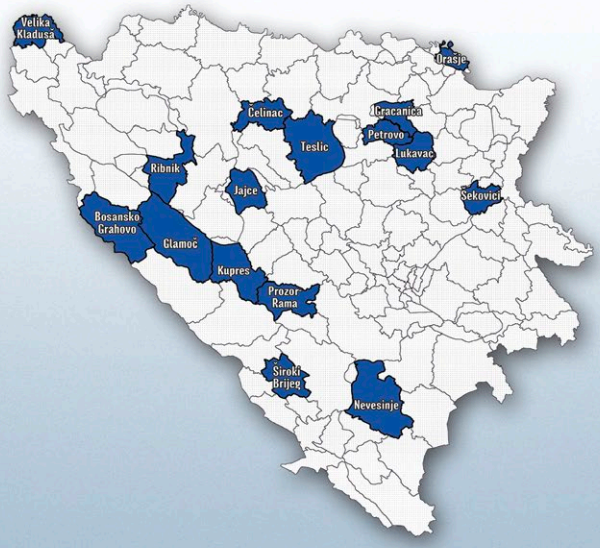
EUROPEAN UNION

IPA PROGRAMME FOR BOSNIA AND HERZEGOVINA

"Technical Assistance to support implementation of water & sanitation programme"



This project is funded by the European Union

Project implemented by IGIP GmbH in consortium with NAMA S.A. and EXERGIA S.A.

Sub consultant

INTRODUCTION

OVERVIEW

The goal of this project is to provide contribution to improvement of water and sanitation infrastructure and living conditions as well as protection of environment in the following priority municipalities: Bosansko Grahovo, Čelinac, Glamoč, Gračanica, Jajce, Kupres, Lukavac, Nevesinje, Orašje, Petrovo, Prozor-Rama, Ribnik, Šekovići, Široki Brijeg, Teslić and Velika Kladuša.

CHALLENGE

The Multiannual Indicative Planning Document (MIPD) for the period 2011-2013 states that there was little progress on water quality. FBiH adopted a water management strategy and a rulebook on the conditions for wastewater discharges into natural recipients and public sewer systems, thus advancing the alignment with the Urban Waste Water Treatment Directive. Bosnia and Herzegovina aligned its legislation with the Drinking Water Directive but implementation is slow. Inadequate administrative capacity and lack of ready-made projects are causing considerable delays in sectoral investments.
BiH is considered to be rich in water resources, but still access to drinking water at home is not yet fully ensured for the whole population. According to the official data on implementation of the Millennium Development Goals for the water supply and sanitation, access to water has been increased from the baseline of 53% in 2000, and the 2015 target of 67% population coverage is almost achieved. Access to a public sewage system has been also increased from the very low baseline of 33% to 36% and the 2015 target of 40% coverage is likely to be achieved.

PROJECT NUMBERS

Overall, the design and consultancy services provided during the preparation of this project can be summarised with the following numbers:

- 16 Municipalities supported
- More than 200.000 P.E. serviced by the investments
- 5 Waste Water Treatment Plants servicing approx. 100.000 P.E.
- 3 Water Treatment Plants of total capacity 45 l/s
- 75 km of water supply networks
- 50 km of waste and storm water networks
- Investments of 20 million euro throught the preparation of 3 feasibility studies
- 59 municipal and public utility staff, members of the PITs/PMUs, have received training on International Procurement Procedures, Financial Planning and Cost Benefit Analysis for the WATSAN programme

RESULTS

In the course of the implementation of this EU project, the Technical Assistance Consultant completed design and tender documents for the Wastewater Treatment Plants in Teslić, Lukavac, Kupres, Velika Kladuša and Orašje, for Water Supply Investments in Glamoč and Bosansko Grahovo, for waste and storm water systems in Široki Brijeg, for main sewer collectors in Kupres, tender documents for three Water Treatment Plants and the sewer network extension in Gračanica, and Feasibility Studies for Čelinac, Ribnik and Šekovići.
Based on the completed project documentation, the construction of water supply investments in Glamoč and Bosansko Grahovo and the construction of the sewer network in Gračanica have started and are presented in detail here. The construction of the other projects will start soon- a short presentation is also included.

TRAINING

The experts of the consortium delivered training on International Procurement Procedures, Financial Management of multi-donor projects, Financial Planning and Cost Benefit Analysis to members of the Project Management Units and Project Implementation Teams of both entities. The trainings were held with the aim to enable the participants to efficiently manage the implementation of their projects.

PARTNERS

EU has strong partnerships with other key development partners in the municipal sector in BiH. Implementation support missions coordinate regularly with other donors, such as the Swedish International Development Agency (SIDA), the KfW Development Bank (KfW), the European Investment Bank (EIB), the European Bank for Reconstruction and Development (EBRD), the World Bank (WB) etc.

1 Municipality of **Ribnik**

Introduction

Ribnik Municipality is located in the western Bosnia and Herzegovina. Administratively, it is situated in the western part of the Republika Srpska entity. It covers an area of 496 km2 and is among the municipalities with the lowest population density in the Republic of Srpska. Approximately, 7200 permanent habitants are living in the Municipality.

The work developed

The Consultant was responsible for the preparation of feasibility study for water supply, waste and storm water infrastructure.

Allocated budget

The proposed investment cost for the sewerage network and the WWTP is estimated 3.8 million € and for the water supply network 1.4 million €.

Status – Comparison: before and after

Currently, the water supply network services 30% and the sewerage network 5% of the total population. The waste is discharged to near the near river and streams without any treatment.
After the completion of the works, the water supply network (total length 66km) will service 70% and the sewerage network (total length 32.5km) 25% of the total population. A new WWTP will be constructed servicing 2500 P.E. (1st phase).

Benefits

- Improved services will be provided in the fields of water supply and sewerage
- An increased number of habitants will be connected to the water supply and sewerage networks
- A decreased percentage of waste will be discharged to natural recipients without treatment

Ribnik (NAMA, 2015)

2 Municipality of **Teslić**

Introduction

Teslić Municipality is located in the central Bosnia and Herzegovina. Administratively, it is situated in the central part of the Republika Srpska entity. It covers an area of 850 km2. Approximately, 52000 permanent habitants are living in the Municipality.

The work developed

The Consultant was responsible for the preparation of conceptual design and tender documents following FIDIC Yellow Book CoC, for WWTP.

Allocated budget

The proposed investment cost for the WWTP and the collectors is estimated 3 million €.

Status – Comparison: before and after

The waste water of the area is currently discharged to Usora River without any treatment.
After the completion of the works, the combined flow will be discharged to Usora River after treatment at the WWTP. The WWTP will be of capacity 16300 m3/day servicing 20800 P.E at 1st phase (year 2030) and of capacity 21630 m3/day 28800 P.E. at 2nd phase (year 2040).

Benefits

- A decreased percentage of waste will be discharged to natural recipients without treatment
- At the WWTP, the organic load and the suspended solids (1st phase) and also the total nitrogen and phosphorus (2nd phase) of the combined waste will be removed to the designated effluent standards

Teslić (NAMA, 2015)

3 Municipality of **Nevesinje**

Introduction

Nevesinje Municipality is located in the southern Bosnia and Herzegovina. Administratively, it is situated in the southern part of the Republika Srpska entity. It covers an area of 1040 km2 in 56 settlements (13,758 inhabitants).

The work developed

The Consultant was responsible for the preparation of detailed design and tender documents for Water Supply and Wastewater Investments during the period November 2014 - January 2016. All outputs have been finalized and approved by PIT, PMU and EUD.

Allocated budget

The proposed investment cost for the sewerage network is estimated to € 200.000, and for the water supply network 50.000 €.

Status – Comparison: before and after

Before

About 50% of the population of Nevesinje Municipality is connected to the public water supply and sewerage system Nevesinje. The remaining population is supplied with water by collecting rain traditionally.

Settlement Šehovina has the biggest problem with water supply and sewerage, as it is not connected to public water supply and sewerage system of Nevesinje Municipality.

After

Works on the construction of water supply system and sewerage system have not yet started.

Benefits

- About 750 new inhabitants in Šehovina will be connected to water supply and sewerage system
- Determination of priority pipelines for reconstruction; hydraulic measurement and leak detection activities; pressure increase, water losses reduction.

Planned location of the pumping station "Nevesinje" (HEIS, 2015)

4 Municipality of **Čelinac**

Introduction

Čelinac Municipality is located in the western Bosnia and Herzegovina. Administratively, it is situated in the western part of the Republika Srpska entity. It covers an area of 362 km2. Approximately, 16880 permanent habitants are living in the Municipality.

The work developed

The Consultant was responsible for the preparation of feasibility study for water supply, waste and storm water infrastructure.

Allocated budget

The proposed investment cost for the sewerage network and the WWTP units is estimated 4 million € and for the water supply network 1.8 million €.

Status – Comparison: before and after

Currently, the water supply network services 28% and the sewerage network 45% of the total population. The waste is discharged to natural recipients without any treatment.

After the completion of the works, the water supply network (total length 33km) will service 78% and the sewerage network (total length 10km) 53% of the total population. A new WWTP will be constructed servicing 10330 P.E. at 1st phase and 11750 at 2nd phase. Also, two WWTP decentralised units will be constructed servicing settlements at a distant area.

Benefits

- Improved services will be provided in the fields of water supply and sewerage
- An increased number of habitants will be connected to the water supply and sewerage networks
- A decreased percentage of waste will be discharged to natural recipients without treatment.

Čelinac (NAMA, 2015)

5 Municipality of **Šekovići**

Introduction

Šekovići Municipality is located in the eastern Bosnia and Herzegovina. Administratively, it is situated in the eastern part of the Republika Srpska entity. It covers an area of 202 km2. Approximately, 9000 permanent habitants are living in the Municipality.

The work developed

The Consultant was responsible for the preparation of feasibility study for water supply, waste and storm water infrastructure.

Allocated budget

The proposed investment cost for the sewerage network and the WWTP units is estimated 3.2 million € and for the water supply network 1.2 million €.

Status – Comparison: before and after

Currently, the water supply network services 28% and the sewerage network 23% of the total population. After the completion of the works, the water supply network (total length 12km) will service 42% and the sewerage network (total length 14km) 37% of the total population. A new WWTP will be constructed servicing 2750 P.E. at 1st phase and 3350 at 2nd phase. Also, a WWTP decentralised unit will be constructed servicing settlements at a distant area.

Benefits

- Improved services will be provided in the fields of water supply and sewerage
- An increased number of habitants will be connected to the water supply and sewerage networks
- A decreased percentage of waste will be discharged to natural recipients without treatment

Sekovici (NAMA, 2015)

6 Municipality of **Petrovo**

Introduction

Petrovo Municipality is located in the northeastern Bosnia and Herzegovina. Administratively, it is situated in the northeastern part of the Republika Srpska entity. It covers an area of 143,9 km2 in 6 settlements (7.010 inhabitants).

The work developed

The project included conducting of topographic and geotechnical surveys, design and preparation of Tender Dossier during the period July 2014 - March 2015. All outputs have been finalized and approved by PIT, PMU and EUD.

Allocated budget

The proposed investment cost for the water supply network is estimated 1.0 million €.

Status – Comparison: before and after

Water supply system of Petrovo Municipality is composed of three systems: Kaluđerica-Petrovo, Jama-Petrovo and Kakmuž-Petrovo. In addition to these three systems, there are also three independent water supply systems in settlements: Karanovac, Sočkovac and Kakmuž.
Some of the problems in water supply network are: old and damaged water pipes, large losses and low pressure in the network, there are no flow meters installed for control of water consumption and disinfection of water.

Benefits

- About 2.000 new inhabitants will be connected to water supply system
- Determination of priority pipelines for reconstruction; hydraulic measurement and leak detection activities; pressure increase, water losses reduction
- Installation of electromagnetic flow meters; construction of three new chlorination stations improving water quality.

Petrovo (HEIS, 2015)

7 Municipality of **Jajce**

Introduction

Jajce Municipality is located in the central part of Bosnia and Herzegovina. Administratively, it is part of the Central Bosnia Canton of the Federation of Bosnia and Herzegovina. It covers an area of 336.7 km2 in 27 settlements (30,758 inhabitants). Area of Dnoluke covers the eastern part of Jajce Municipality, on the right bank of the Vrbas River, with 19 settlements covering the area of 38 km2 (this project includes 4 of 19 settlements: Lučina, Šibenica, Bulići and Kruščica

The work developed

The Consultant was responsible for the preparation of detailed design and tender documents for Water Supply Investments during the period January 2014 - March 2016. All outputs have been finalized and approved by PIT, PMU and EUD.

Allocated budget

The proposed investment cost for the water supply network is estimated to 1.1 million €.

Status – Comparison: before and after

Before

Most of the settlements in the area of Dnoluke has water supply systems that use water from local water sources. In these settlements local water sources are insufficient to cover all needs for water during the summer months.

After

Works on the construction of water supply system have not yet started.

Benefits

- About 3.000 new inhabitants in Šibenica, Bulići, Lučina and Kruščica will be connected to water supply system
- Installation of equipment in new reservoirs and pumping stations; better control of water consumption

Reservoir and pumping station Zastinje (HEIS, 2015)

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8 Municipality of **Kupres**

Introduction

Kupres Municipality is located in the western Bosnia and Herzegovina. Administratively, it is part of the Federation of Bosnia and Herzegovina. It covers an area of 570 km2. Approximately, 4000 permanent habitants are living in the Municipality.

The work developed

The Consultant was responsible for the preparation of preliminary design and tender documents following FIDIC Yellow Book CoC for WWTP and for the detailed design and tender documents following FIDIC Red Book CoC, for main collectors.

Allocated budget

The proposed investment cost for the WWTP and the collectors is estimated 4.2 million €.

Status – Comparison: before and after

The waste water of the area is currently discharged to Karicevac Creek through three existing outlets without any treatment.

After the completion of the works, the combined flow will be discharged to Karicevac Creek after treatment at the WWTP. The WWTP will be of capacity 5500 m3/day servicing 4800 P.E in 2030. Also, main collectors of total length 3.9 km will be installed transporting combined waste water to the new WWTP, while the excess storm water will be diverted to Karicevac Creek through two new overflow chambers

Benefits

- Improved services will be provided in the fields of waste and storm water drainage
- The combined waste will be treated at the WWTP before its discharge at Karicevac Creek. At the WWTP, the organic load, the suspended solids and the total nitrogen of the combined waste will be removed to the designated effluent standards
- An increased number of habitants will be connected to the sewerage network

Kupres (NAMA, 2015)

9 Municipality of **Glamoč**

Introduction

Glamoč Municipality is located in the southwestern Bosnia and Herzegovina. Administratively, it is part of Canton 10 of the Federation of Bosnia and Herzegovina. It covers an area of 1.033,6 km2 in 34 settlements within the municipal borders (4.038 inhabitants).

The work developed

The project included conducting of topographic and geotechnical surveys, design and preparation of Tender Dossier during the period July 2014 - March 2015. All outputs have been finalized and approved by PIT, PMU and EUD.

Allocated budget

The total allocated budget was EUR 545.000, while the allocated IPA 2009 grant was EUR 316.000.

Status – Comparison: before and after

Before

Water supply of Glamoč Municipality is performed using three systems: Goništa, Ajzama and Busija. The main system for water supply of Glamoč is Gonište. Due to years of use and inadequate maintenance of facilities and equipment, water supply system of Glamoč is characterized by: high losses in the distribution network (about 80%), high consumption of electricity due to 24-hour operation of pumping stations Suhalj and Vrba, insufficient measurement of production and consumption of water, inadequate maintenance and investment in reconstruction. In settlements Zajaruga and Vrba, the population collects rainwater and uses it for water supply purposes.

After

Within this project, the following design activities were implemented:
Reconstruction of water supply network in the streets Dr Ivana Ribara and Luke (3 km);
Construction of a new water supply network in the street Jakir (1.5 km);
Reconstruction of water intakes and reservoirs, which includes: reconstruction of hydro-mechanical equipment within different structures; installation of new pumps within water intakes Balaklagija and Suhalj; installation of electromagnetic flow meters for monitoring of water consumption; installation of equipment for disinfection of water; reconstruction of interior and exterior of existing structures; installation of electrical equipment etc.
Construction of new Rudine sub-system which includes: construction of new pipeline from Vrba water intake to the new Rudine reservoir and construction of distribution main to settlement Skučani (3.5 km); construction of new Rudine reservoir (250 m3) with the installation of hydro-mechanical equipment, electromagnetic flow meter and electrical equipment etc.
Construction of discharge shafts, venting valve shafts with isolation valve and connecting shafts
The tender was published in May, 2015. The construction works were realized in the period June - December 2015.

Benefits

- Construction of new pipeline; water losses reduction; coverage increase from 65% to 80%;pressures increase
- Installation of electromagnetic flow meters; better control of water consumption

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Reconstruction of Balaklagija water intake (HEIS, 2015)

New Rudine reservoir (250 m3) (HEIS, 2015)

10 Municipality of **Gračanica**

Introduction

Gračanica Municipality is located in the north eastern Bosnia and Herzegovina. Administratively, it is part of the Federation of Bosnia and Herzegovina. It covers an area of 387 km2. Approximately, 50200 permanent habitants are living in the Municipality

The work developed

The Consultant was responsible for the preparation of the full tender dossiers for the reconstruction and expansion of separate wastewater collection and storm water drainage systems in the urban area of Gračanica (3 lots). The construction contracts are following the FIDIC Yellow Book.
The Consultant was also responsible for the preparation of tender documents following FIDIC Red Book CoC, for three WTPs.

Allocated budget

The total construction cost of three lots of waste and storm water systems is estimated 1.5 million €. The total construction cost of the three WTPs is estimated 0.8 million €.

Status – Comparison: before and after

Before

It had been estimated that the 95% of the waste water system of Gračanica consisted of concrete pipes that were mainly constructed during 1970s and 1980s. These works were executed without any professional supervision, while the pipes had no technical certification. In addition, there were a few collectors that were installed prior to these, at the beginning of the 20th century as well as in 1960s, together with the water supply system in the city centre. The majority of the latter were installed by the Municipality or the local Community of Gračanica, but there are also a few of these constructed randomly by citizens. It was observed that many of the pipes were receiving big flows for their capacity and also some parts were also receiving storm water discharges.
Regarding the water supply sources, at lidza, Vrela and Stjepan Polje sources high turbidity is generated during high precipitation. All other water supply sources are in full compliance to the regulations of the law.

After

Following the request of the PIT, the existing network was surveyed. Upon this survey it was decided that only some parts of the waste water network that were constructed recently and met the hydraulic criteria could be included in the new system. All other parts were considered for reconstruction mainly due to aging or insufficient profiles. Hence, the whole waste and storm water system of the Municipality were redesigned.
Regarding the water supply systems, after the completion of the WTPs of lidza, Vrela and Stjepan Polje, surface and ground water will be treated to the required standards providing drinking water of 45l/sec.

Benefits

- Improved services will be provided in the fields of water supply, waste and storm water systems
- An increased number of habitants will be connected to the sewerage network
- An increased amount of ground and surface water will be treated to the designated standards

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Water source Ilidza and available land plot for construction of WTP (Preliminary Geotechnical Study 2012)

Water source Vrela, existing pumping station and available land plot for construction of WTP (Preliminary Geotechnical Study 2012)

Available land plot for construction of WTP at Stjepan Polje (Preliminary Geotechnical Study 2012)

11 Municipality of Bosansko Grahovo

Introduction

Bosansko Grahovo Municipality is located in the western Bosnia and Herzegovina. Administratively, it is part of Canton 10 of the Federation of Bosnia and Herzegovina. It covers an area of 780 km2 in 35 settlements within the municipal borders (3,166 inhabitants).

The work developed

The Consultant was responsible for preparation of the Detailed Design and full Tender Dossiers for new water supply sub-system. The project included conducting of topographic and geotechnical surveys for both Components. The preparation of Detailed Design – Component 1 was developed during June 2014 - February 2015 and Tender Dossier for water supply - Component 2 was developed during February 2015 - June 2015. All outputs have been finalised and approved by PIT, PMU and EUD.

Allocated budget

The total allocated budget for Component 1 was EUR 950,000, while the allocated IPA 2013 grant was EUR 699,912. For Component 2, the total allocated budget was EUR 750,000.

Status - Comparison: before and after

Before: Currently, water supply of Bosansko Grahovo is based solely on the intake of water from the source Peći, which does not have sufficient capacity to cover the water demand of population and industry of Bosansko Grahovo Municipality in current conditions, as well as in the future. Due to insufficient water quantities in the water supply system of the Grahovo Municipality, the population has for many years been exposed to water reduction, especially during the summer months.

After: After analysis of the current and future water demand, it was decided with Bosansko Grahovo PIT to design a new water supply sub-system, which involves the construction of a new Gudaja water intake and transmission of water from this water intake to the existing water supply system.

The project included the following components:

Component 1

- Construction of the transmission-distribution main from new Vrščić reservoir to the main existing city reservoir Gradina (15 km)

Component 2

- Construction of a new Gudaja water intake with installation of the accompanying hydro-mechanical equipment and other necessary equipment,
- Construction of water supply network: the gravitation pipeline from the Gudaja water intake structure to the Gudaja 1 pumping station, pressure pipeline from the Gudaja 1 pumping station to the Gudaja 2 booster station and the pressure pipeline from the Gudaja 2 booster station to the new Vrščić reservoir, with about 3 km of pipeline length,
- Construction of the Gudaja 1 and Gudaja 2 pumping station structures, with installation of the accompanying hydro-mechanical equipment, electromagnetic flow meters for monitoring of water consumption, electrical equipment installation, equipment for disinfection of water and installation of new pumps that will operate only at night to save energy;
- Construction of a new Vrščić reservoir (250 m3), with installation of the accompanying hydro-mechanical equipment, electromagnetic flow meter for monitoring of water consumption and electrical equipment etc.
- Construction of the junction manholes on the transmission-distribution mains for related settlements.

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The tender for Component 1 was published in March, 2015. Deadline for submission of tenders was in April 2015. The Component 1 construction works were finalised at the end of 2015. The tender for Component 2 was published in October, 2015. The Component 2 works will start in spring 2016.

Benefits

- About 430 new inhabitants will be connected to water supply system
- Water supply improvement by introducing an additional amount of water in the system (Q=60 l/s)
- Installation of new pumps; improvement of energy efficiency of the water supply system;
- Installation of electromagnetic flow meters; better monitoring of water consumption.

Construction of transmission-distribution main from the new Vrščić reservoir to the existing main city reservoir Gradina (HEIS, 2015)

12 Municipality of **Prozor-Rama**

Introduction

Prozor-Rama Municipality is located in the central part of Bosnia and Herzegovina. Administratively, it is part of the Canton 7 of the Federation of Bosnia and Herzegovina. It covers an area of 477 km2 in 64 settlements (16,297 inhabitants).

The work developed

The Consultant was responsible for the preparation of detailed design and tender documents for Water Supply Investments during the period October 2015 - February 2016. All outputs have been finalized and approved by PIT, PMU and EUD.

Allocated budget

The proposed investment cost for the water supply network is estimated to € 2.3 million.

Status – Comparison: before and after

Before: Water supply of Prozor-Rama Municipality dates back to 1908. Current percentage of connection to the municipal water supply system is only 16% and water supply of the entire municipality is unsatisfying.
The main transmission pipeline for water supply of settlements around Rama Lake was built in 1989. The pipeline was made of asbestos cement pipes. In the pipeline, there are numerous cracks and damages, and it needs to be reconstructed. One of the problems is that transmission pipeline often breaks because of topology which results in losses in the system.
After: This project includes construction of the main distribution network for settlements Družinovići, Šlimac, Lapsunj and Ometale and connecting to the public water supply of Prozor-Rama Municipality. Works on the construction of water supply system have not yet started.

Benefits

- About 1.100 new inhabitants will be connected to water supply system
- Reconstruction of main transmission pipeline; water losses reduction
- Installation of electromagnetic flow meters; better control of water consumption
- New disinfection equipment at the chlorine station Krč; improved water quality
- Installation of new pumps in the pumping stations; improvement of the energy efficiency

Hydro-mechanical equipment in pumping station Krupić (HEIS, 2015)

13 Municipality of **Orašje**

Introduction

Orašje Municipality is located in the north Bosnia and Herzegovina. Administratively, it is part of the Federation of Bosnia and Herzegovina. It is one of the smallest Municipalities in BiH and it covers an area of 122 km2. Approximately, 21000 permanent habitants are living in the Municipality.

The work developed

The Consultant was responsible for the preparation of preliminary design and tender documents following FIDIC Yellow Book CoC, for WWTP.

Allocated budget

The proposed investment cost for the WWTP is estimated 2.3 million €.

Status – Comparison: before and after

The waste water of the area is currently discharged to Sava River without any treatment.
After the completion of the works, the combined flow will be discharged to Sava River after treatment at the WWTP. The WWTP will be of capacity 11665 m3/day servicing 10950 P.E at 1st phase (year 2025) and of capacity 18410 m3/day servicing 16800 P.E. at 2nd phase (year 2035).

Benefits

- A decreased percentage of waste will be discharged to natural recipients without treatment
- At the WWTP, the organic load, the suspended solids and the total nitrogen of the combined waste will be removed to the designated effluent standards.

Orašje (NAMA, 2015)

14 Municipality of **Velika Kladuša**

Introduction

Velika Kladuša Municipality is located in the north west of Bosnia and Herzegovina. Administratively, it is part of the Federation of Bosnia and Herzegovina. It covers an area of 332 km2. Approximately, 45000 permanent habitants are living in the Municipality.

The work developed

The Consultant was responsible for the preparation of preliminary design and tender documents following FIDIC Yellow Book CoC, for WWTP.

Allocated budget

The proposed investment cost for the WWTP is estimated 2.8 million €.

Status – Comparison: before and after

The waste water of the area is currently discharged to Kladusnica River without any treatment. After the completion of the works, the combined flow will be discharged to Kladusnica River after treatment at the WWTP. The WWTP will be of capacity 3620 m3/day servicing 15200 P.E at 1st phase (year 2030) and of capacity 6500 m3/day servicing 25300 P.E. at 2nd phase (year 2040).

Benefits

- A decreased percentage of waste will be discharged to natural recipients without treatment
- At the WWTP, the organic load, the suspended solids, the total nitrogen and coliforms (1st phase) and also the total phosphorus (2nd phase) of the combined waste will be removed to the designated effluent standards

Velika Kladusa (NAMA, 2015)

15 Municipality of **Široki Brijeg**

Introduction

Široki Brijeg Municipality is located in the west Bosnia and Herzegovina. Administratively, it is part of the Federation of Bosnia and Herzegovina. It covers an area of 388 km2. Approximately, 26000 permanent habitants are living in the Municipality and its surrounding settlements.

The work developed

The Consultant was responsible for the preparation of detailed design and tender documents following FIDIC Red Book CoC for waste and storm water systems for the collector zones D & E.

Allocated budget

The proposed investment cost for the waste and storm water systems is estimated 3.7 million €.

Status – Comparison: before and after

The waste water is currently discharged to sceptic tanks and Ugrovača River without treatment. After the completion of the works, approximately 8800 P.E. will be connected to the new sewerage network, consisting of pipelines of total length 32.6km and one pumping station. The waste will be transported to existing collectors and then to a new WWTP. In addition, the storm water of collector zoned D & E will be diverted to Ugrovača River through new open channels and culverts of total length 3.5km.

Benefits

- Improved services will be provided in the fields of waste and storm water drainage
- An increased number of habitants will be connected to the sewerage network
- A decreased percentage of waste will be discharged to natural recipients without treatment
- Storm water drained from a basin area 420 ha will be diverted to Ugrovača River

Siroki Brijeg (NAMA, 2015)

16 Municipality of **Lukavac**

Introduction

Lukavac Municipality is located in the north Bosnia and Herzegovina. Administratively, it is part of the Federation of Bosnia and Herzegovina. It covers an area of 353 km2, consisting of 32 settlements. Approximately, 55500 permanent habitants are living in the Municipality.

The work developed

The Consultant was responsible for the preparation of preliminary design and tender documents following FIDIC Yellow Book CoC, for WWTP.

Allocated budget

The proposed investment cost for the WWTP is estimated 2.5 million €.

Status – Comparison: before and after

The waste water of the area is currently discharged to Spreca River without any treatment.
After the completion of the works, the waste water flow will be discharged to Spreca River after treatment at the WWTP. The WWTP will be of capacity 3485 m3/day servicing 10950 P.E at 1st phase (year 2027) and of capacity 5000 m3/day servicing 22000 P.E. at 2nd phase (year 2040).

Benefits

- A decreased percentage of waste will be discharged to natural recipients without treatment
- At the WWTP, the organic load, the suspended solids and the total nitrogen of the waste will be removed to the designated effluent standards

Lukavac WWTP site (NAMA, 2015)

IGIP mbH is one of Germany's leading and well-reputed sector consulting engineering companies for environmental engineering and infrastructure projects within public and private urban water supply, wastewater management, solid waste management, institutional strengthening and resources management. Since its establishment in 1963, IGIP's multidisciplinary team is providing services for accompanied measures such as environmental impact assessments, development planning etc., especially in Central Eastern Europe, the Mediterranean region, Africa and Asia.

NAMA SA, was founded in 1990. NAMA is a multidisciplinary independent consultancy company based in Athens, Greece and is recognized as one of the leading firms in the engineering consultancy sector in Greece. The company provide services for the whole range of engineering topics, achieving total solutions, from the conceptual design level up to detailed design and management of major projects at the sectors of Water & Environment, Transport Engineering, Surveying & GIS, Structural Engineering, Geology & Geotechnical Engineering.

EXERGIA S.A. is an independent firm of consultants operating internationally in the fields of energy and environment. It is member of SESMA, the Hellenic Association of Management Consulting Companies (the Greek branch of FEACO). The cornerstone of EXERGIA is its highly qualified and dedicated staff with top educational background and wide professional experience. EXERGIA's work is based on a decentralized organization, the application of state-of-the-art technology and a sound business attitude.

"The **European Union** is made up of 28 Member States who have decided to gradually link together their know-how, resources and destinies. Together, during a period of enlargement of 50 years, they have built a zone of stability, democracy and sustainable development whilst maintaining cultural diversity, tolerance and individual freedoms. The European Union is committed to sharing its achievements and its values with countries and peoples beyond its borders".

The European Commission is the EU's executive body.

For more information

EU-funded Project
"Technical Assistance to support implementation of water and sanitation programme in Bosnia and Herzegovina" (PPF TA)

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