Section 19 Flood Investigation Report

Date: 3rd July 2025

Section 19 Flood Investigation Report: Bloxham
Date of Flood Incident: 24th November 2024

Revision Schedule

Version	Date	Details	Author	Checked	Approved
1	09.05.25	Draft Bloxham Flood Investigation Report for OCC review	J Linnane	T Luck	T Byres
2	03.06.25	Bloxham Flood Investigation Report for RMA comments	J Linnane	T Luck	T Byres
3	03.07.25	Final	J Linnane	T Luck	T Byres

Executive Summary

This Section 19 (S19) Flood Investigation Report has been issued by Oxfordshire County Council (OCC) in its capacity as Lead Local Flood Authority (LLFA). It is based upon an investigation by OCC into the Bloxham November 2024 floods.

November 2024 Flood Event

It was deemed necessary to complete a formal investigation into the flood incidents in Bloxham due to the number of properties that reported flooding internally.

Up to 35 properties were reported to have flooded internally on the 24th of November 2024. The properties were located across seven different hotspots, with a mix of fluvial and surface water flooding occurring. As such, the flooding met the OCC threshold for undertaking a formal investigation (*Internal flooding (excluding to basements) to five or more residential properties or businesses within an area of 1km^2*). The flooding resulted in properties being uninhabitable.

Flooding in Bloxham was primarily caused by intense rainfall over a short period, which led to an increase in river levels and significant surface water runoff. The high fluvial flows exceeded the capacity of key channels and structures, resulting in out of bank flooding. In addition, debris accumulation in the watercourse further reduced the channel's capacity and reportedly blocked culvert inlets. The sheer volume of surface water, combined with silted highway drainage systems, poorly maintained channels, and capacity issues at culverts, likely contributed to the property flooding.

A summary of the main cause of flooding for each of the seven hotspot locations is provided below.

1. At Tadmarton Road north, it was concluded that the sheer volume of water in the catchment area led to increase river levels and overland flow, exacerbated by the blockage of a trash screen at a culvert inlet. In addition, the excessive water volume caused the culverted Ordinary Watercourse on Tadmarton Road to surcharge through drains, contributing to the surface water flows.

2. At Tadmarton Road south, it is concluded that the intense rainfall over a short period and subsequent surface runoff led to increased levels within Bloxham Brook, resulting in out of bank flooding. This flooding was exacerbated by the lack of maintenance of channels, banks, overflow routes, and trash screens. Additionally, the high fluvial flows entered the Thames Water sewage system, suggesting the need for an investigation into the viability of sealing off this system.

3. At Little Bridge Road, the high river levels within Bloxham Brook alongside accumulation of debris placed strain on the bridge structure and relief culvert. Blockages of the structure and relief culvert are believed to have reduced

channel conveyance and led to out of bank flooding. This out of bank flooding was exacerbated by combining with surface runoff from surrounding roads.

4. At Workhouse Lane, it was concluded that intense rainfall increased the strain on the highways drainage systems. A significant flow constriction occurs where a 375mm culvert downsizes to a 150mm culvert, leading to flooding from manholes and drains upstream of this point.

5. At Steeple Close, it was concluded that high river levels within Bloxham Brook, combined with reduced channel capacity from siltation and vegetation in the channel, likely led to out of bank flooding. In addition, the Thames Water manholes at this location became overwhelmed and surcharged.

6. At Greens Garth, the intense rainfall likely overwhelmed the highways drainage systems, with silted and partially blocked drains reducing the drainage efficiency.

7. At Crab Tree Close, the intense rainfall led to increased overland flows from the topographic high point of Hobb Hill, subsequently leading to an increase in water levels within drainage ditches. Anecdotal evidence suggests that debris in the ditch led to decreased capacity of the channel, and blockage of the culvert inlet beneath Crab Tree Close, causing flooding from the ditch's right bank.

This report provides a number of recommendations aimed at better understanding flooding in the area, increasing preparedness, maintaining current systems and identifying potential solutions to mitigate future risks.

Main Recommendations

Recommendation	**Lead Stakeholders**	**Consulting stakeholders**
Review the current maintenance schedule of highways drainage assets, and look to increase the frequency of cleaning, in line with current Countywide Highways Maintenance Programme and funding availability. Outlined below are example locations where maintenance is recommended. However, this list is not exhaustive, and other areas should also be considered: • Tadmarton Road • Cumberford Hill • High Street • Greens Garth	OCC Highways	

Local residents and Parish Council to set up a flood action group and hold an annual meeting to ensure preparedness for future flood events. Through this action group and subsequent meetings, the issues and recommendations highlighted throughout the S19 report should be discussed. With support from CDC & OCC LLFA, the flood action group can work to develop emergency resilience plans.	Local residents, Parish Council	CDC
Environment Agency to use their permissive powers under the Water Resources Act 1991 to ensure riparian owners carry out required maintenance for lengths of Main River.	Environment Agency	Landowners
OCC LLFA, TW, and CDC to work collaboratively to investigate how adjustments to the culverted drainage network at Workhouse Lane, Courtington Lane and High Street could reduce overall strain on the system, while ensuring that any future works do not simply transfer the issue further downstream.	OCC LLFA, Thames Water, CDC	
Environment Agency and CDC to identify any lengths of Main River or Ordinary Watercourse where repairs and maintenance of the channel or relief channels and culverts could improve conveyance.	Environment Agency, CDC	OCC LLFA, Riparian owners
CDC and OCC to undertake walkovers of culverted Ordinary Watercourses to identify hotspots and, where necessary, conduct surveys to identify potential causes of surcharging (i.e. blockages). One potential location to survey is the culverted Ordinary Watercourse beneath Tadmarton Road.	CDC, OCC LLFA	
Thames Water to explore possible causes of limited network capacity at Steeple Close and Workhouse Lane, which may have contributed to the internal property flooding.	Thames Water	CDC
Thames Water to conduct ongoing and regular maintenance of Thames Water assets. This could involve regular checks for blockages in the system, considering repairs to any damaged structures to reduce the risk of surcharge.	Thames Water	CDC

Thames Water to investigate the route of surface water drainage on High Street, including outfall location into the Bloxham Brook where limited information is currently available. If necessary, Thames Water to survey the system and share findings with OCC LLFA and CDC.	Thames Water	OCC LLFA, CDC
Thames Water to investigate potential sealing off sewer system near Bloxham Brook, behind Greenhills Park, to limit mixing of foul water with fluvial waters.	Thames Water	Environment Agency
OCC LLFA to work with relevant stakeholders and landowners over the long term to identify any structures or assets in poor condition and to ensure maintenance of these structures. This could include ensuring all trash screens are clear, (i.e. Those on Tadmarton Road), whilst also ensuring culvert inlets and outlets are clear (i.e. Those near Crab Tree Close), ensuring maximum through flow.	OCC LLFA	Landowners CDC Environment Agency
OCC LLFA and CDC to work with landowners adjacent to Ordinary Watercourses to investigate how adjustments to existing flood mitigation measures could maximise their effectiveness, ensuring they operate at their full potential. An example of where this may be beneficial is the baffle boards already implemented near Courtington Lane, where adjustments to the current structure may increase overall effectiveness.	OCC LLFA, CDC	Landowners
OCC LLFA, CDC and the Environment Agency to work with landowners to discuss willingness for natural flood management (NFM) measures to be implemented on their land in the catchment upstream of Bloxham to slow and / or attenuate flows in the catchment upstream of Bloxham Brook and/or the Tadmarton Road watercourse. Measures may also be implemented throughout Bloxham, identifying known flow routes that have previously caused issues. An example location of this could be the pathways descending Hobb Hill towards Crab Tree Close, where attenuating flows may relieve strain on the culvert inlet.	OCC LLFA, CDC, Environment Agency	Landowners,
CDC to reintroduce frequent risk-based inspections of the trash screen at Tadmarton Road outside the School.	CDC	

Explore the willingness to implement property flood resilience measures (PFR). Guidance on PFR measures can be viewed through Ciria document (C790F) and a link to this document is provided below: https://www.ciria.org/ItemDetail?iProductCode=C790F&Category=FREEPUBS&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91 Funding in the form of grants, may be available to support the property owners in delivering PFR measures – see Section 5.1.	Property owners	OCC CDC Parish Council

CONTENTS

1. INTRODUCTION

1.1. Lead Local Flood Authority (LLFA) Investigation

Section 19 of the Flood and Water Management Act (F&WMA) states:

1) On becoming aware of a flood in its area, a LLFA must, to the extent that it considers it necessary or appropriate, investigate: -
   a. which risk management authorities have relevant flood risk management functions, and
   b. whether each of those risk management authorities has exercised, or is
   c. proposing to exercise, those functions in response to the flood.

2) Where an authority carries out an investigation under subsection (1) it must: -
   a. publish the results of its investigation, and
   b. notify any relevant risk management authorities.

The LLFA have a set criteria which determines when a S19 report is required. The criteria are set out below.

LLFA/OCC Criteria

- Internal flooding (excluding to basements) to five or more residential properties or businesses within and area of 1km².

- Internal flooding of a business premises employing more than 10 people within an area of 1km².

- Internal flooding (excluding to basements) of at least one property or business for one week or longer.

- Flooding of one or more items of critical infrastructure, which could include hospitals, health centres, clinics, surgeries, colleges, schools, day nurseries, nursing homes, emergency services (police, fire, ambulance) stations, utilities and substations.

Caused a transport link to be impassable:

- Motorways, trunk roads, Class A and B Highways closures shall all be investigated.

- Class C Highways – 10 hours or more unless the route is the only means of access or is primary route for critical infrastructure then reduce to 4 hours.

- Class U Highways – 24 hours or more unless the route is the only means of access or is primary route for critical infrastructure then reduce to 4 hours.

- All rail link closures shall be investigated.

Any flooding event that a risk management authority deems significant but does not meet the agreed thresholds should be put forward to the Agency flood group meeting for consideration.

1.2. Site Location and context

This report relates to a flood event which occurred in Bloxham, OX15 (Figure 1) in November 2024. The village of Bloxham is located within the Cherwell District of Oxfordshire, approximately 6km southwest of Banbury and 20km northwest of Bicester.

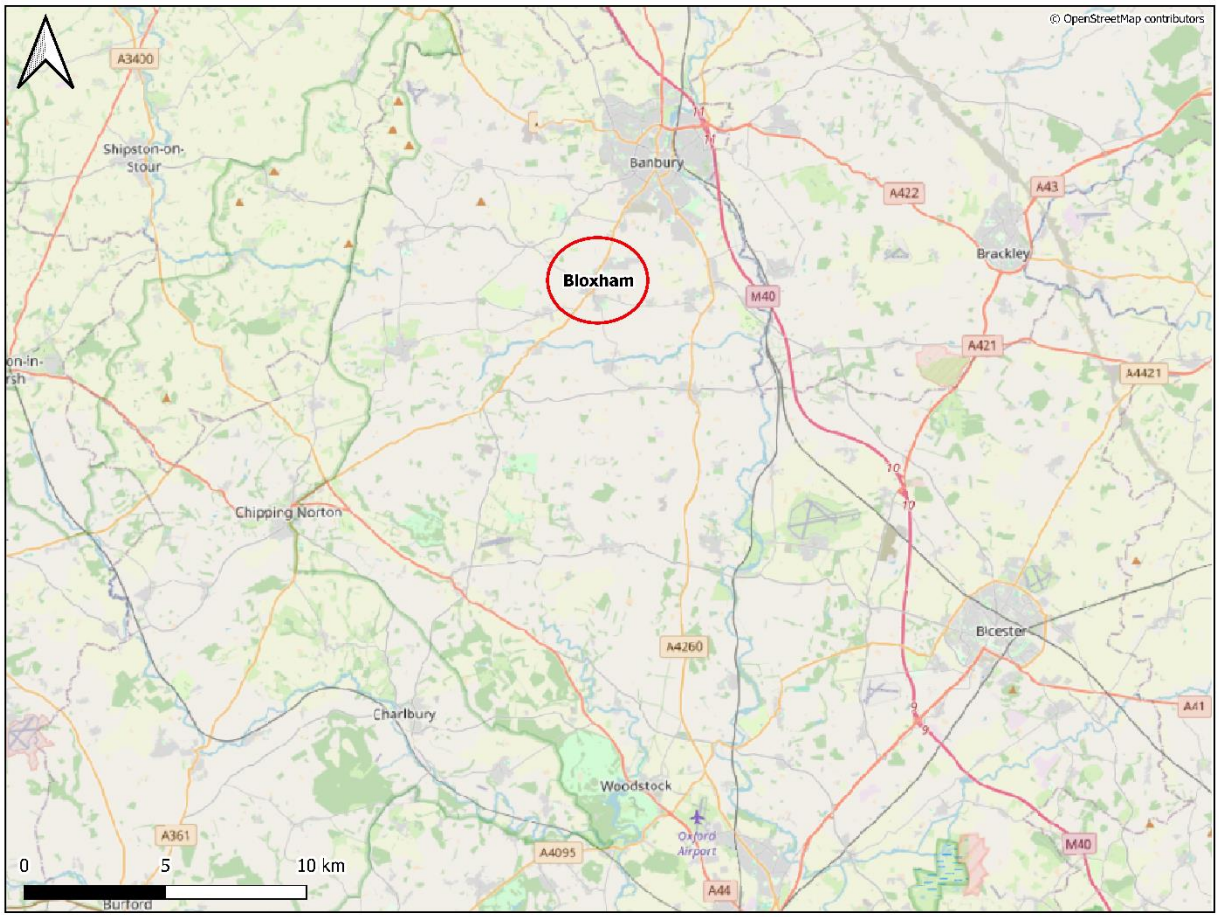

Figure 1 – Bloxham location in relation to Banbury and Bicester (©OpenStreetMap Contributor, 2025)

Bloxham is a village with varied topography, featuring undulating hills, residential areas and open fields. The elevation ranges from 105 to 125 metres above ordinance datum (m AOD), with the topographic high point located to the north of the village at Hobb Hill. The wider catchment area includes even steeper hills, with high points reaching up to 195 m AOD at the upstream extent of the catchment. Figure 2 shows a topographical map of the village and the wider catchment area, created using 2022 1m Light Detection and Ranging (LiDAR). The Bloxham Brook flows through the village from west to east, with higher ground to the north and south sloping towards the brook. The Bloxham Brook is classified as Main River downstream of Brookside Way and as an Ordinary Watercourse upstream of Brookside Way (Figure 2). There are also multiple other ditches throughout Bloxham that are unmapped but classified as Ordinary Watercourses. The Environment Agency are the lead risk management authority for Main Rivers which are typically larger rivers. In contrast, Ordinary

Watercourses are generally smaller rivers, streams, or ditches of which LLFA's are the lead risk management authority. More information on these classifications can be found in Section 4 of this report.

At the village's downstream extent, Bloxham Brook's catchment area is approximately 6.8 km², while the upstream extent's catchment area is around 4.2 km². This means there are approximately 4.2 km² of land from which water can drain before the Bloxham Brook enters the village (Figure 2). The upstream area is predominantly rural but includes one small village called Milcombe.

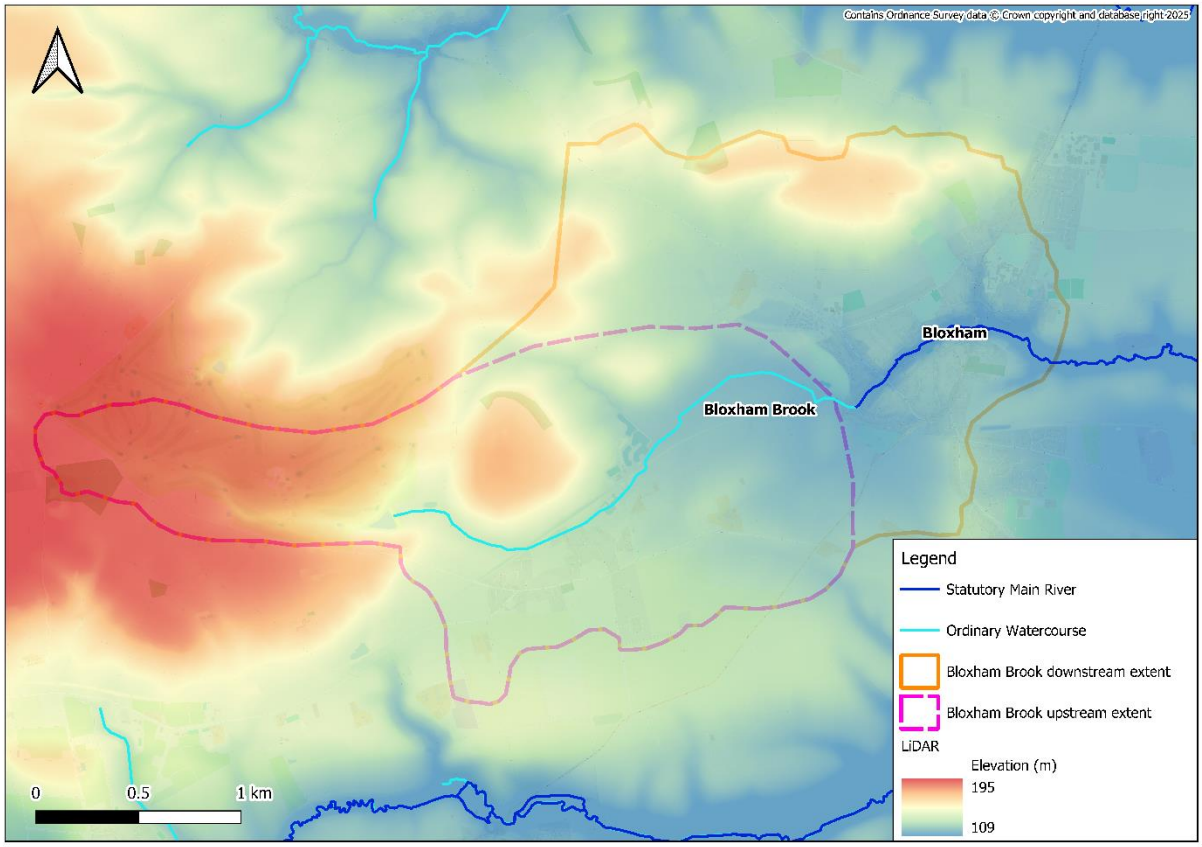

Figure 2 - Bloxham catchment boundary, upstream boundary extent (UK Centre for Ecology & Hydrology 2025) and elevations displayed by LiDAR (DEFRA 2022)

This report focuses on seven main locations throughout the village of Bloxham:

1. 'Tadmarton Road north', including the Tadmarton Road area north of the Winters Way junction.
2. Tadmarton Road south, including the areas near the Bloxham Brook, including the streets named Brookside Way, Cumberford Hill, Greenshill Park. Hereafter known as 'Tadmarton Road south'.
3. Little Bridge Road.
4. Workhouse Lane, including the areas impacted on Courtington Lane and High Street, hereafter known as 'Workhouse Lane'.
5. Steeple Close.
6. Greens Garth.
7. Crab Tree Close.

Some areas of the village are classified as having a high Risk of Flooding from Rivers and Sea (RoFRS), land classified by the Environment Agency as having a greater than 3.33% annual exceedance probability (AEP) of flooding from rivers or the sea, whilst other areas are classified as having medium (1% AEP) or low (0.1% AEP). The rest of the village is classified as having very low RoFRS (<0.1% AEP). Figure 3 shows RoFRS through the village, with the key locations highlighted. Despite having the Bloxham Brook flowing through the village, fluvial flooding is not the sole focus of flooding considered throughout this report. Figure 4 shows the Risk of Flooding from Surface Water (RoFSW) classifications defined by the Environment Agency throughout Bloxham, with some notable areas at high RoFSW visible on Tadmarton Road, High Street, Greens Garth and Crab Tree Close. These flow pathways will be explored further in Figure 5 and Figure 6.

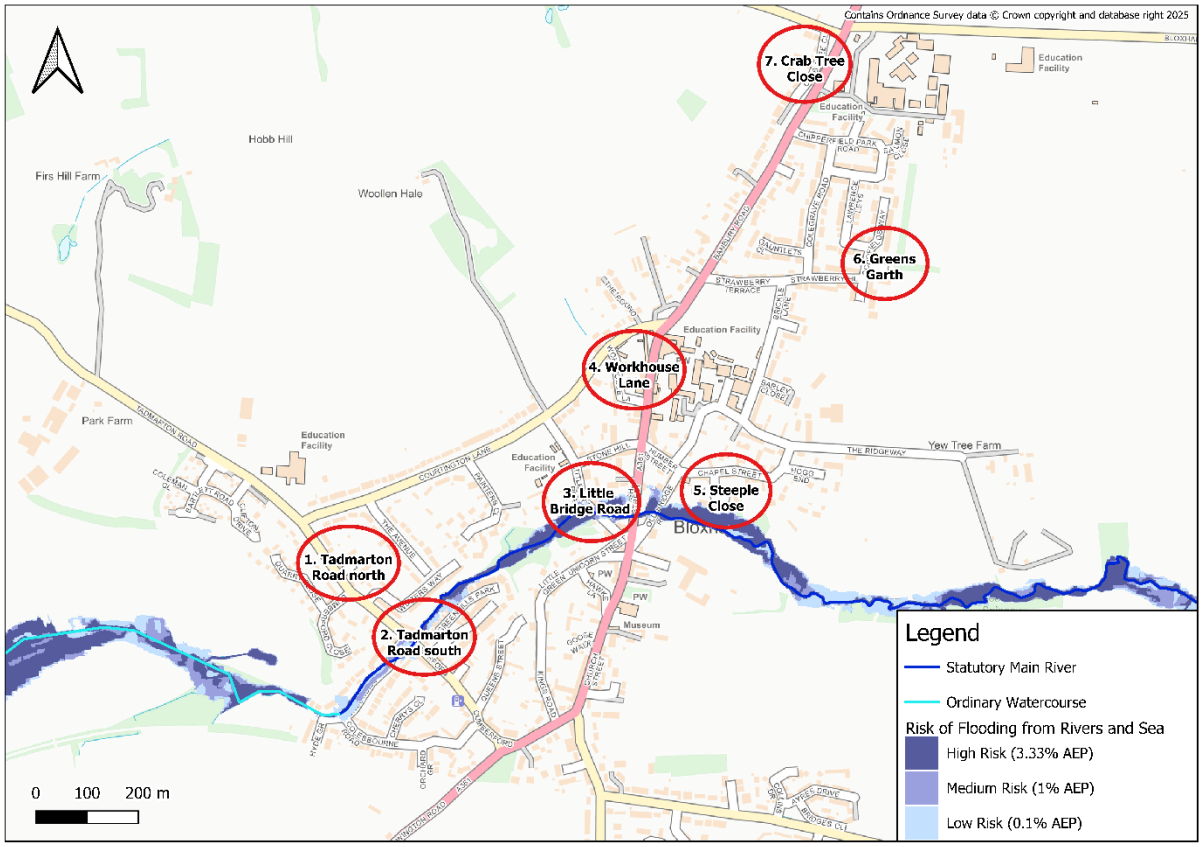

Figure 3 - Main River, Ordinary Watercourse and RoFRS through Bloxham. Data from the DEFRA Data Services Platform (2025)

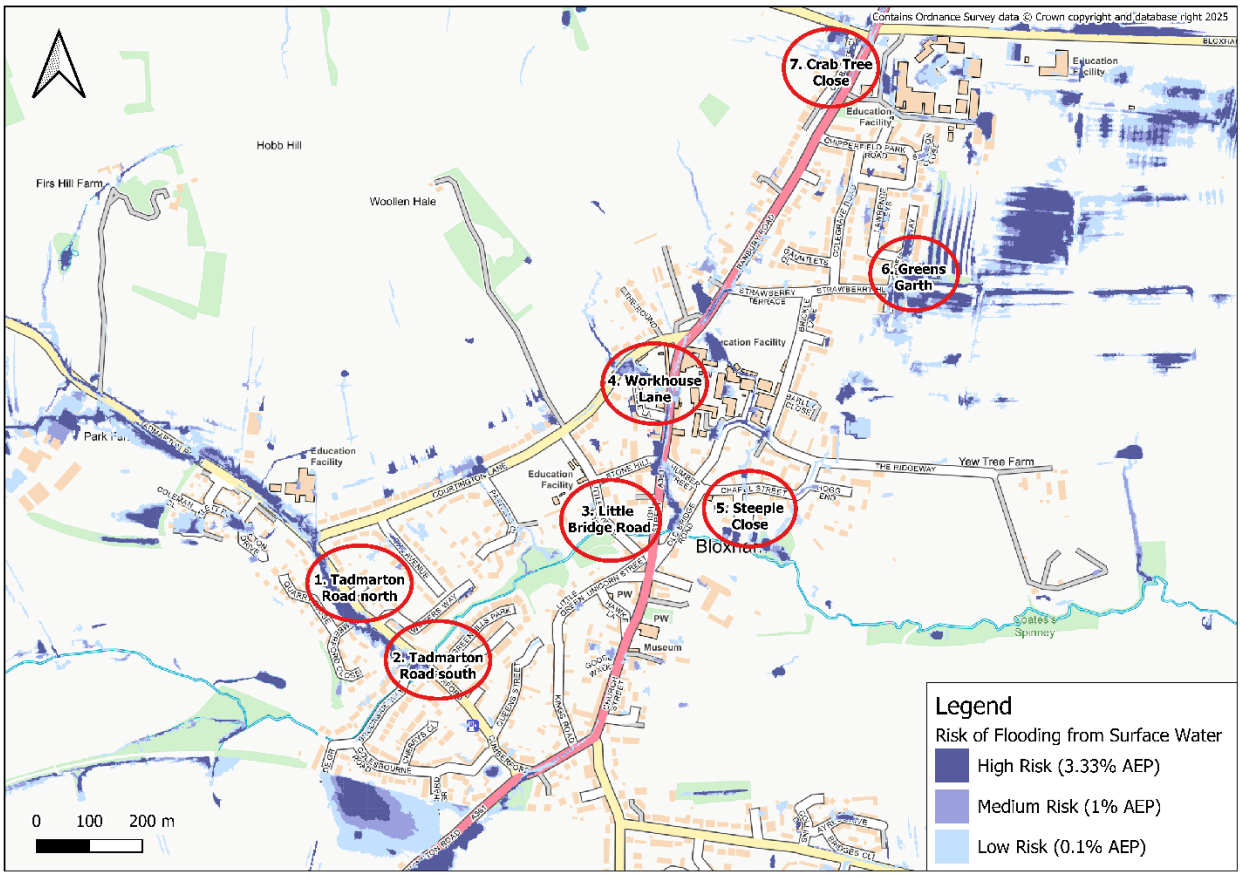

Figure 4 – Bloxham Risk of Flooding from Surface Water. Data from the DEFRA Data Services Platform (2025)

While the proximity to Bloxham Brook is somewhat responsible for the flooding detailed in this report, the flow pathways towards the brook may help explain surface water behaviour. Additionally, these pathways can identify key locations where surface water and fluvial waters interact, causing combined flooding issues. This is particularly relevant where the fluvial waters are already at capacity, leaving no further capacity for the addition of surface water runoff.

Figure 5 and Figure 6 show the locations of indicative overland flow pathways derived from LiDAR data in relation to the seven main areas focusses on in this report. Surface water flooding is difficult to forecast as exact rainfall location and volume are somewhat unpredictable and as such these maps should not be taken as an exact prediction. Many of the flow pathways visible in the below figures descend from Hobbs Hill, a topographic high point. This hill and the surrounding area are characterised by low permeability which can be attributed to its underlying geology of mudstone and underlaying loamy clayey soils. This led to surface water entering watercourses with very little being lost to infiltration.

Figure 5 shows the indicative overland flow pathways near Tadmarton Road north, Tadmarton Road south, and Little Bridge Road. Water flows from the topographic high point of Hobb Hill, visible at the northern extent of Figure 5, and follows the natural shape of the land toward the village, via an unmapped Ordinary Watercourse along Tadmarton Road. Flows are also visible running southeast along Tadmarton Road

towards the topographic low point at Bloxham Brook, and similarly southwards along Little Bridge Road and Painters Close towards Bloxham Brook.

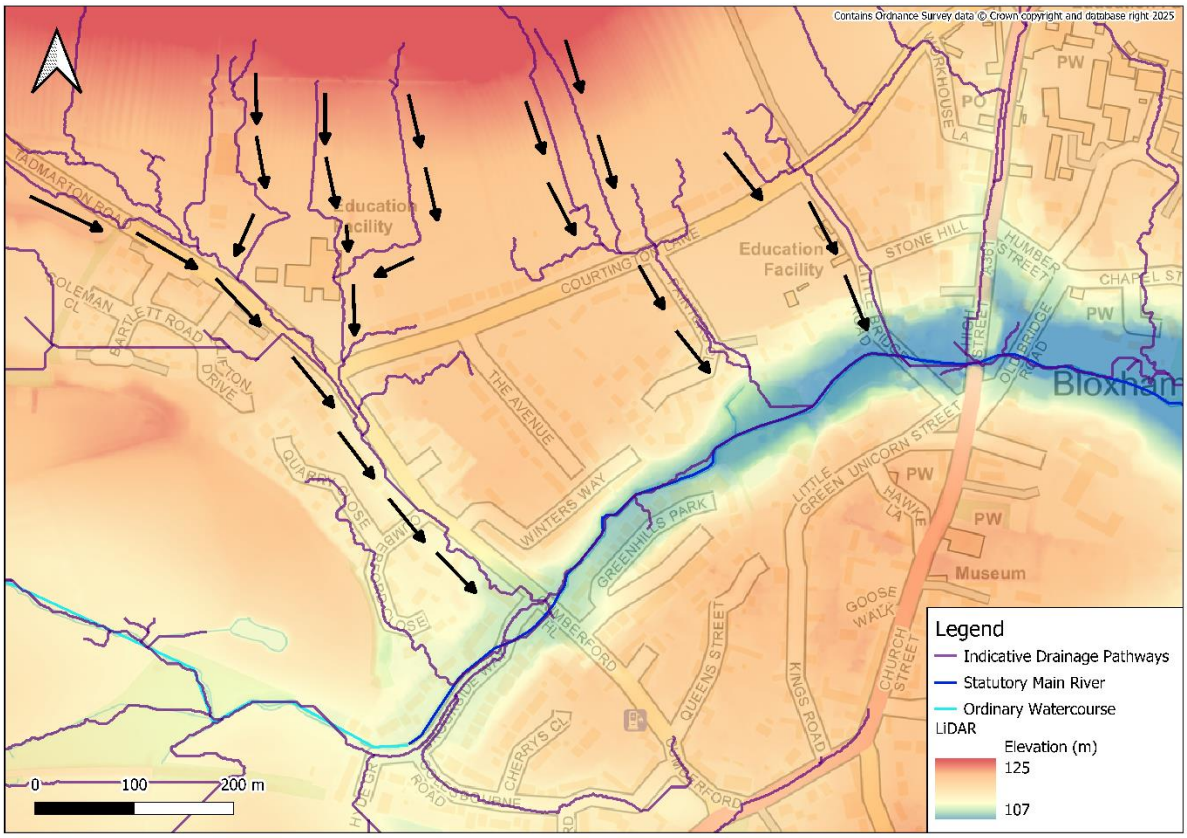

Figure 5 - Indicative overland flow pathways near Tadmarton Road north, Tadmarton Road south and Little Bridge Road. Data from DEFRA Data Services Platform (2025)

Figure 6 shows the indicative overland flow pathways near Workhouse Lane, Steeple Close, Greens Garth and Crab Tree Close. Water flows from the topographic high point of Hobb Hill south before entering an unmapped Ordinary Watercourse in the fields north of Courtington Lane. Flows then continue towards Courtington Lane and Workhouse Lane before flowing south along High Street (A361). Near Steeple Close, water flows southwards through Chapel Street and onto Steeple Close before entering the Bloxham Brook. At Greens Garth, water flows from west to east along Strawberry Hill, as well as southwards behind properties on Schofields Way. At Crab Tree Close, flow pathways follow the gradient downhill from Hobb Hill towards an unmapped Ordinary Watercourse before entering Crab Tree Close at its north easterly extent.

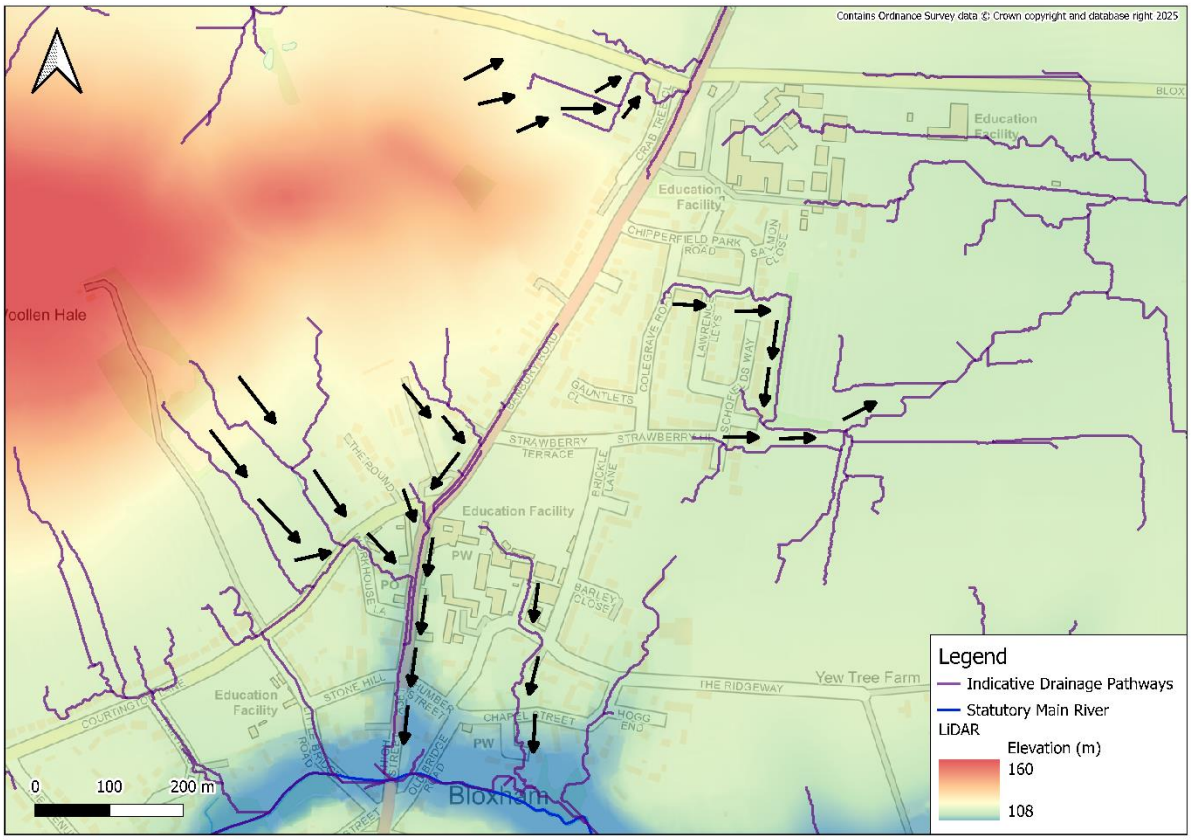

Figure 6 - Indicative overland flow pathways near Steeple Close, Workhouse Lane, Greens Garth and Crab Tree Close Data from [DEFRA Data Services Platform](#) (2025)

1.3. Previous flood events

While there are no recorded flood events on the Environment Agency's historic flood map or recorded flood outlines, according to the Cherwell Level 1 Strategic Flood Risk Assessment (SFRA)[1] the village of Bloxham previously experienced flooding in:

- July 2007 – Fluvial
- October and December 2012 – Fluvial and surface water– Properties and highways flooded, sandbags deployed, and flood boards used for standing water.

Although Bloxham specifically is only mentioned in the two years above, the River Cherwell Corridor, of which Bloxham is a part of, is also reported in the SFRA to have flooded in October 1852, December 1872, October 1875, November 1875, April 1908, May 1932, March 1974, March 1975, December 1979, September 1992, April 1998 and January 2008.

[1] Cherwell Level 1 Strategic Flood Risk Assessment Update (AECOM 2017)

2. RECENT FLOOD ISSUES AND INVESTIGATION

2.1. Summary of November 2024 Floods

The Met Office's report into Storm Bert, describes severe weather impacts across the UK on 22nd – 25th November 2024[2]. Storm Bert brought heavy rain, strong winds, and disruptive snow to large parts of the country, particularly affecting southern and western regions. Across the three-day period of 22nd-24th November, the Met Office reported that Oxfordshire received the whole monthly rainfall average or more, leading to significant flooding issues across the county. Communities across the Cherwell District were most impacted, with multiple locations within this District experiencing more than 5 properties flooding internally.

The heavy rainfall from the 22nd to the 24th of November led to increased surface water runoff in several locations across Bloxham. As this runoff flowed through the catchment, the river levels of Bloxham Brook began to rise, likely peaking on the 24th of November and causing flooding in various areas. The sheer volume of water in the catchment on the 24th of November was likely the main cause of the flood events, particularly as river levels approached or exceeded channel capacity. Additionally, discussions with residents suggested partial blockages of structures, and siltation of the channel in some areas may have contributed to flooding in some locations. Whilst some of the properties that reported flooding were situated in high RoFRS classification, it should be noted that some properties that reported flooding were located in very low RoFRS, land identified as having a low probability of flooding from rivers and sea.

Figure 7 displays approximate locations of culverts and locations of interest throughout Bloxham, with a label referencing the relevant number related to the below sections. It is important to note that as culvert lengths were previously unmapped and as such the extents displayed in Figure 7 are an approximation.

[2] Storm Bert, 22 to 25 November 2024 (Met Office, 2024)

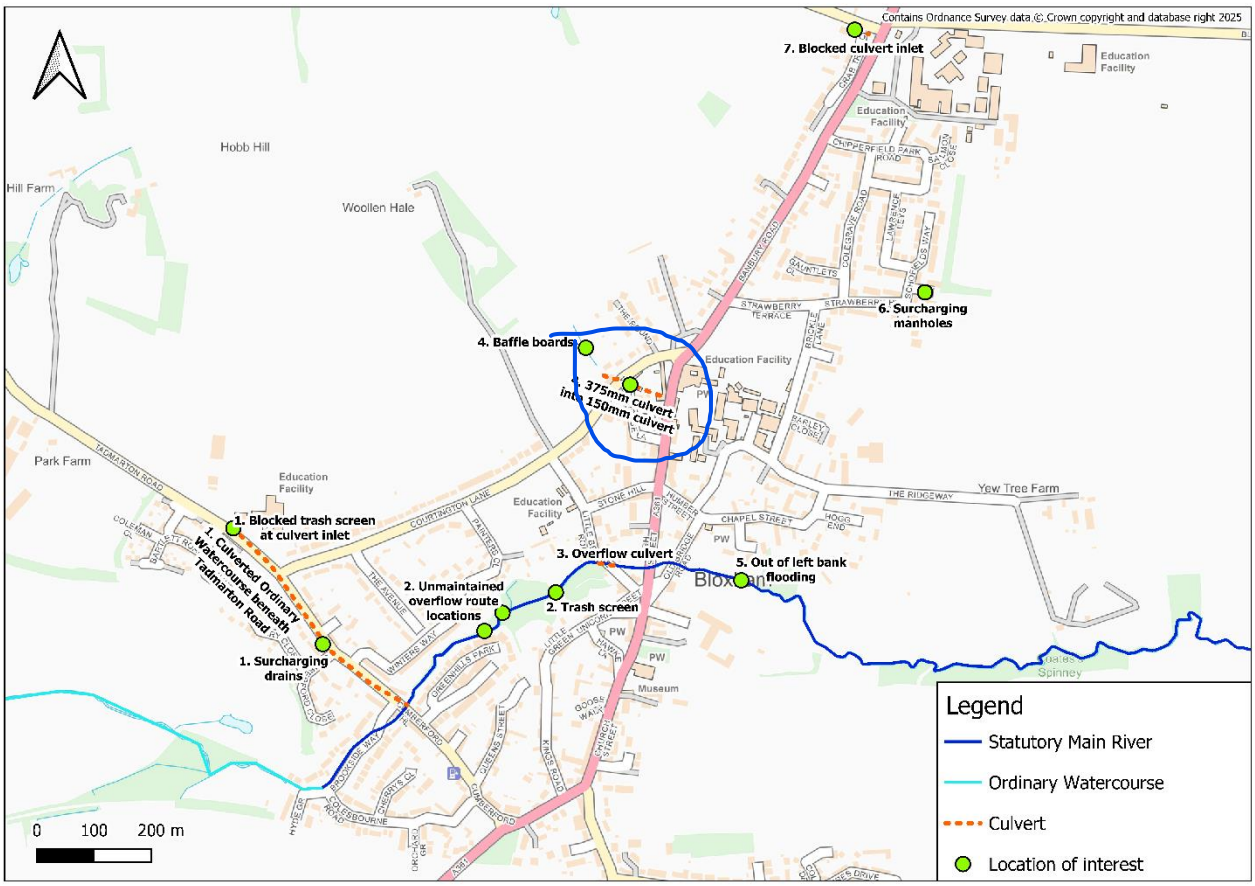

Figure 7 - Map displaying approximate locations of previously unmapped culverts and locations of interest (Source: Site visit Jan 2025)

2.1.1. Location 1: Tadmarton Road north

On Tadmarton Road, near the junction with Cumberford Close, several properties reported internal flooding up to 80cm deep. Anecdotal evidence points to multiple causes for this flooding. Heavy rainfall reportedly overwhelmed poorly maintained highways drainage systems containing silt. Additionally, a blocked trash screen near a culvert inlet on an unnamed Ordinary Watercourse by Bloxham Church of England Primary School caused water to breach the right bank. The flow from the watercourse then travelled south along Tadmarton Road, further overwhelming the existing highways drainage systems. This issue was particularly evident near the Cumberford Close junction, where water surcharged through highways drains and manholes along the culverted Ordinary Watercourse, affecting multiple properties both internally and externally.

2.1.2. Location 2: Tadmarton Road south

Up to 10 properties in the defined Tadmarton Road south area reportedly experienced internal flooding of up to 80cm deep. Flooding in this area is reported to be a continuation of the mechanisms described in Section 2.1.1. Heavy rainfall, overland flow from the blocked culvert inlet further north on Tadmarton Road, and silted drains contributed to increased overland flow. This overland flow overwhelmed highways drainage systems, causing surcharging manholes, which further added to the volume of surface water. Tadmarton Road south's proximity to Bloxham Brook, a topographic low point, means all overland flows drain towards this

location. Additionally, Bloxham Brook reportedly overtopped both banks at this location, causing combined surface water and fluvial flooding at some locations, while others solely experienced fluvial flooding. While distinguishing between fluvial and surface water flooding is challenging, the interactions between both likely caused internal flooding at several properties at this location.

2.1.3. Location 3: Little Bridge Road

On Little Bridge Road, up to 3 properties, both commercial and residential, reported internal flooding up to 150cm deep. This flooding occurred as high river levels within Bloxham Brook reportedly coincided with a blockage at the bridge over the Bloxham Brook. Water began to accumulate against this small bridge due to limited capacity, eventually backing up and overflowing on both sides of the channel, leading to flooding. Additionally, the overflow culvert in this location was reportedly blocked with silt and debris, preventing water from flowing through this alternate route and placing additional pressure on the bridge. The shape of the land in this location also led to surface water flowing down Little Bridge Road towards the topographic low point of the Bloxham Brook, causing combined surface water and fluvial flooding.

2.1.4. Location 4: Workhouse Lane

In the area defined as Workhouse Lane, up to 12 properties experienced internal flooding, with water depths reaching up to 45cm. These properties included both commercial and residential buildings. The flooding resulted in some properties becoming uninhabitable, forcing residents into temporary accommodation.

Anecdotal evidence and reports indicate that intense rainfall caused overland flow from the topographic high point of Hobb Hill, known for its low permeability. The water is believed to have flowed southwards towards Courtington Lane, eventually entering the highways drainage systems on Courtington Lane. This highways drainage system runs eastwards along Courtington Lane, crosses Workhouse Lane, and discharges into a highways gulley on High Street. Reports suggest that the highways drainage systems in this area were silted, preventing efficient drainage. Additionally, the Highways drainage system on Workhouse Lane became overwhelmed, leading to surcharging manholes. While there were reports of a culvert blockage in this location, survey undertaken in January 2025 indicated that this was not the issue, and the flooding likely occurred due to the reduction in capacity from a 375mm culvert to a 150mm culvert. More details on the survey, culverts and conclusions at Workhouse Lane can be found in Sections 2.3.4 and 3.4.

The above mechanisms also had a knock-on effect on High Street, with surface water flowing from Workhouse Lane and Courtington Lane onto High Street. Anecdotal evidence shows water flowing south along High Street towards the topographic low point of Bloxham Brook. This situation was exacerbated by blockage of highways and Thames Water drains on High Street, preventing surface water from entering the drainage systems as intended.

2.1.5. Location 5: Steeple Close

One property on Steeple Close reported internal flooding of up to 5cm deep. Flooding in this location is reported to have been caused by the Bloxham Brook overtopping its

left bank, with reports suggesting the Bloxham Brook at this location was heavily silted and contained debris, reducing channel capacity. Surface water flooding via surcharging Thames Water manholes was also reported, further adding to the volume of flood waters at Steeple Close.

2.1.6. Location 6: Greens Garth

One property on Greens Garth reported internal flooding up to 40cm deep. Flooding in this location reportedly occurred due to intense rainfall overwhelming the highways drainage systems, compounded by partially blocked drains filled with silt and debris, which prevented surface water from draining effectively. Consequently, surface water accumulated on the road, leading to internal flooding of the property.

2.1.7. Location 7: Crab Tree Close

Up to two properties on Crab Tree Close experienced internal flooding, with water depths reaching up to 10cm deep. Anecdotal evidence suggests the flooding was primarily caused by intense rainfall overwhelming the capacity of the ditch near the Ell's Lane and Crab Tree Close junction. Additionally, reports indicate that the ditch and the culvert inlet under Crab Tree Close were blocked with debris, causing water to overtop the ditch's right bank and resulting in internal flooding.

2.2. Rainfall and River data analysis

As mentioned in Section 2.1, across the three day period of 22nd-24th November, the Met Office reported that Oxfordshire received their monthly rainfall average or more (Figure 8). Many parts of the county received particularly heavy rainfall on these dates, with the UK recording its wettest calendar day on 23rd November– as an average across the whole country – since 3rd October 2020.

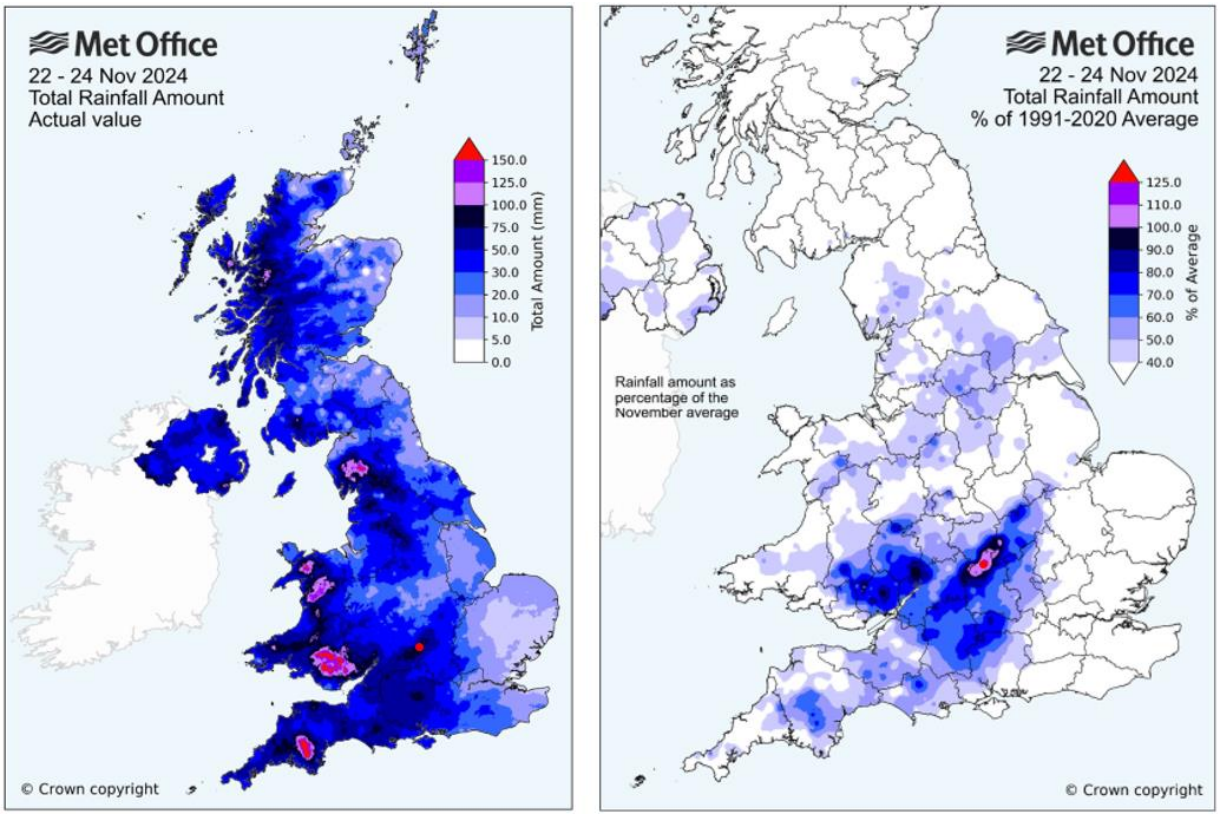

Figure 8 – 22nd-24th November total rainfall amount (left) and % of 1991-2020 November average (right). Red dot = Bloxham approx. location (Met Office, 2024).

To explore rainfall in Bloxham, data has been obtained from the Department for Environment Food & Rural Affairs' Hydrology Data Explorer[3]. At the Grimsbury rain gauge, the nearest to Bloxham (7km to the northeast) approximately 68mm of rain fell across November 23rd-24th, with a 15-minute maximum of 5mm falling at 1pm on the November 24th (Figure 8, Figure 9). The daily rainfall total of 47mm on the 24th of November is the ninth highest since records began at Grimsbury gauge in December 1989. It is worth noting that this data has been checked by DEFRA confirming its accuracy and reliability.

[3] Hydrology Data Explorer, 2025. Department for Environment Food & Rural Affairs.

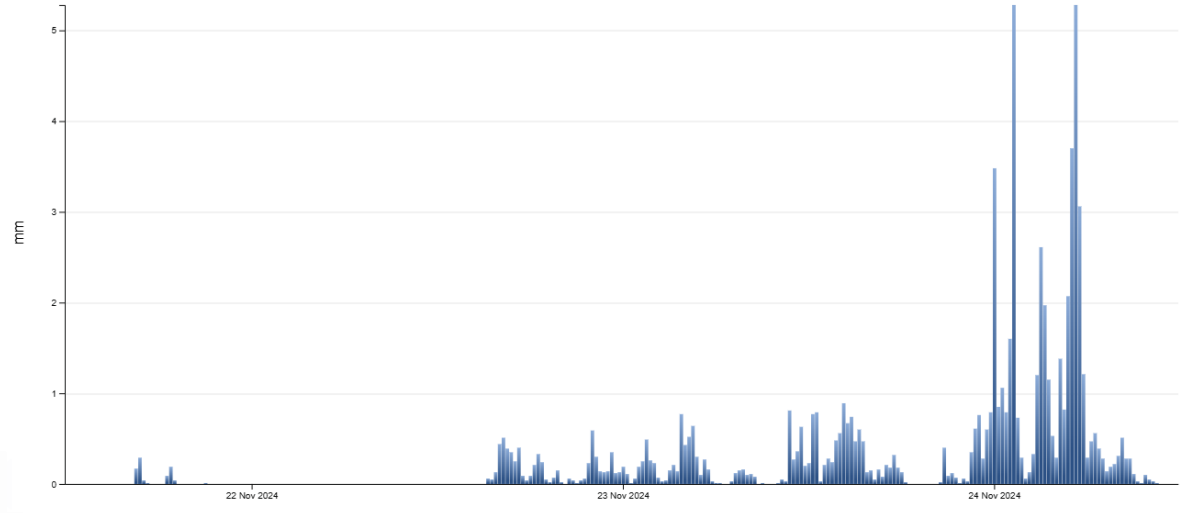

Figure 9 – Checked total recorded rainfall at Chipping Norton Gauge 22nd – 24th November in 15 min intervals (DEFRA 2025 [Accessed: 06/05/2025]).

The river levels recorded at the Bloxham Brook river level gauge show the effects of the prolonged rainfall event (Figure 10). Prior to the rainfall event, river levels in the Bloxham Brook recorded around 0.6m before steadily increasing on the morning of the 23rd of November, drastically peaking in the afternoon of the 24th at a 2.2m. It is worth noting that this data has been checked by DEFRA confirming its accuracy and reliability.

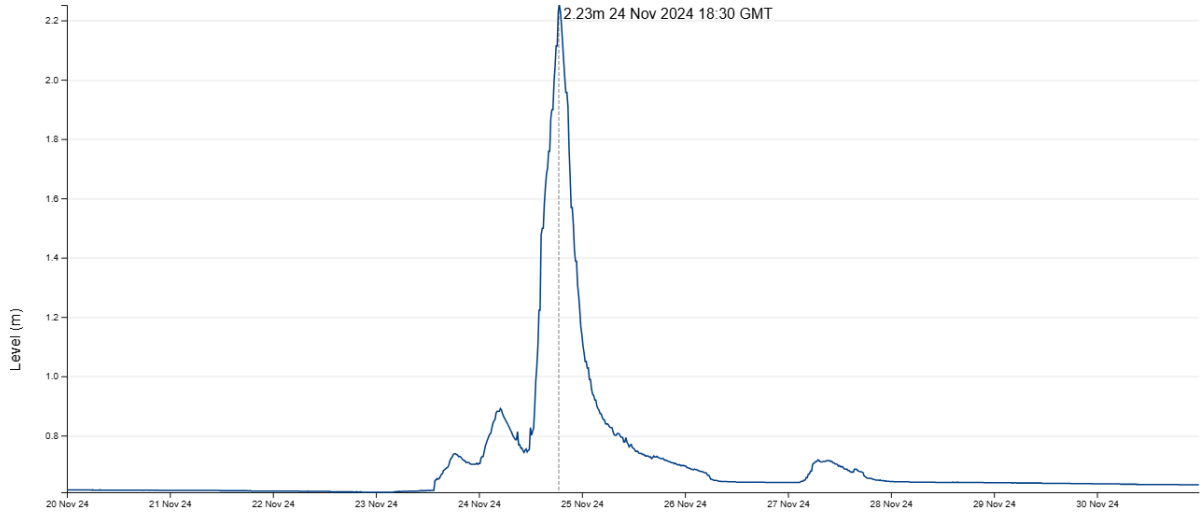

Figure 10 – Checked river levels in the Bloxham Brook prior to, during and flooding the flood event – maximum level peaking a 2.2m (DEFRA 2025) [Accessed: 06/05/2025]).

The data presented here supports the suggestion that county-wide intense rainfall on the 23rd and 24th of November was the primary cause of flooding in Bloxham. The heavy rainfall likely followed the indicative drainage pathways shown in Figures 5, and 6 making its way to Bloxham Brook, which had already collected rainfall from its upstream catchment. Consequently, Bloxham Brook experienced an increase in river flow and level due to the rainfall, likely raising the risk of out of bank fluvial flooding. The low points of Bloxham throughout the village are key locations where fluvial and surface waters can interact, further exacerbating the flooding risk.

2.3. Site Visit and Observations

A site visit was conducted on the 22nd of January with representatives from CDC, during which the team visited multiple locations throughout the village. The observations and discussions on site informed the investigations of the November 2024 floods and the recommendations detailed in this report.

2.3.1. Location 1: Tadmarton Road north

On Tadmarton Road, the site team observed a steep gradient heading north. They walked up this slope and stopped outside Bloxham Church of England Primary School, where an unnamed Ordinary Watercourse enters a culvert via a trash screen on the northern side of the road. Anecdotal reports indicated that during the November flood event, this trash screen became blocked, restricting the volume of water entering the culvert and causing water to overtop the right bank and flow southwards along Tadmarton Road. Figure 11 shows the trash screen during the site visit, with visible debris accumulation on and around it. The culverted Ordinary Watercourse then runs south along Tadmarton Road.

Figure 11 - Trash screen at culvert inlet near Bloxham Church of England Primary School (Source: Site visit Jan 2025)

The team then walked south along Tadmarton Road, noting various sandbags and flood warning signs along the way. Further south, near the Cumberford Close

junction, they observed the drain where the culverted Ordinary Watercourse reportedly surged out. A slight slope from the road towards Cumberford Close and nearby properties was also noted, indicating that any floodwaters would likely follow this gradient towards the properties. A flood mark approximately 1 m high, was visible on some properties in the area, with reports indicating that external flooding had previously occurred here before November 2024.

2.3.2. Location 2: Tadmarton Road south

At the southern end of Tadmarton Road, the team observed the topographic low point at Bloxham Brook, situated between Tadmarton Road and Cumberford Hill, where surface water flows would likely pool. The team walked along a public footpath opposite Brookside Way, following Bloxham Brook towards Little Bridge Road. In this area, the team noted the lower-lying properties on the right bank, located in Greenshill Park. Approximately 200m from the footpath entrance, an overflow route was visible. This overflow route on the left bank provides a secondary flow path but was observed to be heavily vegetated and poorly maintained (Figure 12). A second overflow route, located 50 m downstream, was in better condition (Figure 13).

Figure 12 - Poorly maintained overflow route on Bloxham Brook left bank (Source: Site visit Jan 2025)

Figure 13 - Second overflow route approximately 50m downstream of Figure 12 (Source: Site visit Jan 2025)

Between the locations shown in Figure 12 and Figure 13, a Thames Water foul sewer runs parallel to Bloxham Brook. While reports from the November 2024 flood events do not mention foul flooding in this location, historic reports indicate flood water has previously entered the foul sewer, which has resulted in surcharges of mixed foul and surface water. On-site discussions regarding the maintenance of the relief channels in Figure 12 and Figure 13 suggest that improving these channels would help reduce the strain on the Thames Water sewage system.

Approximately 100m downstream of Figure 13, a small footbridge is located over the Bloxham Brook. The site team noted an informal trash screen located just upstream of the bridge, visible in Figure 14. While the screen was in fair condition, regular maintenance to remove debris would maximise water conveyance during high flows. Additionally, the bottom rung of spikes appeared weak and could potentially be damaged during a high flow event.

Figure 14 - Trash screen upstream of the footbridge (Source: Site visit Jan 2025)

All the features described above, if maintained, aim to enhance the channel's conveyance through the area, ensuring water flows away efficiently and reducing the risk of out of bank flooding.

2.3.3. Location 3: Little Bridge Road

At Little Bridge Road, the site team observed Bloxham Brook flowing under a small bridge. While the upstream side of the bridge was well maintained, the relief culvert on the right bank was partially blocked with silt and debris. The outlet of this culvert, visible on the downstream side of the bridge, was also heavily silted, reducing the capacity of both the channel and the culvert (Figure 15). Additionally, the team noted the gradient of the road on either side of the bridge, with steep slopes leading towards the topographic low point of Bloxham Brook.

Figure 15 - Relief culvert outlet (Source: Site visit Jan 2025)

2.3.4. Location 4: Workhouse Lane

The site team walked along Courtington Lane, noting the steep gradient across the school playing fields up to the topographic high point of Hobb Hill. At the eastern edge of the fields, the team observed an Ordinary Watercourse, which is believed to channel runoff from Hobb Hill into the highways drainage system. In the open channel section of this Ordinary Watercourse, the team saw some wooden baffle boards intended to attenuate flow (Figure 16). While these baffles would impact conveyance, they were observed to be low. Investigating the effectiveness and possible improvements to these baffles could help maximise flow attenuation in the future. This watercourse is then culverted at the southeastern extent of the field, with the inlet and a trash screen visible. The trash screen was observed to contain some debris (Figure 17).

Figure 16 - Wooden baffle boards in Ordinary Watercourse (Source: Site visit Jan 2025)

Figure 17 - Culvert inlet and trash screen in Ordinary Watercourse (Source: Site visit Jan 2025)

The culverted watercourse visible in Figure 17 then joins the highways drainage network along Courtington Lane. The site team observed the outfall of this culvert through an open drain on Courtington Lane. Discussions were had around the culvert survey, which showed that the culvert continues towards Workhouse Lane with an inlet width of 375mm. At the corner of Workhouse Lane, this 375mm box culvert feeds into a 150mm culvert, which then runs eastwards under properties before feeding into a 225mm culvert owned by Thames Water on High Street. As mentioned in Section 2.1.4 a culvert survey was undertaken in January 2025 in this location to investigate concerns regarding capacity. Although the culvert survey showed no signs of a blockage, the reduction in capacity from a 375mm culvert to a 150mm culvert is likely the cause of flooding in the Workhouse Lane area during the November flood event. While the initial thought might be to increase the size of the 150mm culvert to improve capacity, the outfall of this 150mm culvert being 225mm means measures must be taken to ensure the flooding issue is not simply transferred downstream. It also means any benefit of upsizing the 150mm culvert is likely to be limited, as a flow constriction will still occur downstream at the 225mm culvert. At the downstream extent on High Street, the route of the surface water drainage into Bloxham Brook is not fully known. Therefore, an investigation into the surface water drainage along High Street by both Thames Water and the OCC highways is recommended.

2.3.5. Location 5: Steeple Close

The site team did not visit Steeple Close, instead a virtual analysis was conducted. Anecdotal evidence suggests that siltation in the channel likely led to out of left bank flooding, whilst the sheer volume of water overwhelmed Thames Water systems causing surcharging manholes.

2.3.6. Location 6: Greens Garth

The site team did not visit Greens Garth instead a virtual analysis was conducted. LiDAR data shows a downward slope running from west to east along Strawberry Hill towards Greens Garth, likely encouraging the flow of water towards this low point. Multiple drains and manholes are also visible along Greens Garth, likely the location of the surcharging waters.

2.3.7. Location 7: Crab Tree Close

The site team did not visit Crab Tree Close, instead a virtual analysis was conducted. LiDAR data around Crab Tree Close indicates a sharp gradient sloping from the topographic high point of Hobb Hill towards Crab Tree Close. The virtual analysis also revealed a small ditch running from west to east, parallel to Ell's Lane, which is culverted under Crab Tree Close. Google Maps imagery shows this area to be heavily vegetated, consistent with residential reports of vegetation and debris in the channel during the November flooding event. The condition of the ditch parallel to Ell's Lane and the culvert inlet under Crab Tree Close is not visible from the virtual analysis and should be inspected in the future to determine if channel and culvert maintenance is necessary.

3. CONCLUSIONS

This investigation has reviewed the flooding that occurred primarily on the 24th of November 2024, focusing on properties at seven locations across Bloxham. Some of the properties that reported flooding are situated within a high RoFRS classification, which is land classified as having a greater than 3.33% AEP of flooding from rivers and sea. Whilst other properties are located within a medium (1% AEP) or low (0.1%AEP) RoFRS classification. It should be noted that some properties that reported flooding were located in a very low (<0.1% AEP) RoFRS. Anecdotal evidence suggests surface water flow paths, fluvial blockages and surcharging drainage systems may have contributed to the flooding experienced in Bloxham.

Flooding in Bloxham was primarily caused by intense rainfall over a short period, which led to an increase in river levels and significant surface water runoff. The high fluvial flows exerted pressure on key structures, resulting in the out of bank flooding due to insufficient capacity. Additionally, debris accumulation in the fluvial waters further reduced the channel's capacity and reportedly blocked culvert inlets. The sheer volume of surface water, combined with silted highways drainage systems, poorly maintained channels, and capacity issues at culverts, likely led to flooding.

3.1. Location 1: Tadmarton Road north

At Tadmarton Road north, it was concluded that the sheer volume water in the catchment area led to increase river levels and overland flow, exacerbated by the blockage of a trash screen at an Ordinary Watercourse culvert inlet. This blockage caused surface water runoff to flow southwards along Tadmarton Road. Additionally, the excessive water volume caused the culverted Ordinary Watercourse on Tadmarton Road to surcharge through drains, contributing to the surface water flows. Despite limited understanding of the culverted Ordinary Watercourse, the fact that flooding has previously occurred at this location indicates a need for an investigation

into potential solutions to reduce the likelihood of surcharging in the future.

3.2. Location 2: Tadmarton Road south

At Tadmarton Road south, it is concluded that the volume of water catchment led to increased levels within Bloxham Brook, resulting in out of bank flooding. This flooding was exacerbated by the lack of maintenance of channels, banks, overflow routes, and trash screens. Additionally, the high fluvial flows entered the Thames Water sewage system, suggesting the need for an investigation into the viability of sealing off this system. However, it is believed that a functioning relief channel would also reduce the strain on the sewage system. It is likely that by addressing these issues, channel conveyance would improve, allowing water to drain away more effectively from this location.

3.3. Location 3: Little Bridge Road

At Little Bridge Road, the high river levels within the Bloxham Brook alongside accumulation of debris placed strain on the bridge structure and relief culvert. Partial blockages of the structure and relief culvert are believed to have reduced channel conveyance and led to out of bank flooding. This out of bank flooding was exacerbated by combining with surface runoff from surrounding roads.

3.4. Location 4: Workhouse Lane

At Workhouse Lane, it was concluded that intense rainfall caused increasing strain on the highways drainage systems, with capacity issues occurring at the point where a 375mm culvert enters a 150mm culvert leading to flooding. Upsizing this culvert inlet would only shift issues downstream, as the culvert inlet on High Street is 225mm. Therefore, investigations into the entire OCC highways system, along with the interactions with the Thames Water systems on High Street, are needed to work towards reducing flood risk.

Additionally, an investigation into the feasibility of adjusting the already implemented baffle boards in the fields north of Courtington Lane could reduce flood risk in the future by attenuating more flow. However, the impact of attenuation on the surrounding area would need to be considered.

3.5. Location 5: Steeple Close

At Steeple Close, it was concluded that high river levels within Bloxham Brook, combined with siltation and vegetation in the channel, likely led to out of bank flooding. Additionally, the Thames Water manholes at this location became overwhelmed and surcharged. Given the limited information on this surcharging, investigating the Thames Water manholes at this location would be beneficial for increasing understanding.

3.6. Location 6: Greens Garth

At Greens Garth, the intense rainfall likely overwhelmed the highways drainage systems, with silted and partially blocked drains reducing the drainage efficiency. Regular maintenance of these drainage systems would likely improve water conveyance in this area.

3.7. Location 7: Crab Tree Close

At Crab Tree Close, the increase in rainfall led to increased overland flows from the topographic high point of Hobb Hill, subsequently leading to an increase in watercourse levels within drainage ditches. Anecdotal evidence suggests that debris in the ditch led to decreased capacity and blockage of the culvert inlet beneath Crab Tree Close, causing flooding from the ditch's right bank. Regular maintenance of the channel and culvert inlet to remove any debris would likely improve watercourse conveyance in this area.

3.8. Overall

Overall, the sheer volume of water led to a decrease in channel capacity, exacerbated by vegetated and silted channels, drainage systems, and partial blockages of drains and structures. Overwhelmed drainage and sewage systems may have also contributed to flooding in various locations.

For all the locations mentioned above, ensuring that watercourses and drainage systems function freely to carry water away from the village and limit the stress on channel and drainage capacity. Regular maintenance of channels, structures, and drains, along with ensuring the existing drainage infrastructure is functioning effectively, would likely reduce the risk of flooding. Additionally, implementing measures to slow or attenuate flow either upstream or throughout the village would likely reduce the overall strain on the systems at any given time, thereby reducing the overall stress on the system.

4. RIGHTS AND RESPONSIBILITIES

4.1. Communities and Residents

Communities may consist of the Town or Parish Council, Flood Forum, Community Group and affected residents, amongst others.

Communities and residents who are aware that they are at risk of flooding should take action to ensure that they and their properties are protected.

Community resilience is important in providing information and support to each other if flooding is anticipated. Actions taken can include subscribing to MET Office email alerts for weather warnings, implementing a Flood Warden Scheme, producing a community flood plan, implementing property level protection and moving valuable items to higher ground. Finally, individual households can create their own personal flood plans, such as collating important documents for quick removal from the property, torches, waterproof clothing etc.

OCC has produced a number of flood guides covering various subjects, some of which relate to this type of flood incident. The relevant guides have been identified and are available at: www.oxfordshirefloodtoolkit.com

4.2. Lead Local Flood Authority (LLFA)

As stated within the introduction section, OCC as the LLFA has a responsibility to investigate flood incidents under Section 19 of the F&WMA.

The LLFA also has a responsibility to maintain a register of assets which have a significant effect on flooding from surface runoff, groundwater or ordinary watercourses (non-Main River) as detailed within Section 21 of the F&WMA. The register must contain a record about each structure or feature, including the ownership and state of repair. OCC is also required to keep a record of flooding hotspots across the county.

OCC's practices relating to third party assets is to notify third party owners of their asset forming part of a flood risk system and assist by advising those third party owners on the condition of their assets and their maintenance responsibilities.

As LLFA, OCC will be looking for support from other risk management authorities, communities and individual homeowners to ensure flood incidents are reported, and any assets which have a significant effect on flood risk are recorded on the asset register.

While OCC can suggest possible causes of flooding and make recommendations to ensure flood risk is mitigated as far as possible, the F&WMA does not provide OCC with the mandate or funding to act on identified causes of flooding or force risk management authorities to undertake any recommended actions.

4.3. Highways Authority (Oxfordshire Highways)

Oxfordshire Highways have a duty to maintain the Highways under Section 41 of the Highways Act 1980 but subject to the special defence in Section 58.

New Highways drainage systems are designed to Highways England's Design Manual for Roads and Bridges (Volume 4, Section 2). They are only required to be constructed to drain surface water runoff from within the Highways catchment rather than from the wider catchment.

There are historic drainage systems in historic Highways which can become the responsibility of the Highways Authority due to dedication, as opposed to adoption. These drainage systems may not have been designed to any standard.

Oxfordshire Highways undertake regular Highways drainage cleansing. Identify and develop a detailed plan of their assets.

If flooding occurs OCC will assess the capacity of the Highways assets and identify any areas with insufficient capacity for draining runoff from the Highways. Where this leads to flood risk to properties improvement works should be considered.

Oxfordshire Highways should assess the suitability of third party drainage systems accepting discharge from Highways Drainage systems and report any unsatisfactory areas to the relevant Risk Management Authorities.

4.4. Water Authority - Thames Water Utilities (TW)

Water and sewerage companies are responsible for managing the risks of flooding from surface water, foul water or combined sewer systems. Public sewers are designed to protect properties from the risk of flooding in normal wet weather conditions. However, in extreme weather conditions there is a risk that sewer systems can become overwhelmed and result in sewer flooding.

Sewerage undertakers have a duty, under Section 94 of the Water Industry Act 1991, to provide sewers for the drainage of buildings and associated paved areas within property boundaries. Since the 1st October 2011 the majority of private sewers and lateral drains in England and Wales were transferred into public ownership, meaning they are now the responsibility of the relevant sewerage undertaker.

A public sewer is a conduit, normally a pipe that is vested in a Water and Sewerage Company or predecessor, that drains two or more properties and conveys foul, surface water or combined sewage from one point to another, and discharges via a positive outfall.

There is no automatic right of connection for other sources of drainage to the public sewer network. Connection is therefore discretionary following an application to connect.

4.5. Cherwell District Council

District Councils have powers under Section 14 of the Land Drainage Act 1991 (LDA) to undertake flood risk management works on ordinary watercourses (non-Main River) where deemed necessary.

Under Section 20 of the LDA, District Councils have the powers to (by agreement of any person and at that person's expense) carry out any drainage work which that person is entitled to carry out. Agreement may not be required in certain emergency or legally upheld situations.

Cherwell District Council also has delegated authority from OCC/LLFA to serve notice on persons requiring them to carry out necessary works to maintain the flow of ordinary watercourses under Section 25 of the LDA and receives funding from the LLFA to do this.

The District Council is the Planning Authority and has a role in Building Control and the Building Regulations.

4.6. Environment Agency (EA)

The EA is responsible for taking a strategic overview of the management of all sources of flooding and coastal erosion. This includes setting the direction for managing the risks through national and strategic plans; providing evidence and advice to inform Government policy and support others; working collaboratively to support the development of risk management skills and capacity; and providing a framework to support local delivery.

The EA also has operational responsibility for managing the risk of flooding from main rivers. Main rivers are usually larger river and streams and include all watercourses defined on the main river map which can be accessed at https://environment.data.gov.uk/DefraDataDownload/?mapService=EA/StatutoryMainRiverMap&Mode=spatial

The responsibility for maintenance and repair of rivers lies with the riparian owner, but the EA have permissive powers to carry out maintenance work on main rivers under Section 165 of the Water Resources Act 1991 (WRA).

The EA encourage third party asset owners to maintain their property in appropriate condition and may take enforcement action on a prioritised basis where it is appropriate. They may also consider undertaking maintenance or repair of third party assets only where it can be justified in order to safeguard the public interest and where other options are not appropriate.

Further remit of the EA includes;

- preparing preliminary flood risk assessments and flood risk management plans for flooding from main rivers, reservoirs and the sea (F&WMA 2010)

- warning and informing (Ministerial Direction to the National Rivers Authority, 1996)

- regulating activities that may affect the risk of flooding from main rivers (Environmental Permitting Regulations (England and Wales) Regulations 2016)

- Carrying out surveys and mapping (F&WMA 2010, Water Resources Act 1991)

- reporting to the minister on flood and coastal erosion risk and how the national and local strategies are being applied by all of the authorities involved (FWMA, 2010)

- acting as a statutory consultee for planning authorities providing advice on planning applications, local plans and environmental assessments regarding flood risk from main rivers and the sea (Town and Country Planning (Development Management Procedure) (England) Order 2015)

4.7. Landowners and Developers

Landowners are responsible for the drainage of their land and controlling any movement of sediment from their land. Legally, owners of lower-level ground have to accept natural land drainage from adjacent land at a higher level. The exception to this is where the owner of the higher level land has carried out “improvements” such that the runoff from the land cannot be considered “natural”.

Agricultural practices by landowners can be considered as “improvements” to the land, so that cultivation of crops or other land uses can take place. Mitigation works are required on improved land to account for the change in natural land drainage and changes to surface water runoff this can create.

Landowners and developers are responsible for working with the Local Planning Authority to ensure that their development is completed in accordance with the planning permission and all conditions that have been imposed.

Advice for developers is available on the Oxfordshire Flood Toolkit.
www.oxfordshirefloodtoolkit.com/planning/developers/

5. RECOMMENDATIONS

5.1. General

Listed below are the recommendations emanating from this formal Section 19 Flood Investigation Report. All the actions are initial recommendations that require discussing in detail to determine their feasibility.

It is important to note that it is for the relevant responsible body or persons to assess each recommendation in terms of the legal obligation, funding, resource implications, priority and cost/benefit analysis of undertaking such action.

The recommendations may be included within the action plan linked to the Local Flood Risk Management Strategy or in the relevant risk management authority's future work programmes, as appropriate.

Authorities should work together to look into funding opportunities to carry out the listed actions. There are multiple funding sources which could contribute to schemes and improvement works going forward. The majority schemes will require elements of partnership working and contributions to be successfully funded. They are likely to need to provide multiple benefits such as improving flood resilience whilst also managing water levels, reducing drought risks, helping nature recovery as well as climate adaptation.

There are several funding options available which can be explored through multi agency working groups such as,

- Flood & Coastal Erosion Risk Management (FCERM) Flood Defence Grant in Aid (FDGiA)
- Local Levy Regional Flood and Coastal Committee (RFCC)
- DEFRA Natural Flood Management Funding
- Woodland Creation Grants
- Agricultural & Environmental Schemes (Countryside Stewardship)
- Funding sources relating to development and regeneration, such as section 106 agreements, Community Infrastructure Levy (CIL) and New homes bonus
- Non-government organisations and charitable trusts
- Community fundraising and events
- Lotteries (Heritage Lottery Fund, Big Lottery, Arts Council
- Volunteering
- Nature for Climate Fund
- Grants from other government departments, such as BEIS, MHCLG, DfT, DfE (for example, Flood Resilient Schools)
- UKRI – the research councils funding
- Business in the community
- Green recovery challenge fund
- Partnership funding (for example, contributions from partners, local authorities, businesses and communities etc.

5.2. Main Recommendations

Recommendation	Lead Stakeholders	Consulting stakeholders
Review the current maintenance schedule of highways drainage assets, and look to increase the frequency of cleaning, in line with current Countywide Highways Maintenance Programme and funding availability. Outlined below are example locations where maintenance is recommended. However, this list is not exhaustive, and other areas should also be considered: • Tadmarton Road • Cumberford Hill • High Street • Greens Garth	OCC Highways	
Local residents and Parish Council to set up a flood action group and hold an annual meeting to ensure preparedness for future flood events. Through this action group and subsequent meetings, the issues and recommendations highlighted throughout the S19 report should be discussed. With support from CDC & OCC, the flood action group can work to develop emergency resilience plans.	Local residents, Parish Council	CDC
Environment Agency to use their permissive powers under the Water Resources Act 1991 to ensure riparian owners carry out required maintenance for lengths of Main River.	Environment Agency	Landowners
OCC LLFA, TW, and CDC to work collaboratively to investigate how adjustments to the culverted drainage network at Workhouse Lane, Courtington Lane and High Street could reduce overall strain on the system, while ensuring that any future works do not simply transfer the issue further downstream.	OCC LLFA, Thames Water, CDC	
Environment Agency and CDC to identify any lengths of Main River or Ordinary Watercourse where repairs and maintenance of the channel or relief channels and culverts could improve conveyance.	Environment Agency, CDC	OCC LLFA, Riparian owners
CDC and OCC to undertake walkovers of culverted Ordinary Watercourses to identify hotspots and, where necessary, conduct surveys to identify potential causes of surcharging (i.e. blockages).	CDC, OCC LLFA	

One potential location to survey is the culverted Ordinary Watercourse beneath Tadmarton Road.		
Thames Water to explore possible causes of limited network capacity at Steeple Close and Workhouse Lane, which may have contributed to the internal property flooding.	Thames Water	CDC
Thames Water to conduct ongoing and regular maintenance of Thames Water assets. This could involve regular checks for blockages in the system, considering repairs to any damaged structures to reduce the risk of surcharge.	Thames Water	CDC
Thames Water to investigate the route of surface water drainage on High Street, including outfall location into the Bloxham Brook where limited information is currently available. If necessary, Thames Water to survey the system and share findings with OCC LLFA and CDC.	Thames Water	OCC LLFA, CDC
Thames Water to investigate potential sealing off sewer system near Bloxham Brook, behind Greenhills Park, to limit mixing of foul water with fluvial waters.	Thames Water	Environment Agency
OCC LLFA to work with relevant stakeholders and landowners over the long term to identify any structures or assets in poor condition and to ensure maintenance of these structures. This could include ensuring all trash screens are clear, (i.e. Those on Tadmarton Road), whilst also ensuring culvert inlets and outlets are clear (i.e. Those near Crab Tree Close), ensuring maximum through flow.	OCC LLFA	Landowners CDC Environment Agency
OCC LLFA and CDC to work with landowners adjacent to Ordinary Watercourses to investigate how adjustments to existing flood mitigation measures could maximise their effectiveness, ensuring they operate at their full potential. An example of where this may be beneficial is the baffle boards already implemented near Courtington Lane, where adjustments to the current structure may increase overall effectiveness.	OCC LLFA, CDC	Landowners
OCC LLFA, CDC and the Environment Agency to work with landowners to discuss willingness for natural flood management (NFM) measures to be implemented on their land in the catchment upstream of Bloxham to slow and / or attenuate	OCC LLFA, CDC, Environment Agency	Landowners,

flows in the catchment upstream of Bloxham Brook and/or the Tadmarton Road watercourse. Measures may also be implemented throughout Bloxham, identifying known flow routes that have previously caused issues. An example location of this could be the pathways descending Hobb Hill towards Crab Tree Close, where attenuating flows may relieve strain on the culvert inlet.		
CDC to reintroduce frequent risk-based inspections of the trash screen at Tadmarton Road outside the School.	CDC	
Explore the willingness to implement property flood resilience measures (PFR). Guidance on PFR measures can be viewed through Ciria document (C790F) and a link to this document is provided below: https://www.ciria.org/ItemDetail?iProductCode=C790F&Category=FREEPUBS&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91 Funding in the form of grants, may be available to support the property owners in delivering PFR measures – see Section 5.1.	Property owners	OCC CDC Parish Council

5.3. Communities and Residents

These include Town/Parish Council, Flood Forum, Community Group, landowners and affected residents.

Implement a community flood warden scheme to help coordinate the following:

- Preparing Household Emergency Plans for vulnerable properties in this area.
- Regularly inspecting ditches and pipework in the area of flood risk. Report blockages or other issues to the landowner and the LLFA.
- Explore options for property level protection and implement any recommendations. This could include additional drainage at the rear of properties, self-sealing air bricks and flood barriers.

Information on Flood Prevention measures for Home Owners, Communities and Businesses can be found on the Flood Toolkit:
www.oxfordshirefloodtoolkit.com/risk/prevention

Residents should check whether they are at risk of flooding by using the long term flood risk service www.gov.uk/check-long-term-flood-risk.If they are at risk of flooding they should sign up for flood warnings by visiting Sign up for flood warnings - GOV.UK. The Met Office also offer a weather warning alert service.

Permanent measures such as installing floodgates, raising electrical sockets and using flood resistant material when doing building work should be considered. Cherwell District Council, Oxfordshire County Council and the Environment Agency can provide advice on these matters and more information can be found at:
www.oxfordshirefloodtoolkit.com/emergency/preparation
https://nationalfloodforum.org.uk/

Explore community wide solutions (e.g. attenuation areas, overflow routes, tree planting). Use the Flood Toolkit Funding Tool to find sponsors who may be willing to help fund improvement projects: www.oxfordshirefloodtoolkit.com/risk/funding

Continue to report flood incidents to the Lead Local Flood Authority at: www.oxfordshirefloodtoolkit.com/emergency/report-flood. Endeavour to obtain as much evidence of flood events as possible, such as photographic and video evidence.

Residents to explore obtaining Government subsidised flood insurance via Can Flood Re help me? https://www.floodre.co.uk/

5.4. Lead Local Flood Authority (LLFA)

LLFA team to work with the Joint Oxfordshire Resilience Team (JORT) and the EA to set up and support a community based Flood Warden Network.

Assist the JORT, the EA and other flood management authorities to support the community in the production of a Community Flood Plan and provide advice to residents on how to explore options for property level protection.

Inform owners of the drainage systems and watercourses within the overall surface water catchment area of their legal responsibilities.

Establish Multi Agency flood group meetings to discuss problems and to look at strategies to combat flooding due to climate change. Have periodic meetings with the local flood group to discuss the issues and recommendations with representatives from key authorities.

Work with CDC in looking at opportunities for schemes to manage flows upstream such as nature based solutions through partnership working.

5.5. Highways Authority (Oxfordshire Highways)

Regularly check and maintain highways assets through Bloxham in line with their current maintenance regimes. Add detailed information of the assets to the OCC Asset Register.

Assess the capacity of the Highways assets with support from the LLFA and CDC to identify any areas with insufficient capacity for draining runoff from the Highways. Where this leads to flood risk to properties improvement works must be considered.

Assess the suitability of third party drainage systems accepting discharge from Highways Drainage systems and report any unsatisfactory areas to the relevant Risk Management Authorities. Work with the community and LLFA to clarify ownership and maintenance responsibilities for watercourses, particularly where these are located within or near to the Highways.

5.6. Water Authority Thames Water Utilities (TW)

Assess the sources of water entering the public sewerage system. Foul sewers to be checked for surface water connections, blockages and capacity issues. Remedial works to be carried out as necessary to minimise surface water entering the system and increase capacity.

Assess the capacity of their assets and identify any areas of insufficient capacity. Where this leads to flood risk to properties improvement work must be considered.

Ensure the existing foul system is not compromised from future development proposals

5.7. Cherwell District Council

Continue to consult with the Environment Agency and LLFA as required in respect of planning applications for new developments to reduce flood risk. Aim to ensure that all works are carried out in accordance with the approved plans and documents.

Review the planning policies relating to developments in the vicinity of the flooding incident, together with any flood risk assessments and drainage designs. Consider contacting the developers to take action in the event that any items relating to surface water drainage and flood risk are not evident or ineffective in the final developments or in the construction period.

Utilise their enforcement powers under Section 25 of the Land Drainage Act 1991 where it is considered that riparian owners are failing to maintain ordinary watercourses in their ownership.

Continue regular maintenance of their Ordinary Watercourse assets, in line with current maintenance regimes.

Endeavour to assist other flood risk management authorities and landowners in the preparation of a detailed plan of assets relating to drainage and flood risk, to share with the LLFA and the community.

Support landowners to investigate private drainage and check for blockages and defects with remedial works to be carried out where necessary.

Continue to support homeowners and businesses in providing individual property level protection.

5.8. Landowners and Developers

Developers should work with local authorities to ensure all development is completed in accordance with approved plans and documents, and planning policy.

Landowners should undertake regular inspection and maintenance of their drainage systems in accordance with a defined maintenance regime. Further, they should identify and develop a detailed plan of their assets to share with the LLFA, other flood risk management authorities and the community.

Landowners should assess the capacity of their drainage systems and identify any areas with insufficient capacity for the collection, conveyance, storage and disposal of surface water. Where this could lead to runoff to the public Highways or nuisance to third party private property, improvement works should be considered.

Landowners who are riparian owners are responsible for carrying out work to maintain the natural flow of water in the relevant watercourse. Such work will include the removal of significant blockages and the removal of vegetation if it is causing premature flooding to third party land and or property.

Review the library of flood guides on the Oxfordshire Flood Toolkit.

Agricultural landowners should carry out works to their land to reduce surface water runoff. These include following principles of good soil husbandry and providing land drainage systems such as ditches (https://www.gov.uk/guidance/create-and-use-a-soil-management-plan).

These works help to retain the natural land drainage regime and provide the best soil conditions for the continued agricultural use of the land. Examples of good practice for reducing surface water runoff from agricultural land are:

- Ploughing fields in a perpendicular direction to the slope of the land, reducing the effect of channelling of water over the land when it rains
- Using techniques and machinery to limit compaction of soils
- Growing crops that match the capability of the land, particularly in relation to the timings of activities and not overworking soils through the year
- Providing new ditches, sub-soil drainage and outfalls, and reinstating and regularly maintaining existing ditches. Old existing ditches may be completely filled and difficult to see. The type of soil make-up, type of flora and overall lie of the land can help to determine the routes of filled in historic ditches
- Preventing changes to the levels of the land that would cause channelling of surface water to a single point where this would not naturally occur.

It should be noted that following good practice for managing surface water runoff cannot completely remove the risks of natural land drainage and the associated quantities and flow routes of runoff that can cause flooding.

6. DISCLAIMER

The findings of the report are based on a subjective assessment of the information available by those undertaking the investigation and therefore may not include all relevant information. As such it should not be considered as a definitive assessment of all factors that may have triggered or contributed to the flood event.

Any recommended actions outlined in this Flood Investigation Report (FIR) will be for the relevant responsible body or persons to assess in terms of resource implications, priority and cost/benefit analysis of the proposal. Moving forward, these may be included in the Action Plan linked to the Local Flood Risk Management Strategy or in the relevant risk management authority's future work programme as appropriate.

The opinions, conclusions and any recommendations in this Report are based on information provided to Cherwell District Council and Oxfordshire County Council.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the time of preparation Cherwell District Council and Oxfordshire County Council expressly disclaims responsibility for any error in, or omission from, this report arising from or in connection with those opinions, conclusions and any recommendations.

The implications for producing FIRs and any consequences of blight have been considered. The process of gaining insurance for a property and/or purchasing/selling a property and any flooding issues identified are considered a separate and legally binding process placed upon property owners and this is independent of and does not relate to the information in this report highlighting flooding to properties at a street level.

Cherwell District Council or Oxfordshire County Council do not accept any liability for the use of this report or its contents by any third party.

ACRONYMS

AEP Annual Exceedance Probability
CDC Cherwell District Council
OCC Oxfordshire County Council
EA Environment Agency
TW Thames Water
FIR Flood Investigation Report
F&WMA Flood and Water Management Act 2010
LDA Land Drainage Act 1991
LLFA Lead Local Flood Authority
WRA Water Resources Act 1991

USEFUL LINKS

Highways Act 1980:
www.legislation.gov.uk/ukpga/1980/66/contents

Water Resources Act 1991:
www.legislation.gov.uk/ukpga/1991/57/contents

Land Drainage Act 1991:
www.legislation.gov.uk/ukpga/1991/59/contents

EA - Prepare your Property for Flooding:
How to reduce flood damage Flood protection products and services
www.gov.uk/government/publications/prepare-your-property-for-flooding

EA - Long term flood risk service:
https://www.gov.uk/check-long-term-flood-risk

EA - Sign up for flood warnings:
Sign up for flood warnings - GOV.UK

EA - Up to date information on flood alerts & warnings:
Flood alerts and warnings - GOV.UK

Oxfordshire County Council Flood and Water Management Web Pages:
www.oxfordshirefloodtoolkit.com
https://www.oxfordshire.gov.uk/residents/fire-and-public-safety/emergency-planning/community-resilience

Flood and Water Management Act 2010
http://www.legislation.gov.uk/ukpga/2010/29/contents

USEFUL CONTACTS

Oxfordshire County Council Highways:
Tel: 0345 310 1111
Website: www.fixmystreet.oxfordshire.gov.uk

Environment Agency:
General Tel: 08708 506 506 (Mon-Fri 8-6) Call charges apply. Incident Hotline: 0800 807060 (24 hrs)
Floodline: 0345 988 1188
Email: enquiries@environment-agency.gov.uk

Thames Water:
Emergency Tel: 0800 316 9800 (select option 1)
Website: www.thameswater.co.uk/help-and-advice/bursts-and-leaks/report-a-leak- orburst-pip