, which is obligatory for meeting environmental requirements for BOD, ammonium ion and oil products, among others. It is also unlikely to reach suspended materials concentration of 5.08 mg/l without application of additional actions.

Technical liability
Solution 2 and 3 provide the advantage that it will be possible to take into account content of waste water in the Lesnaya Rechka district and to meet the requirements to the quality of treated water during design and construction work.

Solution 1 does not provide a technical liable solution due to the following:

- The existing settling tanks were originally built with faults in the construction. Reconstructing the tanks is unreasonable because it will not provide a solution for settling the waste water and generated sediment.
- Disinfection of waste water using chlorinated lime has a significantly negative impact on the environment due to generation of highly toxic products of chlorine treatment and requires exclusion from the process flowsheet. Location of disinfection equipment according to one of the alternative methods in the existing unit of chlorine treatment is not possible because of the poor state of the facility.

Financial liability
Solution 3 provides the most cost-effective solution as implementation and operational costs are low.

Solutions 1 and 2 have high implementation costs and low – moderate operational costs. Moreover, the possibility to expand WWTF in future will be limited as traditional reinforced concrete facilities cover the most area on the layout and it will not be possible to construct additional facilities to increase production capacity of the WWTF within a small area of the existing WWTF.

Legal liability
Solutions 2 and 3 provide solutions that are within the legal framework and area planning of the district.

In order to be environmentally and technically viable, solution 1 should include additional upgrading actions in the reconstruction of the WWTF. It is, however, not possible to locate additional treatment units in the area of the existing WWTF as the area planning does not allow expansion of the WWTF in operation.

4.2.3 Recommendation of the Most Appropriate Technology

Based on the screening and preliminary assessments and evaluation of the 3 suggested technical solutions, the most appropriate technology at the given time and situation is solution 3 - *Application of prefabricated block-modular small-size plant to treat wastewater*.

Prefabricated block-modular small size plants currently provides the most viable approach regarding all criteria of **Ошибка! Источник ссылки не найден.**, that is social, environmental, technical, financial and legal liabilities.

The advantages of block-modular treatment facilities are:

- Minimum expenditures for construction.
- No smell and noise.
- Possibility to ramp up efficiency owing to installation of additional modular blocks.
- Use of recent drain treatment technologies ensures robust treatment of drains to the characteristics of fishery water bodies.
- Easy to maintain and operate.
- Modest sanitary protection area (approx. 50 m).

Block-modular WWTF are the optimal option for remote facilities and small dwelling districts with production efficiency up to 2-3 thousand m^3 of waste water per day. Application of block-modular WWTF allows not only cutting down capital costs under construction of small WWTF but also significantly decreasing operational costs while keeping high quality of waste water treatment.

4.3 Proposal to Modernize WWTF in the Lesnaya Rechka Residential District

Pursuant to the implemented analysis in point 4.2 to improve situation with treatment of wastewater in the Lesnaya Rechka residential district, as well as to mitigate negative impact on water bodies and the environment, it is required to consider a complex of actions.

To mitigate negative impact on the environment from discharge of waste water of the Lesnaya Rechka residential district a construction of a block-modular small-sized plant for treatment of wastewater with the efficiency of 800m3 per day is proposed. The construction requires the following actions to be taken:

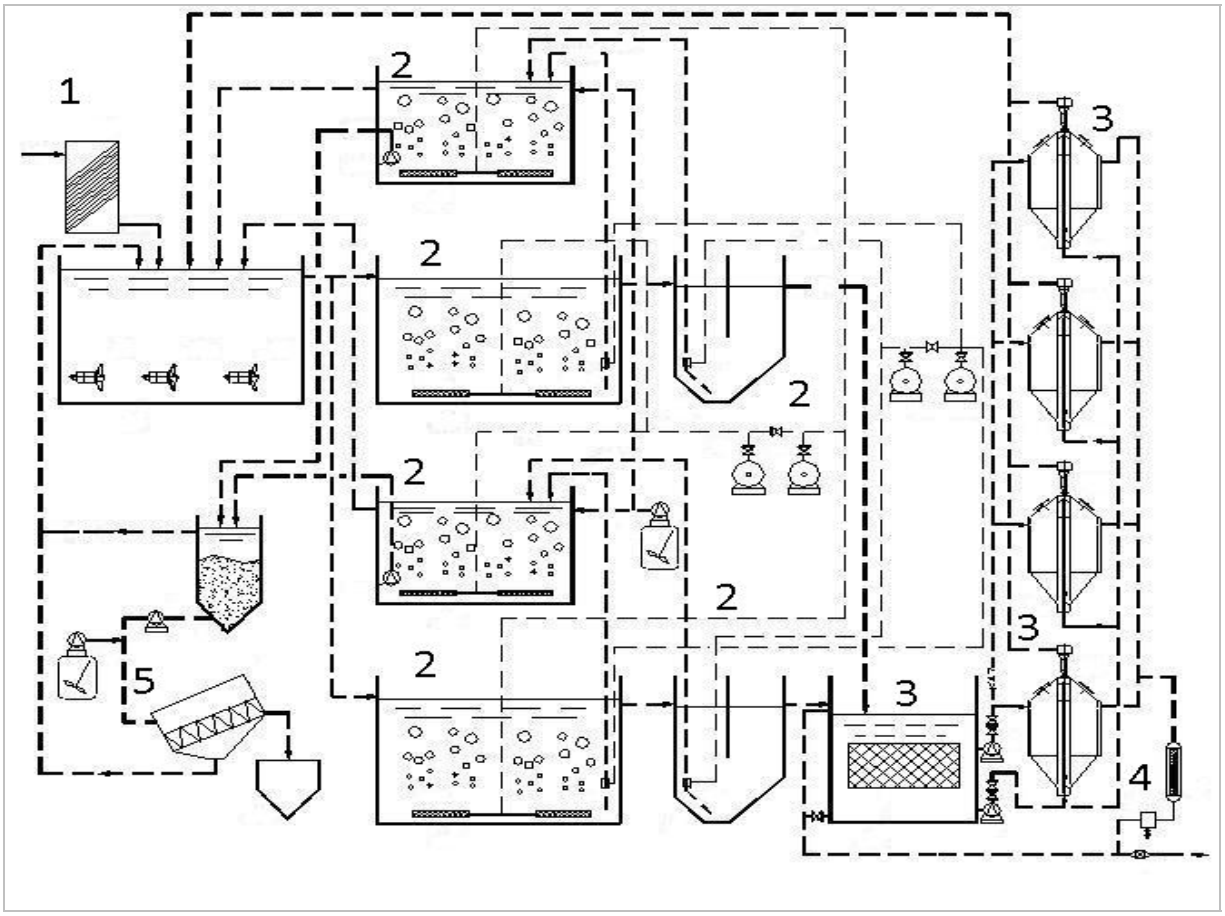
1. Demolition of the existing WWTF, including incomplete facilities. Demolition should be completed at the first stage of the project to clear the site for new WWTP installation. Demolition will not cause pollutant discharge increase because existing WWTP does not actually provide wastewater treatment. .
2. Preparation of the area for installation of the block-modular small-sized plant for treatment of waste water.
3. Selection, procurement, installation and adjustment of the block-modular plant connecting it to the waste water system.
4. Training of personnel by the equipment supplier.

The block-modular small-sized plant for treatment of waste water shall include the following units:

- Mechanical treatment
- Biological treatment to remove nitrogen and phosphor
- Advanced treatment
- Disinfection by UV irradiation
- Sediment treatment

As an example one of the possible options for process flowsheet on new WWTF in the Lesnaya Rechka district is presented on Figure 6.

Small-sized plants are manufactured from plastic, fiberglass or metal protected from corrosion which ensures plants continuous service. Most suppliers envisage this possibility to increase efficiency of plants through installation of parallel treatment lines (modules) which allows receiving increasing volumes of waste water for treatment if new facilities, residential houses, etc. are connected.



1. Mechanical treatment unit. 2. Unit of biological treatment along with nitrogen removal. 3. Units for advanced treatment. 4.Unit UV-disinfection of treated wastewater. 5. Unit for sediment treatment.

Figure 6. A possible option for process flowsheet on new WWTF in the Lesnaya Rechka district

Small-sized plants are manufactured by Russian and foreign manufactures: OOO ORVT, OOO Standard Ecology, ZAO Vodoproekt-Giprokommunvodokanal St.Petersburg, OOO SMB and others.

At present stage of pre-investment studies it is difficult to summarise technical characteristics of these modular plants as they differ significantly among the manufactures: dimensions of plants may be from 10 to 20m in length; modules have horizontal and vertical arrangement; one unit of 800m^3/day capacity or several units of smaller capacity may be installed, etc. To define technical characteristics required for this IP it will be reasonable to carry out a pre-qualification selection among possible manufactures of small-sized wastewater treatment plants.

5. PROJECT COST ESTIMATE

The estimate of the project cost is approximate. It is assumed the detailed cost calculation will be performed during detailed design stage of the project.

5.1 Capital Costs

The estimate of the capital cost has been based on the manufacturers' quotations, consolidated costs of similar projects, available project documentation, and offers of the equipment providers.

The capital costs of the prefabricated block-modular WWTF will comprise the following types of expenditures:

1. Demolition of the existing WWTF with waste water discharge via the temporary discharge into the Lesnaya River.
2. Engineering geological and geodesic surveys at the WWTF site.
3. Procurement, delivery and assembly of the WWTF.
4. Connection of WWTF to the Lesnaya Rechka district sewage system and pre-commissioning.

Based on the data provided by the manufacturers of block-modular WWTF the cost of the WWTF may amount to approximately 30 million roubles. Dismantling and surveys may require an additional 3 million roubles. It is difficult to estimate the cost of connection of the block-modular plant to the sewage system as the scope of works is unknown, but the preliminary cost of connection may be 1 million roubles. Thus, the total cost of works will amount to approximately 34 million roubles (or 772 720 euro), Table 9.

Table 9: Capital cost estimates when applying the block-modular WWTF

Cost component	Component value*	
	million roubles	euro
Dismantling	2	45 460
Engineering surveys	1	22 720
Procurements and assembly	30	681 820
Connection to the network	1	22 720
TOTAL:	**34**	**772 720**

* 1 euro = 44 roubles

The cost estimate presented in Table 9 may be revised in case the block-modular WWTF manufacturer requires additional payment for the design of WWTF connection to the site facilities and other additional expenditures including connection to the power lines.

Most block-modular WWTF manufacturers include this work into the cost of equipment and they do not influence the overall project cost. In case design works of WWTP connection to the site will require state expertise, it can be financed from the funds allocated for the design works.

When model of new WWTP is specified and its technical specifications are available (including electric power consumption) it will be necessary to estimate the cost of connection to the power lines.

5.2 Operational Costs

Operational costs have been estimated as a tentative assumption. The following assumptions were made to evaluate operational costs:

- Electric power tariff rate - 3 rubles/kWhour.
- Installed power capacity of equipment of block-modular WWTF - 30 kW. The value characterizes one of the most power-consuming examples of block-modular WWTF available on the Russian market.

The operational costs related to block-modular WWTF are estimated at 323 000 roubles (Table 10).

Table 10: Operational costs when using the block-modular WWTF

Cost	Annual expenditures*	
	thousand roubles	euro
Electric power	263	5 980
Chemical agents and materials	30	680
Maintenance and repairs of equipment	30	680
TOTAL	**323**	**7 340**

* 1 euro = 44 rubles

The personnel expenditures are not included in the operational costs as the block-modular WWTF operate in automatic mode without permanent personnel. Maintenance and repairs will be carried out by the maintenance personnel of MUE Vodokanal.

6. PROJECT PRE-INVESTMENT ASSESSMENT

This chapter includes description of environmental and social assessments of the project which is of great importance to the IP implementation the same as the technical and economic aspects. So, during project development it is necessary to take into account natural and environmental peculiarities, living conditions of the population, and in addition existing and possible bottlenecks which may appear during IP implementation.

6.1 Environmental Assessment

Implementation of this investment project will certainly allow reducing overall pollution load on local environment as well as global environmental impact.

The environmental assessment is based on the environmental status of the WWTP and assessed dispersion routes of potential pollution from the WWTP.

6.1.1 Existing Environmental Status in the IP Area

The waste water treatment at WWTF Lesnaya Rechka involves the mechanical treatment and disinfection using the chlorinated lime solution. The liquid and solid portions of the waste water are separated during the mechanical treatment. Screens and settling tanks are used for this purpose.

Discharged water from residential houses flows via the pipe duct into the intake chamber of diameter of 300 mm. A screen is installed in the intake chamber. Approximately 10-15 cm of the screen is under water. The screens are cleaned once per shift. After the screen the discharged water flows into 2 settling tanks where the water settles and mechanical residues remain upon separation. Subsequently the settled waste water flows through a pipe with diameter of 300 mm to the contact reservoir based in the chlorination room. From the reservoir via the second contact reservoir the waste water flows to the wet department of the sewage pumping station where the water should be pumped into the moor through the pipe with diameter of 200 mm, but in fact it is discharged into the water basin closest to the WWTF – into the Lesnaya River, located 50 m south of the sewage pumping station. In case of power supply failure a shutter has been installed in the sewage well to regulate the discharge of waste water from the contact reservoir No2.

Chlorinated lime of mark A, type 3 (GOST 1692-85) is used as a chlorinating agent. Since the chlorination building is in poor condition (due to the defects of building structures) and the preparation of solution in the available tanks is not possible (solution freezes in winter) the chlorine solution for disinfection of the waste water is prepared in an enameled bucket. 4-5 kg of chlorinated lime is diluted in a small quantity of water up to the mash consistency. Then the remaining water is added up to the total volume of the solution of 10 l. The solution is stirred and left for 24 hours. During the first 4 hours of the mixture settling it is stirred 3-4 times. After 24 hours the film that has appeared is removed from the top without stirring up the sludge and the required portion of the solution is taken. Per day the required quantity of solution to be added into the waste water is 8 l, which is equivalent to 333 ml/hour or 2.7 l in the morning, 2.7 in the afternoon and 2.7 l at night. Every hour the amount of the residual chlorine in the waste water is measured by iodometric method, the amount is in the range of 1.7-2.5 mg/l.

The use of the existing scheme of waste water treatment does not allow reaching the standard requirements which are set for the RF at the moment in respect to the quality of waste water (Table 11 and Table 12).

Table 11. Indices of the Treated Waste Water 2008*

Factor	Measurement unit	MPD	2008											
			Jan.	Feb.	March	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
pH	pH		7,88	8,57	7,87	9,09	7,87	6,83	7,71	8,3	7,89	7,8	7,8	8,1
Suspensions	mg/dm3	5,08	144,5	144,5	201,5	100	85,5	206	113	132	7,55	123,5	117,5	166
Biochemical oxygen demand 5	mg/dm3	5,3	198	103,3	172	74	81,5	279	221,5	112,5	86,8	233,5	114,8	106,3
Ammonium ions	mg/dm3	0,55	53,3	46,3	45,9	14,5	43,9	24,7	55,1	26,2	54,9	38,4	57,1	41
Phosphate ions P	mg/dm3	0,2	4,3	4,5	4,9	1,26	3,3	1,9	5,58	2,76	4,6	6,29	5,53	4,75
Oil products	mg/dm3	0,05	0,74	0,27	0,34	0,12	0,58	-	0,1	0,72	0,38	0,96	0,48	0,52
Synthetic Surface-active Substance	mg/dm3	0,5	2,5	2,05	-	2,49	1,51	1,99	1,82	1,03	1,4	0,96	1,2	0,79
Nitrites	mg/dm3	0,08	0,32	0,12	0,33	0,06	0,11	0,11	0,22	0,15	0,13	1	0,2	0,2
Chlorides	mg/dm3	68,3	60	-	-	100	-	-	-	60	-	0,3	-	-
Sulphates	mg/dm3		72,5	-	-	67	-	-	-	99,2	-	65	-	-
Dry residue	mg/dm3	429	454	-	-	579	-	-	-	491	-	92,2	-	-

* Data provided by MUE Vodokanal

Table 12. Indices of the Treated Waste Water 2009 *

Factor	Measurement unit	MPD	Jan.		Feb.		March		Apr.		May	
			input	output	input	output	input	output	input	output	input	output
pH	pH		7,8	8,3		7,6		9,1	7,8	8		7,3
Suspensions	mg/dm3	5,08	150,5	148,5		166,5		745	243,5	245,5		-
Biochemical oxygen demand 5	mg/dm3	5,3	109	123,8		211		243	190	133,5		237
Ammonium ions	mg/dm3	0,55	85	57,2		50		43,8	51,8	48,5		38,3
Phosphate ions P	mg/dm3	0,2	6,1	5,78		4,72		3,59	6,58	6,16		4,75
Oil products	mg/dm3	0,05	0,64	0,58		0,62		1,3	0,5	0,28		0,84
Synthetic Surface-active Substance	mg/dm3	0,5	1,4	-		1,6		2	1,5	3,1		5,2
Nitrites	mg/dm3	0,08	0,2	0,2		0,2		0,1	0,3	0,2		0,3
Chlorides	mg/dm3	68,3				65				55		-
Sulphates	mg/dm3					74,6				-		116,4
Dry residue	mg/dm3	429				448				503		-

* Data provided by MUE Vodokanal

It is clear from the above that WWTF Lesnaya Rechka does not provide the required level of treatment quality of the district waste water. All the indices exceed the maximum permissible discharge levels (MPD) and for some indices MPD is exceeded 10 times. It is clear from Table 12 that the concentration of harmful substances at the output stage after the treatment is the same as at the input stage and in some cases even exceeds the

input level. This is caused by the fact that the WWTF Lesnaya Rechka uses an outdated method of treatment and the poor condition of equipment which is unable to efficiently treat the waste water of the district and this negatively influences the general hydro chemical condition of the Lesnaya River and the Northern Dvina River in general.

The key negative effect from the WWTF is caused by the work of the chlorination plant. This leads to both the discharge of toxic by-products of chlorination into the Lesnaya River and to the inevitable emission of chlorine even during the standard treatment process. Accidental emissions of chlorine into the atmosphere may potentially lead to considerable risks to human health and the environment.

The precipitation waters that are not fully treated are transported to the municipal waste landfill and stored there without the environmental protection measures. This aspect of the waste water treatment has an additional negative impact on the environment.

6.1.2 Dispersion Routes

Geology and hydrogeology
Based on the site inspection of the project team, the topsoil layer at the WWTF is assessed as consisting of loamy sand and clay sediments. Possible subsurface ground water aquifers are expected to flow south towards the Lesnaya River.

Surface water recipients
The nearest surface water recipient is the Lesnaya River located approximately 50 m downstream the WWTF. The Lesnaya River flows directly into the Northern Dvina River, hence accessing the Arctic marine environment.

Waste water equivalent to untreated waste water level is discharged directly into Lesnaya River.

Air
Dispersion routes of air include gas emissions of pollutants, including degradation products of the waste water.

Gas emissions from the polluted site include carbon dioxide and methane from the degradation process, volatile components of the waste water and chlorine products.

Influence of climate change on the dispersion routes
Climate changes are anticipated to cause an increase in the mean annual air temperatures of up to several degrees over much of the Arctic. In addition climate changes are anticipated to cause alteration of precipitation patterns.

The potential increase in temperature is not expected to lead to substantial increase in the degradation processes at the WWTF. Due to the location in forest area, local geology and lack of continuous permafrost an increase in temperature and alteration of precipitation pattern is not expected to entail geotechnical instability of the area.

6.1.3 Preliminary Environmental Risk Assessment

The preliminary environmental risk assessment is based on existing environmental data, site inspection observations and the dispersion routes.

In Table 13 below the risks of occurrences caused by the WWTF potentially impacting human health and the environment before, during and after implementation are

presented. The current situation and the implementation period are assessed as entailing similar environmental impacts as the existing WWTF will be used for waste water treatment in the implementation period.

Table 13: Assessed risks of occurrences caused by the WWTF related to human health and dispersion to the environment before, during and after implementation

	Current situation and implementation period		After implementation	
Human health				
Direct contact	**Local settlements** Located in adjacent area of the WWTF	**Workers** Potential contact with waste water Contact with chlorine and chlorination products	**Local settlements** Located in adjacent area of the WWTF No discharge of untreated waste water	**Workers** Limited contact with waste water No contact with potentially hazardous chemicals
	Medium risk	**High risk**	**Low risk**	**Low risk**
Exposure - air emissions	**Local settlements** Limited content of volatile components	**Workers** Exposure to waste water Exposure to potentially hazardous chemicals	**Local settlements** Limited content of volatile components	**Workers** Limited contact with waste water No exposure to potentially hazardous chemicals
	Low risk	**High risk**	**Low risk**	**Low risk**
Exposure - water	**Local settlements** Located in adjacent area of the WWTF Expected contact with river water	**Workers** Direct exposure to the waste water	**Local settlements** Located in adjacent area of the WWTF No discharge of untreated waste water	**Workers** Limited contact with waste water
	High risk	**High risk**	**Low risk**	**Low risk**
Dispersion in the environment				
Air	**Particles** During dry conditions, risk of particle dispersion	**Emissions** Degradation products Limited emissions of volatile components	**Particles** Limited particle dispersion	**Emissions** Limited emissions of degradation products, volatile components and potentially hazardous chemicals
	Low risk	**Medium risk**	**Low risk**	**Low risk**
Water	**Subsurface water** Leakage in WWTF constructions	**Lesnaya/Dvina River** Direct discharge of untreated waste water	**Subsurface water** No leakage in construction	**Lesnaya/Dvina River** No direct discharge into the River
	Medium risk	**High risk**	**Low risk**	**Low risk**

Current assessed environmental impact

Human health

The WWTF is located in the immediate vicinity of residential areas. The site has low accessibility for the local population. However due to the direct discharge of untreated

waste water into the Lesnaya River, the WWTF is assessed as posing a hazardous risk to the health of the local population.

Workers at the WWTF are directly exposed to the waste water and hazardous chlorination products. Current activities at the WWTF are assessed as posing a hazardous risk to workers at the site.

Dispersion to the environment
Dispersion of airborne particles and emissions are assessed as posing a low – medium risk of dispersion to the environment due to the limited degradation processes. The emission of degradation products and hazardous chlorination products are assessed as posing a risk to the local environment, rather than the regional/global environment.

The direct discharge of untreated waste water into Lesnaya River is assessed as posing a hazardous risk to the local and regional environment. Lesnaya River flows directly into the Northern Dvina River, so the WWTF may pose a hazardous risk to the Arctic marine environment.

Implementation period – assessed environmental impact

In the implementation period the same assessed environmental impacts as the current situation apply.

The potential environmental impacts caused by the physical works of the implementation are presented in Table 14.

Table 14: Overview of the consequences, risks and preventive measures for environmental impact in the implementation period

Description	Consequence/ impact	Affected people/ environment	Probability/ risk	Preventive measures
Human health				
Transport vehicles and construction machinery	Exposure to air pollution and particles	Workers	High	HSE plan
Dispersion to the environment				
Transport vehicles and construction machinery	Increase in air pollution and particle emissions	Local, regional and global environment	High	Assess the environmental impact Particle filters on vehicles/machines Environmentally friendly use of vehicles/machinery
Accidents	Accidental change in dispersion routes causing unintentional pollution	Local environment	Low	HSE plan including emergency action plan

During the implementation period the project will negatively impact the atmosphere due to the utilization of transport and hardware needed for the construction. The main pollutants are combustion products and greenhouse gasses. The pollution is limited to the implementation period and is expected to be outweighed by the long-term environmental gains of remediating the oil pollution at the site. In order to limit pollution and particle

emissions during the implementation period, it is recommended to include a plan for minimizing emissions in the health, safety and environment plan (HSE).

During the implementation period, workers are exposed to the pollution through direct contact, particles and emissions of volatile components. Measures to limit the exposure to the pollution shall be included in the HSE plan.

After implementation

Subsequent to implementation and decommissioning of the existing WWTF, untreated waste water should no longer be discharged into the Lesnaya River and should hence no longer pose a hazardous risk to the human health and the environment.

6.1.4 Environmental Benefits

During the construction period a short-term increase in environmental impacts is expected. The long-term environmental benefits of constructing a new WWTP are however assessed as outweighing the short-term environmental impacts. In general, implementation of this IP will result in decrease of negative environmental impact in Arkhangelsk including adjacent water bodies.

The IP implementation will bring the following environmental benefits.

An important environmental effect of the project will be the dismantling of the hazardous production facility - chlorination plant and WWTP chlorine store house. Replacement of sewage water chlorination unit by ultraviolet sewage water disinfection plant will allow excluding the risk of unavoidable chlorine leakage during transportation, storage and application of the agent.

Also, as a result, sewage water chlorination products that are highly toxic substances will not be emitted into the environment and the efficiency of disinfection will remain at a high level.

The block-modular WWTF are especially designed to meet the strict environmental standards, location and operation in the sanitary protection area.

Increase of sewage water treatment effectiveness with respect to such characteristics as "oil products", "phosphorus", "suspended particles", "BOD" and nitrite will result in significant reduction of pollutants discharged into water bodies (Fig. 7)

In order to calculate the discharge of pollutants after the implementation of the project the most probable concentrations of pollutants in the treated waste water were multiplied by the annual discharge of the waste water. Besides, the elimination of discharge of the non-treated waste water will considerably influence the environmental impact.

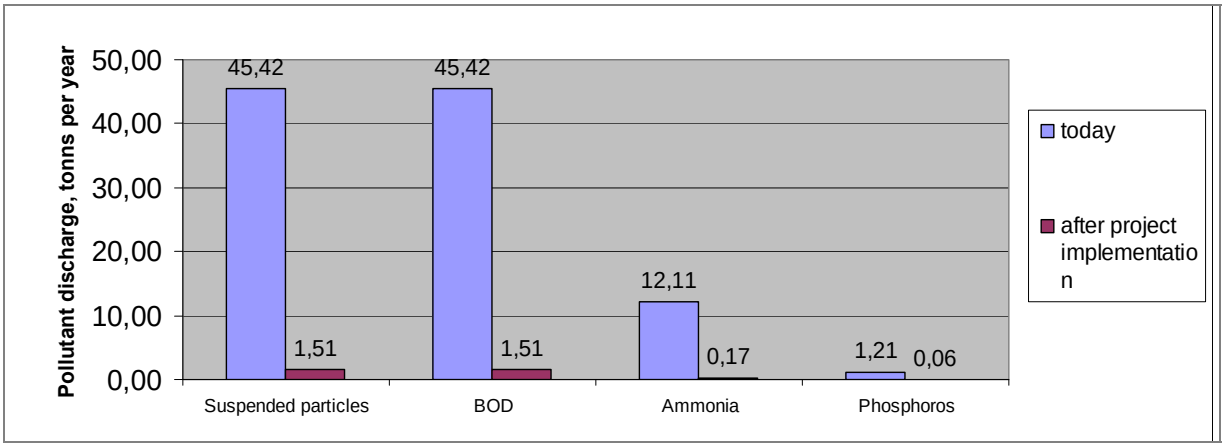


Fig. 7. Reduction of the pollutants discharge into the water reservoirs

Elimination of the pollution sources which are similar to this facility will allow reducing the negative environmental impact in the future, not only in a particular area but on the Arctic coast as a whole and will therefore preserve the unique natural and marine environment.

6.2 Social Assessment

WWTF of the Lesnaya Rechka district are in improper condition due to the defects of construction and poor operation and the lack of upgrade work from the date of construction thereof. The untreated sewage water is discharged to the Lesnaya River due to ineffective operation of the WWTF that results in water area pollution around the district and Arkhangelsk. The current situation results in deterioration of both environmental and social situation in the city, particularly in increase of social tenseness, population health impairment and reduction of recreation and tourism areas previously used by population.

6.2.1 Stakeholder Identification

The following stakeholders have been identified in the project:

- Employees at the WWTP
- Contractors/workers at the WWTP
- Local population
- Community of Isakogorka and Tsiglomen districts
- Administration of Isakogorka and Tsiglomen districts
- Arkhangelsk City Administration
- Arkhangelsk Region Administration

6.2.2 Social analysis

Thorough social interviews of all stakeholders have not been made. The following social analysis is based on opinions/assessments of the project owner and the local and regional authorities, and further on the general socio-economical situation in Lesnaya Rechka.

The administrations of Arkhangelsk and Isakogorka and Tsiglomen districts are very concerned about the existing situation, which worsens every year due to the poor technical state of the equipment and network, and permanently declining reliability. The meetings held with the stakeholders in Arkhangelsk indicated that the owner of the

project, MUE Vodokanal, is interested in a rapid problem solving. Administration of Arkhangelsk city considers this project implementation as one of its top targets.

6.2.3 Social Benefits from the IP Implementation

The social impact assessment shows that implementation of the project will lead to the following social benefits which are difficult to reflect in financial equivalent:

- Increase of the sewage systems reliability which is one of the most significant systems of life sustenance;
- Elimination of the non-treated water discharge into the surface water reservoirs of Arkhangelsk and Lesnaya Rechka District in particular. This will have a positive influence on the environment and will lead to considerable improvement of the living conditions of local population.
- Increase of the living comfort to the population will reduce the level of diseases and therefore will reduce the personal and budgetary expenditures for medical treatment, and also this will reduce the migration of the population to other regions of the RF.
- Introduction of a new viable waste water treatment technology in the region. Adapting similar solutions for other areas of environmental and health concerns induces capacity building.

6.3 Stakeholders Participation/Involvement

Stakeholder participation
Stakeholders' participation in the project is essential for communicating the social benefits of the project.

Measures aimed at public and local population awareness of this IP implementation are taken in the course of pre-investment studies.

Information about the project was published in June 2009 newsletter of Nordic Council of Ministers "Energy Efficiency in Barents and Baltic Regions" in Russian and in English.

During the meeting of the Environmental Working Group of the Barents Euro-Arctic Council which took place in Arkhangelsk in the beginning of October 2009 a presentation was made about the Lesnaya Rechka Project. The consultant presented information about the current status of water management in the Arkhangelsk Region and about the Lesnaya Rechka Project. The implementation of the latter could become an example for implementation of similar projects on modernization of small municipal WWTFs. The presentation had genuine interest among the meeting participants and received positive feedback. On request from NEFCO the presentation was handed over to them for further analysis.

Prior to the project implementation all stakeholders and the public were informed of the project progress and were granted the possibility to study the project report for comments and corrections. On 16th December 2009 the project press-release was published on the Arkhangelsk regional administration web page (http://www.dvinaland.ru/prcenter/release/10062). On 23rd December 2009 the press-release was published in the main municipal newspaper "Arkhangelsk". A short project presentation was transmitted on the municipal radio station "Pomorye".

It was possible to receive detailed project information in the offices of the project Directorate NPA-Arctic, the project owner – MUE Vodokanal, Arkhangelsk municipal

administration and Ramboll Barents office. This was organized for the IP owner to be able to define possible concern of the acknowledged community and stakeholders at the early stage of the project implementation.

The Consultant did not receive comments and corrections from the project owner and the public. Comments of the project Directorate NPA-Arctic and Department of Energy, Fuel and Communal services of the Arkhangelsk regional administration have been taken into account in the final version of the project report.

Recommendations on municipal infrastructure development

In the sphere of infrastructure, apart from the all-Russian problem of high depreciation of assets and lack of road infrastructure due to the growth of car fleet, there is a problem of efficient use of funds for infrastructural needs of the city raised from the budgets of various levels and private investors. The reason of low efficiency is lack of unified policy on development of the engineering infrastructure of the city which would allow comprehensively addressing the resolution of existing problems and prevention of potential challenges.

7. PROJECT FINANCIAL VIABILITY

This chapter covers the financial justification for the implementation of the proposed new WWTP construction measures in Lesnaya Rechka. The chapter contains the results of the preceding chapters' analyses and financial justification for the proposed investment plan.

7.1 Approaches of Economic Evaluation

The main goal of evaluation is to determine financial viability and economic efficiency of the investment project. After economic evaluation the financial viability, payback and possibility of profit earning are estimated, subsequently leading to the decision about reasonability of the IP implementation.

The reasonability evaluation is based on comparison of the current situation and expected situation after project implementation.

It shall be noted that WWTP are in unsatisfactory condition, and equipment is worn-out due to the improper use during the previous years. The situation is getting worse from year to year. If this IP is not implemented, this tendency is expected to continue.

When evaluating the project it becomes clear that there is no direct economic effect after project implementation because there is no fuel, energy or material saving results. Besides, treatment plants were transferred to Vodokanal from the previous owner without any additional financing for the maintenance purposes. Therefore, present financial support from Vodokanal is insignificant and too far from the real necessary expenses. Other factors and effects are also considered such as environmental and social influence. So, many of the benefits cannot be evaluated in money equivalent.

7.2 Financial Status of MUE Vodokanal

The Balance Sheets (BS) and Income Statements (IS) of Arkhangelsk Vodokanal were analysed to verify the financial status of the organisation.

The BS and IS were collected from the last 5 years and the first quarter of the year 2009. The BS and IS are presented in EUR. Also the working capital and development of tariff levels were analysed.

Table 15: Income Statement of Arkhangelsk Vodokanal, EUR

Income Statement	Unit	2004	2005	2006	2007	2008	2009, 1st Q
Receipts and expenditures in general activities							
Products, works and services sales proceeds (netto) (minus VAT, excises and similar copulsory payments)	EUR	9 547 482	10 571 773	10 445 636	11 960 545	14 519 500	4 389 068
Net value of goods and services sold	EUR	-9 306 578	-10 370 273	-11 923 250	-13 190 091	-16 772 386	-4 552 432
Gross Profit	**EUR**	**240 904**	**201 500**	**-1 477 614**	**-1 229 545**	**-2 252 886**	**-163 364**
Commercial expenditures	EUR						
Management costs	EUR						
Sales Profit (loss)	**EUR**	**240 904**	**201 500**	**-1 477 614**	**-1 229 545**	**-2 252 886**	**-163 364**
Other receipts and expenditures							
Interests receivabe	EUR	674	2 591	1 568	1 705	568	45
Interest due	EUR	-7 705	-4 318	-41 068	-277 273	-337 045	-125 159
Revenues from participation in other companies	EUR	0	0	0	609 182	0	0
Other revenues	EUR	30 563	6 909	52 568	-847 318	710 795	838 318
Other costs	EUR	-35 857	-15 227	-440 364	0	-747 773	-206 955
External income	EUR	6 360	17 023	0	0	0	0
External costs	EUR	-66 789	-624 523	0	0	0	0
Profit (loss) before taxes	**EUR**	**168 150**	**-416 045**	**-1 904 909**	**-1 743 250**	**-2 626 341**	**342 886**
Deferred tax assets	EUR	0	0	468 773	402 068	563 614	-84 886
Deferred tax liabilities	EUR	-63 255	-45 727	-74 205	-39 568	-17 364	-3 205
Current income tax	EUR	60 879	-4 864	0	0	0	0
Supplementary indicators	EUR	0	0	0	0	0	-4 795
Income tax and other compulsory payments	EUR	-59 136	-32 636	-33 341	-32 432	-87 568	0
Net Profit (loss)	**EUR**	**106 638**	**-499 273**	**-1 543 682**	**-1 413 182**	**-2 167 659**	**250 000**

During the last years the revenues have been increasing in nominal terms. The increase was from EUR 9.5 million in 2004 to EUR 14.5 million in 2008. When considering an average annual 18% inflation, the real value of revenues of the Vodokanal services has been in clear decline since 2004. Annual decrease has steadily been 15%. This can be seen also in the declining real tariff levels (Table 16 and Table 17) and declining water sales (in m^3), see Fig. 8. The real drinking water tariff level has declined 30% between 2004 and 2009. The real waste water tariff level has declined 21% during the same period. Water sales (in m^3) to industry and commercial sectors have declined and the sales to the population have remained unchanged during the same period. The revenues from industry and commercial sector are higher (and hence more important) than revenues from the population due to much higher tariff level for industry and commercial sector than for population (Table 16 and Table 17).

During the period 2005 – 2008 the costs have been higher than the revenues (annual loss 5% to 15 % of the revenues). It is preliminary to make any conclusions about the net profit of the first quarter of 2009.

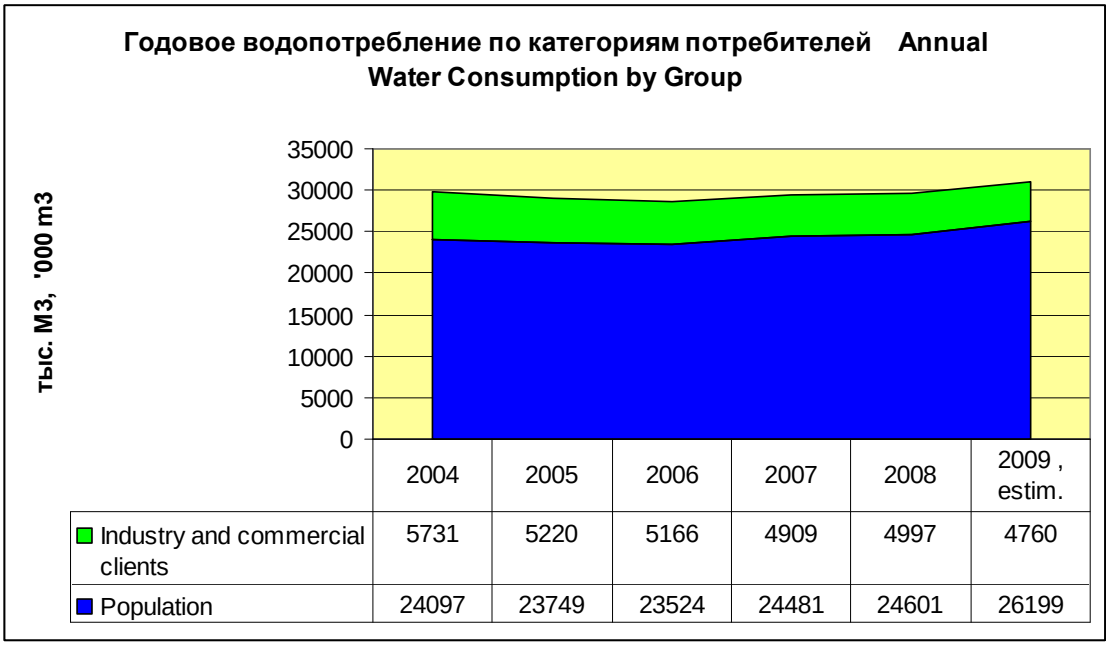


Fig. 8. Water demand/sales between the years 2004 and 2009, the 2009 demand/sales is estimate based on the 1st quarter sales

Table 16: Tariff levels between the period 2004-2009, VAT assumed 18%, 000'RUB

Drinking Water Tariffs in 2004, 2005, 2006, 2007 and 2008, RUB/m3

	2004		2005		2006		2007		2008		2009	
Drinking water	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT
Population	3,98	4,70	4,55	5,37	4,55	5,37	5,37	6,34	6,44	7,60	8,05	9,50
Other clients	27,41	32,34	27,41	32,34	27,41	32,34	32,48	38,33	39,45	46,55	44,68	52,72
Weighted avg. (water demand as a weight)	**8,48**	**10,01**	**8,67**	**10,23**	**8,67**	**10,23**	**9,90**	**11,68**	**12,01**	**14,18**	**13,68**	**16,15**
Weighted average with 18% inflation correction to 2009 money value	**19,41**	**22,90**	**16,81**	**19,83**	**14,24**	**16,80**	**13,79**	**16,27**	**14,18**	**16,73**	**13,68**	**16,15**

Waste Water Tariffs in 2004, 2005, 2006, 2007 and 2008, EUR/m3

	2004		2005		2006		2007		2008		2009	
Waste water	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT
Population	3,41	4,02	4,03	4,75	4,03	4,75	4,75	5,61	5,70	6,73	7,13	8,41
Other clients	26,44	31,20	29,11	34,35	29,11	34,35	34,02	40,14	39,74	46,89	48,62	57,37
Weighted avg. (water demand as a weight)	**6,99**	**8,25**	**7,82**	**9,23**	**7,87**	**9,28**	**8,98**	**10,60**	**10,56**	**12,46**	**12,64**	**14,92**
Weighted average with 18% inflation correction to 2009 money value	**15,99**	**18,87**	**15,17**	**17,90**	**12,92**	**15,25**	**12,50**	**14,76**	**12,46**	**14,70**	**12,64**	**14,92**

Table 17: Tariff levels between the period 2004-2009, VAT assumed 18%, EUR

Drinking Water Tariffs in 2004, 2005, 2006, 2007 and 2008, EUR/m3

	2004		2005		2006		2007		2008		2009	
Drinking water	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT
Population	0,09	0,11	0,10	0,12	0,10	0,12	0,12	0,14	0,15	0,17	0,18	0,22
Other clients	0,62	0,74	0,62	0,74	0,62	0,74	0,74	0,87	0,90	1,06	1,02	1,20
Weighted avg. (water demand as a weight)	**0,19**	**0,23**	**0,20**	**0,23**	**0,20**	**0,23**	**0,23**	**0,27**	**0,27**	**0,32**	**0,31**	**0,37**
Weighted average with 18% inflation correction to 2009 money value	**0,44**	**0,52**	**0,38**	**0,45**	**0,32**	**0,38**	**0,31**	**0,37**	**0,32**	**0,38**	**0,31**	**0,37**

Waste Water Tariffs in 2004, 2005, 2006, 2007 and 2008, EUR/m3

	2004		2005		2006		2007		2008		2009	
Waste water	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT	w.o. VAT	with VAT
Population	0,08	0,09	0,09	0,11	0,09	0,11	0,11	0,13	0,13	0,15	0,16	0,19
Other clients	0,60	0,71	0,66	0,78	0,66	0,78	0,77	0,91	0,90	1,07	1,11	1,30
Weighted avg. (water demand as a weight)	**0,16**	**0,19**	**0,18**	**0,21**	**0,18**	**0,21**	**0,20**	**0,24**	**0,24**	**0,28**	**0,29**	**0,34**
Weighted average with 18% inflation correction to 2009 money value	**0,36**	**0,43**	**0,34**	**0,41**	**0,29**	**0,35**	**0,28**	**0,34**	**0,28**	**0,33**	**0,29**	**0,34**

Table 18: Balance Sheet of Arkhangelsk Vodokanal, EUR

ASSETS	Unit	2004	2005	2006	2007	2008	2009, 1st Q
Fixed Assets							
Fictious assets	EUR						
Fixed assets	EUR	6 883 905	6 854 932	7 050 136	7 369 523	7 991 227	7 888 727
Uncompleted construction	EUR	33 495	43 909	33 500	48 659	810 091	867 295
Profitable investmnets into mateial assets	EUR						
Long-term financial investments (assistance)	EUR						
Deferred tax assets	EUR	0	0	468 773	870 864	1 434 477	1 110 500
Other fixed assets	EUR						
Total Fixed Assets	**EUR**	**6 917 400**	**6 898 841**	**7 552 409**	**8 289 045**	**10 235 795**	**9 866 523**
Current Assets							
Inventories	EUR	515 892	649 159	837 841	1 015 818	499 159	519 023
stocks, materials and other similar valuables	EUR	393 120	408 841	410 773	434 159	465 545	489 841
animals for farming and fattering	EUR						
costs for goods-in-process	EUR	312	545	614	659	750	0
finished commodity and goods for resale	EUR	1 896	1 614	1 114	1 182	2 114	2 795
shipped goods	EUR	0	0	0	0	0	0
expenditures of future periods	EUR	120 563	238 159	425 364	579 841	30 750	26 386
other purveyance and costs	EUR	0	0	0	0	0	0
VAT on purchased valuables	EUR	223 870	221 364	107 636	37 205	6 500	7 159
Receivables (payments expected to receive more than 12 months)	EUR						
customs and clients	EUR						
Receivables (payments expected to receive in 12 months)	EUR	3 241 192	3 300 318	3 599 273	3 842 114	4 519 523	5 253 841
customs and clients	EUR	3 087 179	3 131 955	3 341 159	3 626 205	3 623 682	4 316 818
Short term financial investmneets	EUR	29 545	0	81 205	6 114	6 114	6 114
Cash assets	EUR	46 915	28 455	8 614	33 068	130 682	132 773
Other current assets	EUR						
Total Current Assets	**EUR**	**4 057 414**	**4 199 295**	**4 634 568**	**4 934 318**	**5 161 977**	**5 918 909**
TOTAL ASSETS	**EUR**	**10 974 814**	**11 098 136**	**12 186 977**	**13 223 364**	**15 397 773**	**15 785 432**

LIABILITIES	Unit	2004	2005	2006	2007	2008	2009, 1st Q
Equity and reserves							
Equity capital	EUR	33 962	33 955	33 955	33 955	33 955	33 955
Own bought out stocks	EUR						
Surplus capital	EUR	8 987 254	3 572 205	3 572 205	3 569 182	3 556 682	3 556 682
Reserve capital including	EUR						
Reserves formed in accordance with a legislation	EUR						
Reserves formed in accordance with founding documents	EUR						
Undivided profit (ucovered loss)	EUR	-539 187	4 547 795	3 496 114	2 561 773	1 305 614	1 400 477
Property transfered to management	EUR	0	5 586 250	6 078 250	6 554 023	7 453 068	0
Total Equity Capital	**EUR**	**8 482 029**	**8 153 955**	**7 102 273**	**6 164 909**	**4 896 250**	**4 991 114**
Long term liabilities							
Borrows and loans	EUR	0	0	1 102 273	2 305 682	2 418 182	1 848 295
Defererd tax liabilities	EUR	114 364	160 091	234 318	273 886	291 250	245 909
Other long-term liabilities	EUR						
-	EUR						
Total long-term liabilities	**EUR**	**114 364**	**160 091**	**1 336 591**	**2 579 568**	**2 709 432**	**2 094 205**
Current Liabilities							
Borrows and loans	EUR	0	109 159	123 159	284 091	1 931 818	1 412 636
Bills payable	EUR	2 378 421	2 674 909	3 624 955	3 998 318	5 586 136	7 022 750
supliers and contractors	EUR	1 898 781	1 728 068	2 465 886	2 323 273	2 190 045	2 918 341
depts to company's staff	EUR	140 754	195 909	215 295	281 114	345 295	343 341
debts to state non-budget funds	EUR	0	2 295	82 568	390 659	279 568	555 977
tax-and-duties debts	EUR	338 728	336 773	459 409	651 159	516 227	661 295
other debtees	EUR	158	411 886	401 818	352 091	2 255 023	2 543 795
Arrears of dividents	EUR						
Deferred income	EUR	0	0	0	196 477	274 136	264 727
Reserves for future expenditures	EUR						
Other current liabilities	EUR						
Total Current Liabilities	**EUR**	**2 378 421**	**2 784 068**	**3 748 114**	**4 478 886**	**7 792 091**	**8 700 114**
Total Liabilities	**EUR**	**2 492 785**	**2 944 159**	**5 084 705**	**7 058 455**	**10 501 523**	**10 794 318**
TOTAL EQUITY CAPITAL AND LIABILITIES	**EUR**	**10 974 814**	**11 098 114**	**12 186 977**	**13 223 364**	**15 397 773**	**15 785 432**

Arkhangelsk Vodokanal has EUR 1.8 million long term loans and EUR 0.25 million of other long term liabilities. These loans have been taken during the years 2008 and 2009. Previous loans Vodokanal has paid back without delays – according to the information received from the Vodokanal. The present loans should be taken into account, if new loans are considered in the Vodokanal.

According to the data received from Arkhangelsk Vodokanal the subsidies received from the municipality (city of Arkhangelsk) have been less than EUR 1 million annually (in 2008 MEUR 0.48 and the two first quarters of 2009 MEUR 0.68). No information about other subsidies was received.

No information was received from Arkhangelsk Vodokanal about:

- history of unpaid taxes nor unpaid salaries;
- possible subsidy/support from the Arkhangelsk region;
- payments of pollution fines exceeding normative discharges.

Table 19: Analysis of working capital

Working capital	Unit	2004	2005	2006	2007	2008	2009, 1st Q
Working capital in the end of the year							
Receivables	EUR	3 241 192	3 300 318	3 599 273	3 842 114	4 519 523	5 253 841
Bills payable	EUR	2 378 421	2 674 909	3 624 955	3 998 318	5 586 136	7 022 750
Inventories	EUR	n/a	n/a	n/a	n/a	n/a	n/a
Working capital compared to							
Products, works and services sales proceeds (netto) (minus VAT, excises and similar copulsory payments)	EUR	9 547 482	10 571 773	10 445 636	11 960 545	14 519 500	4 389 068
Net value of goods and services sold	EUR	9 306 578	10 370 273	11 923 250	13 190 091	16 772 386	4 552 432
Materials	EUR	n/a	n/a	n/a	n/a	n/a	n/a
Rotation times of working capital categories							
Receivable, average payment time	Days	124	114	126	117	114	109
Bills Payable, average payment time	Days	93	94	111	111	122	141
Inventories, consumables turnover	Days	n/a	n/a	n/a	n/a	n/a	n/a

Working capital of Arkhangelsk Vodokanal was analysed, as regards to receivables and bills payable. The inventory and other working capital items were not analysed because there was not enough information available.

The collection time of receivables between 2004 and 2008 has been between 114 and 126 days, which is about 4 months. The payment time of bills payable during the same period was 92 to 122 days, which is 3 to 4 months. Both collection times and payment times are typical in Russia in water utilities. Receivables may include bad debts (receivables which will never be received). Bad debts may, if large amounts exist, lead to financial problems.

Conclusions

The revenues of Arkhangelsk Vodokanal are declining and the organisation is making losses. The organisation has some long term loans. The organisation is unlikely willing to increase its loan amount. The collection times of receivables and payment times of bills are long but at the normal level in similar organisations in Russia. All the needed information was not received to complete the analysis. The missing information should be received and the issues mentioned above clarified.

7.3 Project Financing

7.3.1. IP Financing Schedule

IP financing schedule is presented in this chapter. The total project cost is 772 720 euro. The financing schedule by financier and the year is presented in the Table 20 below. The financing schedule is preliminary.

Table 20: Financing Schedule by Year, EUR

IP Financing Source	Years of implementation		TOTAL	Share, %
	1st year	2nd year		
Grant	309 100	-	309 100	40%
Local Funds	231 820	231 800	463 620	60%
TOTAL planned investment	**540 920**	**231 800**	**772 720**	**100%**

* Local financing means financing from the federal program. Necessary municipal financing will be supported by an international grant.

The financial schedule was developed based on the information received during the meetings and negotiations with the management of MUE Vodokanal and the Department of Housing and Communal Services and Energy of the Arkhangelsk City Administration, and by making estimates based on previous experience of the consultant.

Financing schedule was made by using the following assumptions:

- For the time being MUE Vodokanal has loan liabilities in the amount of 10 million euro (or 346 million rubles). The loan was approved by the European Bank of Reconstruction and Development (EBRD) in 2003 for the implementation of the project "Modernization of the city utilities and services in water supply and waste water in Arkhangelsk". Until now Vodokanal has drawn 32 million rubles. The remaining sum shall be drawn during 2010. The loan payment term is 2019.

- According to the agreement with the EBRD, Vodokanal is not allowed to receive any credits without the bank's consent. Therefore, this condition prejudices possibility to raise a new loan which will lead to the increase of the accounts payable, and the payment of the second loan is not possible taking into account that Vodokanal does not obtain profit during a number of years.

- During the meetings with the Arkhangelsk City Administration the representatives of the Administration stated their negative attitude towards any new international loan that would be an additional burden for Vodokanal.

- As local co-financing the Arkhangelsk City Administration intends to involve funds from federal sources as. Since Vodokanal does not possess its own assets to co-finance the project it is planned to attract an international grant as municipal co-financing necessary to receive federal financing.

Thus, it is assumed that the financial structure of investment will consist of 40% international grant and 60% local financing. The total investment amounts to 772 720 EURO.

IP Profitability

Project profitability was not analyzed as the project does not provide for the reduction of the cost price or additional revenues. The financial earning indicator is negative. However, such economic benefits as improvement of health level and environmental conditions of population justify the implementation of the project. The evaluation of economic benefits was not performed. Cash flow analysis was not made either, because the financing schedule proposed by the Arkhangelsk City Administration does not provide for international or Russian loans.

7.3.2. Planned Project Co-financing

It is impossible to describe project co-financing today. The Arkhangelsk City Administration and, moreover, Vodokanal do not have local budget funds to provide the project financing. However, the city administration is planning to apply for co-financing to one of the federal target programs. For that purpose the Administration is prepared to develop the project documentation in 2010 using the funds from the municipal budget for consequent utilization of the project documentation when applying for the project approval by federal authorities.

7.3.3. Possible Sources of Financial Support from Interested Stakeholders

The project does not have direct economic effect. However, there are some possibilities to attract the local investments for the project implementation. Possible Russian financing sources:

- Investment program of MUE Vodokanal. Investment program of the enterprise provides for incorporation of investment mark-up for a certain action or IP financing. Today the program is being reviewed in the Arkhangelsk Municipal Deputy Council. The program for 2010 does not include investment mark-up for Lesnaya Rechka project financing but this can be made for 2011.

- Financing from the regional budget. This financial source of project implementation shall be approved in the regional budget for a year ahead. According to the Department of Energy, Fuel and Communal services of Arkhangelsk regional administration (now Ministry of Fuel and Energy Complex and Housing Utilities of the Arkhangelsk region) it is unlikely to co-finance the project implementation from municipal budget and MUE Vodokanal budget in 2010. The project has not been included in the long-term regional target program "Clean water" for 2010-2012.

- Federal target program "Clean Water". Today the program is being reviewed by the executive and legislative authorities. The program is expected to be approved on 1 July 2010 (Annex 8). The financing plan of the federal programmes provides for 50-60% of the federal support and 40-50% of the local financing depending on the program. Arkhangelsk municipal administration intends to use an international grant to cover local (municipal) share of financing because municipality and MUE Vodokanal do not have their own funds to finance the project.

- It is possible to use state-private partnership with tariff regulation and interest backing at the expenses of the federal budget. The law № 52-4-ОЗ "Tax remissions for investment activities in the Arkhangelsk region" was adopted in the Arkhangelsk region in 2009. The law provides tax remissions for profit tax and exemption from property tax for new-built property in large-scale investment projects namely 100 mln. RUR per year and larger. Lesnaya Rechka WWTP does not have this scale and doe not fall under this law. According to Arkhangelsk municipal administration this question has not been actively considered yet because the number of large-scale investors in the Arkhangelsk region is limited and business society does not consider water/wastewater services sector as possible target for investment due to significant accumulated depreciation of communal infrastructure and equipment.

In order to clarify the existing financial support for the IP from the relevant authorities and the project owner, as well as to identify potential IFI additional consultations have been held.

According to the letter of the Ministry of Fuel and Energy Complex and Housing Utilities of the Arkhangelsk region, the regional budget does not provide funding for the IP in 2010 (Annex 8). However, the Ministry has confirmed the readiness to support further promotion of the IP and recommended the mayor of Arkhangelsk to provide necessary information on investment projects for upgrading, renovation and construction of new water supply and drainage facilities to the Expert Group on regional projects and Clear Water programs to participate in tender selection of projects for 2010 in order to obtain co-financing from the federal budget.

Administration of Arkhangelsk confirmed its willingness to undertake necessary steps to attract co-financing under the proposed financial scheme subject to the project implementation schedule in 2011 (Annex 9). In addition, the Ministry of Fuel and Energy Complex and Housing Utilities of the Arkhangelsk region reported that administration of Arkhangelsk is considering the issue of allocation of funds in the city budget in the 2nd half of 2010 for development of design estimates documentation for the IP and the state review of project documents (Annex 8).

Consultations with IFI - International Finance Corporation (IFC), European Bank for Reconstruction and Development (EBRD), the Global Environment Facility (GEF Earth Fund), Northern Dimension Environmental Programme (NDEP), NEFCO, UNEP, the Nordic Investment Bank (NIB) - showed that the majority of institutions such as IFC, EBRD, NDEP, and NIB prefer larger projects, and this project does not refer thereto.

NEFCO has not yet commented on the possibility of their participation in this IP. Given that NEFCO focuses on infrastructure projects, including projects with small amounts of investment, the continuation of negotiations with NEFCO seems promising.

As mentioned in chapter 6.3 the Consultant conducted negotiations with NEFCO representatives. NEFCO expressed interest in this type of projects and confirmed their possible participation in wastewater projects. The order of financing has not been defined as NEFCO is only starting activity in this sphere. Besides there are no demonstration projects implemented by NEFCO in water/wastewater sector. Implementation of this project could be an example of introduction of this type of projects of modernization of minor municipal WWTPs.

7.4 State Support

The Regional Government pays particular attention to the projects connected with municipal sector. The basic environmental activities are as follows: drinking water supply, waste water treatment, remediation of polluted land, solid domestic waste reprocessing. The project is initiated by the Arkhangelsk City Administration which applied to the Arkhangelsk Regional Administration asking for assistance for this project and including into the federal target program "Clean Water" which development started in 2008 but was suspended in 2009 due to the complicated economic situation.

As suggested by the Regional Administration this IP was selected as one of the priority projects for the development of pre-investment studies (Annex 1).

The Administration of Isakogorka and Tsiglomen districts where WWTP Lesnaya Rechka is located as well as Vodokanal, the owner of the project, are very interested in the project implementation.

Thus, the project is supported on all levels from the owner to the regional authorities.

7.5 Legal or Other Types of Restrictions for Russian and Foreign investors

The project will be implemented on the territory without any restrictions. Russian and foreign investors can participate in co-financing of the project.

8. PROJECT STATUS AND ACTIONS

8.1 Present Situation

The Administration of Isakogorka and Tsiglomen territorial districts together with the project owner MUE "Vodokanal" and the Arkhangelsk City Administration are interested in implementation of the project on construction of new waste water treatment facilities in residential district Lesnaya Rechka that has been more than once emphasised during pre-investment studies meetings.

8.2 Project Implementation Plan

The project implementation will include several stages:

- receiving a grant;
- tender documents preparation and tender procedures;
- design documentation development and approval;
- contract negotiation;
- production and procurement;
- installation;
- personnel education and equipment commissioning;
- equipment maintenance and monitoring of the project's economic efficiency.

The project implementation schedule is presented in Table 21 with 2010 as the starting point. If the financing plan is changed, the project implementation plan will also require revision, but the implementation periods will not change. The project duration will be 2 years from the start of contract negotiations till project completion.

If the local financing is not received for 2010, since in some cases it should be approved the year before, the works listed in items 2 and 3 should be postponed till 2011 and in item 4 – till 2012.

Table 21: Project implementation schedule

	Project stages	Year of implementation	
		1st year	2nd year
1	Survey and design		
2	Demounting and construction		
3	Equipment delivery and installation		
4	Pre-commissioning		

It is worth considering that this project implementation plan is very approximate and depends on how quickly an investor will be identified, because the project owner and the Arkhangelsk City Administration cannot afford financing of this project on their own account.

8.3 Organizational Measures / Key Decision Points

Prior to the initiation of the project the following organizational measures should be performed:

- The Arkhangelsk City Administration to develop the technical documentation in 2010.
- To get the project approved and receive co-funding for the project from the Federal Target Programme for 2010 and/or 2011.
- If the co-funding from the Federal Target Programme is not possible:
  - MUE Vodokanal to develop the investment programme for 2011 considering the investment load for implementation of this investment project;
  - the Arkhangelsk City Administration to approve the investment programme
- The Arkhangelsk Regional Government to allocate funds from the regional budget for the project co-funding for 2010 and 2011.
- To develop the project funding model according to the foreign investor's requirements and possibilities of the municipality and the project owner.

8.4 Own Resources of MUE Vodokanal for Project Implementation

MUE Vodokanal does not have resources for the project implementation. Field survey and construction, as well as equipment procurement and installation in similar projects are performed by special external subcontractors, selected on a tender basis.

8.5 Project Organization Structure

MUE Vodokanal is the owner of the project and possible future loan receiving party.

To enhance project implementation efficiency and to use the experience of project development and implementation both in the north-west Russia and in the country as a whole, the following project organization structure is proposed on Fig. 9 below.

As for the project management, the international experience shows that an independent project manager is one of the obligatory requirements for international projects from International Financing Institutions.

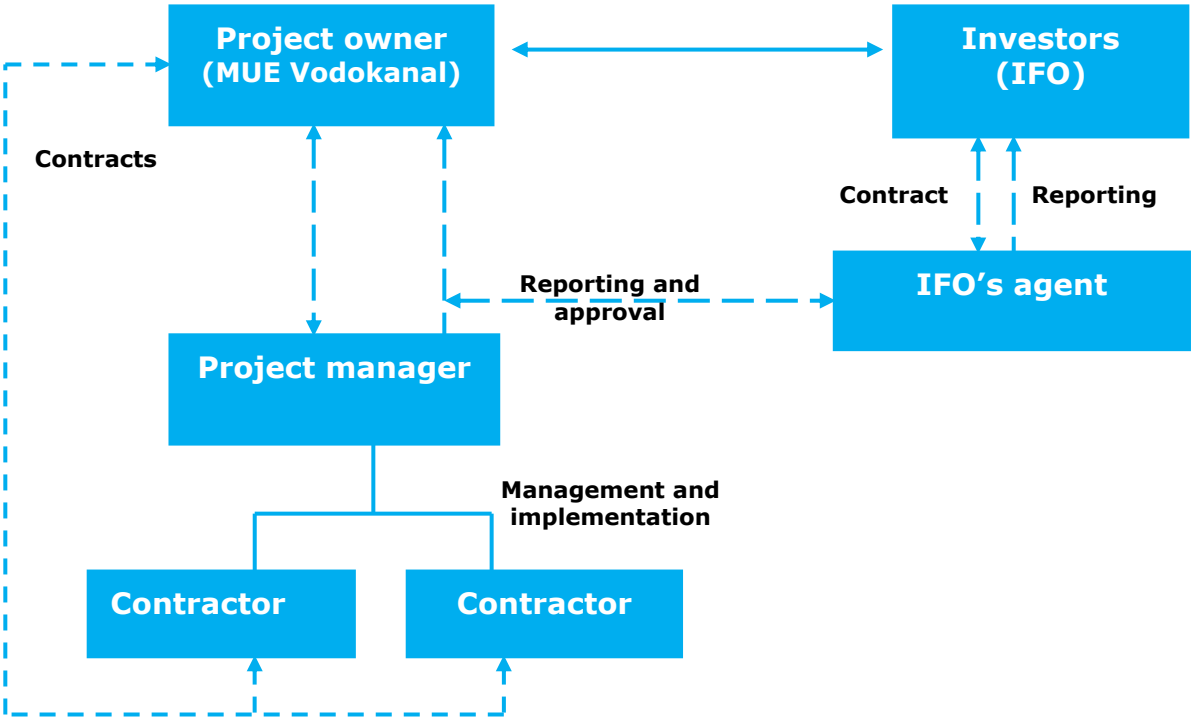


Fig. 9. Example of possible project organization chart with possible participation of IFOs.

The project organization chart can be slightly altered if necessary and in case of change in the project participating parties.

The managing function will be performed by the Project Manager whose responsibilities will include daily project progress monitoring at every project stage. Main responsibilities include:

- to coordinate and approve project activities;
- to coordinate work on the project;
- to insure the project reports comply with the requirements;
- to arrange project progress meetings;
- to prepare documents for the project financing management in due time;
- to coordinate procurement and contractors' activities;
- to approve and monitor project expenses;
- to control contractors' activities;
- to coordinate all changes in the project.

The owner of the project MUE Vodokanal is responsible for the project implementation in accordance with the contracts with the investor and contractors; performs co-financing of the project (if applicable), and bears full financial and legal liabilities for the project.

The Arkhangelsk City Administration acts as a project guarantor, controls the progress of the project, co-finances the project, bears full legal and financial liabilities in case the project owner fails to fulfil its responsibilities.

Selection of contractors is based on tender procedures. The candidates should confirm their technical, organizational and financial abilities with documents (obligatory requirements: licence received according to the established procedure, registration certificate, tax-payer certificate, etc). The winner of the tender is awarded a contract with the Customer.

The tender board is formed by the Customer's decision involving its personnel as agreed with the municipal administration. Representative of the Project Manager has advisory vote only aiming to make an impartial assessment of the tender procedure.

During project realization the participants should follow the requirements of the Russian legislation, federal standards, industry requirements and standards, as well as other requirements regulating investment and construction activity.

9. ASSESSMENT OF RISKS AND JUSTIFICATION OF PROJECT SELECTION

This chapter contains preliminary risk assessment and project selection justification. As the project is at the starting stage, the specific information on the project is limited. Preliminary assumptions are based on the collected information, basic knowledge of the field and professional experience in similar projects.

9.1 Risk Evaluation

Project evaluation includes the following investment risk assessment:

- Technological risk
- Environmental risk
- Implementation risk
- Social risk
- Financial risk
- Legislative risk
- Responsibility risk

Technological risk
Technical solutions proposed for the project are quite common in Russian and foreign practice of waste water treatment. There are no considerable risks in implementing these solutions provided that surveys and design are performed by a qualified designer and construction is performed with a high quality.

Environmental risk
Environmental risks will be reduced significantly compared to the existing situation, as the proposed solutions will help to reduce negative impact of untreated waste water discharge into Arkhangelsk City basins and also eliminate the negative impact of existing waste water chlorination process.

During periods of the project in which physical work is undertaken, an increase in greenhouse gas emissions is expected. In order to reduce gas emissions, it is suggested that preventive measures are included in a health, environment and safety plan for the project.

Implementation risk
The time frame for the project has not been determined yet because the first priority for development of a full and specific project plan is to find an investor and approve the local financing.

It is necessary to consider companies with positive references from similar projects as a Principal Contractor for the project.

Considering the economic efficiency it may be reasonable to sign turnkey contracts with subcontractors and suppliers with a fixed price.

Social risk
The project is expected to have an overall positive effect on the social situation of Lesnaya Rechka. Some of the population may however feel that money allocated for this project, would be better spent on other social improvements in the municipality.

Prior to project initiation, the project owner will hold public hearings in Lesnaya Rechka involving citizens of the municipality and other stakeholders in the project. The aim of the

hearings is to identify potential social risks that can be taken into account early in the planning process.

Financial risk
The financial risk for this project is the financial crisis of this year that can lead to insufficient project funding and higher project implementation costs.

To reduce financial risk the project provides for external financing sources in the form of a grant.

In addition, to minimize the financial risk the project should be included in the Regional Program for allocation of regional and municipal financing. In addition the MUE Vodokanal investment programme should be approved, at the end of this year, when the budgets for the next year are developed and approved.

Legislative risk
There are no obstacles for the project implementation in the Russian legislation.

Responsibility risk
The owner of the project has been defined and will bear the legal and financial risk.

To reduce the responsibility risk, the Arkhangelsk City Administration must act as a guarantor of the project implementation and provide guarantees by adding special articles into the budget for 2010-2011 to cover co-financing cost.

9.2 Selection Justification

This project of the waste water system renovation has been initiated by the Arkhangelsk Vodokanal and supported by Administration of the Isakogorka and Tsiglomen territorial districts, as well as by the Arkhangelsk City Department of the Housing and Communal Services and Energy. From a local and regional point of view the WWTP is considered as a significant source of negative environmental impact in Arkhangelsk. Due to the continuous discharge of untreated waste water to Lesnaya River, the WWTP will continue to pose a risk of dispersing hazardous components into the environment.

The project provides treatment methods which ensure that hazardous components are not discharged at levels unacceptable to the environment. The project should be regarded as an integrated approach for preventing discharge of hazardous components from the Lesnaya Rechka WWTF, well adaptable to other similar WWTF in the region. The negative environmental impact also contributes to the social situation in Lesnaya Rechka and the social aspects are hence considered positive side effect of project implementation.

Reducing the pollution from the WWTP to the aquatic environment is in line with the overall purpose of the NPA project. The existing WWTP should be regarded as a local source of pollution to the Arctic marine environment, a source that is continuously contributing to negative impact on the environment. The justification of implementing the project as an investment project is hence reasonable and can be regarded as a concrete result of regional and local priorities in protecting the Arctic environment.

10. CONCLUSION

In this report work related to preparation of regional investment studies for modernisation of the waste water system in the residential district Lesnaya Rechka in Arkhangelsk.

Environmental and social aspects
Lesnaya Rechka is situated approximately 15 km south of Arkhangelsk City Centre in an area defined as forest. According to the Administration of the Isakogorka and Tsiglomen districts, no the area is regarded as environmentally clean. Lesnaya Rechka is a suburb with no industrial activities. Sources of pollution include local hotspots such as the WWTF, petrol stations and the former military activities.

The existing WWTF is in a critical state due to poor constructions and outdated methods for treatment of wastewater that do not meet environmental requirements. The WWTF is continuously discharging untreated wastewater to the Lesnaya River. In addition, the disinfection of water by chlorination entails emission/discharge of toxic chlorine products. Due to the direct discharge of untreated wastewater into the Lesnaya River, which flows directly into the Dvina River, the existing WWTF is assessed as posing a hazardous risk to the local and regional environment, including the Arctic marine environment. In addition the WWTP poses a potential risk to the health of the workers and local residents.

Technical aspects
Based on a preliminary assessment of 3 solutions for modernizing the WWTF, in which the social, environmental, technical, financial and legal liabilities were assessed, the most appropriate technology was '*Application of prefabricated block-modular small-sized plant to treat wastewater*'. The technological solution provides treatment of wastewater to levels that meet the environmental requirements of discharge into fishery water bodies. In addition the solution provides advantages such as low construction and operational costs, possibilities of expanding the designed plant, easy to maintain and operate.

Financial aspects
Based on the existing information for wastewater treatment capacity and environmental requirements, implementation of the project amounts to approximately 773 thousand euro. The annual operational costs, including maintenance and repair amount to approximately 7 thousand euro.

Financing of the project is based on grants and not an international loan, as the project owner and the Arkhangelsk City Administration state that an additional international loan provides a high financial risk. The financing of project implementation is based on a 40% grant and 60% local funding. Local financing means financing from the federal program. Necessary municipal financing will be supported by an international grant. The project is regarded as a high priority on all levels from the project owner to the regional authorities.

Recommendations
Risks identified in the project are not critical and can be met by using professional and experienced companies for design and construction, and involving stakeholders at as early a stage in the project as possible. In addition the Arkhangelsk City Administration must act as guarantor of project implementation to ensure the implementation and financial responsibility.

Implementation of the project is expected to significantly decrease the environmental strain on the local and regional environment, including the Arctic marine environment. The IP has significant support in the local and regional authorities. Due to the

environmental and social benefits of the project and in order to overcome the financial uncertainties related to project implementation it is suggested to continue with a full scale investment plan by support of NPA-Arctic Project.

ANNEXES

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Annex 1. Letter of Arkhangelsk Region Administration on ranked list of IP proposals

АДМИНИСТРАЦИЯ
АРХАНГЕЛЬСКОЙ
ОБЛАСТИ

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04.05.2009 № 06-40/23

На №

ООО «Рамболь Стурвик»

Н.У. Муртазалиевой

пр.Обводный канал, 13/3
163046, г.Архангельск

Уважаемая Нанда Убайдуллаевна!

Администрация Архангельской области в связи с обращением ООО «Рамболь Стурвик» о ранжировании по значимости заявленных прединвестиционных проектов, планируемых к реализации на территории области, направляет запрашиваемый перечень в порядке, соответствующем уровню приоритетности их реализации с учетом установленных потенциальным инвестором критериев:

1. Ликвидация загрязнения нефтепродуктами земель водоохранной зоны реки Северная Двина бассейна Белого моря в районе населенного пункта Красное Приморского района Архангельской области;
2. Проектирование и строительство канализационных очистных сооружений в жилом районе Лесная речка г. Архангельска;
3. Проектирование и строительство водозабора с водоочистными сооружениями в поселке Поньга Онежского района Архангельской области;
4. Проектирование и строительство сетей канализации и очистных сооружений в г. Мезени Архангельской области;
5. Проектирование реконструкции системы очистки и обеззараживания сточных вод на канализационных очистных сооружениях г. Котлас.

Исполняющий обязанности заместителя главы администрации области по управлению природными ресурсами и экологии **А.Ш. Давитиашвили**

Коршунов Сергей Николаевич
28-85-08
Калетюк Татьяна Александровна
28-51-54

Annex 1

Translation

To: Naida Murtazalieva
OOO Ramboll Storvik

From: Alexander Davitiashvili
Acting Vice-Head of the Arkhangelsk
Region Administration on Natural
Resources Management and Environment

Re: Potential investment project

Dear Mr. Murtazalieva,

We refer to Ramboll Storvik request regarding ranking of the suggested pre-investment projects planned for implementation on the territory of Arkhangelsk region, Arkhangelsk Region Administration sends the requested list according to priority level of their implementation subject to specified by potential investor criteria:

1. Land remediation from oil products in water protection zone of Northern Dvina River of White Sea basin near settlement Krasnoe of Primorsky district of Arkhangelsk region.

2. Construction of sewage treatment facilities in Lesnaya Rechka dwelling district of Arkhangelsk.

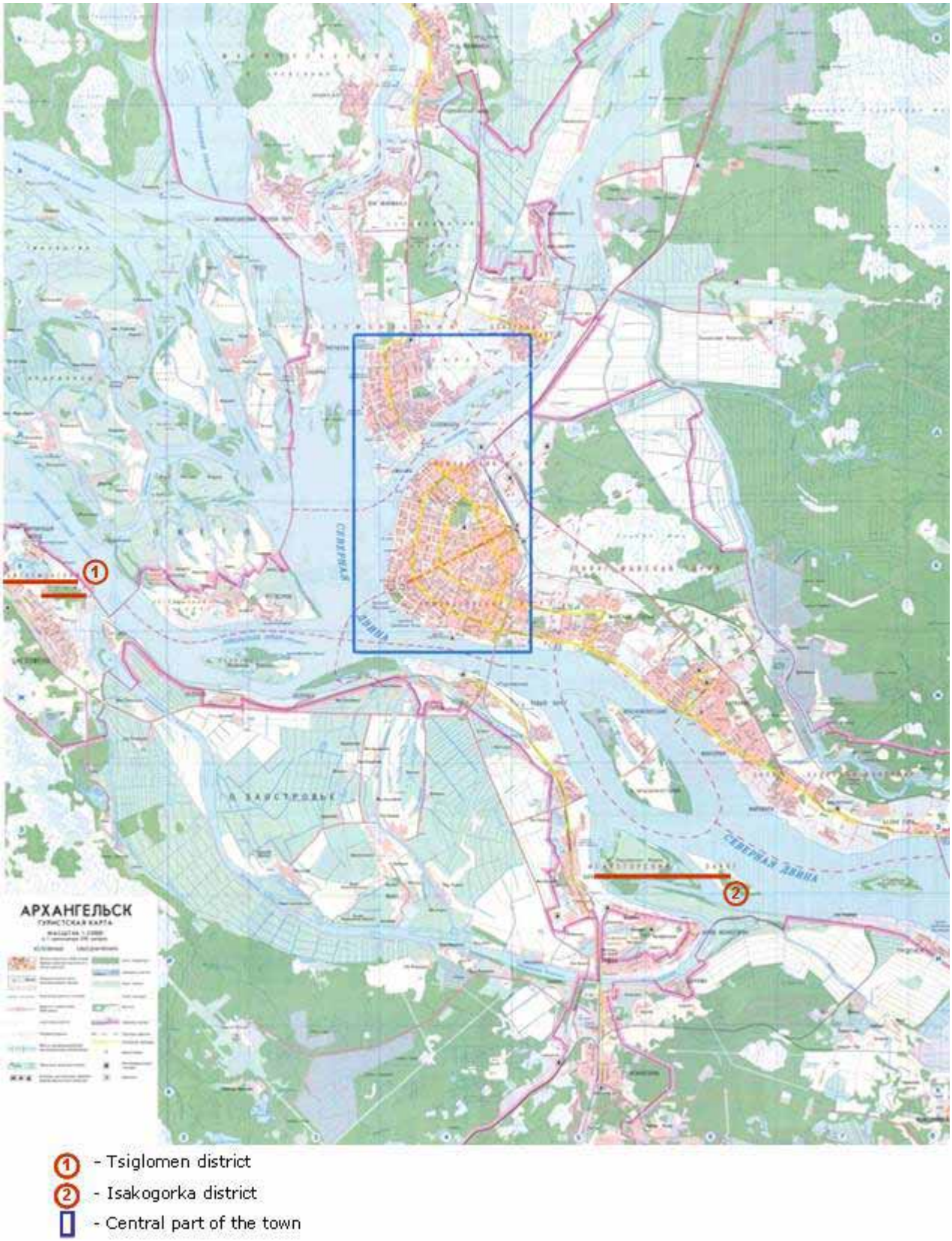
3. Design and construction of water intake with water treatment facilities in settlement Ponga of Onega District of Arkhangelsk region.

4. Design and construction of sewage system and sewage treatment facilities in city of Mezen of Arkhangelsk region.

5. Design of reconstruction of treatment system and disinfection of waste water at sewage treatment facilities in city of Kotlas of Arkhangelsk region.

Alexander Davitiashvili
Acting Vice-Head of the Arkhangelsk
Region Administration on Natural
Resources Management and Environment

Annex 2. Map of Arkhangelsk with location of territorial districts



Annex 3. Operating and Financial Activities of MUE Vodokanal in 2008

A. Operating activities. WATER SUPPLY

ACTIVITIES	Measurement units	Report 2007	Report 2008	% change
1. Water lifting, total (city+Khabarka+MKP)	Thousand m^3	61123,9	63303,2	104
• including that from Central Water Treatment Facilities (CWTF) (city)	Thousand m^3	55660	55503,7	99,72
2. Water procured	Thousand m^3	379,9	329,2	87
3. Water consumption for process and sanitary needs, total	Thousand m^3	6874,9	7279,5	106
• including that for the city (filters washing, networks washing, sanitary needs)		6087	6079,7	99,9
3.1. As above for the enterprise (city)	% of the water intake	10,9	10,5	-0,4
4. Water supply to the network, total	Thousand m^3	54628,9	56352,9	103
• incl. that from CWTF (city)		49573	49416,4	99,7
5. Unaccounted water consumption, total	Thousand m^3	25075,1	26565,2	106
• including that for the city		23135,2	24055,9	104
5.1. As above in % to the water	%	40,8	41,7	+0,9
6. Water sales, total (city+Khabarka+MKP)	Thousand m^3	29553,8	29787,7	101
including that for the city		26430,2	25360,5	96,0
• to population	Thousand m^3	24481,3	24600,6	100,5
including that for the city		21972,5	21083,0	96,0
• state-financed enterprises	Thousand m^3	2478,9	2518,4	102
• industrial enterprises	Thousand m^3	2429,8	2478,7	102
• technical water	Thousand m^3	163,8	190	116

A. Operating activity. SEWAGE

ACTIVITIES	Measurement units	Report 2007	Report 2008	% change
1. Waste water pumped for biological treatment of other enterprises	Thousand m^3	271253	28647,1	105,6
1.1. as above	Thousand m^3 /day	74,3	78,5	+4,2
1.2. Including the waste water pumped to OAO Solombala Pulp-and-Paper Plant for biological treatment		26600,9	28104,6	105,7
3.Waste water transferred to WWTF of the peripheral settlements	Thousand m^3	1905,3	2124,5	111,5
3.1. As above	Thousand m^3 /day	5,2	5,8	+0,6
4. Waste water throughput, total	Thousand m^3	27357,4	27323,8	99,9
including:				
that for the city	Thousand m^3	25158,0	24020,0	95,5
• from population	Thousand m^3	23406,7	23428,9	100,1
that for the city	Thousand m^3	21387,7	20401,3	95,4
• from state-financed enterprises	Thousand m^3	2067,5	2108,3	102
• from industrial enterprises	Thousand m^3	1883,2	1786,6	94,9

Annex 3

B. Financial activities. WATER SUPPLY

ACTIVITIES	Measurement units	Report 2007	Report 2008	Deviation + increase - decrease
1. Expenditures from operating activity, total	**thous. RUR**	**322021,7**	**404058,2**	**+81857,0**
- power supply	thous. RUR	83306	103604,8	+20298,8
- depreciation	thous. RUR	8324,9	8892,8	+567,9
- materials	thous. RUR	47754,6	53904,5	+6149,9
- workers' wage	thous. RUR	52687,3	67882,6	+15195
- social insurance contributions	thous. RUR	13759,1	17731,4	+3772,3
- payment of the sick leave	thous. RUR	163,6	234,9	+71,3
- workshop expenditures	thous. RUR	49750,7	74148,4	+24397,7
incl. capital refurbishment	thous. RUR	3841,1	16930,7	**+**13089,6
- general running costs	thous. RUR	28826,3	35911,7	+7085,4
incl. capital refurbishment	thous. RUR	0	22,4	+22,4
- auxiliary production	thous. RUR	33301,2	37154,9	+3853,7
- direct expenditures	thous. RUR	341,8	363,1	+21,3
- procured water	thous. RUR	3806,2	4229,1	+422,9
2. Income from operating activity, total	**thous. RUR.**	**284844,5**	**352563,8**	**+67719,3**
- population	thous. RUR	123392,2	152719,3	+29327,1
Incl. compensation of benefits to the population (excl. VAT)	thous. RUR	10589,4	13776,2	+3186,8
- from Settlement Uima	thous. RUR	1593,4	1883,3	+269,9
- state funded + industrial	thous. RUR	159286,1	197377,7	+36387,4
- technical water	thous. RUR	572,8	783,5	+210,7
2.1. Income from payments, total	thous. RUR	255245,1	348006,9	+92761,8
2.2.Collection rate, total	%	89,6	98,7	+9,1
2.3.Paid by the population	**RUR**.	99691,8	146751,4	10549,8
2.4.Collection rate from population	%	80 ,8	96,1	15,3
3.Income +; Losses -;	**thous. RUR**	**-37177,2**	**-52271,9**	**-15094,7**
4.Profitability	**%**	**-11,5**	**-12,9**	**+1,4**
5.Average tariff per 1m3 of water	**RUR.**	**9,64**	**11,84**	**+2,20**
6.Cost value 1m^3 of water	**RUR.**	**10,96**	**13,56**	**+2,60**

The increase of the full cost value of the water supply in 2008 in comparison with 2007 is 81 857.0 thousand RUR against all expenditures. Thus:

- Cost value of 1m^3 of water in 2008 in comparison with 2007 increased by 2.60 RUR.
- Increase of the average tariff per 1m^3 of water in 2008 in comparison with 2007 by 2.20 RUR.

Annex 3

B. Financial activity. SEWAGE

ACTIVITIES	Measurement units	Report 2007	Report 2008	Deviation + increase - decrease
1. Expenditures from operating activity, total	thous. RUR	**256368,8**	**331776,9**	**+75390,1**
- power supply	thous. RUR	28564,2	34705,7	+6141,5
- depreciation	thous. RUR	7269,1	8178,6	+909,5
- materials	thous. RUR	79,4	280,7	+201,3
- workers' wage	thous. RUR	42689,2	54547,2	+11858,0
- social insurance contributions	thous. RUR	11134,3	14277,0	+3142,7
- payment of the sick leave	thous. RUR	122,1	155,6	+33,5
- workshop expenditures	thous. RUR	13913,7	37600,5	+23686,8
incl. capital refurbishment	thous. RUR	3614,6	20836,1	+ 17221,5
- general running costs	thous. RUR	28826,3	35911,8	+ 7085,5
incl. capital refurbishment	thous. RUR	0	22,3	+22,3
- auxiliary production	thous. RUR	33301,2	37155,0	+3853,8
- direct expenditures	thous. RUR	90487,3	108964,8	+18477,5
incl. OAO Solombala Pulp-and-Paper Plant	thous. RUR	81210,7	96895,8	+15685,1
2. Income from operating activity, total	thous. RUR	**239818,6**	**284503,8**	**+44685,2**
- population	thous. RUR	104820,3	129061,8	+24241,5
Incl. compensation of benefits to the population (excl. VAT)	thous. RUR	9373,1	12199,1	+2826,0
- state funded and industrial enterprises	thous. RUR	134998,6	155442	+20443,4
2.1. Income from payments, total	thous. RUR	251141,5	284643,6	+33502,1
2.2.Colection rate, total	%	104,7	100,0	-4,7
2.3.Paid by the population	RUR	88212,9	126932,9	+41720,0
2.4.Collection rate from population	%	84,2	100,7	+16,5
3.Income +; Losses -;	thous. RUR	**-15568,2**	**-47273**	**+26704,8**
4.Profitability	**%**	**-6,5**	**-14,2**	**+7,7**
5.Average tariff per 1m3 of water	RUR	**8,77**	**10,41**	**+1,64**
6.Cost value 1m^3 of water	RUR	**9,37**	**12,14**	**+2,77**

The increase of the full cost value of the water sewage in 2008 in comparison with 2007 is 73 390.1 thous. RUB. Thus:

- Cost value of 1m^3 of water in 2008 in comparison with 2007 increased by 2.77 RUB.
- Increase of the average tariff per 1m^3 of water in 2008 in comparison with 2007 by – 1.64 RUB.

Annex 4. Legal Framework of Arkhangelsk Vodokanal

1. RF Constitution
2. RF Civil Code
3. RF Labour Code
4. RF Housing Code No188-FZ dated 29.12.2004
5. RF Tax Code
6. RF Water Code
7. RF Land Code
8. RF Government Decree No.844 dated 30.12.2006 On the Procedure and Decision-making on Assigning the Water Body for Use
9. Law of the RF No.1738-1 dated 11.10.1991 On Payment for Land
10. Federal Law of the RF No.147-FZ dated 17.08.1995 On Natural Monopolies
11. Law of the RF No. 948-1 dated 22.03.1991 On Competition and Restriction of Monopolistic Activity in the Goods Market
12. Federal Law of the RF No.128-FZ dated 08.08.2001 On Licensing Individual Types of Activity
13. Federal Law of the RF No.129-FZ dated 21.11.1996 On Accounting
14. Federal Law of the RF No.122-FZ dated от 21.07.1997 On State Registration of Rights to Immovable Property and Transactions therewith
15. RF Government Decree No.844 dated 21.08.2001 On Measures of Liquidation of Cross-subsidization System within Water Supply, Sewage, Heating and Municipal Solid Waste Disposal, Recycling and Burial.
16. Federal Law No.116-FZ dated 21.07.1975 On Industrial Safety of Hazardous Production Facilities
17. RF Government Decree No.344 dated 12.06.2003 On Fee Ratio for Emissions of Pollutants into the Atmosphere by Stationary and Mobile Sources, Discharge of Pollutants into Surface and Ground Waters, Disposal of Industrial and Consumer Wastes
18. RF Government Decree No.632 dated 28.08.1992 On the Procedure of Setting the Fees and their Limits for Environmental Pollution, Waste Disposal and other Types of Hazardous Influence
19. RF Government Decree No.167 dated 12.02.1999 On Establishment of Rules of Water Supply and Sewage in the RF
20. RF Government Decree No.307 dated 23.05.2006 On the Procedure of Rendering Utilities Services to the Citizens
21. Law of the RF dated 07.02.1992 No.2300-1 On Protection of Consumer Rights
22. Decree of the Russian Federation State Committee for Construction, Architectural and Housing Policy No. 168 dated 30.12.1999 Rules of Technical Operation of Water Supply and Sewage Systems and Facilities. MDK 3-02.2001
23. Decree of the Chief State Medical Officer of the RF No.19 dated 25.07.2001 On Enactment of Sanitary Regulations – SP 2.1.5.1059-01 (along with Hygienic Requirements to Protection of Ground Waters from Pollution. SP 2.1.5.1059-01, approved by the Chief State Medical Officer of the RF on 16.07.2001) (Registered at the Ministry of Justice of the RF as No. 2886 dated 21.08.2001)
24. Circular Letter of the Russian Federation State Committee for Construction, Architectural and Housing Policy No. LCh-3555/12 dated 14.10.1999 On Explanation regarding the Application of Rules of Use of the Water Supply and Sewage Systems in the Russian Federation
25. Rules of Technical Operation of Water Supply and Sewage Systems and Facilities. MDK 3-02.2001. Order of the Russian Federation State Committee for Construction, Architectural and Housing Policy No. 168 dated 30.12.1999.
26. Decree of the RF Ministry of Labour No.61 dated 16.08.2002 On Establishment of Cross-sectoral Labour Protection Rules during the Operation of Water Supply and

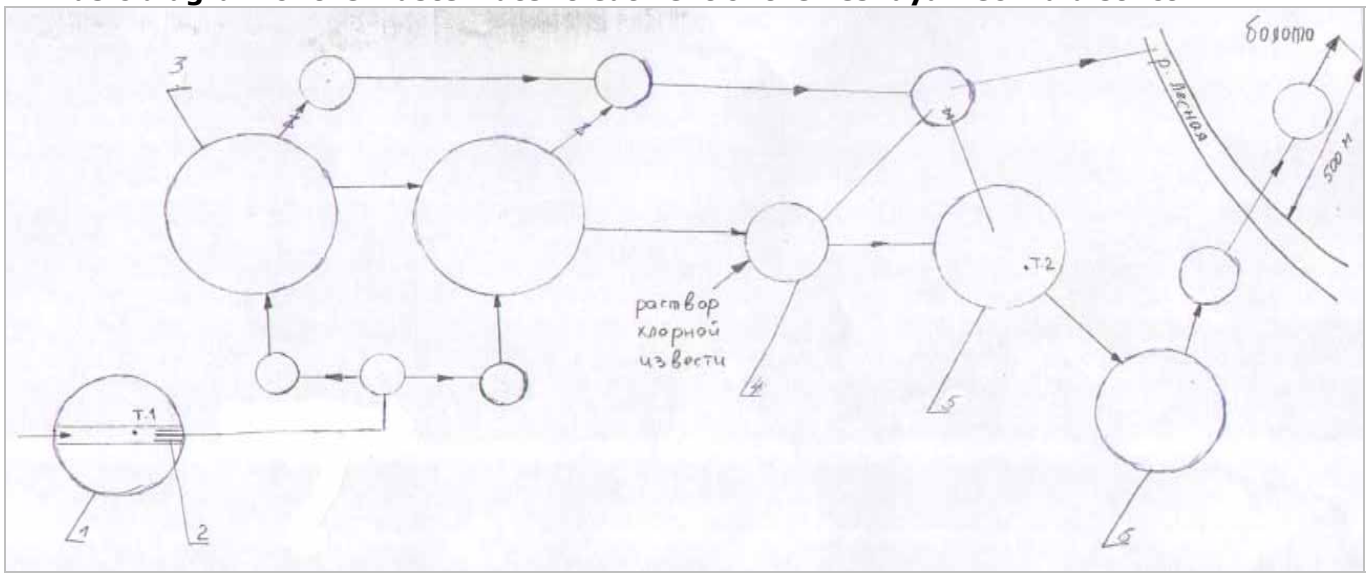
Sewage Facilities (Registered at the Ministry of Justice of the RF as No. 3847 dated09.10.2002)

27. Resolution of the Arkhangelsk Regional Legislative Assembly No.720 dated 10.02.2004 On the Guarantee of the Arkhangelsk Region to EBRD as a Security for Loan to MUE Vodokanal of Arkhangelsk
28. Decree of the Head of Arkhangelsk Region Administration No. 57 dated 25.03.2004 On the Rules of State Regulation of Tariffs on the Territory of the Arkhangelsk Region
29. Articles of Association of MUE Vodokanal of Arkhangelsk, as amended on 25.06.2003
30. Resolution of the Arkhangelsk Regional Legislative Assembly No.409 dated 5.03.2005 On Approval of the List of Services within the Housing Facilities' Maintenance, List of Services related to Maintenance of Dwelling Houses Paid for by means of Dwelling Rates, and List of Activities related to the Running Maintenance of Common Property of Dwelling Houses Paid for by means of Dwelling Houses' Repairing Rates.
31. Resolution of the Arkhangelsk Regional Legislative Assembly No.43 dated 14.06.2001 On Information regarding the Procedure of Subsidizing the Residents of Arkhangelsk in Payment for Housing and Utilities
32. Instruction of Arkhangelsk Mayor dated 28.06.1996 No. 493/3r On Granting Immunity of Payment of Land Tax and Land Rent to Certain Categories of Citizens
33. Instruction of the Head of Arkhangelsk Region Administration dated 25.06.1996 No. 396r On Payment of Contributions to Off-budget State Funds by Organizations which Receive Budgetary Funds for Payroll Payments.

Annex 5. Map, Basic Diagram and Equipment of the Lesnaya Rechka WWTF

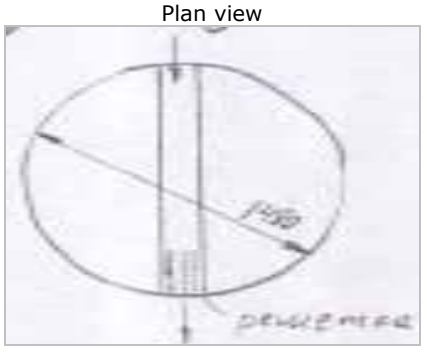
1 – Input chamber with a screen. 2 – Two-layer settlement tanks. 3 – Waste water chlorination plant. 4 – Pump station. 5 – Overpass with a pressure header. 6 – the Lesnaya River. 7 – Actual waste water discharge location.

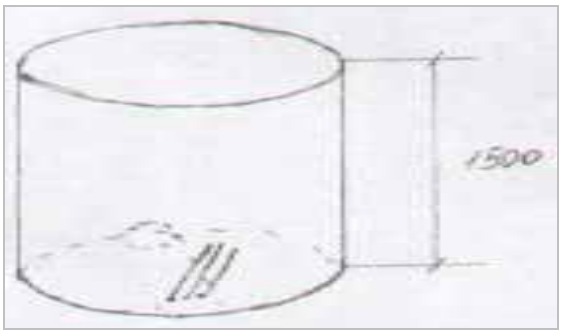
Basic diagram of the waste water treatment of the Lesnaya Rechka district



1 – Intake chamber. 2 – Screen. 3 - Two-layer settlement tank. 4 – Contact reservoir No1
5 – Contact reservoir No2. 6 – Sewage pumping station (SPS)

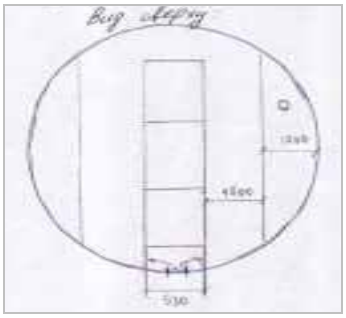
Plan view

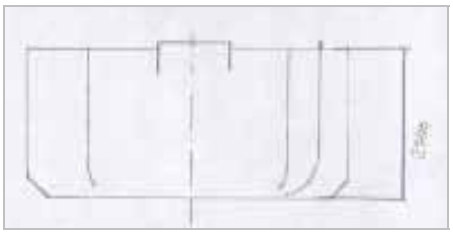


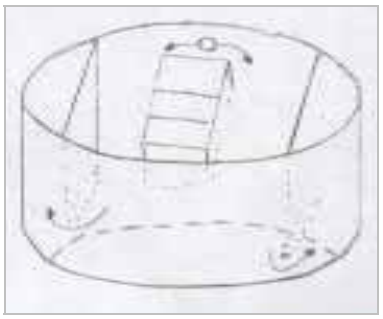


Intake chamber, 1 off.

Plan view

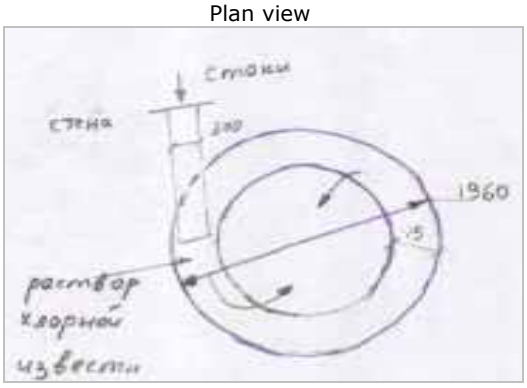




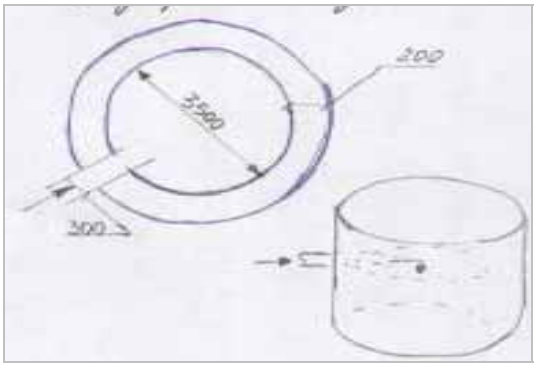


Two-layer settlement tank, 2 off.

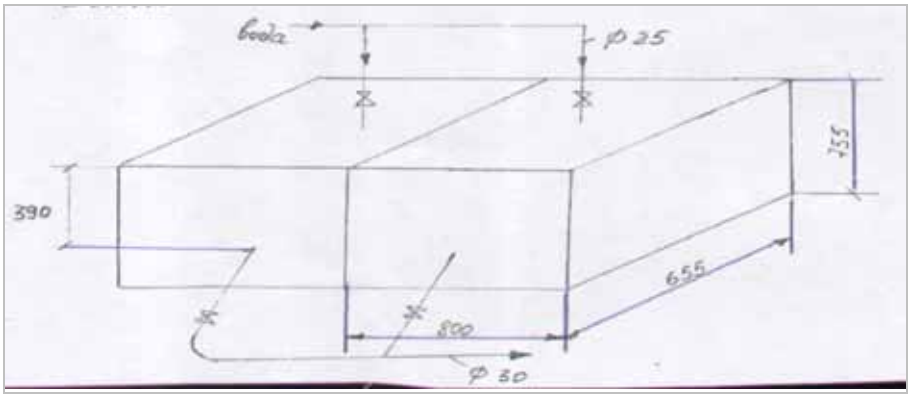
Reservoir in the chlorination room
Plan view



Reservoir outside



Contact reservoirs, 2 off.



Tanks for preparation of the chlorinated lime, 2 off.

Annex 6. Project Team Visit to the Facilities in Arkhangelsk on June 9, 2009

Waste water treatment facilities of the district Lesnaya Rechka

Photo 1. Two-layer settlement tank No.1, in operation

Photo 2. Two-layer settlement tank No.2, filled with sediment

Photo 3. Screen for retention of large debris

Photo 4. Sludge beds

Photo 5. Contact reservoir No1

Photo 6. Contact reservoir No2

ANNEX 6

Photo 7. Engine room of the sewage pumping station

Photo 8. Pressure header

Photo 9. Sewage well at the top point of the overpass

Photo 10. Overpass at the sewage network

Photo 11. Meeting with the Head of Isakogorka and Tsiglomen districts of Arkhangelsk

Annex 7. Water sales and bulk water supply to Lesnaya Rechka in 2009

Month	Bulk water supply, thousands m^3	Water sales, thousands m^3
January	29,5	28,3
February	27,2	18,6
March	29,6	18,0
April	28,5	18,0
May	30,2	17,2
June	25,9	15,9
July	24,2	17,0
August	25,6	17,2
September	26,5	17,2
October	26,9	17,6
November	30,7	17,8
December	25,3	17,2
Total:	330,1	220,0

MUE Vodokanal note: in January 2009 significant re-accounting has been done and water sales volumes for January differ from the average monthly level.

Annex 8. Letter of Ministry of Fuel and Energy Complex and Housing Utilities of the Arkhangelsk region on project support

15-АПР-2010 16:44 От: Кому:8152 690290 С.1

ПРАВИТЕЛЬСТВО АРХАНГЕЛЬСКОЙ ОБЛАСТИ

МИНИСТЕРСТВО ТОПЛИВНО-ЭНЕРГЕТИЧЕСКОГО КОМПЛЕКСА И ЖИЛИЩНО-КОММУНАЛЬНОГО ХОЗЯЙСТВА АРХАНГЕЛЬСКОЙ ОБЛАСТИ

Троицкий просп., д. 49, г. Архангельск, 163004
Тел. (8182) 28-84-14, тел./факс 20-17-36
E-mail: atek@dvinaland.ru

14 АПР 2010 № 203/852

на № 73 от 26.03.2010,
на № 203/192 от 26.03.2010,

ООО «Рамболь Баренц»

В.А. Блинову

183038, г. Мурманск,
Портовый проезд, д.21
Факс: 8-815-2-69-02-90

Уважаемый Владимир Александрович!

Рассмотрев предлагаемую компанией «Рамболь Баренц» схему финансирования инвестиционного проекта «Строительство новых КОС микрорайона Лесная речка г.Архангельска», сообщаем следующее.

Схема предусматривает долевое финансирование: за счет международного гранта – 40%, из местных источников - 60%, при этом предполагается в качестве местного финансирования использовать средства федеральных источников. На сегодняшний день государственная программа «Чистая вода», в рамках которой возможно получение федеральных средств на реализацию мероприятий в сфере водопроводно-канализационного хозяйства, не принята и отправлена на доработку, планируемые сроки принятия программы – 1 июля 2010 года. Министерством ТЭК и ЖКХ Архангельской области рекомендовано мэрии города Архангельска представить необходимую информацию по инвестиционным проектам, предусматривающим модернизацию, реконструкцию и строительство объектов водоснабжения и водоотведения, в электронном виде в адрес Экспертной группы по региональным проектам и программам «Чистая вода» для участия в конкурсном отборе проектов на 2010 год (продлен до 1 июня 2010 года) в целях получения софинансирования за счет средств федерального бюджета. В областном бюджете на текущий год финансирования на реализацию мероприятия «Строительство новых КОС микрорайона Лесная речка г.Архангельска» не предусмотрено.

В настоящее время в мэрии города Архангельска прорабатывается вопрос о выделении во II полугодии 2010 года в городском бюджете средств, необходимых для разработки проектно-сметной документации по указанному инвестиционному проекту и прохождения государственной экспертизы проектной документации.

Министр **П.П. Орлов**

Потребная Н.Н.
(8182) 288-440

Annex 9. Letter of the Arkhangelsk city administration on project support

МЭРИЯ ГОРОДА АРХАНГЕЛЬСКА

ДЕПАРТАМЕНТ ГОРОДСКОГО ХОЗЯЙСТВА

пл.В.И.Ленина, д.5, г.Архангельск, 163000
тел. 607-311;, факс 607-313
E-mail: dgh@arhcity.ru; http://www.arhcity.ru

11052010 № 035-И/1353

На № _____ от _____

ООО «Рамболь Баренц»
В.А. Блинову

Уважаемые господа!

Мэрия города внимательно рассмотрела возможность реализации проекта «Строительства новых КОС микрорайона Лесная речка города Архангельска» в рамках Проекта НПД-Арктика на условиях его софинансирования: 60% – из средств городского бюджета, 40% – за счёт международного гранта и подтверждает свою готовность провести необходимые действия в этом направлении с учётом сроков реализации проекта в 2011 году.

Директор департамента **Степанов А.Б.**

Чурносов В.П.
21-42-90, 21-50-22