AUDACIOUS

Adaptable Urban Drainage – Addressing Change and Intensity, Occurrence and Uncertainty of Stormwater

AUDACIOUS will provide an improved understanding of the impacts of climate change on building and local drainage and the interaction of both surface and sub-surface flows.

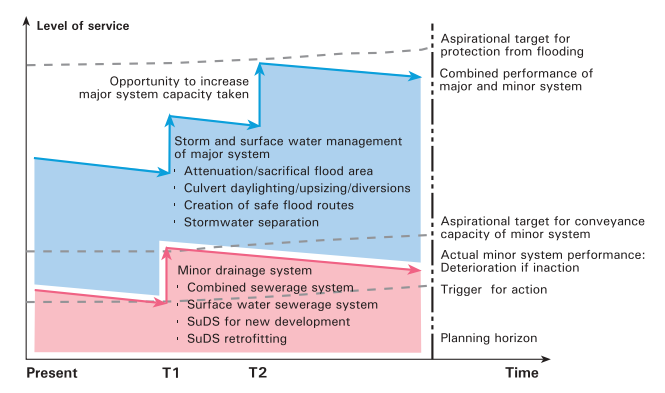
BKCC

Building Knowledge for a Changing Climate

Project Outcomes

By investigating key aspects of the effects of climate change on existing drainage in urban areas, AUDACIOUS will establish a new framework for problem-centred, cost-efficient, adaptable and sustainable decision-making for local drainage systems. It will provide tools for drainage managers and operators to enable them to adapt to uncertain futures.

AUDACIOUS will set out a clear picture of the scope and interactions between the likely problems caused to the performance of existing drainage systems due to climate change and the wider urban catchment, comprising major and minor drainage systems, within which they operate.



Major and minor system performance

The new tools will provide new procedures, computer models, and appropriate guidance targeted to particular users to assist in the assessment of climate change impacts and the development of adaptable responses for building and local drainage systems.

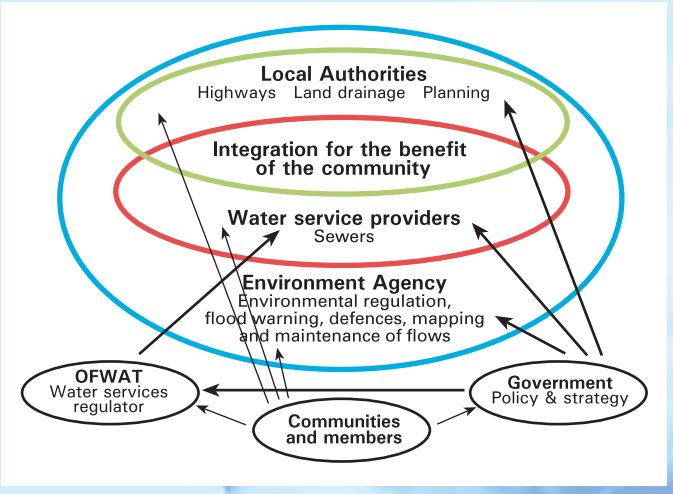
Stakeholder's comments

"Scottish Water welcomes the opportunity presented by the BKCC initiative to establish a real framework for addressing urban drainage problems at a catchment scale. The impact of climate change and implementation of sustainable drainage systems will influence the scale and type of strategic flood solutions promoted."

Scottish Water

Project Description

Climate change is more often than not seen as a threat. However, the need to manage extreme rainfall events in urban areas provides an opportunity to integrate the activities of Local Government, Water Service Providers and Regulators to improve our urban environment. The management of climate change impacts can contribute to the integrative activities required to develop "Sustainable Communities" in an ever changing world and improving the environment for the community as shown below. In order to generate optimum solutions



Relationships between stakeholders

involving contributions from the key stakeholders, there is a need for new enhanced urban drainage models capable of being adapted to meet the need of changing environmental factors such as groundwater levels, vegetation, changing design standards and rainfall. These models will have to be capable of simulating the interactions between surface and pipe flows and will be used in conjunction with whole life cost assessment of solutions within a risk based approach. The models are being developed and tested by means of case studies based on real flooding problems in Bradford and Glasgow.

Property flooding in Bradford, August 2003

Highway flooding in Bradford, August 2003

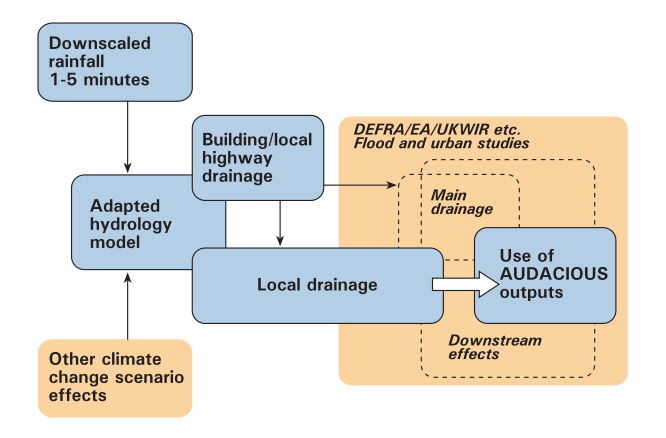
Highway flooding in Glasgow, July 2002

Highway flooding in Glasgow, July 2002

Potential Applications

The project will enable and demonstrate the integration of the models and procedures with the behaviour of drainage and urban systems and will establish the baseline procedures for evaluation and mitigation of the effects of climate change on existing urban drainage. The models and procedures will also be used to assess the impact of future urbanisation. In these respects, the AUDACIOUS team is utilising the outputs of the BKCC projects BETWIXT, ASCCUE and BESEECH to establish scenarios for climate change, development within property curtilages, and demands for future urbanisation.

The results of the project will be used to set out a clear picture of the scope and interactions between the likely problems caused to the performance of existing drainage systems and the wider urban catchment due to climate change.



AUDACIOUS scope and areas of tool development

However, the toolbox development within AUDACIOUS is only a start. The project is, in conjunction with Water and New Developments (WaND), Whole Life Costs of Sewers (COST-S) and the urban flood management workpackage within the Flood Risk Management Research Consortium, designed to produce a comprehensive, enhanced, new modelling tool for all aspects of urban drainage. It has been recognised by Government as meeting the requirements of the integrated approach set out by the Department of Environment, Food and Rural Affairs (Defra) in 'Making space for water'.

Sharing the outcomes

A conference paper on roof and building drainage was presented at CIBW62 Water Supply and Drains for Buildings, Paris, in September 2004. Following this a paper has been accepted by 'Building and Environment Journal'.

Papers on the drainage aspects were presented at Novatech, Lyon in June 2004, and at Urban Drainage Modelling Conference at Dresden in September 2004, at the 10th ICUD in Copenhagen 2005 and the 2005 Defra Flood and Coastal Management conference. Papers have been submitted for the Urban Drainage Modelling and Water Sensitive Urban Design conference in Melbourne in 2006, and contributions are being made to an Institution of Civil Engineers Seminar in Wigan in October 2005, a workshop for the Waste Water Planners User Group meeting in November and at a Chartered Institution of Water and Environmental Management event in January 2006.

See website for up-to-date details:
www.eng.brad.ac.uk/audacious/

Anticipated project completion date:
TBS

Contact Details

Project Manager:
John Blanksby
Pennine Water Group
University of Sheffield
j.blanksby@sheffield.ac.uk

Stakeholder Contact:
Alistair Dyer
Scottish Water
alistair.dyer@scottishwater.co.uk

UKCIP:
Gerry Metcalf
UK Climate Impacts Programme
OUCE/University of Oxford
gerry.metcalf@ukcip.org.uk

EPSRC:
Dr Filomena La Porta
Climate Change, Energy Efficiency and Fusion
Engineering and Physical Sciences Research Council
filomena.laporta@epsrc.ac.uk

UK Climate Impacts Programme

Building Knowledge for a Changing Climate (BKCC) is a portfolio of research projects which look at how changing climate will affect different aspects of the built environment. Most of the projects use case studies in a variety of locations to generate results that can be applied across the UK. This 2005 update part way through the projects is to inform potential users of the research of potential outcomes when the projects are completed in 2006.

EPSRC
Engineering and Physical Sciences Research Council