

Evaluation of the combined effect of increasing storage and treatment capacity in the Alcântara catchment

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ABSTRACT

Within the scope of the Alcântara WWTP rehabilitation project, advanced physical-chemical treatment was introduced to up-grading existing primary treatment of wet-weather flows. In addition, biofiltration and ultra-violet disinfection of dry-weather flows were installed. A conceptual model using historical rainfall series was applied to the Alcântara catchment to evaluate the CSO discharges for a combination of scenarios of storage and treatment. Despite its simplicity, the model closely matches measured hydrographs. Results show important reductions of the volume, frequency and duration of CSO discharges associated with increasing the WWTP capacity, although the benefits become less significant as the WWTP capacity raises. Results also highlight that, for small WWTP capacities, a slight increase in the WWTP capacity leads to the same reduction of the discharged volume as an appreciable increase in storage capacity. However, for high treatment capacities, benefits from storage increase significantly compared with those resulting from a rise in the WWTP capacity. Benefits from storage also become less significant as storage capacity increases. Higher benefits are achieved for the bathing season, then improving conditions for recreation uses in Tagus estuary. Results may provide an important technical contribution to the decision-making process.

KEYWORDS

continuous modelling, CSO control, storage, WWTP upgrading