

Master Plan, Chapter 5, Option Analysis on Wastewater Agglomerations

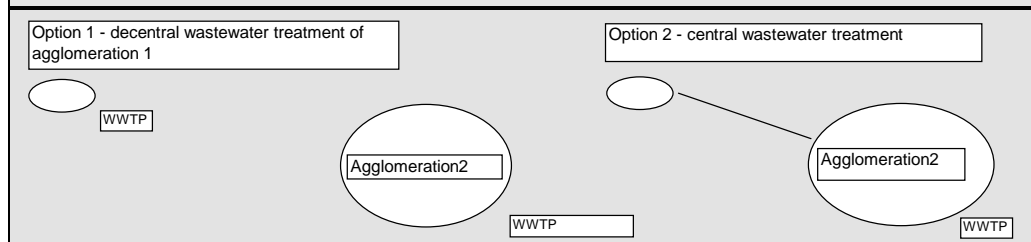
County: Mures

Agglomeration 1: BAND

Agglomeration 2: TRIPTELNIC

Agglomeration 3: VALEA RECE

Agglomeration 4: MARASESTI



		Option 1	Option 2
Data Base			
Size of agglomeration 1	[PE]	3.712	3.712
Size of agglomeration 2	[PE]	137	137
Size of agglomeration 3	[PE]	297	297
Size of agglomeration 4	[PE]	323	323
Size of agglomeration 1+ 2+3+4	[PE]		4.469
No. of WTP modules	[items]	4	
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]	371	
Wastewater amount of agglomeration 2	[m³/d]	14	
Wastewater amount of agglomeration 3	[m³/d]	30	
Wastewater amount of agglomeration 4	[m³/d]	32	
Wastewater amount of agglomeration 1+ 2+3+4	[m³/d]		447
Connection details			
Lenth of the transportation line	[m]	-	11.000
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]	250	
Specific price WWTP agglomeration 4 (according formula)	[€/PE]	250	
Specific price WWTP agglomeration 1+2+3+4 (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)	[€]	386.200	-
(1.2) WWTP for agglomeration 2 (40 % of total costs)	[€]	28.700	
(1.3) WWTP for agglomeration 3 (40 % of total costs)	[€]	44.700	
(1.4) WWTP for agglomeration 4 (40 % of total costs)	[€]	47.300	
(2) WWTP for agglomeration (40 % of total costs)	[€]		461.900
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	36.323
(4) Transportation line	[€]	-	1.875.500
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs civil works	[€]	506.900	2.373.723
Writing-off period	[years]	40	40
Cost of capital, average	[€/a]	12.673	59.343
	[%]	3	3
	[€/a]	15.207	71.212
Annual costs civil works	[€/a]	27.880	130.555

B. Mechanical and electrical equipment			
(1.1) WWTP for agglomeration 1 (60 % of total costs)	[€]	571.800	-
(1.2) WWTP for agglomeration 2 (60 % of total costs)	[€]	35.550	-
(1.3) WWTP for agglomeration 3 (60 % of total costs)	[€]	59.550	-
(1.4) WWTP for agglomeration 4 (60 % of total costs)	[€]	63.450	-
(2) WWTP for agglomeration (60% of total costs)	[€]	-	685.350
(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	[€]	730.350	689.050
Writing-off period	[years]	12	12
Cost of capital, average	[€/a]	60.863	57.421
	[%]	3	3
	[€/a]	21.911	20.672
Annual costs mechanical and electrical equipment	[€/a]	82.773	78.092
Annual costs I. (Investment)	[€/a]	110.653	208.647
II. Maintenance / Repairs			
in % of the mechanical and electrical equipment installed	[%/a]	4	4
Annual costs II. (Maintenance / Repairs)	[€/a]	29.214	27.562
III. Labour costs			
specific labour costs	[€/h]	5	5
annual expenses option 1 (2 full-time workers/module)	[h/a]	35.040	-
annual expenses option 2 (2 full-time workers)	[h/a]	-	8.760
Annual costs III. (labour)	[€/a]	175.200	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]	371	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,94	-
Daily energy consumption WWTP agglomeration 1	[kWh/d]	351	-
A 1.2 WWTP agglomeration 2			
Wastewater amount of agglomeration 2	[m³/d]	14	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	2,20	-
Daily energy consumption WWTP agglomeration 2	[kWh/d]	30	-
A 1.3 WWTP agglomeration 3			
Wastewater amount of agglomeration 3	[m³/d]	30	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,96	-
Daily energy consumption WWTP agglomeration 3	[kWh/d]	58	-
A 1.4 WWTP agglomeration 4			
Wastewater amount of agglomeration 4	[m³/d]	32	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,93	-
Daily energy consumption WWTP agglomeration 4	[kWh/d]	62	-
Total A 1	[kWh/d]	501	
A 2 - Option 2			
A 2.1 Pumping station agglomeration 1 (if necessary)			
Wastewater amount of agglomeration 1	[m³/d]	-	43
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+3+4			
Specific price WWTP agglomeration 2 (according formula)	[m³/d]		447
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]		1,29
Daily energy consumption WWTP agglomeration 2	[kWh/d]		578
Total A 1 - A 2	[kWh/d]	501	580
Specific energy price	[netto €/kWh]	0,15	0,15
Energy costs	[€/d]	75	87

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]	75	87
Annual costs IV. (consumption)	[€/a]	27.457	31.730

Summary

Annual costs I. (Investment)	[€/a]	110.653	208.647
Annual costs II. (Maintenance / Repairs)	[€/a]	29.214	27.562
Annual costs III. (labour)	[€/a]	175.200	43.800
Annual costs IV. (consumption)	[€/a]	27.457	31.730
Total annual costs	[€/a]	342.524	311.739

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