



Integrated Modelling Using Data Driven Models

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ABSTRACT

Integrated modelling of water quality involves the use of wastewater network, treatment plant and receiving water models to assess impacts on receiving watercourses. The traditional approach has limitations as it cannot replicate the complex performance of extreme events, mechanical equipment, manual operation and management decisions. This study demonstrates that a calibrated hydraulic model could not produce an accurate representation of the existing operation of an inlet pumping station and storm tanks and an alternative, unconventional modelling strategy was required. A novel data driven modelling methodology was developed to replicate the existing performance

For modelling the future, the hydraulic model was used to determine flows arriving at the sewage treatment works (STW) including the increases in population, this is referred to as growth throughout the rest of this paper. Due to the manual operation of some of the elements within the inlet pumping station and storm tanks a number of informed decisions were required. Various sensitivity analyses were performed.

The data was used to model water quality impacts through the calculation of 90%ile and 99%ile values of Biological Oxygen Demand (BOD) and Ammonia. These were used to provide the current performance baseline and future performance. These were compared against the Water Framework Directive (WFD) and the River Ecosystem (RE) targets to ensure regulatory compliance and future 'no detriment'.

KEYWORDS

Flow to full treatment, modelling, telemetry, Water Framework Directive, water quality