

## **Preliminary flood risk assessment: Buckinghamshire County Council**

This addendum by Buckinghamshire County Council (2017) updates the council's preliminary flood risk assessment report published in 2011. Read the addendum in conjunction with the [preliminary assessment report](#).

### **Addendum**

The preliminary flood risk assessment (PFRA) and flood risk areas (FRAs) for Buckinghamshire County Council (BCC) were reviewed during 2017, using all relevant current flood risk data and information.

Changes to the assessment of risk since the preliminary assessment report was published in 2011 are described in the statements in this addendum.

### **Past flood risk**

Since 2011, BCC has had the statutory requirement under Section 19<sup>1</sup> of the FWMA 2010 to formally investigate flood events defined as 'significant' on the basis of criteria established in the Local Flood Risk Management Strategy. The aims of the reports are to understand the cause and mechanisms of the flooding and responses by relevant authorities and stakeholders. (Note that the criteria defining 'significant' for Section 19 investigations are much lower than the criteria used by the national PFRA analysis to determine Flood Risk Areas, so the two are not directly comparable).

BCC have undertaken 19 Section 19 investigations into significant flood events since 2011. Within each Section 19 Flood Investigation report, we have made recommendations to enable RMAs, as well as residents and landowners, to learn lessons from the event and improve management of flood risk in future. Many of these recommendations are either complete or underway. The conclusions derived from these investigations have contributed to a greater overall understanding of flood risk across the county.

Notably, widespread groundwater flooding occurred in the unconfined Chalk aquifers of the Chilterns and permeable superficial deposits along the Thames during the winter of 2012/13 and again in 2013/14. Major disruption was caused as a result of flooding of properties, roads, agricultural land and the overwhelming of sewers. Though BCC were aware of groundwater flood risk and past incidents within the county (particularly the groundwater dominated flood event in the winter of 2000/1, which was the only event considered as 'significant' in the 2011 PFRA), these events re-emphasised the risk and highlighted the extensive consequences of groundwater flooding. Though groundwater flooding has historically occurred less frequently in Buckinghamshire than fluvial and surface water flooding, these groundwater flood events have illustrated that the consequences can be more prolonged and extensive. The 2012/13 and 2013/14 events lasted for many weeks in places, resulting in high social hardship, disruption and economic impacts.

The significant groundwater flood events that have occurred since 2011 also highlighted to BCC that nationally our understanding and management of groundwater flooding, and the available flood mapping to support this, has been considerably more limited than that of other sources of flood risk. In response, BCC commissioned work that delivered innovative probabilistic groundwater flood hazard mapping for five key catchments within the county at high risk of groundwater flooding. The new technique has given BCC a much improved understanding of the extent, depth and flow volume of groundwater flooding from Chalk

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<sup>1</sup> An investigation into a flooding event that a lead local flood authority (LLFA) is required to carry out under Section 19 of the [Flood and Water Management Act 2010](#), and according to [the LLFA's local flood risk management strategy](#)

aquifers at the surface for a range of probability events. Further information is outlined in Annex 2 of Appendix D. The outputs could be used by emergency managers to guide appropriate emergency response, by the lead local flood authorities and water utilities to guide infrastructure investment decisions, and by planners to guide development decisions.

This work also delivered a proof-of-concept predictive tool to forecast rising groundwater levels and give warning of flooding to allow for preparation of flood risk management activities.

Additionally, recent flood events have highlighted some surface water issues and issues with interaction of different flood sources that BCC were previously unaware of, particularly in the north of Aylesbury Vale.

Improvements in BCC's understanding of local flood risk following recent flood events has helped target flood management interventions. For example, four Buckinghamshire communities that were affected by flooding during the winter of 2013/14 have been the focus of BCC's "Small Schemes" Pathfinder scheme.

Following the floods of 2013/14, BCC led a Flood Inquiry. BCC's own actions include to build our own resilience and that of communities, and to improve communication with other risk management authorities during a flood event.

### **Future flood risk**

Our understanding of the flood risk in the lead local flood authority (LLFA) has changed since 2011 in the following ways:

Since 2011, BCC have undertaken 19 Section 19 investigations into significant flood events, and have collected and collated data on flood incidents and flood risk hotspots. The conclusions derived from these investigations have contributed to an increase in understanding of local flood issues in those areas, as well as a greater overall understanding of flood risk across the county.

Our understanding of groundwater flood risk has improved in terms of extent, depths, volume and durations of flooding in the chalk catchments. This has been through innovative probabilistic groundwater flood hazard mapping, based on evidential data, for five catchments at high risk of groundwater flooding across the south of the county. The outputs can be used to guide infrastructure investment decisions and by planners to guide development decisions.

BCC has begun work to enable prioritisation of local areas at greatest risk of flooding. This will provide an evidence base for BCC to target flood management funds and measures where they will realise the greatest benefit. A high-level screening of the settlements most at risk has been undertaken as an initial step in this process, based on the numbers of properties within surface water and fluvial flood outlines separately. This is set out in the updated local flood risk management strategy (2017).

We are currently refining this work by undertaking a detailed GIS-based assessment (the "Buckinghamshire Local Flood Risk Prioritisation" project) at a finer spatial scale to further update and underpin the LFRMS. Existing information on flood risk within Bucks is largely limited to maps showing the probability or depth of flooding in a particular area, and does not consider the economic, social, environmental and cultural consequences of flooding that receptors (eg. properties, infrastructure) will suffer should flooding occur. Our project assesses the combined probability of all flood sources into one dataset and spatially intersects this with receptor data (counts, lengths and areas of affected receptors) to provide an overall 'Risk Score' for each reporting unit.

The key outcome is to prioritise 'hot spots' of flood risk that may require priority action and identify economic damages to support the flood and coastal risk management grant-in-aid application process.

Interim outputs from this project have been used to support our review of the PFRA FRAs. Due to the improvements in our understanding of combined risk from all sources arising from this project, we have identified an additional area that would be considered at significant risk in the context of the PFRA.

#### **Flood risk areas (FRAs)**

The following FRAs have been identified for the purposes of the Flood Risk Regulations (2009) 2nd planning cycle:

- High Wycombe/ Marlow area
- Chesham

There are no iFRAs within the northern half of Buckinghamshire.

**Buckinghamshire County Council**  
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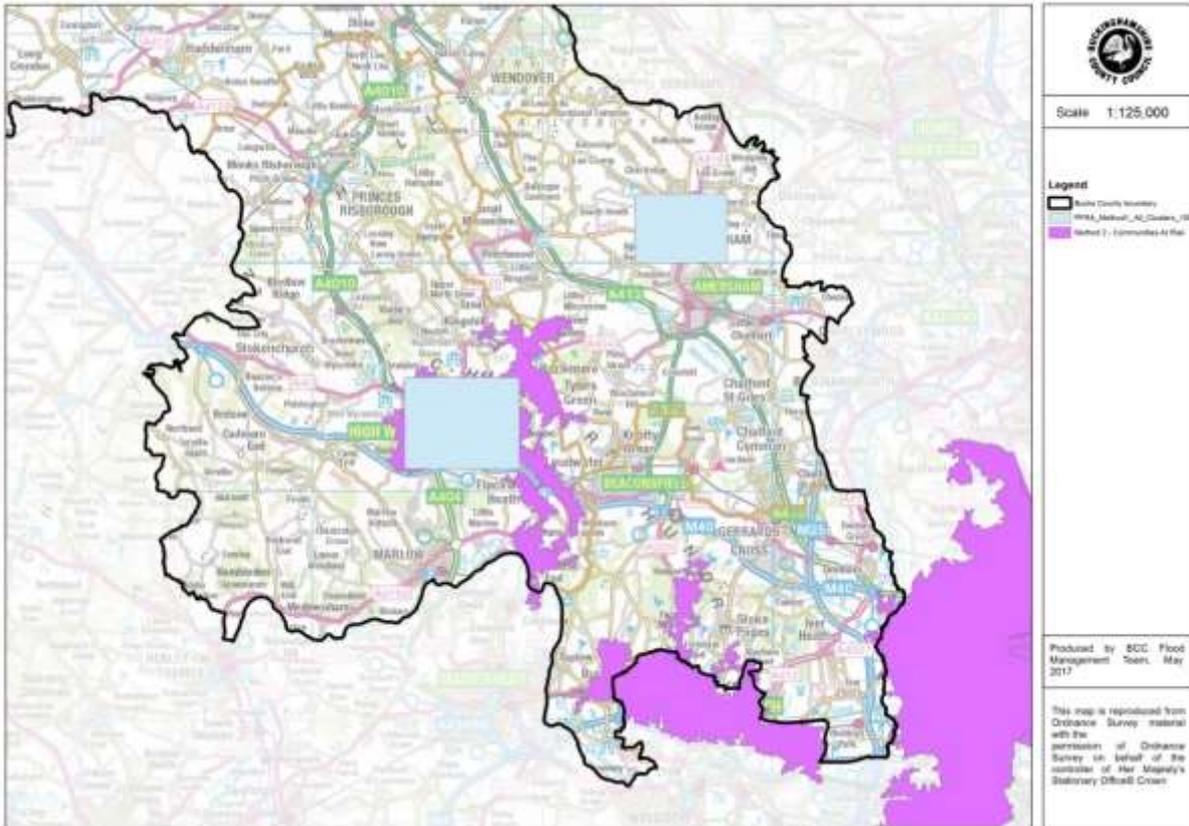


Fig. 1: Indicative Flood Risk Areas in Buckinghamshire (prior to review). Light blue squares represent iFRAs identified using the Cluster method. Purple polygons represent iFRAs identified using the Communities at Risk method.

BCC have been required to review these four iFRAs using our own local understanding of surface water flood risk, but also to consider the consequences of flooding from other local sources (i.e. groundwater and local watercourses), plus the combined impact of flooding from multiple sources. In order to inform this, BCC have undertaken our own analysis of areas of significant risk across Bucks: this includes the same reporting units, indicators and criteria as the national iFRA method, but considers the risk from groundwater and fluvial sources as well as surface water, plus the risk from all sources combined (fluvial, GW and SW). On the basis of this analysis, plus historical records of flooding, BCC confirm that we agree that the above four iFRAs should be taken forward.

However, through this analysis we have identified that the Marlow area would be considered at significant risk when the combined risk of flooding from all sources is considered. Indeed, in our analysis of nearly 1800 1km grid squares across Bucks, Marlow was found to have 3 of the top 5 grid squares (see Figure 2 below).

