

Ozonation + constructed wetlands

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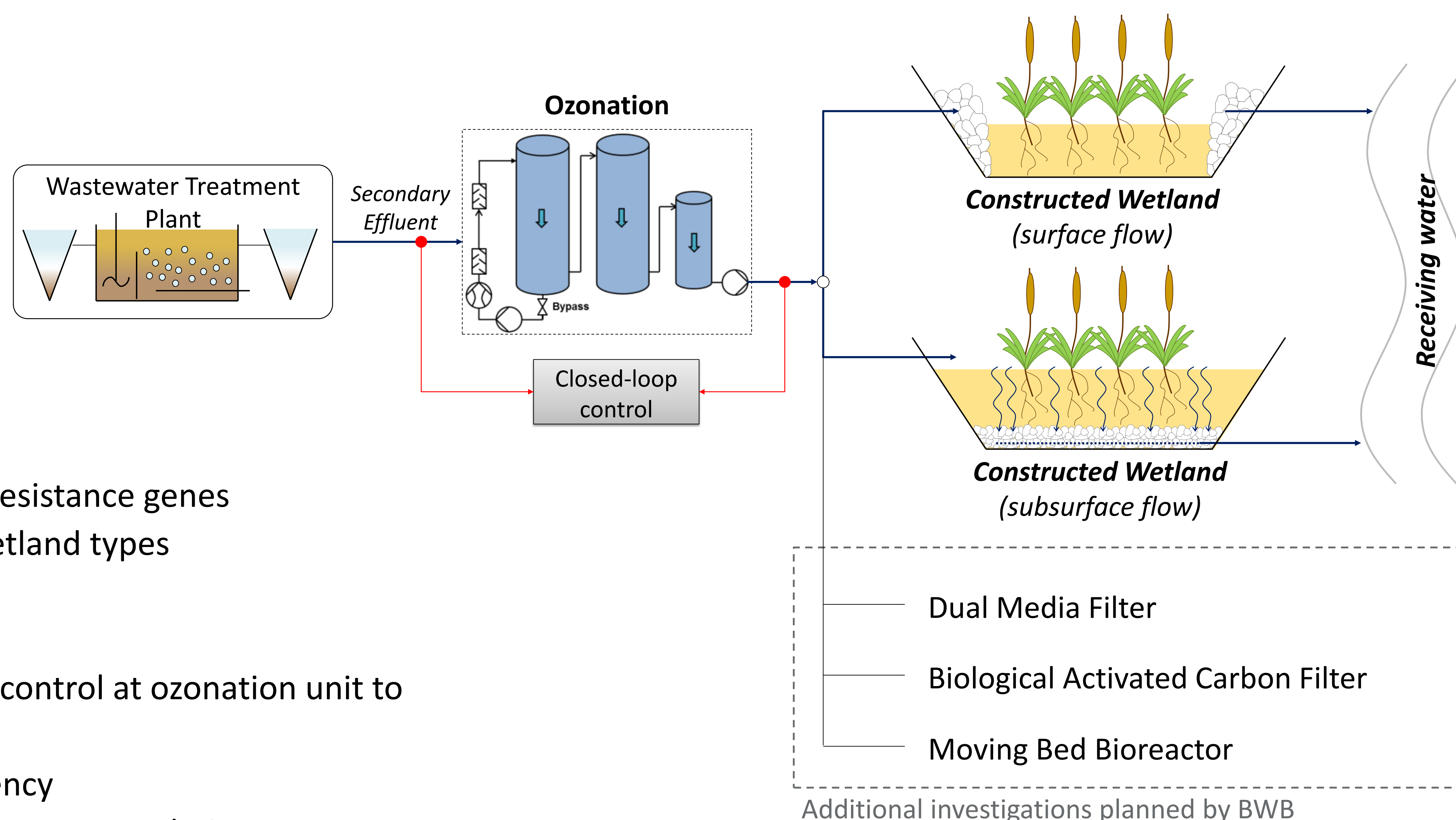
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Approach

Application of constructed wetlands as low energy post-treatment for ozonation of secondary effluent.
A pilot scale system will be operated for 18 months at WWTP Schönerlinde north of Berlin, Germany.

Site scheme:



Aims

Additional elimination of

- Micropollutants
- Pathogens and antibiotic resistance genes

Comparison of two different wetland types

- Surface flow
- Subsurface flow

Implementation of closed-loop control at ozonation unit to

- Minimize energy demand
- Optimize treatment efficiency

Establish design and marketing recommendations

Ozonation

- able to oxidize a number of compounds recalcitrant to removal in WWTP or wetlands, e.g. carbamazepine
- Inactivation of hormone active compounds
- further reduction of microbiological contamination
- generation of more easily biodegradable transformation products

Pilot design

Flow : 5-15 m³/h
Ozone dosage: 0.6 – 0.9 mg O₃/mg DOC
HRT : > 12 min

Feed water quality (WWTP effluent): 11-13 mg/L DOC
5-10 mg/L TSS

Constructed wetlands

- Low energy and maintenance systems with ecological and social benefits (e.g. habitats, recreational use)
- Subsurface flow: biological degradation processes at anoxic conditions in substrate
- Surface flow: includes open water areas that also allow photodegradation processes

Pilot design

Loading rate: 50 – 150 mm/d
Two system types operated in parallel (each 20 - 100 m²)

