

# **Environment Agency**

Ford Brook

Strategic Flood Risk Mapping

Final Report

## **Halcrow Group Limited**

### **Halcrow Group Limited**

Lyndon House, 62 Hagley Road, Edgbaston, Birmingham, B16 8PE  
Tel +44 (0)121 456 2345 Fax +44 (0)121 456 1569  
[www.halcrow.com](http://www.halcrow.com)

Halcrow Group Limited has prepared this report in accordance with the instructions of their client, Environment Agency North East Region, for their sole and specific use. Any other persons who use any information contained herein do so at their own risk.

© **Halcrow Group Limited 2009**

---

## EXECUTIVE SUMMARY

The Ford Brook is approximately 7km in length (Main River length) and drains an area of around 45km<sup>2</sup>. The headwaters of the main river consist of a minor river inflow and an outfall from Goscote sewage treatment works just south of Pelsall. The watercourse runs in a southerly direction toward, through, and beyond Walsall town centre to its confluence with the River Tame at Bescot. Its tributaries include the Ford Brook minor river and the Arboretum Brook. The topography of the catchment is relatively flat, the underlying catchment geology is varied, and the catchment is heavily urbanised. The river is hydraulically complex with a large number of flow-inhibiting structures and flood plain flow is similarly complex. There are no formal defences within the study area. There is little history of flooding in the Ford Brook catchment, although Walsall Arboretum flooded during the summer of 2007.

Halcrow were commissioned by the Environment Agency to undertake a flood risk mapping study of a reach of the Ford Brook and its tributaries through Walsall. This report details the hydrology, hydraulic modelling and flood mapping undertaken.

There are no flow-gauges within the catchment with which to calibrate a hydraulic model, and no major historical flood events or wrack mark data with which to verify a model. It should therefore be noted that the model is uncalibrated and unverified. Any future high flow and flood events should be used in order to gather data that could be used to calibrate or verify the hydraulic model produced as part of this Strategic Flood Risk Management (SFRM) study.

A 1D-2D linked iSIS-TUFLOW hydraulic model was constructed for the Ford Brook and its tributaries, including the old Ford Brook (non-Main River) and the Arboretum Brook, using LiDAR Digital Terrain Model (DTM) data for the region. Design hydrological inflows for a suite of return period events (events of 1:5, 1:10, 1:20, 1:50, 1:75, 1:100, 1:100(+20%), and 1:1000 year return period) were derived using a distributed catchment model and utilising the Revitalised Flood Hydrograph methodology in order to derive hydrograph shapes. A statistical analysis was undertaken using gauged data from nearby and hydrologically similar catchments in order to derive peak flows for the suite of return periods considered with which inflow hydrographs were reconciled.

The model produced for this SFRM study is suitable for a strategic study. Future flood risk studies in the area, however, should review the model prior to utilisation and ensure it is suitable for the new purpose for which it is to be used.

The mapping was successful in identifying areas at risk. Results are consistent with anecdotal, pictorial and reported knowledge and evidence and offer the best estimates given the data available. No properties fall within Flood Zone 3b (5% AEP) and few properties are located within Flood Zone 3a (1% AEP), although Flood Zone 2 (0.1% AEP) is of greater extent and includes areas within Walsall town centre.

Local authorities should use these Flood Zones in order to inform development decisions; these outlines replace those previously published in Strategic Flood Risk Assessments (SFRAs) undertaken for the Ford Brook catchment.

The model exhibited sensitivity to values adopted for channel roughness. It is recommended, therefore, that regular channel and structure maintenance be conducted in order to maintain a low level of flood risk in the area. This is particularly important for the older long culverted sections of the Arboretum Brook and the old Ford Brook.