



# Flood investigation report

## High Wycombe, July 2017

Buckinghamshire Council as Lead Local Flood Authority has a duty to investigate flood incidents as detailed within Section 19 of the Flood and Water Management Act 2010.

### Date of incident:

17 July 2017

### Location detail:

Various locations throughout the High Wycombe area

### Overview of incident:

On evening of 18th July 2017, there was a two hour period of heavy rainfall over the High Wycombe area. A number of properties in the Desborough Road, Sands, Booker and Cressex areas of High Wycombe reported flooding in and off the road and five residential properties and two business reported internal property flooding

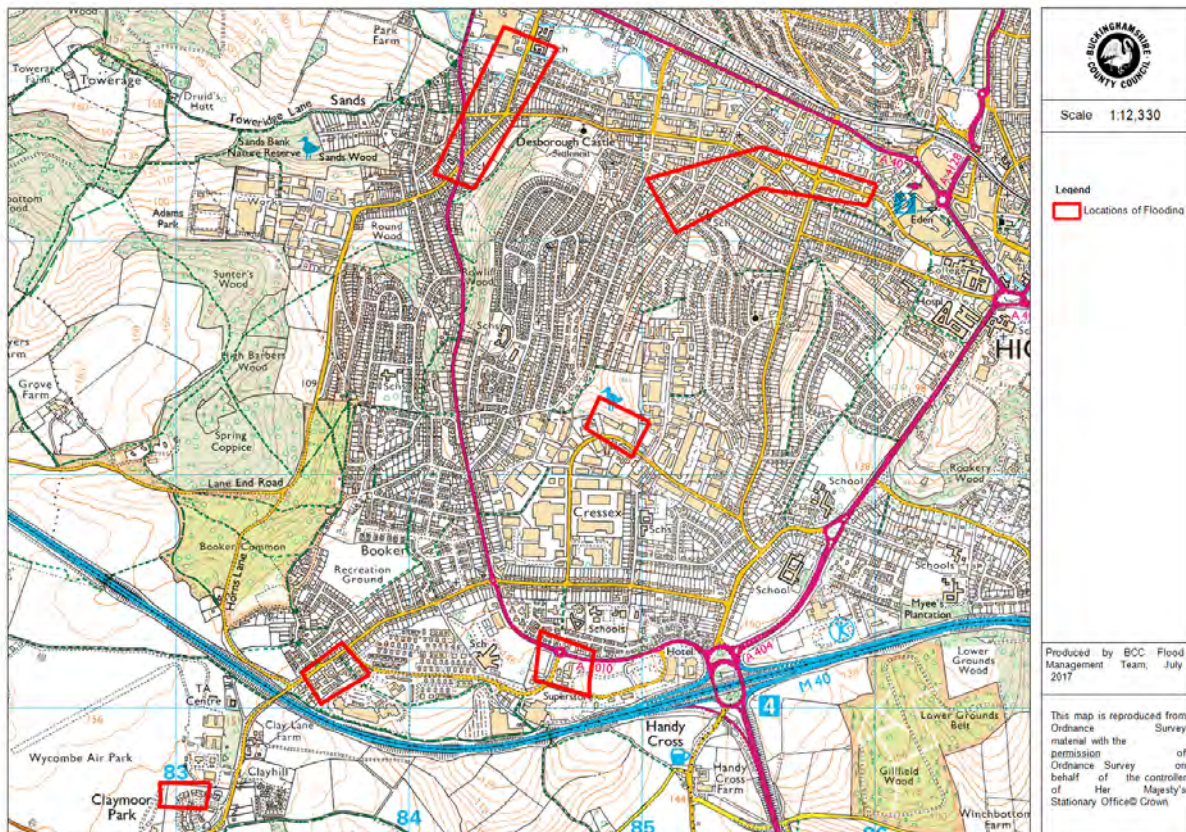


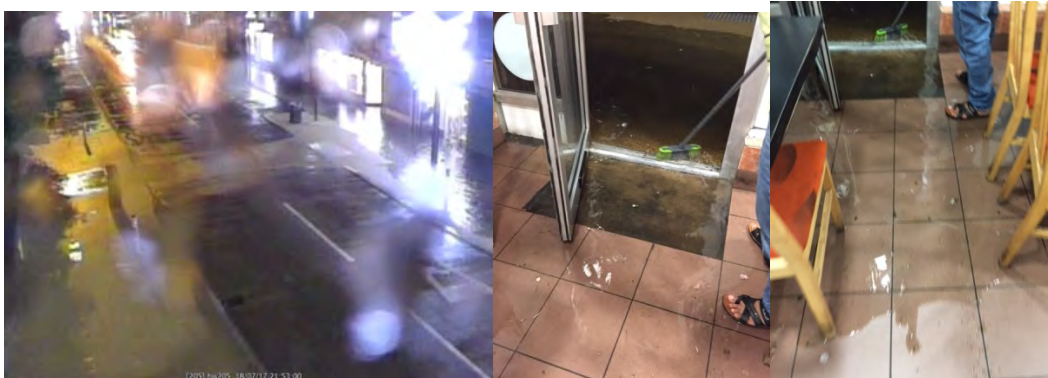
Figure 1 - Location plan of flooded area.

## Summary of extent and impact

There was heavy rainfall over High Wycombe on the evening of 18<sup>th</sup> July 2017 and there were numerous reports of flooding around High Wycombe. The broad locations of the flooding were:

- Along Desborough Road especially at the junction with Westbourne Street, off Green Street and Dashwood Avenue
- Sands area along A4010, Mill End Road and Lane End Road around the hourglass roundabout
- Junction of Holmers Farm Way and Crest Road, Cressex at the YMCA
- Booker Place, off Cressex Road, Booker
- Coronation Road, Cressex Business Park
- Chairborough Road and Carrington Road

Figure 1 shows the broad locations of these areas of flooding. Questionnaires were sent to properties in the known areas of flooding to ask about the nature of the flooding, where it occurred (internal, external etc.), how it occurred and where the flooding came from. Forty three properties responded to the questionnaire. There were five properties where internal flooding was identified (two on Desborough Road, one in the Cressex area, one in the Chairborough Road area and one of the A4010 near Sands. In addition, through correspondence with the Highways Infrastructure Projects team, two other business properties on Desborough Road were identified as being flooded internally.



Pictures 1, 2 and 3 - 18/07/2017 21:53 – Desborough Road



Picture 4 – Ryemead Way, High Wycombe

## Potential Cause

In the Desborough Road area the residents of properties which were flooded identified that the water flooded the footway, rose above the door thresholds and entered properties. This was further evidenced by a review of CCTV for the area which highlights flooding started at approximately 21.40hrs, and that the flood water had drained and cleared by 22.10hrs.

The Environment Agency's Updated Maps for Surface Water show that the direction of the surface water flow is primarily from the hard surfaces in and around High Wycombe and flows from the south along the Chairborough Road towards Desborough Road and along Westbourne Street to Desborough Road. Desborough Road is the lowest point along the valley floor so water collects in this area.

In the other locations, the residents all identified that the flooding came off the road and into their properties. Other responses to the questionnaire where flooding was external predominantly identified that flooding was caused by water running off the road into gardens and drives.

Figure 2 shows the overlaying of the Environment Agency's surface water maps and the areas of flooding. This indicates that the locations where flooding occurred on 18<sup>th</sup> July 2017 were at the locations where flooding would be predicted from the mapping when a heavy rainstorm event occurs.

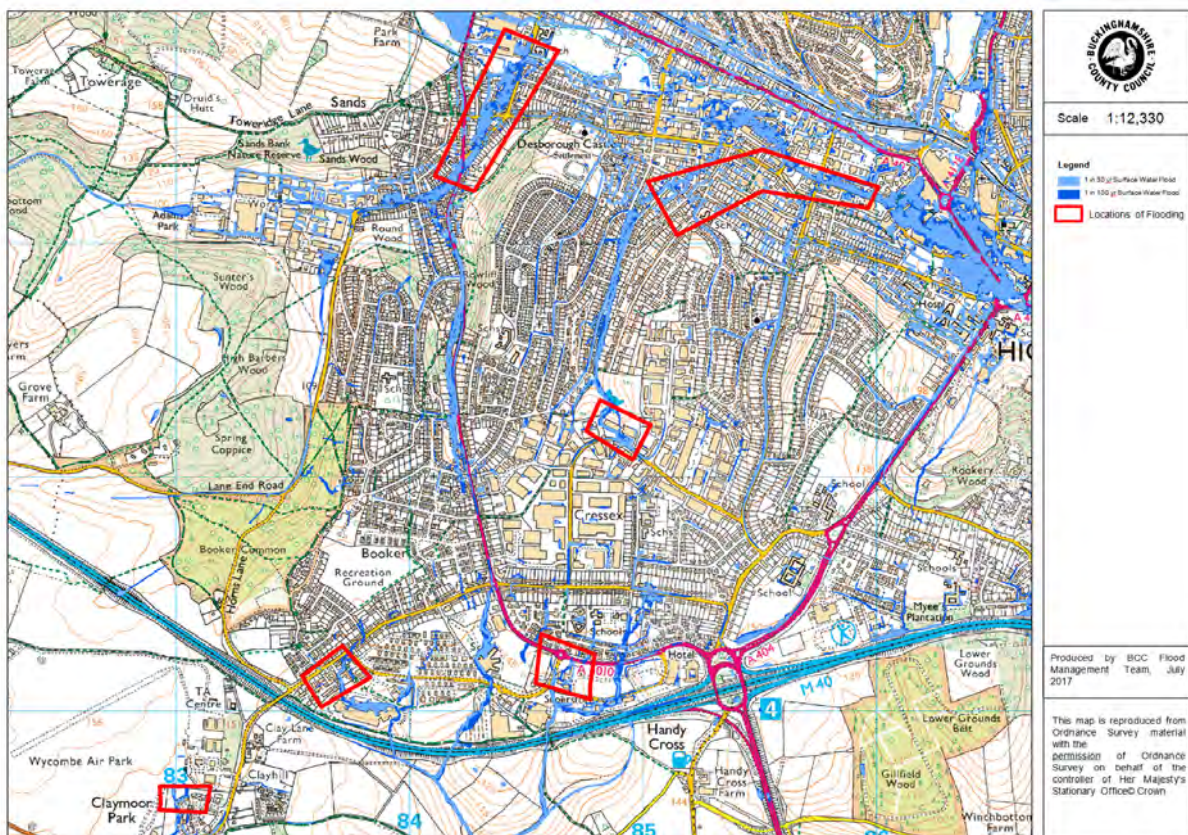
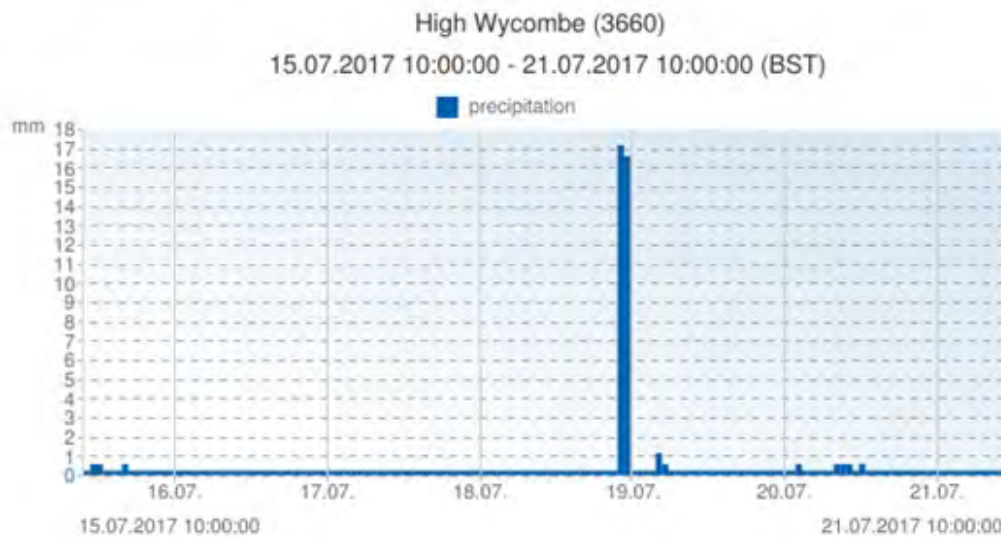


Figure 2 - Predicted Surface Water flooding and locations of actual flooding on 18<sup>th</sup> July 2017

**Weather conditions** – On the evening of July 18th 2017 there was heavy rainfall over the High Wycombe area. The nearest weather station to the centre of High Wycombe is Waters Ash in Buckinghamshire, approximately one mile away from the site. This weather station recorded 16.8mm of rainfall between 23.00 on 18<sup>th</sup> July 2017 and 00.00 on 19<sup>th</sup> July 2017 and 16.4mm between 00.00 and 01.00 on 19<sup>th</sup> July 2017, see Figure 3. Over the two hour period 33.2mm fell which statistically equates to a rainfall event 1 in 13 year event over a 2 hour period.



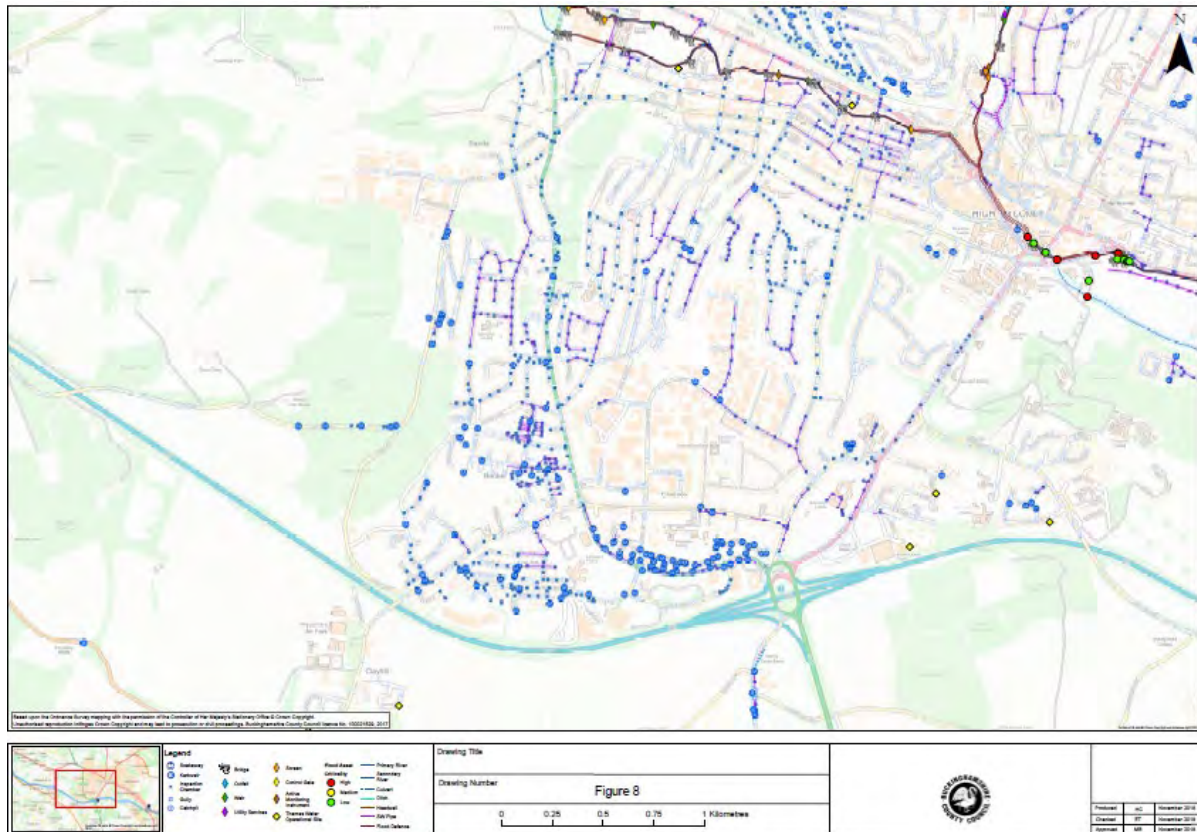
**Figure 3 - Rainfall at Walters Ash, High Wycombe on 19<sup>th</sup>/20<sup>th</sup> July 2017**

The rainfall reported in the Desborough Road area and caught on the CCTV cameras occurred earlier in the evening than that recorded at the Walter's Ash rain gauge station. This discrepancy is understandable as the sites are a short distance apart.

The flows in the River Wye on that day were recorded as being 0.117m<sup>3</sup>/s which is not a high flow and not sufficient to cause flooding.

The groundwater levels for this area in July were low and would not have caused any flooding issue.

**Drainage assets** - Figure 4 shows flood and drainage assets recorded on the Flood Risk Asset Register (<https://www.buckscc.gov.uk/services/environment/flooding/strategic-flood-management/asset-register>). It shows that soakaways are a dominant feature for surface water disposal in the area of interest, as would be expected given the permeable nature of the local Chalk geology.



**Figure 4 - Drainage assets**

The area around Desborough Road and Westbourne Street had been partially subject to reconstruction as part of the High Wycombe Town Centre Master Plan (TCMP) Phase 2 Public Realm Improvement Works shortly before the flood event with the work commencing in September 2016 and being completed in June 2017.

Prior to the works the area was made up of flag paving and setts and was semi-impervious. Any surface water drainage was reliant on discharging through existing gullies both in the footway and carriageway. The slope of the footway is very shallow and there was only a small cross fall in this area from shop frontage to the drainage channel. All the footway drainage discharged directly to the surface water carrier drain, which is a 450mm carrier drain laid at a slope of 1:36. The approximate depth of the carrier drain is 2m below surface level. The footway had an existing Aco drainage channel out falling approximately 15m west of the Westbourne Street Junction. However the existing Aco drainage channel was partially blocked due to missing grates being infilled with asphalt.

The new design and construction of the drainage system is compliant to a 1:100 + 10% storm capacity. The design increased the drainage from the shop thresholds to the drainage

channel by reducing the footway by an additional 36mm, therefore increasing capacity and flow. This coupled with the design of a 150mm wide granite channel with a long fall of 65mm over 14m. A new footway chamber was included which outfalls directly to the 450mm road surface water carrier approximately 4.6m into the carriageway (Desborough Road). It should also be noted that this area also takes additional rain water from the roofs of 150 and 152 Desborough Road which discharges onto the footway via a downpipe. Figure 5 shows the design.



Downpipe from 150 and 152 discharging roof water onto footway

New Footway Gully Pot

**Figure 5 - New Design of footway drainage and downpipe**

On 27<sup>th</sup> July 2017, as part of the investigation into the flooding a physical examination of the footway chambers took place. It was found, after rodding, that the gully [1] as identified in Figure 6 was blocked with concrete at approximately 0.8m along the lateral. The blockage was removed and the drain then ran clear and free into the 450mm surface water carrier drain under Desborough Road.



**Figure 6 - Location of blockage in Desborough Road footway**

A further visual inspection of the footway gully pot was then undertaken and concrete blockage was found on the entry into the lateral connection. The excess concrete was cleared and the pipe discharged freely without any backing up.

**Summary** - High intensity rainfall over a 2 hour period on evening of 18<sup>th</sup> July 2017 created surface water runoff from the hard surfaces around High Wycombe. The steep topography in some locations around the town, mean that there are some significant runoff routes along steep roads such as the A4010 from Cressex towards Sands and along Chairborough Road towards Desborough Road, see Figure 5. At the bottom of the valley the water ponds at Sands and along Desborough Road. The flooded locations are consistent with the Environment Agency Surface Water mapping as shown in Figure 2. The high intensity rainfall event (1 in 13 year) means that some of the road drainage would have become overwhelmed. Road drainage traditionally is design to a 1 in 10 year standard. Where the road drainage was not able to deal with the water, the roads became flooded and in some locations water flowed into the properties. The cause of the flooding in Cressex, Booker and Sands was due to the intensity of the rainfall and the insufficient capacity of the road drainage.

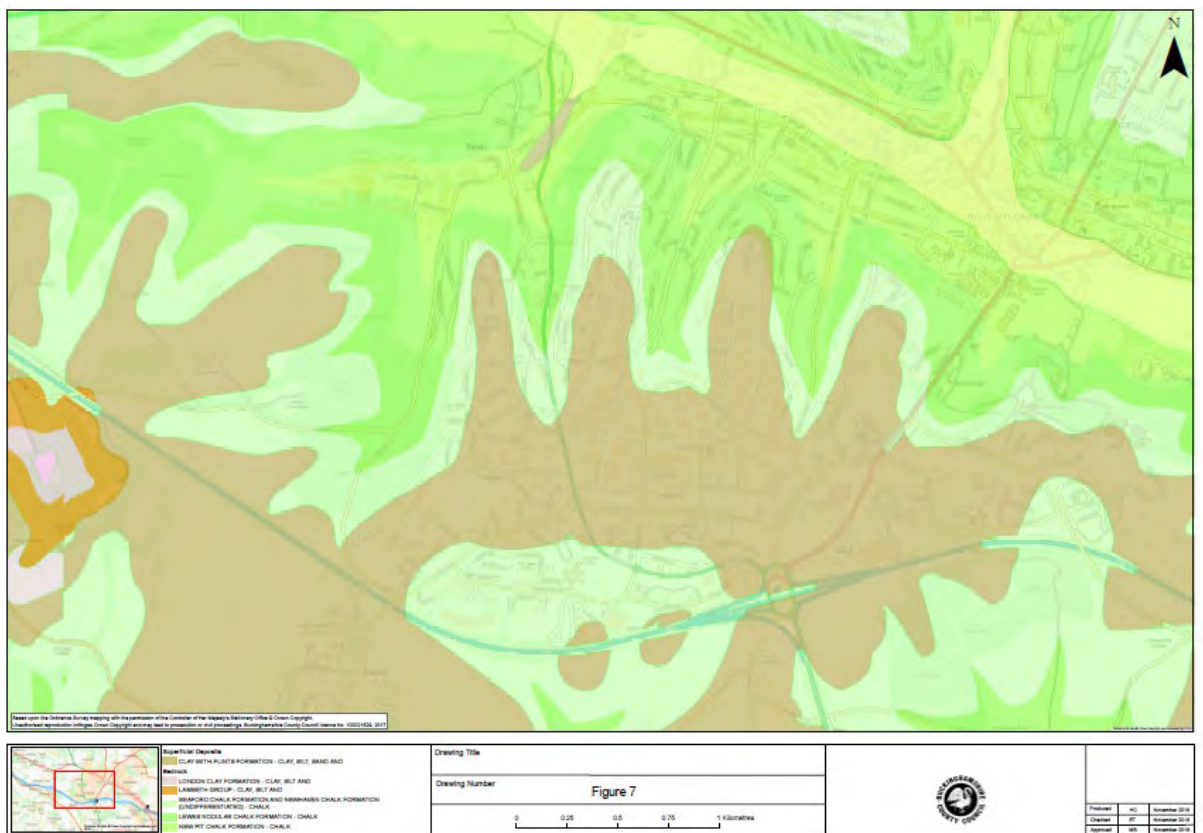
Along Desborough Road and particularly at the junction of Desborough Road and Westbourne Street, road improvements had been carried out and completed in June 2017. The design of the road and footway drainage should have been able to take the 1 in 13 year rainfall volumes and intensities. On investigation in this location, there was a blockage in the lateral connections from the footway to the main surface water carrier in the

carriageway. This was identified as the cause of the flooding as the designed drainage was reduced in capacity and was not able to discharge the rainfall and runoff.

There was no flooding from the River Wye or from groundwater or from Thames Water sewage pipes.

### Catchment area and local information

Much of High Wycombe in the area of interest is on exposed Chalk geology, Figure 7. This type of geology is generally highly permeable. However, ponding of surface water can still occur during intense storms, particularly in urban areas where runoff from roads and buildings collects in local surface depressions.



**Figure 7 - shows the bedrock and superficial geology.**

Figure 8 shows an extract from the surface water flood maps with the 30 year and 100 year flooded outline shown. This dataset is based on the Environment Agency's Updated Flood Map for Surface Water. Nearly all reported internal flooding locations are in areas that are indicated to be at risk of surface water flooding. Figure 1 shows the locations which were flooded and Figure 8 shows the overlain surface water flood maps and the areas which were flooded.

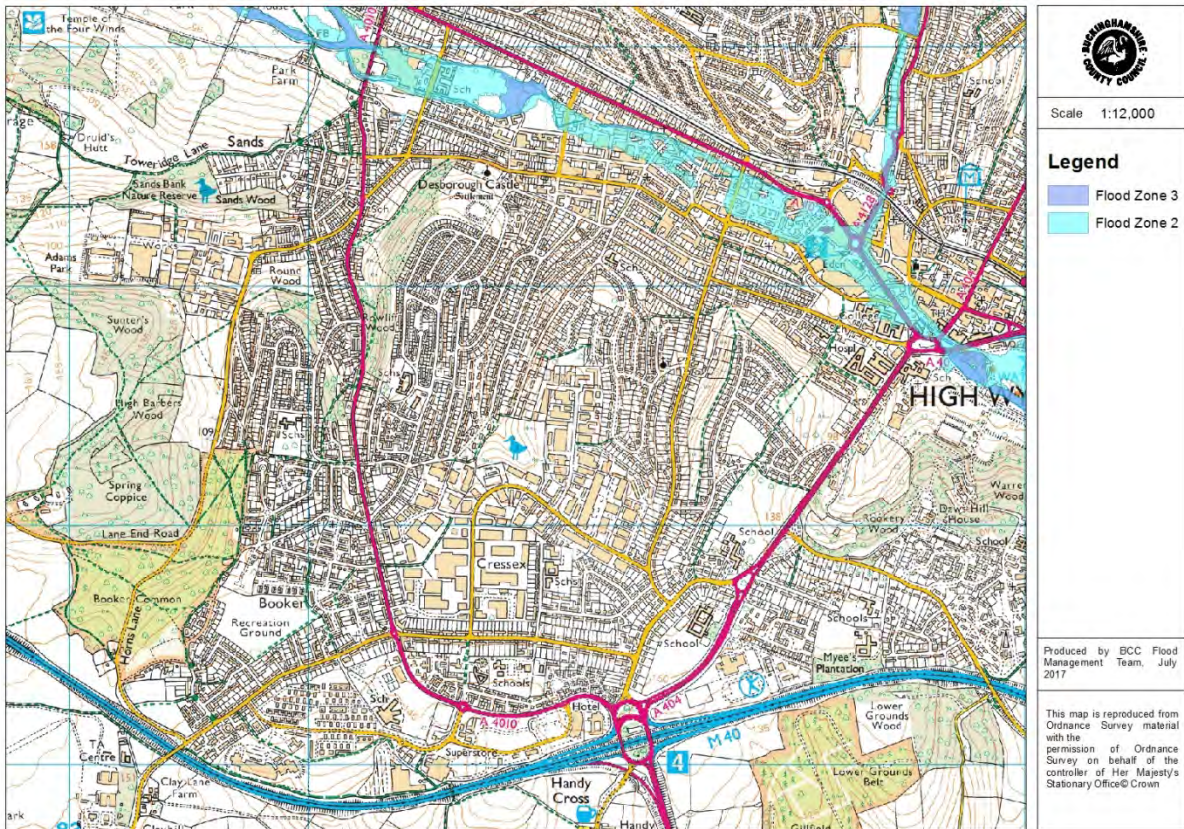




**Figure 8 – Surface Water Flood Map showing 1 in 30 and 1 in 100 year flood events**

Figure 9 shows Fluvial Flood Zones 2 and 3 (from the River Wye and Hughenden Stream). Flood Zone 2 is the zone with a medium likelihood of fluvial flooding, between 0.1% and 1% annually; Flood Zone 3 is that with a high likelihood of fluvial flooding, greater than 1% annually. Any location outside these flood extents is in Flood Zone 1, with a low likelihood of fluvial flooding (less than 0.1% annually).

As the flood of July 2017 was a relatively short intense rainfall event, water levels in the River Wye did not rise to the levels shown here. The reported floods are expected to be caused by surface water flooding instead.



**Figure 9 – Fluvial Flood Map**

### **Historic flood information**

A previous section 19 report was carried out in 2014 from January to March, please see the link below.

<https://old.buckscc.gov.uk/media/2842878/chalfont-st-peter-flooding-report.pdf>

### **Responsible bodies -**

There are different responsibilities for flood management depending on the type of flooding. Organisations responsible for flooding are known as Risk Management Authorities (RMAs) and their responsibilities are detailed below. Riparian landowners also have responsibilities for watercourses across their land and these are also detailed below. These are summaries of the details included in the Buckinghamshire Councils Local Flood Risk Management Strategy.

### **Lead Local Flood Authority**

The Lead Local Flood Authority in this area is Buckinghamshire Council. Buckinghamshire Council has a role as a RMA in coordinating management of local flood risk from surface water, ground water and ordinary watercourses in the county.

### **Wycombe District Council**

Wycombe District Council have responsibilities to inspect and maintain watercourses on District Council land, respond to requests for assistance during flood events and have the power, if instructed by Buckinghamshire Council, to carry out flood risk management work which will benefit management of surface runoff, groundwater and ordinary water courses.

### **Environment Agency**

The Environment Agency is one of the RMAs as defined by the Flood and Water Management Act 2010. Protecting the river environment and managing flood risk is part of their job. The EA is the RMA for flooding from main rivers.

### **Highways Authority – Transport for Buckinghamshire**

Any flooding from highways is managed by the Highways Authority which is BC and the highways function is managed by TfB.

### **Water Utility Company – Thames Water**

Thames Water is responsible for flooding from foul sewers and surface water sewers which they own. Whilst undertaking this they must manage flood risk from sewers.

### **Landowners and riparian owners**

Landowners and riparian owners must maintain any culvert, or the bed and banks of any adjacent watercourse. They should clear away any debris from the watercourse or culvert even if it did not originate from their land.

Riparian owners can find further guidance on their responsibilities as landowners in the Environment Agency document 'Living on the Edge' which can be found online at [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/297423/LIT\\_7114\\_c70612.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297423/LIT_7114_c70612.pdf).

### **Residents**

Residents have a responsibility to take measures to protect themselves and their property when flooding is imminent.

### **Emergency Responsibilities**

The emergency responsibilities are outlined in Table 1 below. Please note that Parish and Town Councils do not have a legal obligation to respond to emergencies. Whatever service they provide is voluntary and unique to each Parish or Town Council.

## **Recommended actions**

At this stage, the actions listed are recommendations only and their delivery is likely to depend on the RMAs securing funding and on other commitments and priorities within each authority. Any major works requiring capital investment will be considered through the Defra funding programme. The RMAs will continue to work together to engage with the communities affected and to identify all potential options for each location reduce flood risk across the High Wycombe area.

Meanwhile, the communities need to be prepared for more similar extreme weather events in the future, such as heavy and intense downpour after a quite dry period. These kinds of event can be more common due to climate change, and their impacts can be reduced with paying attention to the weather forecast and flood warnings, and regular maintenance of the drains and watercourses.

### **Communities and residents (e.g. town/parish councils, flood forum, community group, landowners and affected residents)**

Communities & residents who are at risk of flooding from surface water to make themselves aware of their individual risk and how to protect their properties.

### **The Environment Agency and Lead Local Flood Authority**

- 1) Continue to develop options for flood management projects through the ongoing River Wye catchment Surface Water Management plan being developed and due for completion in 2020.
- 2) Work with their emergency planning team, the Environment Agency and other flood management authorities to put on a community event in order to raise awareness of flooding in High Wycombe, risks & responsibilities.
- 3) Investigate having a Property Flood Resilience (PFR) pot to part fund resilience measures for particularly vulnerable properties.
- 4) Make it clearer on Buckinghamshire Council website where sandbags are available from.

### **Transport for Buckinghamshire**

- 1) Regular highway drainage inspection and cleansing especially at the junction of Desborough Road and Westbourne Street.
- 2) Assess the capacity of their assets, identify any areas with insufficient capacity for draining runoff from the highway and, where this leads to flood risk to properties, consider improvement works – especially in the Desborough Road area of High Wycombe.
- 3) Install real-time monitoring cameras or alarm systems to alert them to any blockages/ maintenance issues.

## **Water and sewerage utility companies**

- 1) Assess sources of water entering the public sewerage system.
- 2) Assess the capacity of their assets, identify any areas of insufficient capacity and, where this could lead to flood risk to properties, consider improvement work.
- 3) Install real-time CCTV cameras or alarm systems to alert them to any blockades/maintenance issues.

## **Other utility companies**

- 1) Examine bespoke protection options where assets were shown to be at high risk of flooding, including using resistant and resilient building repairs.

## **Developers**

- 1) Work with local authorities to ensure all development is completed in accordance with approved plans and documents, and planning policy.
- 2) Take care when constructing the approved development and, in particular, prior to drainage systems being built or connected; ensure that flood risk to adjacent properties/land is not increased.

## **References**

British Standards Institute (2017) BS 85600: Post-event flood assessments — Guidance on investigating flooding incidents. London: British Standards Institute.

The Flood and Water Management Act (2010) London, TSO

## **Next steps**

Buckinghamshire Council will circulate this flood investigation to all relevant stakeholders and publish this document online at

<https://www.buckscc.gov.uk/services/environment/flooding/strategic-flood-management/flood-investigations/>

[BC to monitor the recommended actions and report to the strategic flood management meeting](#)

## **Acknowledgements**

Buckinghamshire Council would like to thank contributors for the information provided in order to produce this Section 19 Flood Investigation Report.

British Geological Survey

Thames Water

Frost Partnership

Transport for Buckinghamshire

Environment Agency

<b>Revision</b>	<b>Date</b>	<b>Details</b>	<b>Author</b>	<b>Checked and approved by</b>
1	27/11/20		RS / AH	KF
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