

Master Plan, Chapter 5, Option Analysis on Wastewater Agglomerations

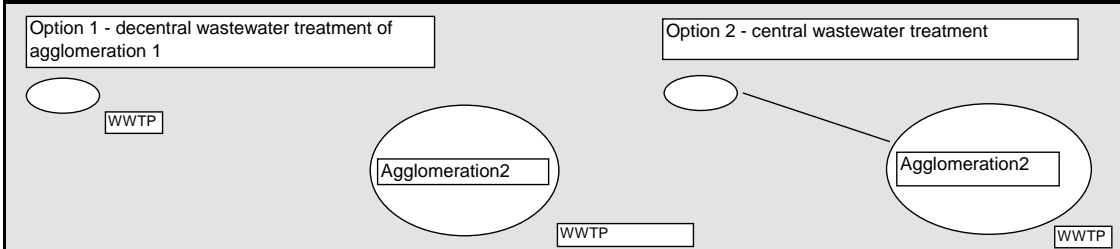
County: Mures

Agglomeration 1: GHEORGHE DOJA+LIENI+SATU NOU+ TRIMIA (group)

Agglomeration 2: LEORDENI

Agglomeration 3:

Agglomeration 4:



		Option 1	Option 2
Data Base			
Size of agglomeration 1	[PE]	2.486	2.486
Size of agglomeration 2	[PE]	383	383
Size of agglomeration 3	[PE]		0
Size of agglomeration 4	[PE]		0
Size of agglomeration 1+ 2	[PE]		2.869
No. of WTP modules	[items]	2	
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]	249	
Wastewater amount of agglomeration 2	[m³/d]	38	
Wastewater amount of agglomeration 3	[m³/d]	0	
Wastewater amount of agglomeration 4	[m³/d]	0	
Wastewater amount of agglomeration 1+ 2	[m³/d]		287
Connection details			
Lenth of the transportation line	[m]	-	2.000
Kind of connection (g = by gravity, p = by pressure main)	[-]	-	P
Diameter of the transportation line	[mm]	-	250
Maximum difference in height Δh (only in case of pumping station)	[m]	-	10
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]	0	
Specific price WWTP agglomeration 4 (according formula)	[€/PE]	0	
Specific price WWTP agglomeration 1+2(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)	[€]	263.600	-
(1.2) WWTP for agglomeration 2 (40 % of total costs)	[€]	53.300	
(1.3) WWTP for agglomeration 3 (40 % of total costs)	[€]	0	
(1.4) WWTP for agglomeration 4 (40 % of total costs)	[€]	0	
(2) WWTP for agglomeration (40 % of total costs)	[€]		301.900
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	36.323
(4) Transportation line	[€]	-	341.000
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs civil works	[€]	316.900	679.223
Writing-off period	[years]	40	40
Cost of capital, average	[€/a]	7.923	16.981
	[%]	3	3
	[€/a]	9.507	20.377
Annual costs civil works	[€/a]	17.430	37.357

B. Mechanical and electrical equipment			
(1.1) WWTP for agglomeration 1 (60 % of total costs)	[€]	387.900	-
(1.2) WWTP for agglomeration 2 (60 % of total costs)	[€]	72.450	
(1.3) WWTP for agglomeration 3 (60 % of total costs)	[€]	0	
(1.4) WWTP for agglomeration 4 (60 % of total costs)	[€]	0	
(2) WWTP for agglomeration (60% of total costs)	[€]	-	445.350
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	3.700
(4) free	[€]		
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs mechanical and electrical equipment	[€]	460.350	449.050
Writting-off period	[years]	12	12
	[€/a]	38.363	37.421
Cost of capital, average	[%]	3	3
	[€/a]	13.811	13.472
Annual costs mechanical and electrical equipment	[€/a]	52.173	50.892
Annual costs I. (Investment)	[€/a]	69.603	88.250
II. Maintenance / Repairs			
in % of the mechanical and electrical equipment installed	[%/a]	4	4
Annual costs II. (Maintenance / Repairs)	[€/a]	18.414	17.962
III. Labour costs			
specific labour costs	[€/h]	5	5
annual expenses option 1 (2 full-time workers/module)	[h/a]	17.520	-
annual expenses option 2 (2 full-time workers)	[h/a]	-	8.760
Annual costs III. (labour)	[€/a]	87.600	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]	249	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,94	-
Daily energy consumption WWTP agglomeration 1	[kWh/d]	235	-
A 1.2 WWTP agglomeration 2			
Wastewater amount of agglomeration 2	[m³/d]	38	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,88	-
Daily energy consumption WWTP agglomeration 2	[kWh/d]	72	-
A 1.3 WWTP agglomeration 3			
Wastewater amount of agglomeration 3	[m³/d]	0	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,00	-
Daily energy consumption WWTP agglomeration 3	[kWh/d]	0	-
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]	307	
A 2 - Option 2			
A 2.1 Pumping station agglomeration 1 (if necessary)			
Wastewater amount of agglomeration 1	[m³/d]	-	38
Maximum difference in height Dh (only in case of pumping station)	[m]	-	10
Daily energy consumption pumping station agglomeration 1	[kWh/d]	-	2
A 2.2 WWTP agglomeration 1+2			
Specific price WWTP agglomeration 2 (according formula)	[m³/d]		287
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]		1,38
Daily energy consumption WWTP agglomeration 2	[kWh/d]		397
Total A 1 - A 2	[kWh/d]	307	399
Specific energy price	[netto €/kWh]	0,15	0,15
Energy costs	[€/d]	46	60

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]	46	60
Annual costs IV. (consumption)	[€/a]	16.809	21.821
Summary			
Annual costs I. (Investment)	[€/a]	69.603	88.250
Annual costs II. (Maintenance / Repairs)	[€/a]	18.414	17.962
Annual costs III. (labour)	[€/a]	87.600	43.800
Annual costs IV. (consumption)	[€/a]	16.809	21.821
Total annual costs	[€/a]	192.426	171.833

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