Softening

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Design of 4th Mega location Oasen

CT 5520, Drinkwater Treatment 2

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Content

- Visit to Lekkerkerk:
  - Capacity of the plant
  - Quality data
- 4 alternatives

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Summary last week

- Implement softening by:
  - Pelletreactor
  - Membranereactor
  - Ion-exchange

- 4e Megalocation is an expansion of ‘Lekkerkerk’,
- Future capacity: 8,5 M m3/year.
  (Now 6 M m3/year for plant ‘De Put’ and ‘Lekkerkerk’)

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Capacity

Max. capacity of the plant Lekkerkerk:

- Dry filtration: 4,2 M m3/year
- Active Carbon filtration: 8,5 M m3/year
- UV filtration: 5,0 M m3/year

Max. capacity of plant ‘De Put’:

- 4,5 M m3/year
- No expansion is possible: Not enough space

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Quality data

		Norm		Influent		
		min	max	DE PUT	Schuwacht	Tiendweg
Temperatuur	oC		25	12,3	12	12
Zuurstof	mg/l O2	2		<0,5	<0,5	<0,5
Troebelingsgraad	FTE		1			
Zuurgraad	pH	7	9.5	7,34	7,3	7,24
Saturatie-index	SI	-0,2				
EGV	mS/m		125	68,4	70,6	74,7
HCO3	mg/l	60		241	233	224
Cl	mg/l		150	94,5	101	121
SO4	mg/l		150			
NH4	mg/l		0,2	5,9	1,86	5,09
NO2	mg/l		0,1			
NO3	mg/l		50			
TOC	mg/l					
Na	mg/l		200	46,5	56,8	63,2
Hardheid	mmol/l	1	2,5	2,5	2,5	2,5
Fe	mg/l		0,2	2,68	3,12	5,25
Ca	mg/l			80,3	81,7	81,2
Mg	mg/l			10,6	11,2	10,7
Mn	mg/l		0,5	0,336	0,869	0,598

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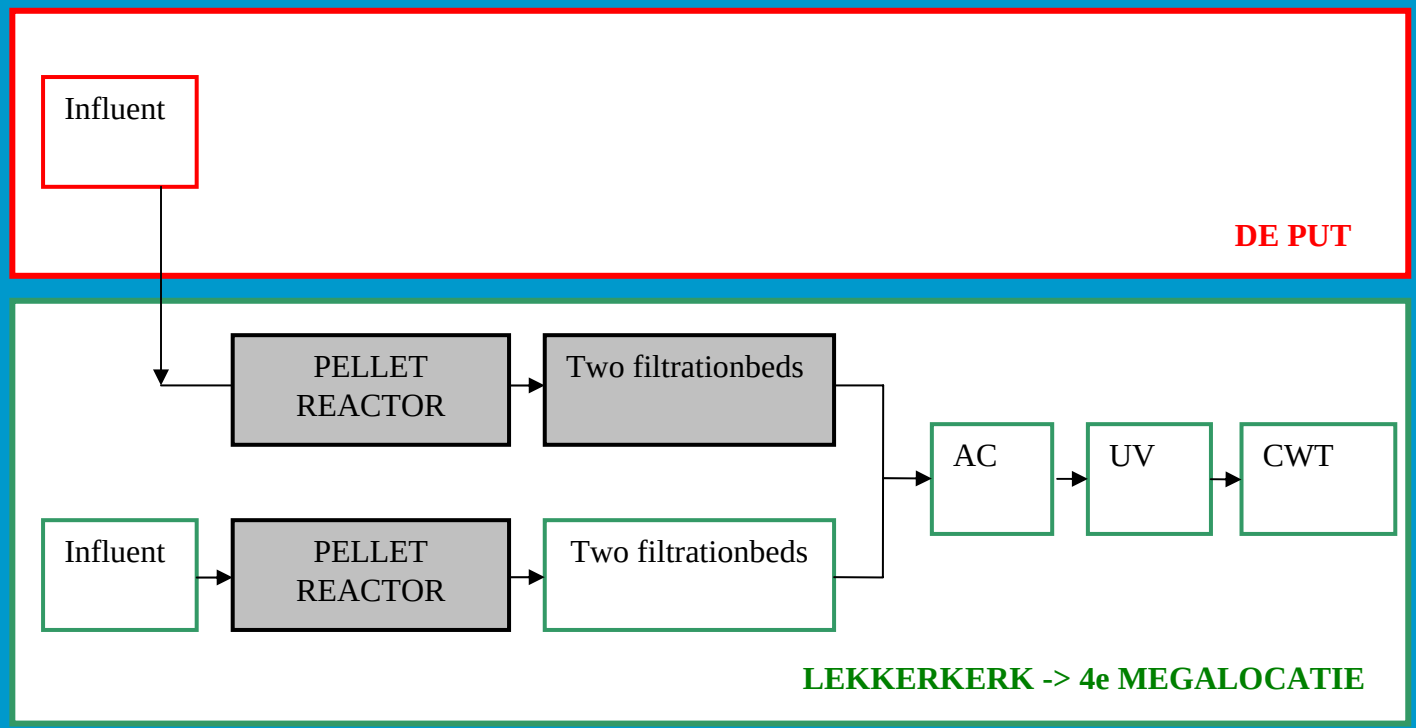
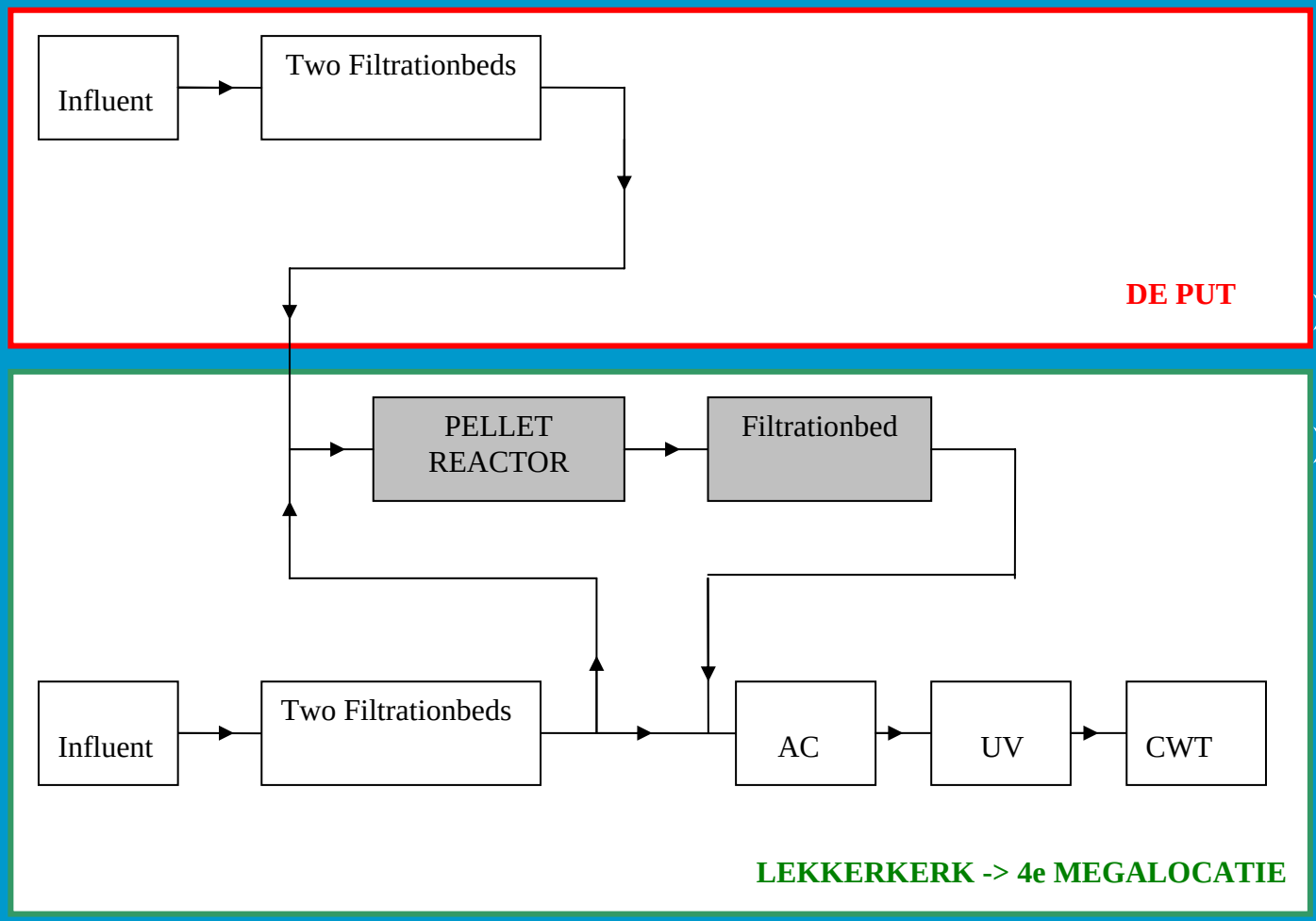
Option 1: Anaerobic softening



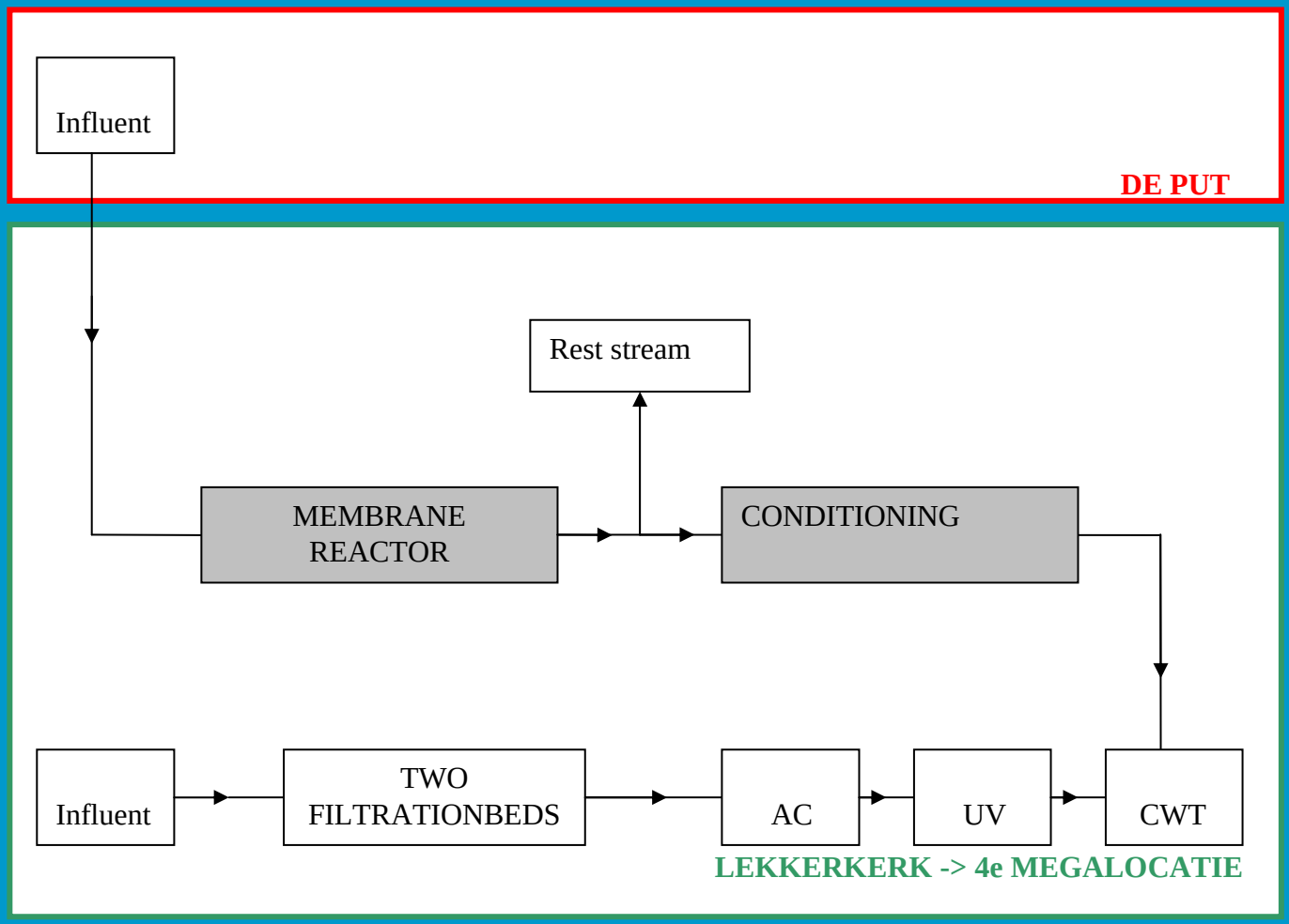
- Softening by a pellet-reactor
- Decrease load on the filterbeds

Option 2: Aerobic softening



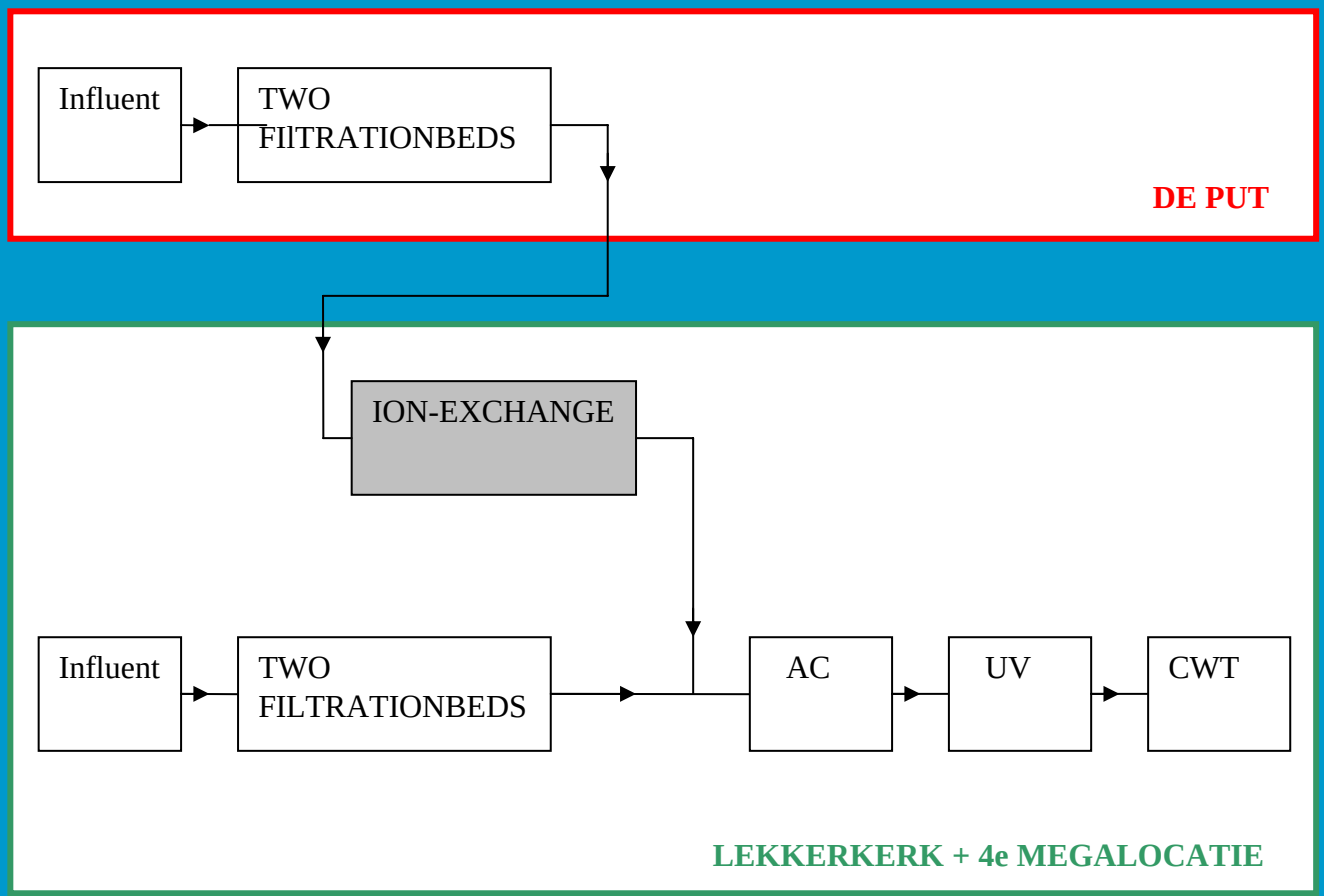
- Softening by a pellet-reactor
- Extra filtration-bed is needed

Option 3: Membrane Reactor



- Membranes efficiency: 90 % for softening
- Already invested in AC
- Rest stream: licence is too small
- Is in progress

Option 4: Ion-exchange



- Ionexchange: efficiency
  60 % for softening
- Already invested in AC
- Regeneration is needed
- Is in progress

Option 5: Rebuild location

After investigation →no option:

- Good treatment quality and state of maintenance
- High investments in capacity for AC already done
- Enough space on Lekkerkerk for adaptation and expansion

Decision

- Reliability / Risks
- Adaptation
- Maintenance
- Licenses
- Costs

First choice for alternatives to the other groups.
We like to realize a not common design in GWT.

- Next step: working out 1 alternative

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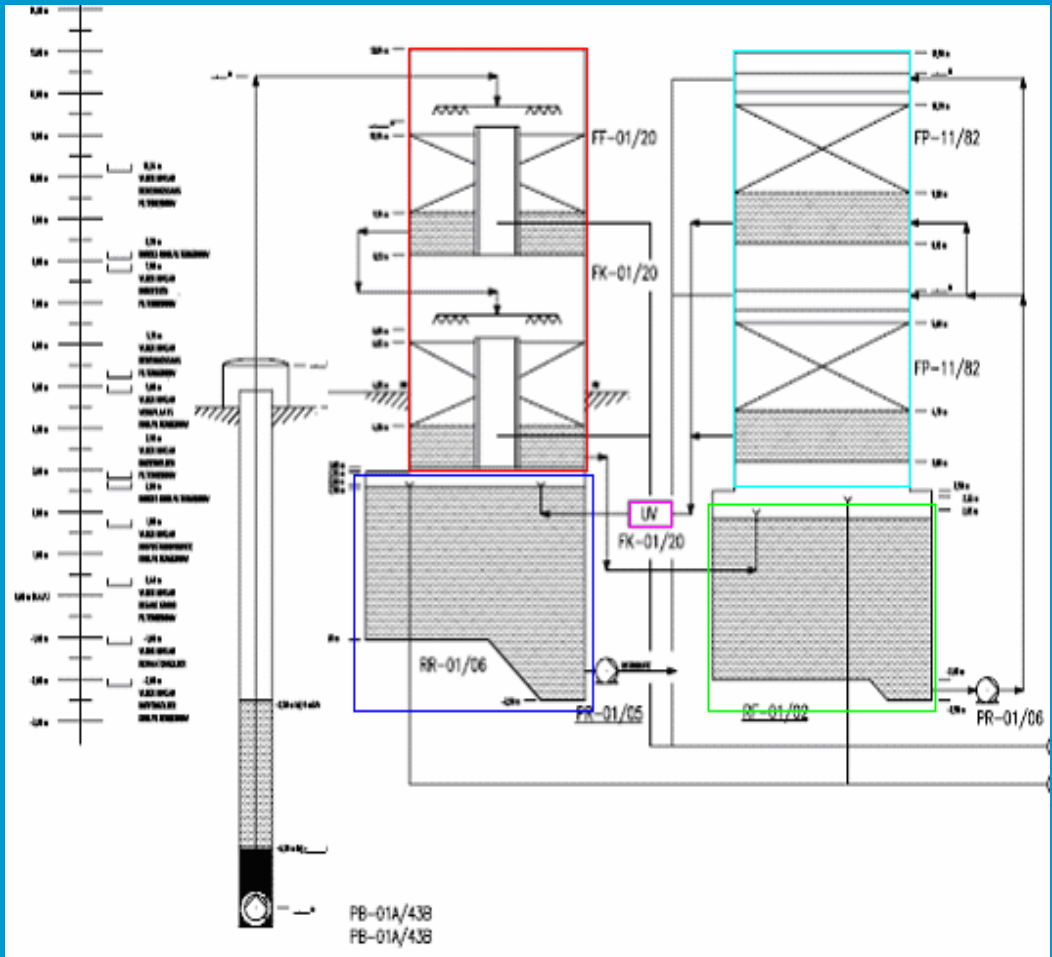
Questions ????

Hydraulic line



Dry filtration

Filtration-buffer

Active Carbon Filtration

UV-desinfection

Clear Water Tank

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Summary last week

- Treatment of riverbank groundwater:
  - Two steps of dry filtration
    (remove NH_4^+, Fe^{2+} and Mn^{2+})
  - Active Carbonate filtration
    (remove of pesticides, taste)
  - UV-desinfection
    (remove of micro-organisms)

- OASEN wants softening!