

# **Calculation of pollutant load discharged out a combined sewer network. Model simulation.**

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## **Abstract**

Urban runoff has been studied in depth due to the problems that the drainage of the water volumes carries during a rainfall event. The need to gather and transport runoff water on an urban catchment has made necessary to extend the conduits and design outlet systems and detention basins on the sewer networks to reduce the flow that come to the sewer plant treatment. The remaining volume was spilt to the environment because it was thought that this water was non pollutant.

Several studies proved the abundance of heavy metals, suspended matter, nutrients, oils and other pollutants attached to the urban runoff water. It was demonstrated that with any medium rainfall event there were taking place discharges out of the unitary sewer system to the environment: they are called Combined Sewer Overflows (CSO).

Generally, Combined Sewer Overflows are associated with important volumes of water and with very high load discharges. These overflows exercise instantaneous or deferred impacts very negative that provoke the degradation of the environment.

In the first part of this document there is an analysis of the current situation in relation to urban overflows and there is a theoretical study of the processes of build-up, wash-off and pollutant removal on urban surfaces.

This theoretical study is applied in a specific urban catchment, an area called Terra Nostra in the municipality of Montcada i Reixac with an unitary draniage system. This sewer network has 13 outlets that flow to Riera de Sant Cugat and they avoid the overcharge of the interceptor pipe that leads wastewater to Montcada's System sewer treatment plant.

The analysis of the results of the numerical model for the studied catchment shows that discharged load of pollutant in a period of time can represent approximately 30% of the pollutant total mass generated on the catchment by human activity (dry weather flows) and runoff in the same period. Concentration of suspended matter attached to overflows can be up to 6 times the average concentration attached to wastewater in dry time.

In the last part of this document the efficiency and the feasibility of different actions and measures of control of the pollution for urban runoff are analyzed on the studied catchmnnent. Finally, there are some recommendations to reduce or to attenuate the impact of the CSO in urban areas similar to those of the model.