

Technical Note

Project:	Oxford City SFRA Level 2	To:	Mapping & Data Management Team, Red Kite House
Subject:	Hydrological Assessment of the River Cherwell	From:	Esther Ainsworth
Date:	7 th July 2011	cc:	Richard Wyatt

1. Introduction

This brief technical note describes the hydrological assessment of the River Cherwell, undertaken as part of the Oxford City Council Strategic Flood Risk Assessment Level 2. The purpose of the assessment was to derive a hydrograph for input into a linked ISIS-TUFLOW hydraulic model to assess the flood hazard associated with the allocation site of St. Cross College Annex at NGR: 452120 206570.

Details of the catchment conceptualisation, assessment methodology and results are provided in the FEH Calculation Record. A summary is provided in this technical note.

2. Methodology

This study was undertaken using the Flood Estimation Handbook (FEH) methodology for estimating design event flood flows. It included the following:

- Conceptualisation of the area into an upstream catchment to the downstream extent at the confluence with the River Thames. The location of this catchment is illustrated in Figure 1. The catchment descriptors for the catchment were taken directly from the FEH CD-ROM.
- FEH statistical analysis for the catchment to the confluence with the River Thames, including consideration of the use of donor catchments to improve peak flow estimations and pooling group analysis to derive a flood frequency curve.
- ReFH analysis for the catchment using a critical catchment wide storm duration for flood events with an annual chance of 1 in 20 (5%), 1 in 100 (1%) and 1 in 1000 (0.1%). In all cases, the winter rainfall profile resulted in the highest flood peaks and hydrograph flood volumes. The catchment was found to have a critical storm duration of 33 hours.
- Comparison of the peak flow estimates obtained for the upstream catchment using the two different methods. In line with a conservative approach, the ReFH hydrographs were preferred as this increased the peak flow and total flood volume.
- Comparison of the results from this study with the peak flows within the Environment Agency Oxford Strategy model provided.

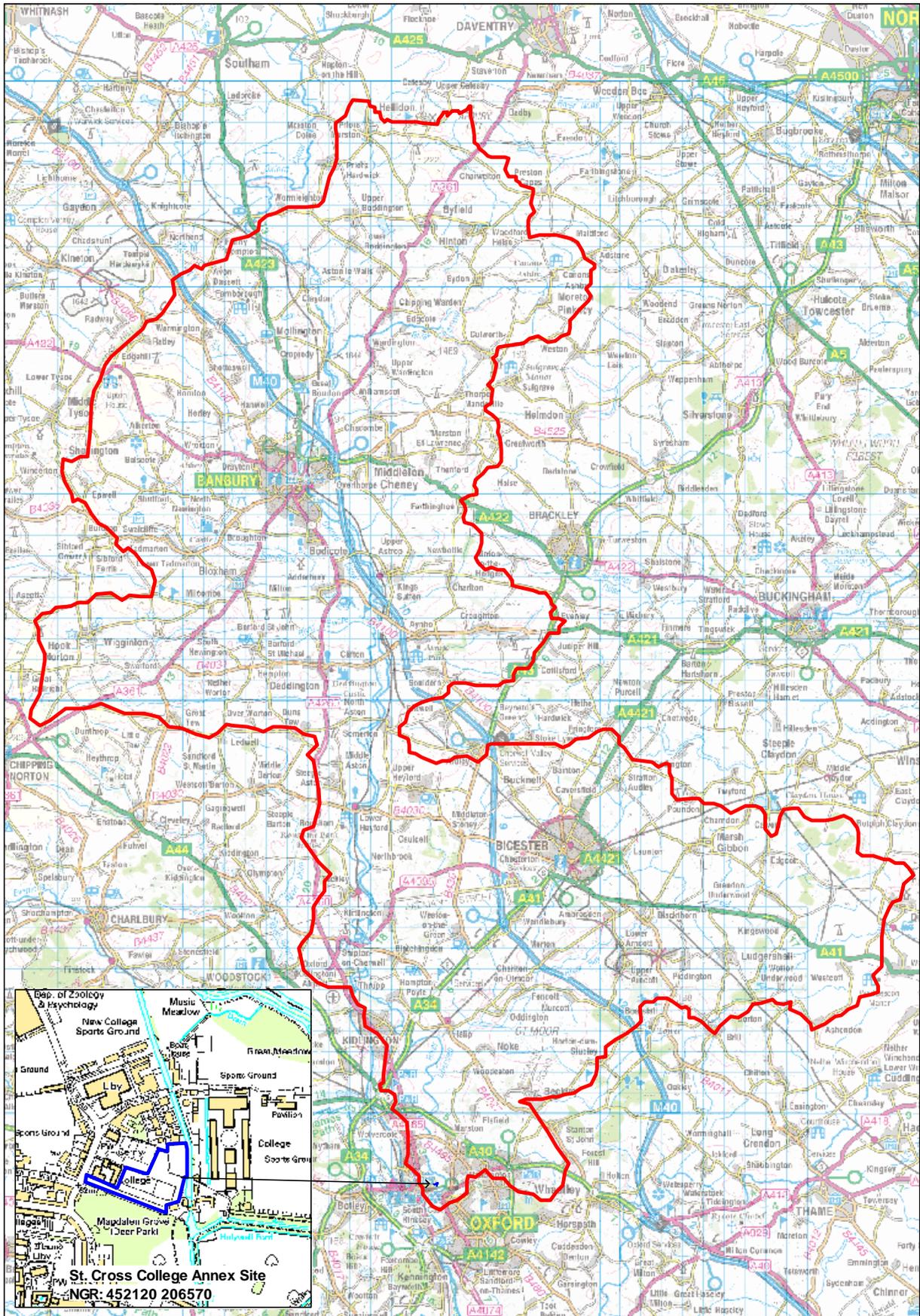


Figure 1 – Catchment Locations

3. Results

The results of this hydrological study are documented in the FEH calculation record. The peak flows for the 33 hour storm duration are provided in Table 1.

	Peak Flow (m ³ /s) for a 33 hour storm duration flood event		
	1 in 20(5%)	1 in 100 (1%)	1 in 1000 (0.1%)
Cherwell downstream	125.2	166.7	271.2

Table 1 – Peak Flow Results

Whilst statistical analyses are held to be more reliable they are not appropriate for a 1000 year return period due to the length of records available within the UK to derive statistical estimates.

The Environment Agency flows within their Oxford Strategy model are considerably larger than both the ReFH and FEH Statistical peak flows (Q20 = 228 m³/s, Q100 = 278 m³/s) although the derivation of the Strategy flows is unknown.

In line with a conservative approach the ReFH flows are preferred as they are higher than the statistical method.