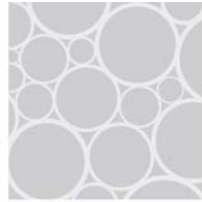




ENVIRONMENTAL



FLOOD RISK



DRAINAGE



ECOLOGY

Meadowhead Macro Model

Scottish Water & Atkins Water, 2005 to 2007

Project aims

Combination of 9 models to create a single model representing the sewerage system draining to the Meadowhead WwTW. The model is required to represent the 165 CSO discharges that potentially impact upon the Ayrshire bathing beaches. Key aspects of this study involved InfoWorks modelling, model combination and testing, time series rainfall, CSO assessment and spatial rainfall analysis.

Project summary

Working as sub-consultants to Atkins Water, an InfoWorks macro model was built by combining 9 individual models. The macro model contains 13,900 nodes and represents a sewerage catchment of 190,000 population with 165 CSO discharges. The area encompasses Ayr, Prestwick, Irvine, Kilmarnock and Troon.



A robust model combination methodology was developed to allow the different models to be

simulated within a single model space without errors occurring due to conflicts within the model parameters between models.

The modelling forms part of the Ayrshire Coastal Strategy that is required to assess compliance of the Ayr and Prestwick beaches with the Bathing Waters Directive. The macro model provides an assessment of both coastal and inland discharges.

A baseline model was established to represent the existing system and CSO spill performances based on a stochastic rainfall series. In addition, actual recorded rainfall was used to simulate the model for a bathing season analysis.

The baseline model was subsequently updated to include recent completed capital schemes. Future development proposals were obtained from local plans and the model was further updated to give a representation of future flows.

A comparative future system performance was established to highlight the longer term requirements for any upgrading schemes.

This project involved working in collaboration with Hyder and Babbie who were undertaking the river and coastal modelling to determine the overall coastal impacts. Outputs from the sewer model were fed into the coastal and river water quality and bathing compliance assessment packages (InfoWorks UPM tool and 3D coastal and estuary model).

The analyses were later repeated following a detailed assessment of historical rainfall from a number of sites across the large catchment so that the impact of spatially varying timeseries rainfall and design storms could be assessed.

