

Master Plan, Chapter 5, Option Analysis on Wastewater Agglomerations

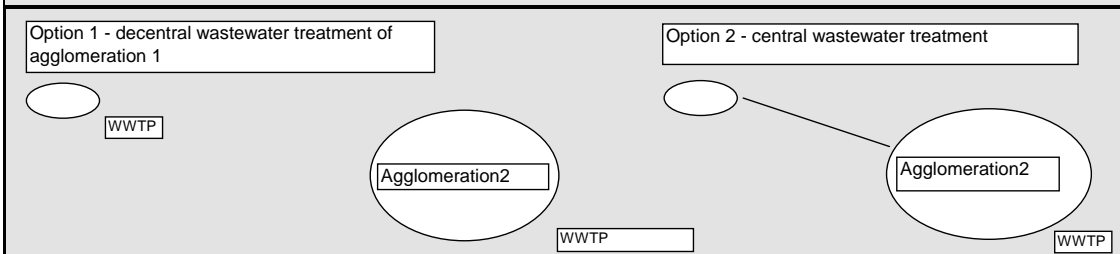
County: Mures

Agglomeration 1: SASCHIZ

Agglomeration 2: CLOARSTEF

Agglomeration 3: MIHAI VITEAZU

Agglomeration 4:



		Option 1	Option 2
Data Base			
Size of agglomeration 1	[PE]	1.563	1.563
Size of agglomeration 2	[PE]	197	197
Size of agglomeration 3	[PE]	319	319
Size of agglomeration 4	[PE]		0
Size of agglomeration 1+2+3	[PE]		2.079
No. of WTP modules	[items]	3	
Specific wastewater amount	[l/cap x d]	80	80
Specific wastewater amount	[l/cap x d]	110	110
Infiltration rate	[%]	25	25
Wastewater amount of agglomeration 1	[m³/d]	156	
Wastewater amount of agglomeration 2	[m³/d]	20	
Wastewater amount of agglomeration 3	[m³/d]	32	
Wastewater amount of agglomeration 4	[m³/d]	0	
Wastewater amount of agglomeration 1+ 2+3	[m³/d]		208
Connection details			
Lenth of the transportation line	[m]	-	9.000
Kind of connection (g = by gravity, p = by pressure main)	[-]	-	G
Diameter of the transportation line	[mm]	-	250
Maximum difference in height Δh (only in case of pumping station)	[m]	-	0
Costs			
Specific price WWTP agglomeration 1 (according formula)	[€/PE]	250	-
Specific price WWTP agglomeration 2 (according formula)	[€/PE]	250	
Specific price WWTP agglomeration 3 (according formula)	[€/PE]	250	
Specific price WWTP agglomeration 4 (according formula)	[€/PE]	0	
Specific price WWTP agglomeration 1+2+3(according formula)	[€/PE]	-	250
Specific price transportation line (according Unit Price Data Base)	[€/m]	-	171
I. Investment costs			
A. Civil works			
(1.1) WWTP for agglomeration 1 (40 % of total costs)	[€]	171.300	-
(1.2) WWTP for agglomeration 2 (40 % of total costs)	[€]	34.700	
(1.3) WWTP for agglomeration 3 (40 % of total costs)	[€]	46.900	
(1.4) WWTP for agglomeration 4 (40 % of total costs)	[€]	0	
(2) WWTP for agglomeration (40 % of total costs)	[€]		222.900
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	
(4) Transportation line	[€]	-	1.534.500
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs civil works	[€]	252.900	1.757.400
Writting-off period	[years]	40	40
Cost of capital, average	[€/a]	6.323	43.935
	[%]	3	3
	[€/a]	7.587	52.722
Annual costs civil works	[€/a]	13.910	96.657

B. Mechanical and electrical equipment			
(1.1) WWTP for agglomeration 1 (60 % of total costs)	[€]	249.450	-
(1.2) WWTP for agglomeration 2 (60 % of total costs)	[€]	44.550	-
(1.3) WWTP for agglomeration 3 (60 % of total costs)	[€]	62.850	-
(1.4) WWTP for agglomeration 4 (60 % of total costs)	[€]	0	-
(2) WWTP for agglomeration (60% of total costs)	[€]	-	326.850
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	
(4) free	[€]		
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs mechanical and electrical equipment	[€]	356.850	326.850
Writting-off period	[years]	12	12
	[€/a]	29.738	27.238
Cost of capital, average	[%]	3	3
	[€/a]	10.706	9.806
Annual costs mechanical and electrical equipment	[€/a]	40.443	37.043
Annual costs I. (Investment)	[€/a]	54.353	133.700
II. Maintenance / Repairs			
in % of the mechanical and electrical equipment installed	[%/a]	4	4
Annual costs II. (Maintenance / Repairs)	[€/a]	14.274	13.074
III. Labour costs			
specific labour costs	[€/h]	5	5
annual expenses option 1 (2 full-time workers/module)	[h/a]	26.280	-
annual expenses option 2 (2 full-time workers)	[h/a]	-	8.760
Annual costs III. (labour)	[€/a]	131.400	43.800
IV. Operation costs consumption			
A. Energy consumption			
A 1 - Option 1			
A 1.1 WWTP agglomeration 1			
Wastewater amount of agglomeration 1	[m³/d]	156	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,94	-
Daily energy consumption WWTP agglomeration 1	[kWh/d]	148	-
A 1.2 WWTP agglomeration 2			
Wastewater amount of agglomeration 2	[m³/d]	20	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	2,08	-
Daily energy consumption WWTP agglomeration 2	[kWh/d]	41	-
A 1.3 WWTP agglomeration 3			
Wastewater amount of agglomeration 3	[m³/d]	32	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,94	-
Daily energy consumption WWTP agglomeration 3	[kWh/d]	62	-
A 1.4 WWTP agglomeration 4			
Wastewater amount of agglomeration 4	[m³/d]	0	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,00	-
Daily energy consumption WWTP agglomeration 4	[kWh/d]	0	-
Total A 1	[kWh/d]	251	
A 2 - Option 2			
A 2.1 Pumping station agglomeration 1 (if necessary)			
Wastewater amount of agglomeration 1	[m³/d]	-	52
Maximum difference in height Dh (only in case of pumping station)	[m]	-	0
Daily energy consumption pumping station agglomeration 1	[kWh/d]	-	0
A 2.2 WWTP agglomeration 1+2+3			
Specific price WWTP agglomeration 2 (according formula)	[m³/d]		208
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]		1,45
Daily energy consumption WWTP agglomeration 2	[kWh/d]		302
Total A 1 - A 2	[kWh/d]	251	302
Specific energy price	[netto €/kWh]	0,15	0,15
Energy costs	[€/d]	38	45

B. Chemicals consumption

The difference in the consumption of chemicals is neglectable.

C. Sludge disposal

The sludge amounts produced in both options is almost the same.

The difference in the sludge disposal costs is neglectable.

Total IV.	[€/d]	38	45
Annual costs IV. (consumption)	[€/a]	13.716	16.539

Summary

Annual costs I. (Investment)	[€/a]	54.353	133.700
Annual costs II. (Maintenance / Repairs)	[€/a]	14.274	13.074
Annual costs III. (labour)	[€/a]	131.400	43.800
Annual costs IV. (consumption)	[€/a]	13.716	16.539
Total annual costs	[€/a]	213.742	207.113

Conclusion : according to the option analysis the Consultant proposed centralized solution to be followed.