

Master Plan, Chapter 5, Option Analysis on Wastewater Agglomerations

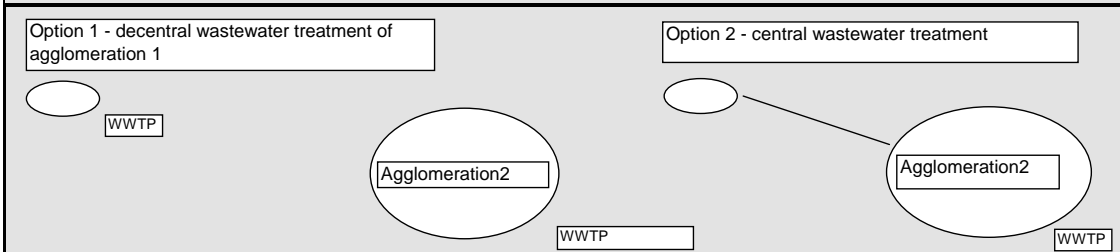
County: Mures

Agglomeration 1: MIERCUREA NIRAJULUI

Agglomeration 2: DUMITRESTI

Agglomeration 3: SARDU NIRAJULUI+LAURENI+TAMPA (group)

Agglomeration 4:



		Option 1	Option 2
Data Base			
Size of agglomeration 1	[PE]	6.010	6.010
Size of agglomeration 2	[PE]	338	338
Size of agglomeration 3	[PE]	1.228	1.228
Size of agglomeration 4	[PE]		0
Size of agglomeration 1+ 2+3	[PE]		7.576
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]	826	
Wastewater amount of agglomeration 2	[m³/d]	34	
Wastewater amount of agglomeration 3	[m³/d]	123	
Wastewater amount of agglomeration 4	[m³/d]	0	
Wastewater amount of agglomeration 1+ 2+3	[m³/d]		983
Connection details			
Lenth of the transportation line	[m]	-	7.500
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]	513	-
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]	-	465
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)	[€]	1.232.712	-
(1.2) WWTP for agglomeration 2 (40 % of total costs)	[€]	48.800	
(1.3) WWTP for agglomeration 3 (40 % of total costs)	[€]	137.800	
(1.4) WWTP for agglomeration 4 (40 % of total costs)	[€]	0	
(2) WWTP for agglomeration (40 % of total costs)	[€]		1.410.623
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	36.323
(4) Transportation line	[€]	-	1.278.750
(5) free	[€]		
(6) free	[€]		
(7) free	[€]		
(8) free	[€]		
(9) free	[€]		
(10) free	[€]		
Total costs civil works	[€]	1.419.312	2.725.696
Writting-off period	[years]	40	40
Cost of capital, average	[€/a]	35.483	68.142
	[%]	3	3
	[€/a]	42.579	81.771
Annual costs civil works	[€/a]	78.062	149.913

B. Mechanical and electrical equipment			
(1.1) WWTP for agglomeration 1 (60 % of total costs)	[€]	1.849.068	-
(1.2) WWTP for agglomeration 2 (60 % of total costs)	[€]	65.700	-
(1.3) WWTP for agglomeration 3 (60 % of total costs)	[€]	199.200	-
(1.4) WWTP for agglomeration 4 (60 % of total costs)	[€]	0	-
(2) WWTP for agglomeration (60% of total costs)	[€]	-	2.115.934
(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	[€]	2.113.968	2.119.634
Writting-off period	[years]	12	12
	[€/a]	176.164	176.636
Cost of capital, average	[%]	3	3
	[€/a]	63.419	63.589
Annual costs mechanical and electrical equipment	[€/a]	239.583	240.225
Annual costs I. (Investment)	[€/a]	317.645	390.138
II. Maintenance / Repairs			
in % of the mechanical and electrical equipment installed	[%/a]	4	4
Annual costs II. (Maintenance / Repairs)	[€/a]	84.559	84.785
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]	826	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,94	-
Daily energy consumption WWTP agglomeration 1	[kWh/d]	781	-
A 1.2 WWTP agglomeration 2			
Wastewater amount of agglomeration 2	[m³/d]	34	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,92	-
Daily energy consumption WWTP agglomeration 2	[kWh/d]	65	-
A 1.3 WWTP agglomeration 3			
Wastewater amount of agglomeration 3	[m³/d]	123	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,58	-
Daily energy consumption WWTP agglomeration 3	[kWh/d]	193	-
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]	1.039	
A 2 - Option 2			
A 2.1 Pumping station agglomeration 1 (if necessary)			
Wastewater amount of agglomeration 1	[m³/d]	-	157
Maximum difference in height Dh (only in case of pumping station)	[m]	-	10
Daily energy consumption pumping station agglomeration 1	[kWh/d]	-	7
A 2.2 WWTP agglomeration 1+2+3			
Specific price WWTP agglomeration 2 (according formula)	[m³/d]		983
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]		1,19
Daily energy consumption WWTP agglomeration 2	[kWh/d]		1.172
Total A 1 - A 2	[kWh/d]	1.039	1.179
Specific energy price	[netto €/kWh]	0,15	0,15
Energy costs	[€/d]	156	177

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]	156	177
Annual costs IV. (consumption)	[€/a]	56.894	64.544
Summary			
Annual costs I. (Investment)	[€/a]	317.645	390.138
Annual costs II. (Maintenance / Repairs)	[€/a]	84.559	84.785
Annual costs III. (labour)	[€/a]	131.400	43.800
Annual costs IV. (consumption)	[€/a]	56.894	64.544
Total annual costs	[€/a]	590.498	583.268

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