

Feasibility Study of Alternatives to Extend the Current Water Supply System in Carpineni, Moldova



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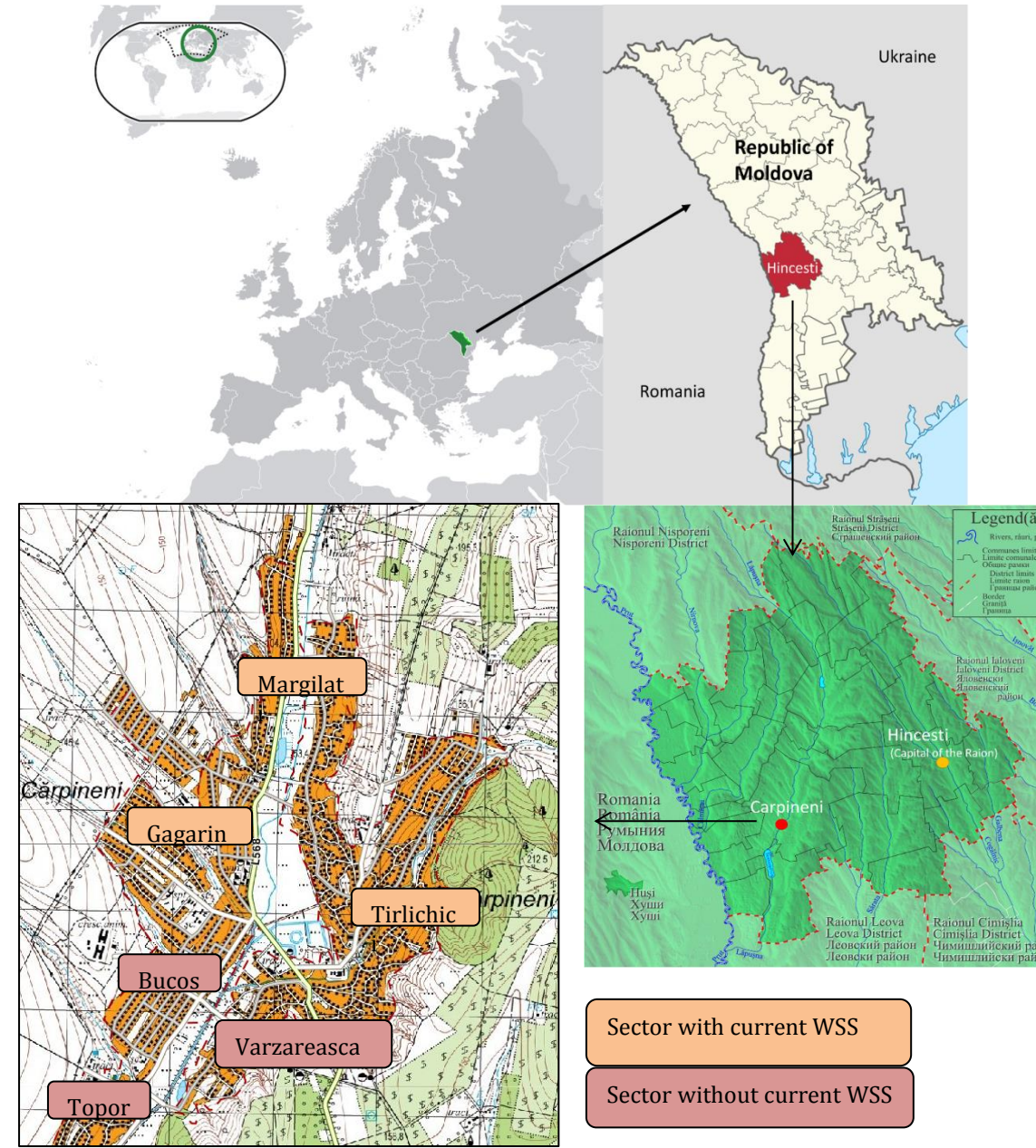
E.T.S.I. CAMINOS, CANALES Y PUERTOS)



In collaboration with ApaSan (Water and Sanitation project in Moldova)

INTRODUCTION

This Final Degree Project is a Technical Report that analyses the current situation of Carpineni water supply system and studies the technical feasibility of several alternatives for the improvement and extension of the network. This paper tries to show the reality of the water supply in the municipality of Carpineni, which is located in the region of Hincesti, Republic of Moldova. To carry out the research it has been needed a stay of 10 months in the working area, Republic of Moldova. During this period it has been necessary the incorporation to ApaSan Team. This organization is in charge of implementing a cooperation project financed by the Swiss Cooperation Agency through the Foundation SKAT for the construction and improvements of water supply and sanitation infrastructure in rural areas of Moldova.



Report Aim

The purpose of this report is to create a technical base for the design and construction tender of Carpineni General WSS. The Skat Foundation together with the town hall of Carpineni requested a deep analysis of the current WSS situation and the proposal of several alternatives to supply the non-connected areas of Bucos, Topor and Varzareasca. Among this options it will be chosen the most suitable according to the village characteristics. Afterwards the reference terms for the technical design will be redacted and launched based on the recommendations collected in this report.

The necessity of this report emerges when the City Council of Carpineni together with the Water Consumer Association tries to execute a construction project for water transfer between village sectors. Despite of their efforts to keep autonomy in the works, the City Council has to request technical and economical help to the Foundation SKAT.

WORKING METHODOLOGY

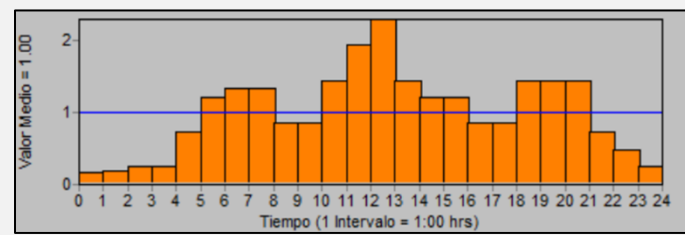
Documents, Language and Hydraulic Simulators



The main efforts to write this report was done in compiling all the information related to the previous 4 projects which in some cases were not complete or disappeared. All the information contained in the existing design and execution projects was presented either in Romanian (official language of the country) or Russian, the most used language for technical purpose.

All the WSS network have been modelled with Epanet. In order to get the most realistic approach WSS model creation have followed an exhaustive procedure.

- Draft model with CAD
- Transform data in INP
- Data Alterations
- Create and Simulate Network with Epanet



Site Works and Meetings with the Community



It was especially important the approach done to the catchment yield along the year. During the driest season of the year in the country (September and beginning of October) the water flow outcomes from the different sources were monitored.

In order to improve the quality of the project it was necessary to organize regular meetings with the main authorities of the village. The meetings were held weekly and all the perspectives of the assistants were taken into consideration.

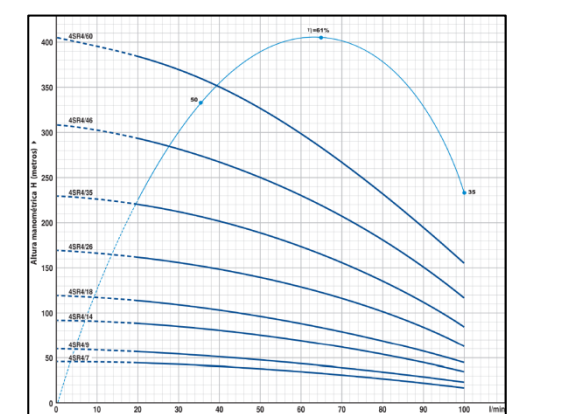
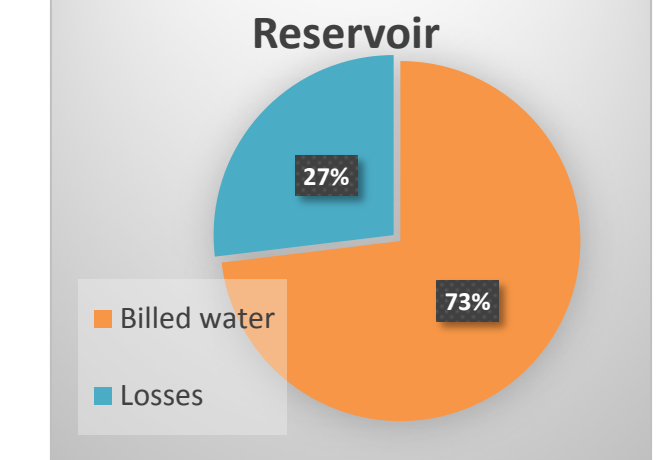


CURRENT WATER SUPPLY SYSTEM ANALYSIS



The village of Carpineni is divided in 6 sectors. Just 3 of them have current WSS. The WSS are independent and were built during different periods in the last 8 years. Although relatively new, the systems had problems especially in terms of water yield. The high volume of water losses within the network compounds this situation.

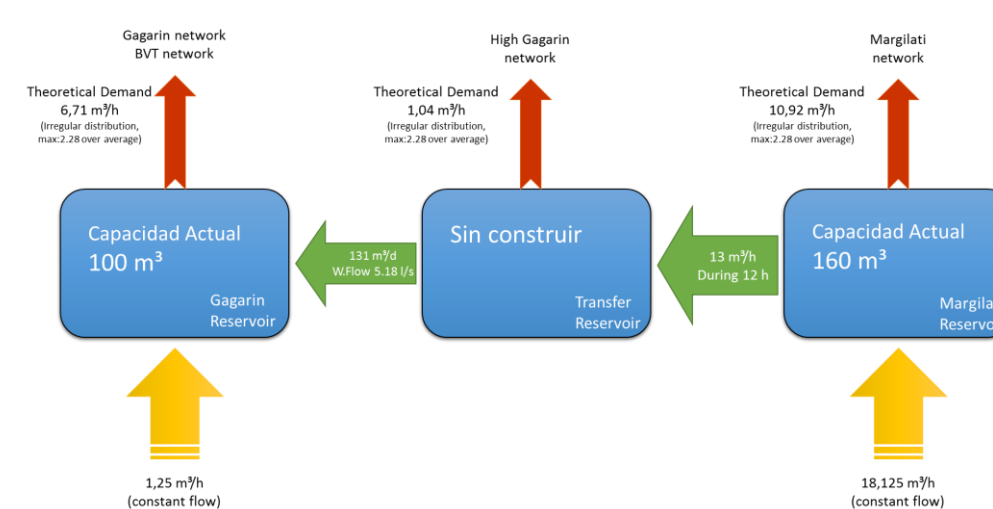
Total Water at Gagarin Reservoir



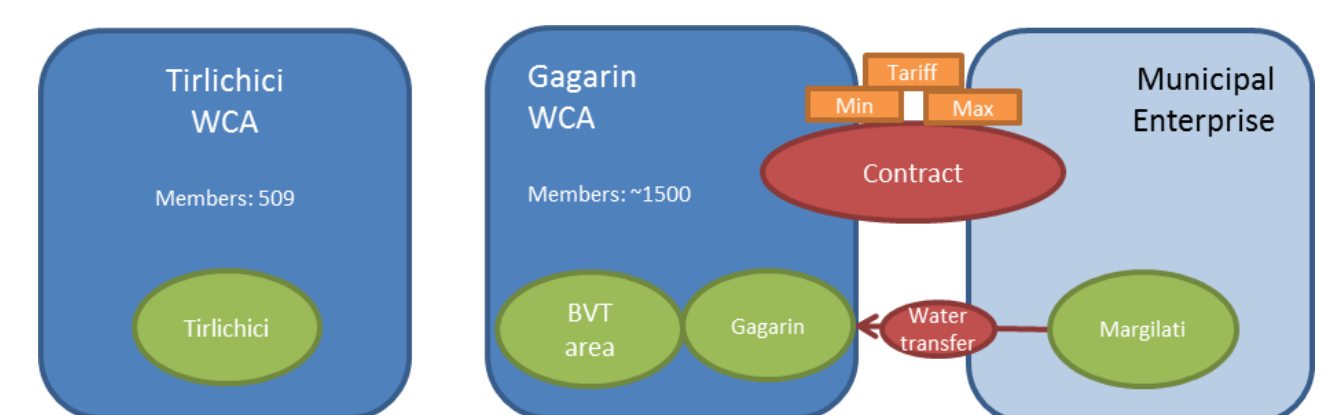
ALTERNATIVES

The main aim of this report is to give a solution in order to build a proper WSS for the whole village. Therefore it implies to correct the fails of built sectors (Margiati, Gagarin and Tirlidici) and design a new network to supply the new ones (Bucos, Topor and Varzareasca). Each Alternative was analyzed through:

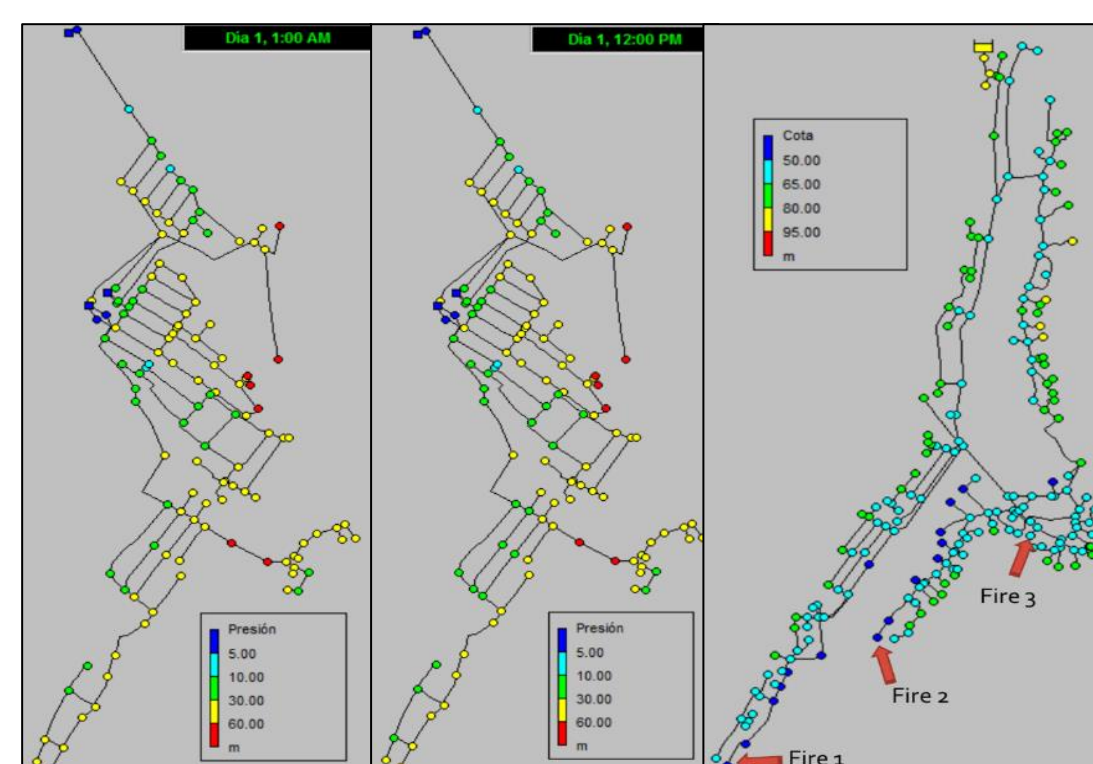
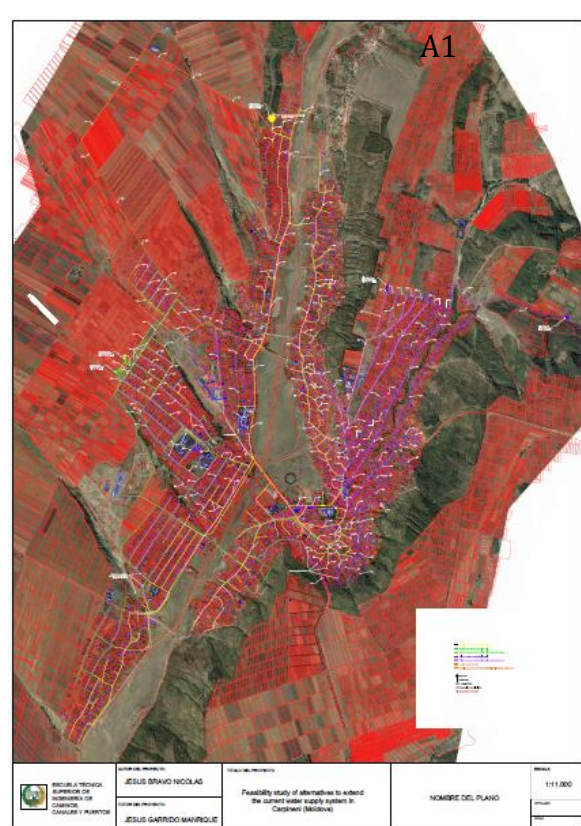
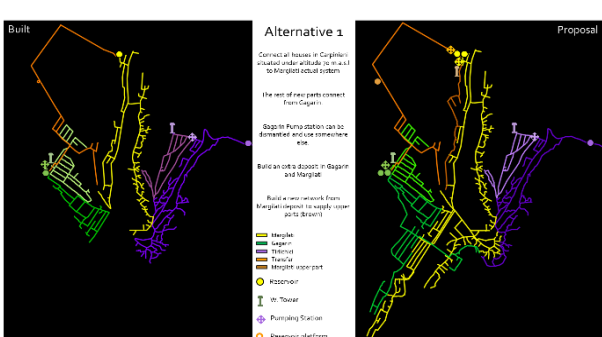
Hydraulic Analysis with Epanet models and Water transfer analysis (energy consumption)



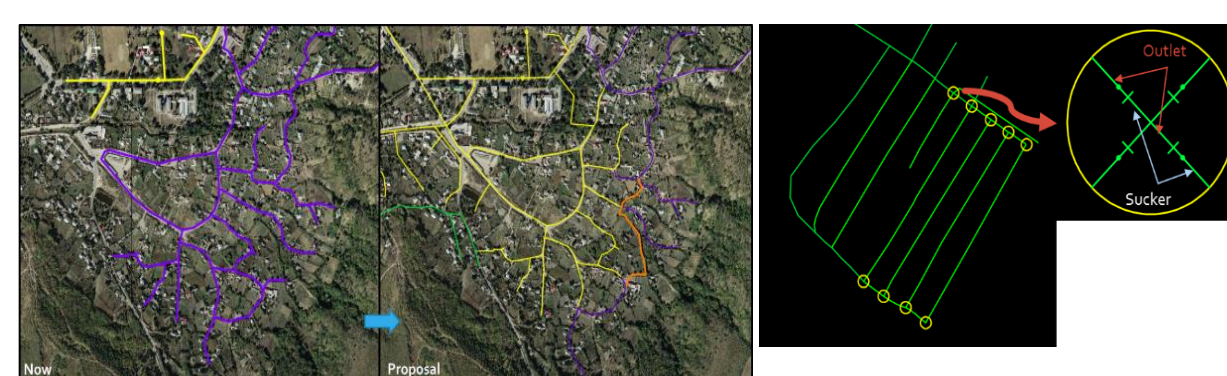
Management Proposals and New Water Tariff Calculation



Detailed plan of the new network, (depicting technical changes in the alignment) and scheme of connection.

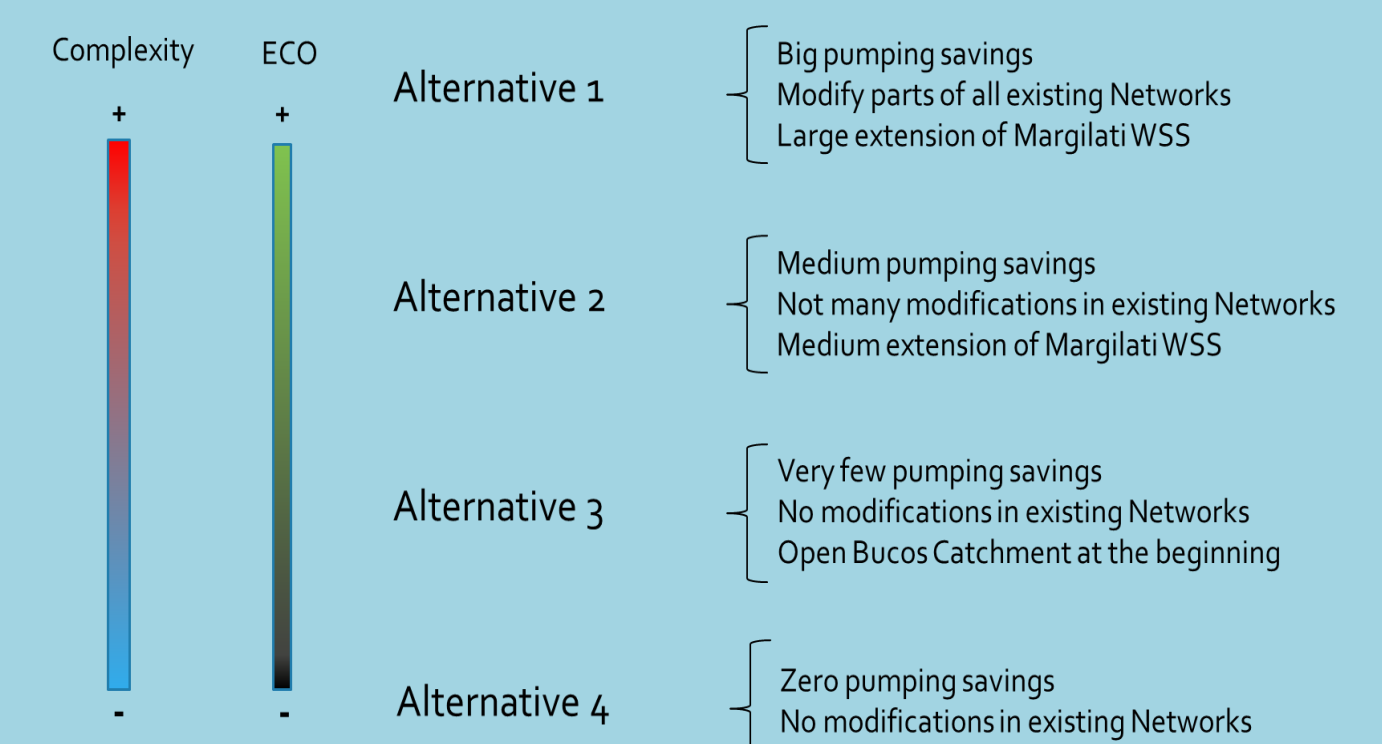


Technical modifications in detail to improve the network performance



CONCLUSIONS

This PFC delivered 4 technical solutions for the water supply in Carpineni. Those proposals are formed by 4 main technical alternatives with 3 management suggestions, 2 technical variants and 2 phases of implementation according to the water yield in the system. In the graphic below is depicted the characteristics of each alternative. The approach of the report has been based on the economical, technical, social and environmental sustainability. All the solutions try to mitigate the features of Moldovan Water Supply systems in terms of water losses, energy efficiency and economical sustainability.



Water Balance Analysis. Production vs Consumption

ALTERNATIVE 1 m ³ /d	Separated System			Alternative			Final Balance
	Actual Production	Estimated Demand	Hypothetic Balance	Transfer to other areas by Gravity	Transfer by pumping	Received from other areas	
Margiati	435	95	340	114	182	0	45
Gagarin	50	164	-114	68	0	182	0
Tirlidici	80	131	-51	0	0	0	-51
Bucos	0	61	-61	0	0	61	0
Topor	0	56	-56	0	0	56	0
Varzareasca	0	64	-64	0	0	64	0