

A better strategy  
**for a sustainable development**



**Company for Hydraulics, Environment and Rehabilitation**

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# Survey on rural sanitation in Bulgaria and typological approach for solutions

(for the Ministry of Agriculture and Food)

realized by *SHER Ingénieurs-Conseils s.a.*  
(Belgium) in 2009

## Two phases:

- ✓ Survey
- ✓ Case study

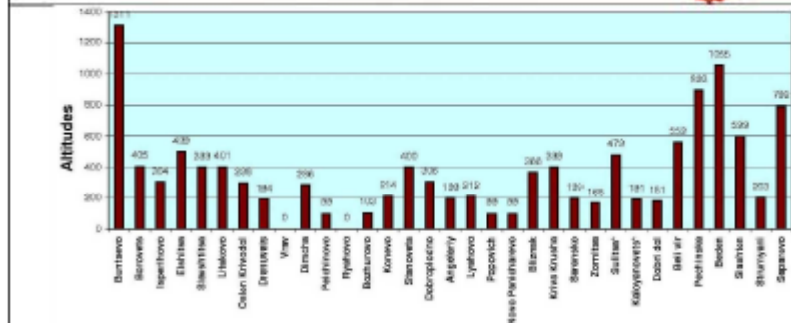
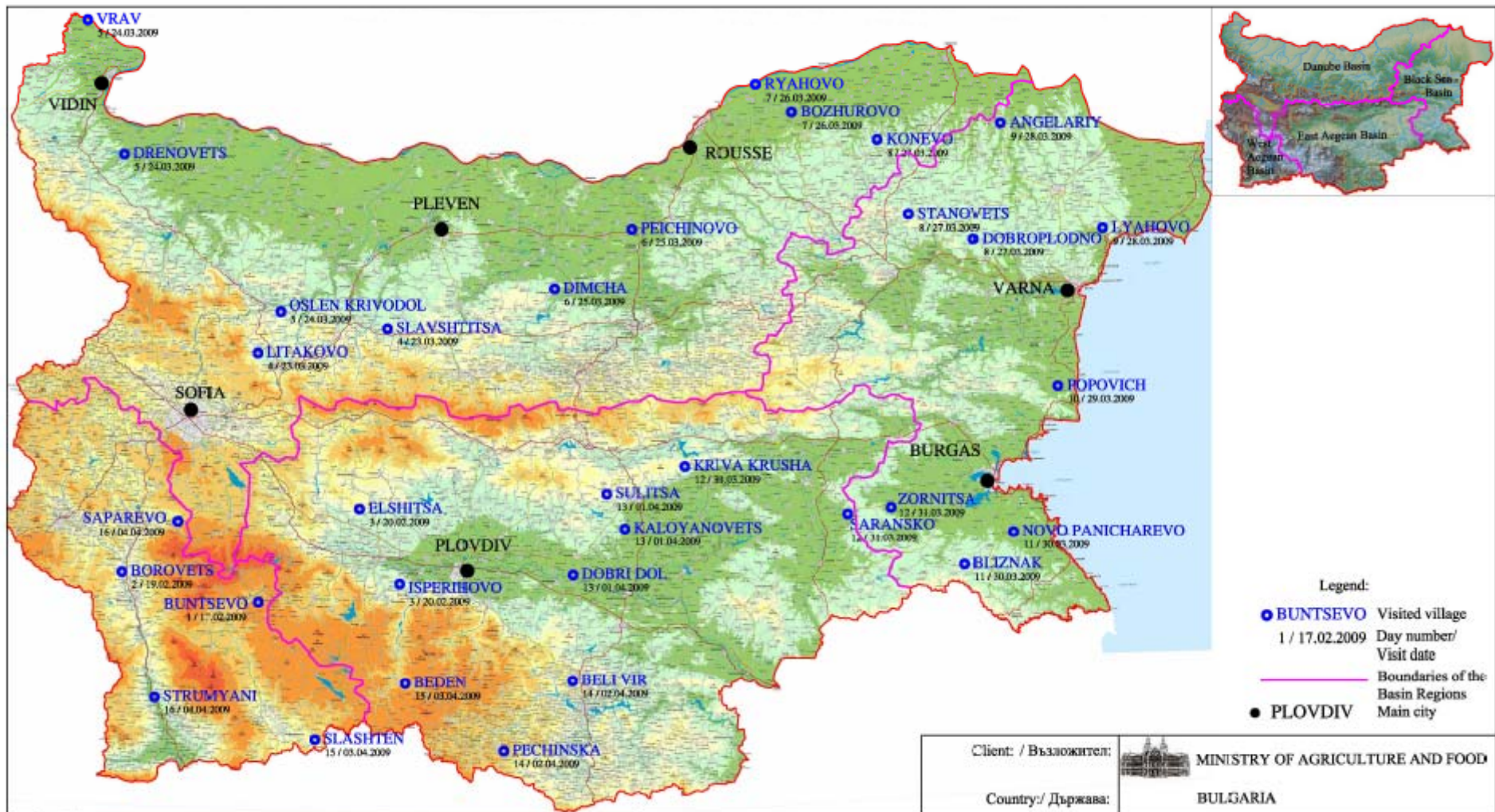


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Client / Възложител:	 <b>MINISTRY OF AGRICULTURE AND FOOD</b>
Country / Държава:	<b>BULGARIA</b>
Consultant / Консултант:	 <b>SHER Consulting Engineers (With Povvik)</b> Address: 15, Rue Matagne, B-5020 VEDRIN - Belgium
Drawn by / Изработено от:	 <b>GEOTOTAL</b> Address: 9 Ravette St., 1421 Sofia, Bulgaria
Project / Проект:	Study of modern technological and technical decisions for waste water treatment of Villages with less than 2000 P.E. in rural regions and development of concrete Model
Title of Document / Име на документа:	Map of visited villages during Phase 1
size/формат:	A3
scale/масаб:	1:160000
sheet/лист:	1/2
Date/ Дата:	April 2009

## Common aspects in Bulgarian villages

- ✓ The Bulgarian villages are generally grouped.
- ✓ The villages are generally established along a river.
- ✓ The animal load within the villages is generally high.
- ✓ Usually, the groundwater in the village area is contaminated.
- ✓ In most of the villages, the revenues per grownup are low, from 200 to 400 LEV/month.



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## Specific aspects in Bulgarian villages

- ✓ Village density.
- ✓ Number of inhabitants
- ✓ Nature of the soil and depth of them.
- ✓ Topography.
- ✓ Age of the communities.
- ✓ Water consumptions: varies from 5 to 20 m<sup>3</sup>/household/month
- ✓ Available space around the village.
- ✓ Ethnic composition.



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	Total Population	Tap Water	Well water	Public tap
Angelariy	130	Negative	Positive	Positive
Beden	550	Negative		Positive
Beli Vir	1500	Positive		Positive
Blisnak	150	Positive	Positive	Positive
Borovets	100			
bozhurovo	462	Negative	Positive	
Buntsevo	499			
Dimcha	389	Positive	Positive	Positive
Dobri Dol	150	Positive	Positive	
Dobroplodno	1100	Positive		Negative
Drenovetz	1500		Positive	Positive
Elshitsa	867			
Isperihovo	2200			
Kaloyanovets	1500	Positive		
Konevo	123	Negative		
Kriva Krusha	48	Negative	Negative	
Liahovo	482	Negative		
Litakovo	1860	Negative	Positive	
Novo Panicharevo	1000	Negative	Negative	
Oslen	130	Positive		
Petchinska	80	Positive	Positive	Positive
Peichinovo	400	Positive	Positive	Negative
Popovich	500	Negative	Positive	
Ryahovo	2100	Negative	Positive	
Saparevo	1800	Positive	Positive	Negative
Saransko	150	Positive	Positive	
Slashten	2261	Positive	Positive	Negative
Slashvitza	127	Positive	Negative	
Stanovets	100	Negative	Positive	
Strumyani	1100	Negative		Positive
Sulitsa*	185	Negative	Positive	
Vrav	400	Negative	Positive	
Zornitsa	450	Positive	Positive	
<b>Total</b>	<b>24393</b>	<b>28</b>	<b>21</b>	<b>12</b>
Positive		14	18	8
Percentage	100%	50%	78.90%	





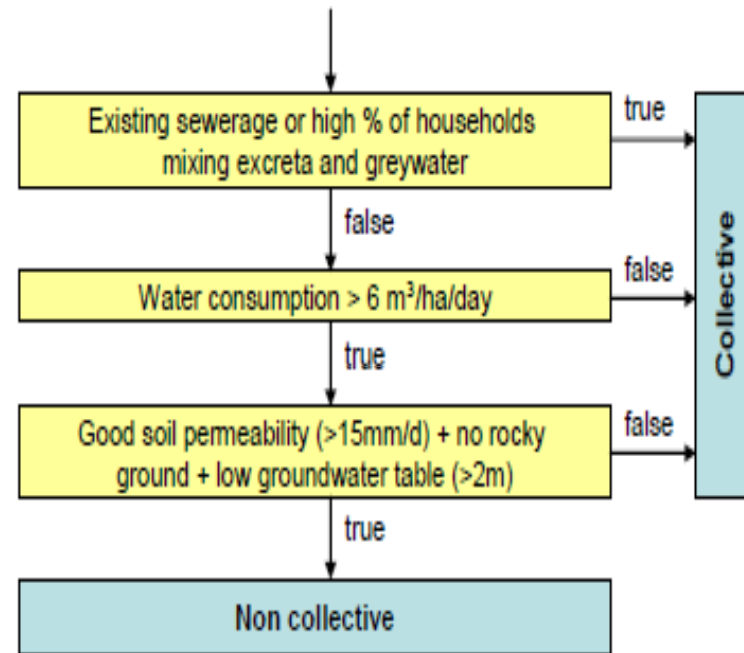
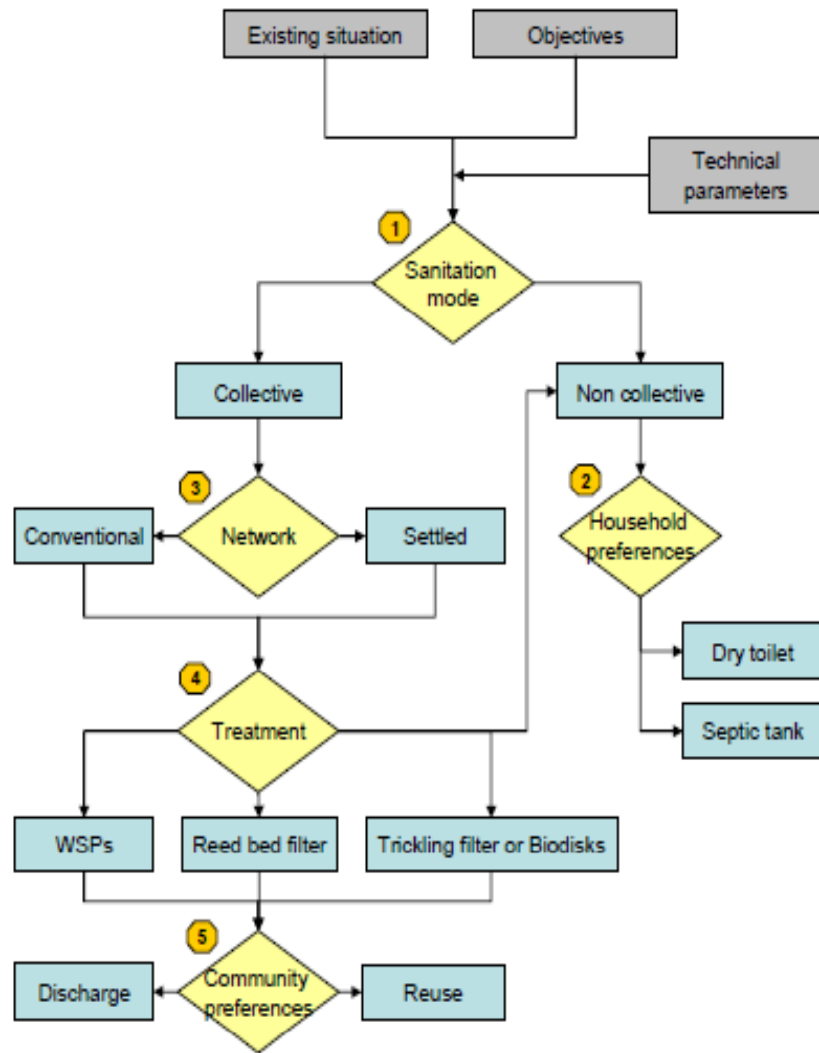
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# Decision trees





## Case studies

Village Name	District Name	Municipality Name	Inhabitants	District GDP 2004	Municipal Correction	Living Standard	Topography
Buntsevo	Blagoevgrad	Yakoruda	499	4010	761	Impoverished	Mountains
Peichinovo	Ruse	Byala	406	4149	2247	Average	Plains
Bozhurovo	Razgrad	Kubrat	497	3559	1088	Low	Plains
Angelariy	Dobrich	Tervel	149	3758	1080	Impoverished	Plains
Strumyani	Blagoevgrad	Strumyani	991	4010	1342	Low	Mountains



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## Proposed solutions

Village Name	Inhabitants	Sanitation technique	Networks	WW Treatment	Topography
Buntsevo	499	Collective	Simplified network (condominial)	Collective septic tanks	Mountains
Peichinovo	406	Collective	Sanitary network	Planted reed bed filters	Plains
Bozhurovo	497	Collective	Partially combined network	Lagooning	Plains
Angelariy	149	Individual	/	Septic tanks + infiltration trenches or infiltration pits	Plains
Strumyani	991	Collective	Existing combined sewer network	Biodisks	Mountains



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# Peychinovo

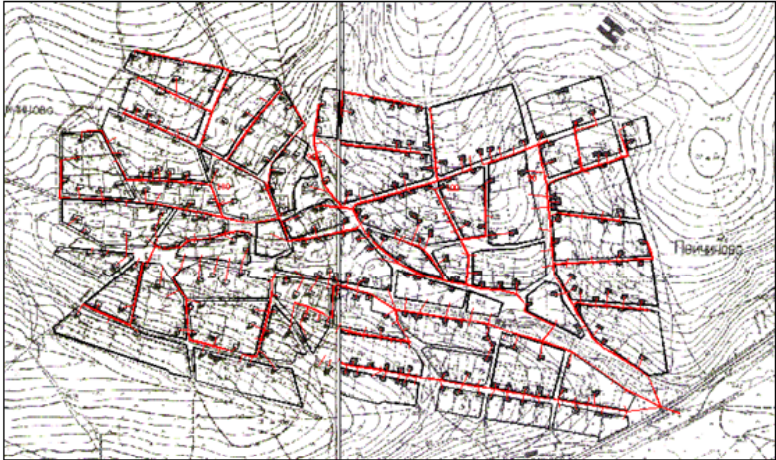
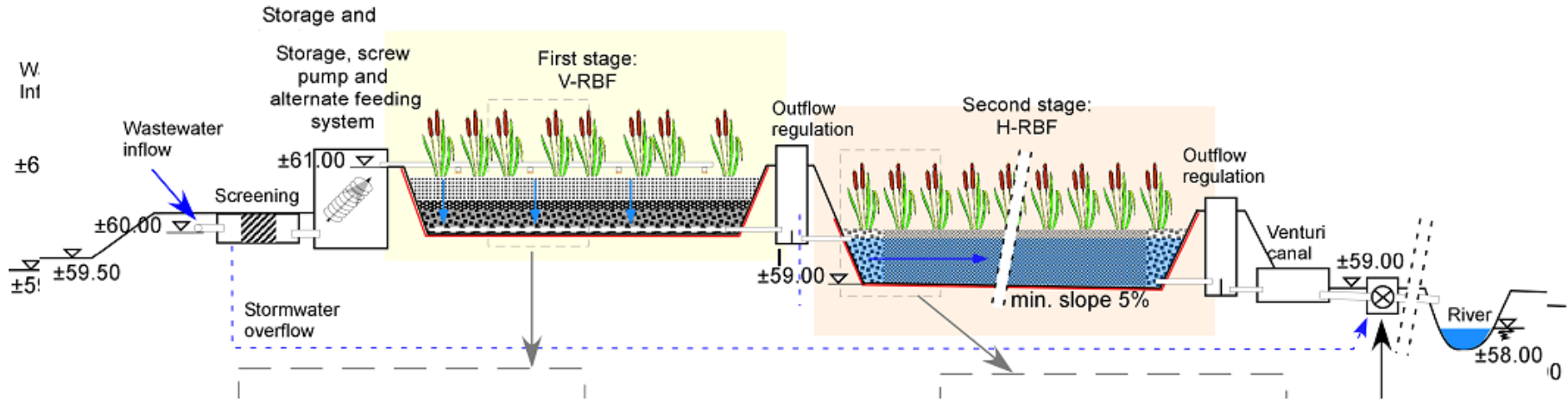


Figure 13. WWTP schematic profile (no scale)



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# Bozhurovo

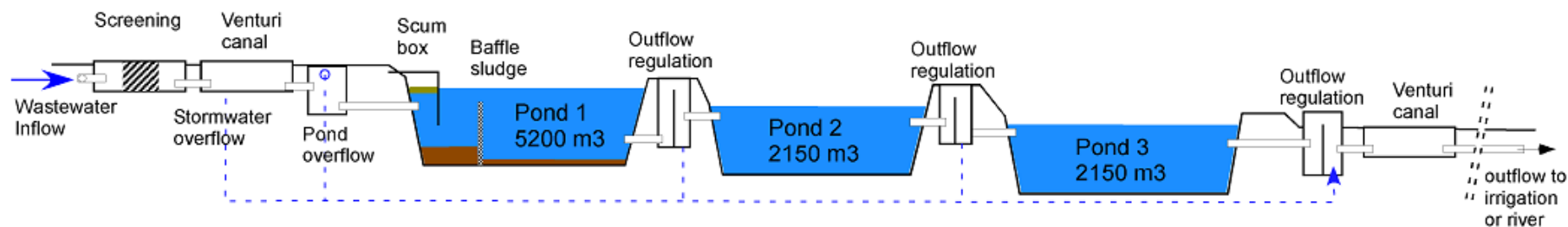


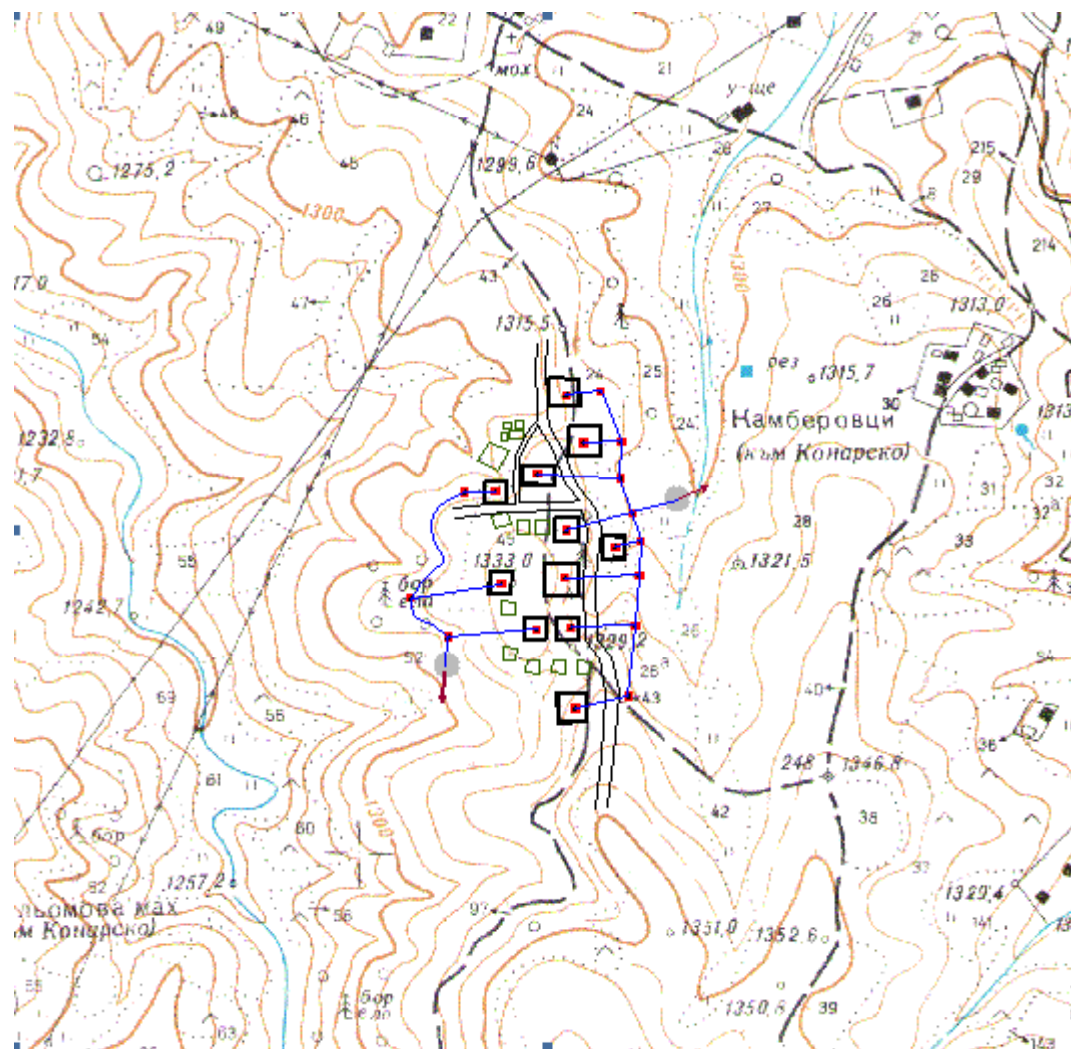
Figure 13: WWTP schematic profile (no scale)



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# Buntsevo



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## Case studies costs

Village	Population	Network EUR	Treatment EUR	Running Cost EUR	Network/hab EUR	Treatment/hab EUR	Run. Cost/hab EUR
Bozhurovo	480	6,327,896	177,997	19,282	13,183	371	40
Peychinovo	400	1,537,460	106,855	21,497	3,844	267	54
Strumyani	1200		299,092	9,336	0	249	8
Buntsevo	600	68,463	85,351	16,246	114	142	27



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# Conclusion

1. In rural areas, much has to be done.
2. Conventional networks are unaffordable.
3. Simplified networks are valid options in dense villages.
4. Extensive WWTP techniques are valid alternatives to activated sludge.

*Thank you for your kind attention*

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