

Master Plan, Chapter 5, Option Analysis on Wastewater Agglomerations

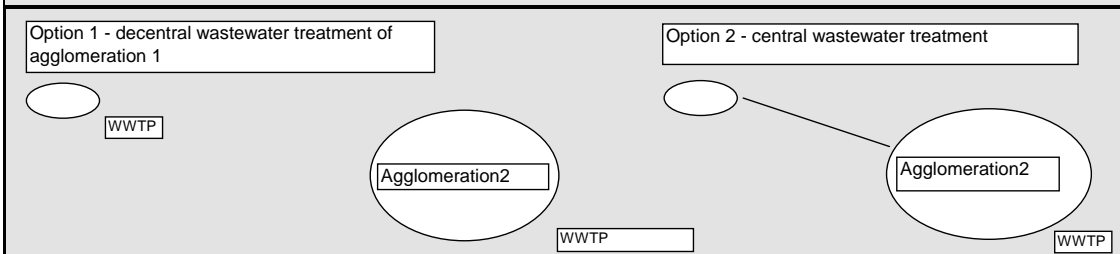
County: Mures

Agglomeration 1: BATOS

Agglomeration 2: GORENI

Agglomeration 3: DEDRAD

Agglomeration 4:



		Option 1	Option 2
Data Base			
Size of agglomeration 1	[PE]	1.355	1.355
Size of agglomeration 2	[PE]	690	690
Size of agglomeration 3	[PE]	1.526	1.526
Size of agglomeration 4	[PE]		0
Size of agglomeration 1+2+3	[PE]		3.571
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]	136	
Wastewater amount of agglomeration 2	[m³/d]	69	
Wastewater amount of agglomeration 3	[m³/d]	153	
Wastewater amount of agglomeration 4	[m³/d]	0	
Wastewater amount of agglomeration 1+ 2+3	[m³/d]		357
Connection details			
Lenth of the transportation line	[m]	-	10.000
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)	[€]	150.500	-
(1.2) WWTP for agglomeration 2 (40 % of total costs)	[€]	84.000	
(1.3) WWTP for agglomeration 3 (40 % of total costs)	[€]	167.600	
(1.4) WWTP for agglomeration 4 (40 % of total costs)	[€]	0	
(2) WWTP for agglomeration (40 % of total costs)	[€]		372.100
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	
(4) Transportation line	[€]	-	1.705.000
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs civil works	[€]	402.100	2.077.100
Writting-off period	[years]	40	40
Cost of capital, average	[€/a]	10.053	51.928
	[%]	3	3
	[€/a]	12.063	62.313
Annual costs civil works	[€/a]	22.116	114.241

B. Mechanical and electrical equipment			
(1.1) WWTP for agglomeration 1 (60 % of total costs)	[€]	218.250	-
(1.2) WWTP for agglomeration 2 (60 % of total costs)	[€]	118.500	
(1.3) WWTP for agglomeration 3 (60 % of total costs)	[€]	243.900	
(1.4) WWTP for agglomeration 4 (60 % of total costs)	[€]	0	
(2) WWTP for agglomeration (60% of total costs)	[€]	-	550.650
(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	[€]	580.650	550.650
Writting-off period	[years]	12	12
	[€/a]	48.388	45.888
Cost of capital, average	[%]	3	3
	[€/a]	17.420	16.520
Annual costs mechanical and electrical equipment	[€/a]	65.807	62.407
Annual costs I. (Investment)	[€/a]	87.923	176.648
II. Maintenance / Repairs			
in % of the mechanical and electrical equipment installed	[%/a]	4	4
Annual costs II. (Maintenance / Repairs)	[€/a]	23.226	22.026
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]	136	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,94	-
Daily energy consumption WWTP agglomeration 1	[kWh/d]	128	-
A 1.2 WWTP agglomeration 2			
Wastewater amount of agglomeration 2	[m³/d]	69	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,72	-
Daily energy consumption WWTP agglomeration 2	[kWh/d]	119	-
A 1.3 WWTP agglomeration 3			
Wastewater amount of agglomeration 3	[m³/d]	153	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,52	-
Daily energy consumption WWTP agglomeration 3	[kWh/d]	232	-
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]	479	
A 2 - Option 2			
A 2.1 Pumping station agglomeration 1 (if necessary)			
Wastewater amount of agglomeration 1	[m³/d]	-	222
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]		357
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]		1,34
Daily energy consumption WWTP agglomeration 2	[kWh/d]		478
Total A 1 - A 2	[kWh/d]	479	478
Specific energy price	[netto €/kWh]	0,15	0,15
Energy costs	[€/d]	72	72

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]	72	72
Annual costs IV. (consumption)	[€/a]	26.238	26.151
Summary			
Annual costs I. (Investment)	[€/a]	87.923	176.648
Annual costs II. (Maintenance / Repairs)	[€/a]	23.226	22.026
Annual costs III. (labour)	[€/a]	131.400	43.800
Annual costs IV. (consumption)	[€/a]	26.238	26.151
Total annual costs	[€/a]	268.786	268.624

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