Section 19 Flood Investigation

Flooding 20th October 2023 in Coughton

Warwickshire County Council as Lead Local Flood Authority

Version	Date	Issued to
Version 1: Draft	April 2024	LLFA
Version 2: Draft	July 2024	LLFA
Version 3: Draft	July 2024	Partners
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1 CONTENTS

2 EXECUTIVE SUMMARY

In October 2023, Warwickshire was affected by a period of rainfall over a few days from what was referred to as Storm Babet, which was one named storms of a historically wet winter. During this event, higher intensities of rainfall were experienced across Warwickshire, in particular to the west, in the early morning hours of October 20th. This resulted in internal and external flooding to properties and businesses across the county. Coughton was one area that was heavily affected by the amount of rainfall during this period, with 6 properties internally flooding on the 20th. Due to the number of properties impacted by this event, this triggered the threshold for formal S19 investigation identified in Warwickshire County Council's (WCC) Local Flood Risk Management Strategy (LFRMS).

As required by Section 19 of the Flood & Water Management Act 2010, Warwickshire County Council as Lead Local Flood Authority (LLFA) has a duty to investigate flooding where the appropriate thresholds have been met. Our thresholds for investigation are outlined in our LFRMS and have triggered the requirement for this report.

In the post event phase that followed, WCC's Flood Risk Management team worked with WCC's County Highways team and Parish members of Coughton, to identify affected residents, provide advice and guidance and undertake remedial works to the drainage infrastructure where required. Whilst work has already taken place, some other lines of investigation are still ongoing. This report focuses on the flooding that occurred during October 2023, and may not lead to the resolution of all issues relating to flooding in Coughton.

3 INTRODUCTION

3.1 The requirement to undertake this report

Section 19 of the Flood & Water Management Act 2010 (FWMA) requires that the Lead Local Flood Authority (LLFA) undertake an investigation (to the extent that it considers it necessary or appropriate) upon becoming aware of flooding in its area.

The role of the LLFA in Warwickshire is carried out by the Flood Risk Management team at Warwickshire County Council (WCC).

The flood investigation must also determine the risk management authorities (RMAs) that have relevant flood risk management functions and whether each of those authorities have exercised or is proposing to exercise those functions in response to the flood. See Appendix I for the responsibilities of the various RMAs involved in this flood event.

Warwickshire County Council's Surface Water Management Plan (SWMP) identifies the thresholds that will apply when determining whether an investigation under Section 19 of the FWMA is required. These thresholds are as follows:

1. Flooding that poses a threat to the safety of the public or may directly result in serious injury or death
2. Five or more residential properties internally flooded
3. Two or more commercial properties internally flooded
4. One or more piece of critical infrastructure affected that impact on the wider area
5. Flooding that places vulnerable individuals or vulnerable communities at risk e.g. hospitals, care and nursing homes, schools, etc.
6. Where one or more residential properties have flooded internally from the same source on five or more occasions within the last five years

3.2 Scope of this report

This report summarises the completed and ongoing investigations carried out by Risk Management Authorities into the flooding which occurred on October 20th 2023 in Coughton.

This report does not obligate the LLFA or other risk management authorities into resolving the flooding issues investigated herein, nor is it possible for the LLFA to impose others to undertake any of the recommended actions.

3.3 Disclaimer

This report has been prepared as part of WCC's responsibilities under the FWMA. 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.

The opinions, conclusions and any recommendations in this report are based on assumptions made by WCC when preparing this report including reliance on information provided by others.

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Nothing in this legal disclaimer will limit any of our liabilities in any way that is not permitted under applicable law or exclude any of our liabilities that may not be excluded under applicable law.

4 WEATHER AND FLOOD INFORMATION

4.1 Weather and flood warnings

In the days preceding the flood event, the Met Office named the incoming weather system as Storm Babet. Whilst severe weather warnings were issued for other parts of the country, the Met Office did not issue any severe weather warnings for Warwickshire. The very localised nature of the rain is most likely the reasoning behind this. However, despite the lack of weather warnings the rainfall locally around Coughton fell consistently for over 8 hours.

Whilst no weather warnings were issued by the Met Office the Flood Forecasting Centre did release a Flood Guidance Statement. Warwickshire County fell in to Risk Area C (see map below), with low likelihood of impact but impact rating of significant.

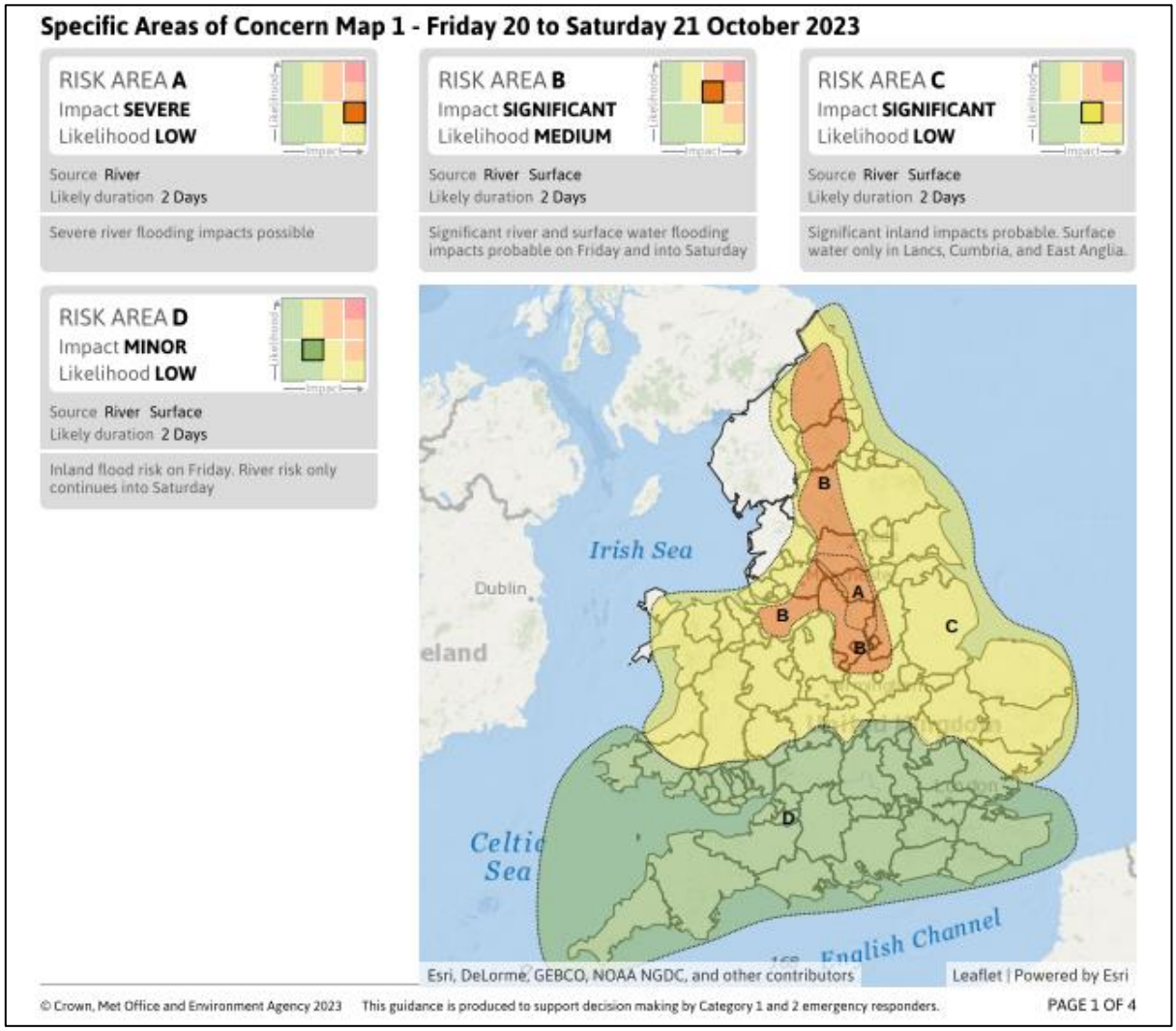
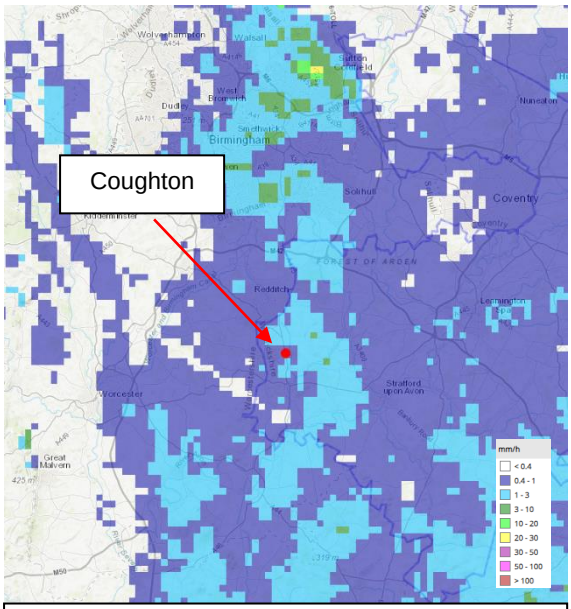
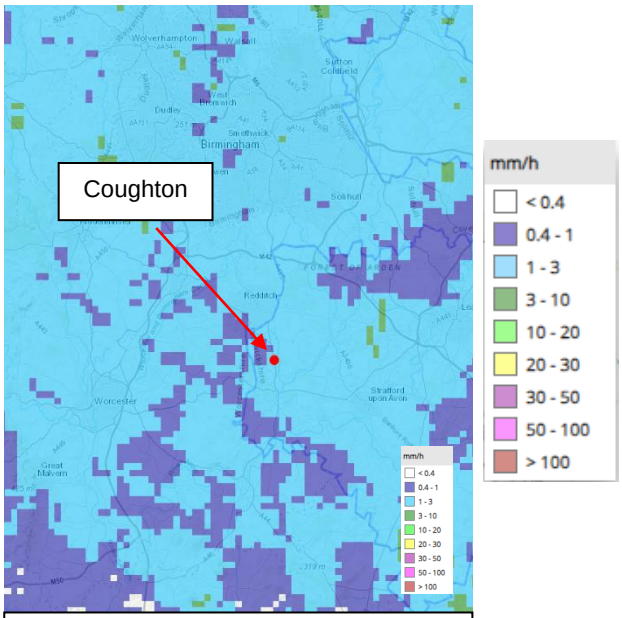


Figure 1 – Section of the Flood Guidance Statement from the Flood Forecasting Centre for Friday 20th October to Saturday 21st October 2023

Rainfall radar data for Coughton obtained through Hydromaster, a software which WCC utilises which provides real time and historic rainfall data from the Met Office, shows the rainfall across Coughton (marked with a red spot) on October 20th 2023. It can be seen that the rainfall fell across the whole County with some heavy rain falling around Coughton and to the north of Coughton. The rain began around midnight on 20th October, looking to be at its worst in Coughton around 7am and 8am.



Friday 20th October 2023 – 00:00



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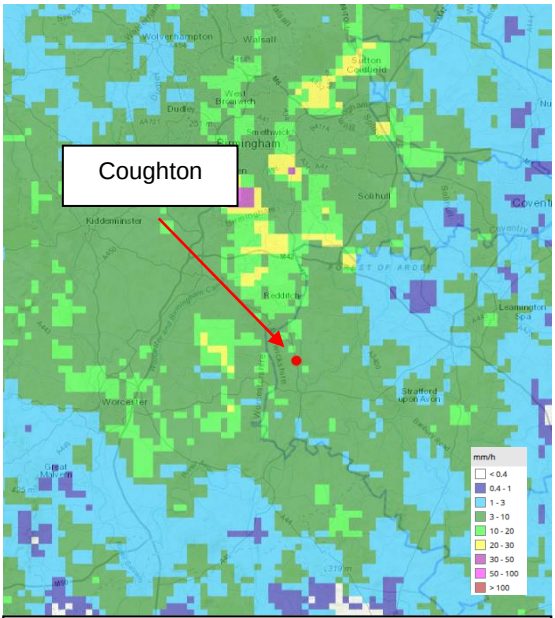

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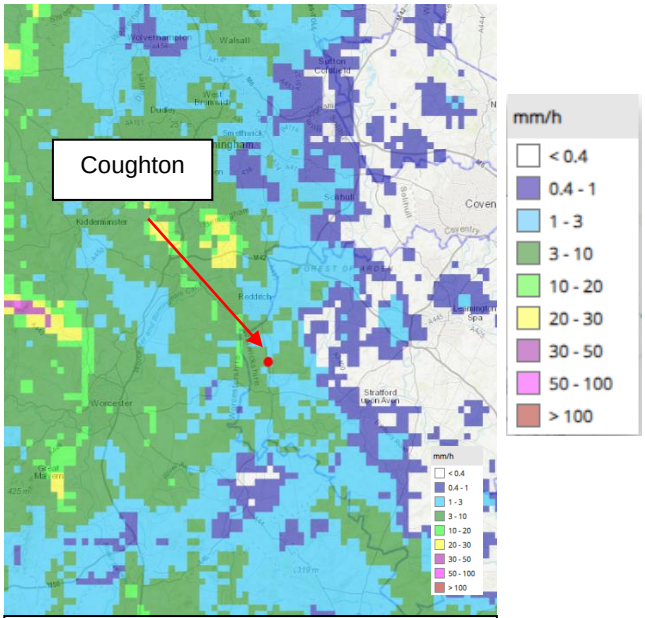

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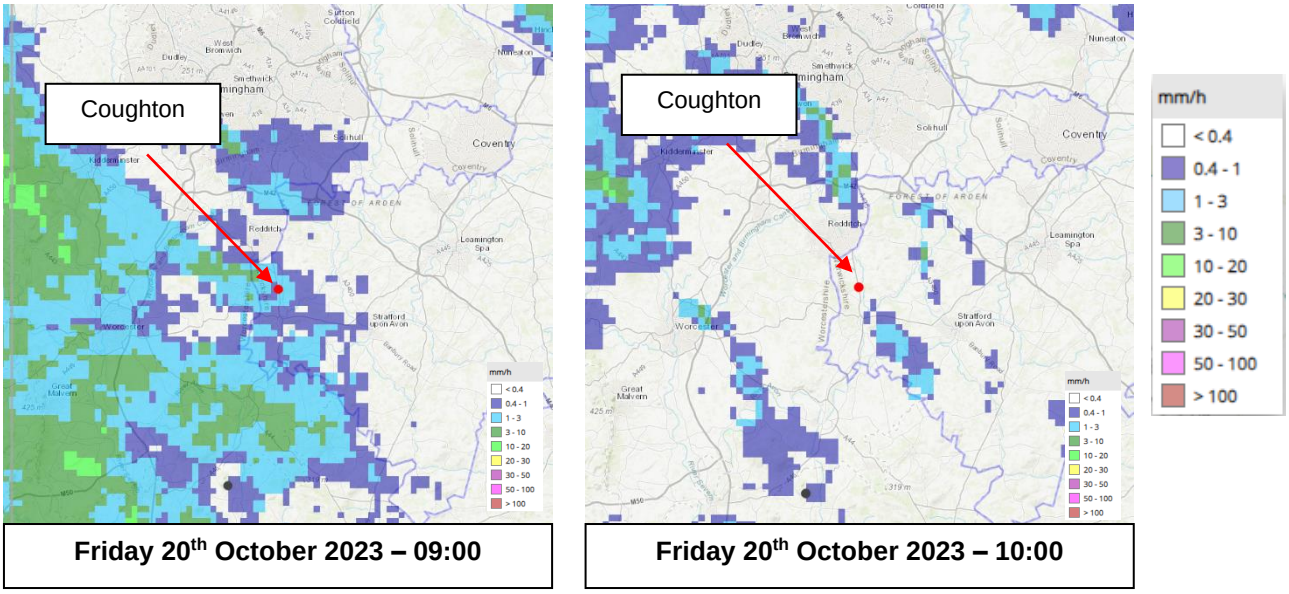


Figure 2 - Rainfall data from Hydromaster representing rainfall between 00:00-08:00 hrs on October 20th 2023.

By using the Hydromaster rainfall data the rainfall amount over the preceeding days and the event itself can be analysed. Centred on Coughton, Hydromaster data shows the rainfall data each day between 18/10/2023 to 21/10/2023.Total accumulation over the 4 days was 52.7mm, with a value of 27.57mm of rain falling in the 24 hour period of 20th October.

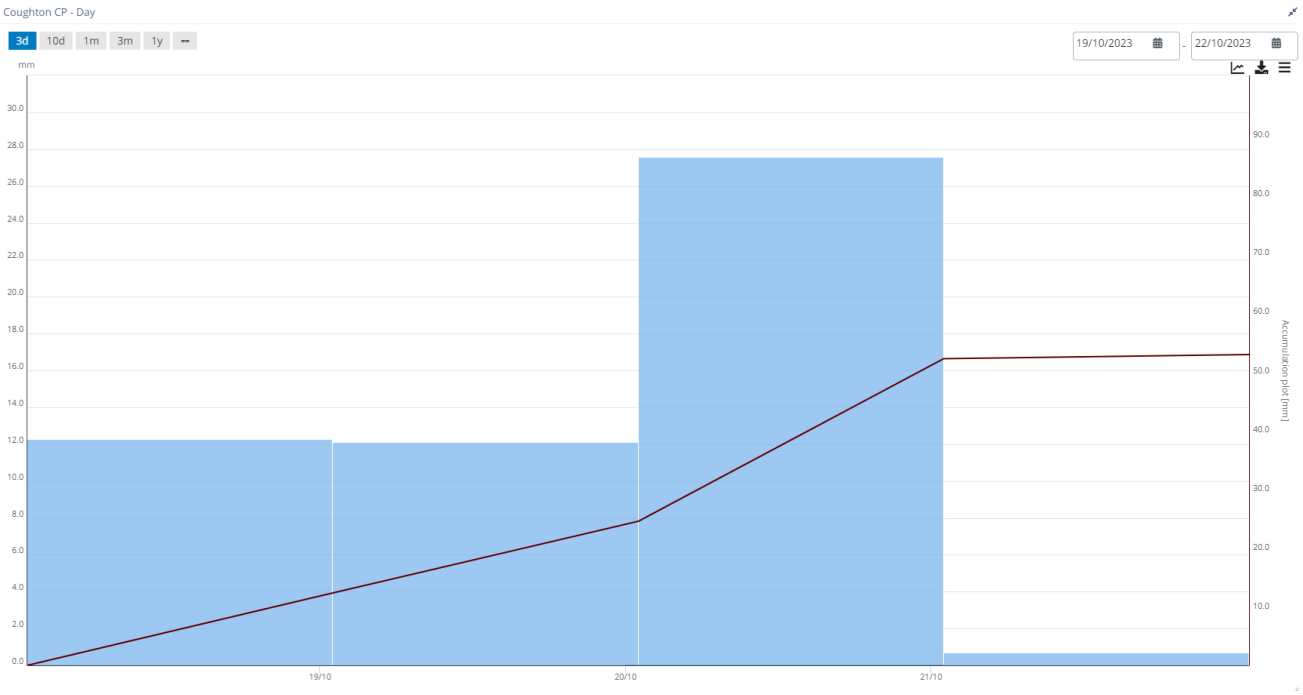


Figure 3 – Coughton rainfall accumulation sourced from Hydrometer over a 4 day period, showing the rainfall peaking on the morning of Friday 20th October 2023.

The event summary map below shows the parish council areas in south Warwickshire and how much rainfall (mm) they experienced across the entirety of Storm Babet. Coughton CP is highlighted as the worse hit parish in the County, experiencing 52.7 mm of rainfall over 4 days of Storm Babet.

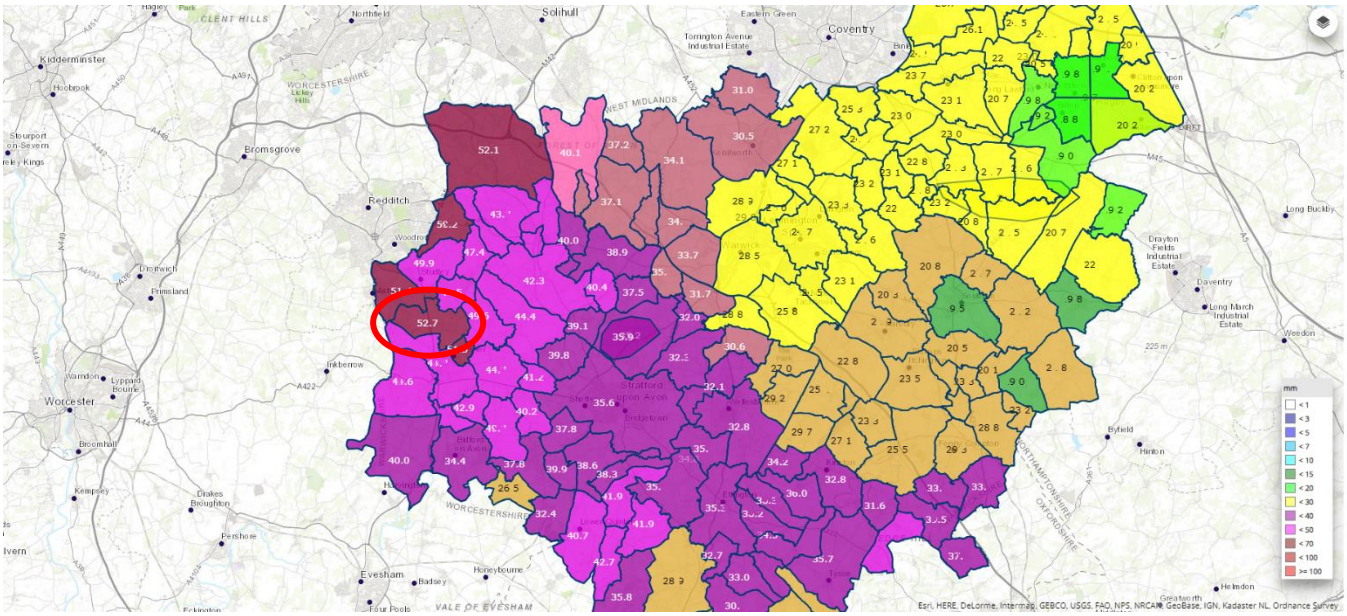


Figure 4 – Event Summary map of Storm Babet

Statistical analysis of the rainfall over Coughton (as measured by radar) between 18th and 22nd October 2023, indicates the storm which occurred had an annual probability of between 10% and 20% chance of occurring in any given year.

Anecdotal reports, alongside reports from local Coughton residents suggests that the rainfall fell heavily over many hours, resulting in run off from surrounding fields and roads. Several properties experienced internal flooding whilst more experienced external flooding to gardens.

Given the highly localised rainfall associated with an event of this nature, it is therefore conceivable that in the absence of a local rain gauge, that the true intensities discussed above may have been higher.

Reviewing the rainfall for the month of October gives an idea of the saturation of the ground before Storm Babet arrived. A report from the Met Office shows the rainfall totals from 1st to 23rd October. Storm Babet struck around a week after a significantly wet period for England and Wales occurring the 10th – 13th October where around 40-50mm fell, with higher recordings locally. This very wet October only increased the impacts of Storm Babet with already saturated fields and full watercourses, leading to increased runoff across the Country as a whole.

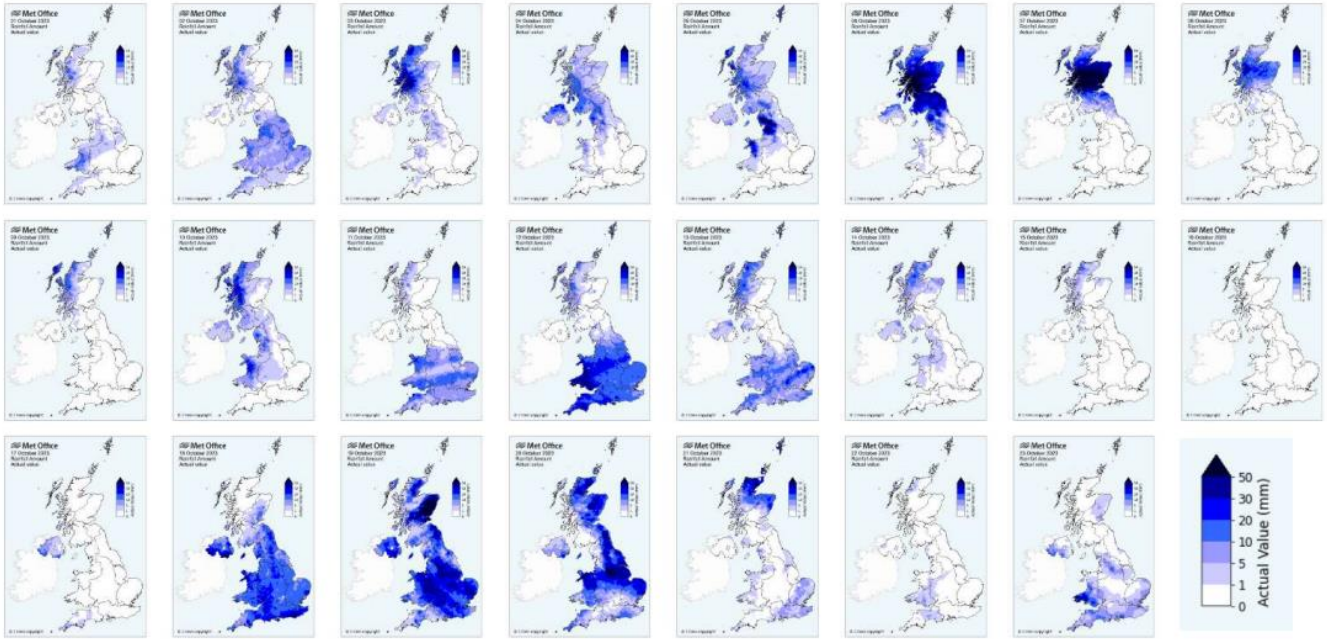


Figure 5 – Daily rainfall totals for October 2023 (1st-23rd) Source: Met Office – Storm Babet Report

5 INVESTIGATION SUMMARY

5.1 Locations included in the investigation

The details in this investigation relate only to flooding experienced within Coughton. Whilst other areas of Warwickshire experienced flooding during Storm Babet, Coughton was the only location to meet the threshold for a Section 19 investigation.

The below figure shows the area of Coughton covered by this report. The LLFA received reports from several properties on Coughton Lane and Birmingham Road. Our recommendations following this flood event, as discussed within this document consider information contained within all flood reports collated.

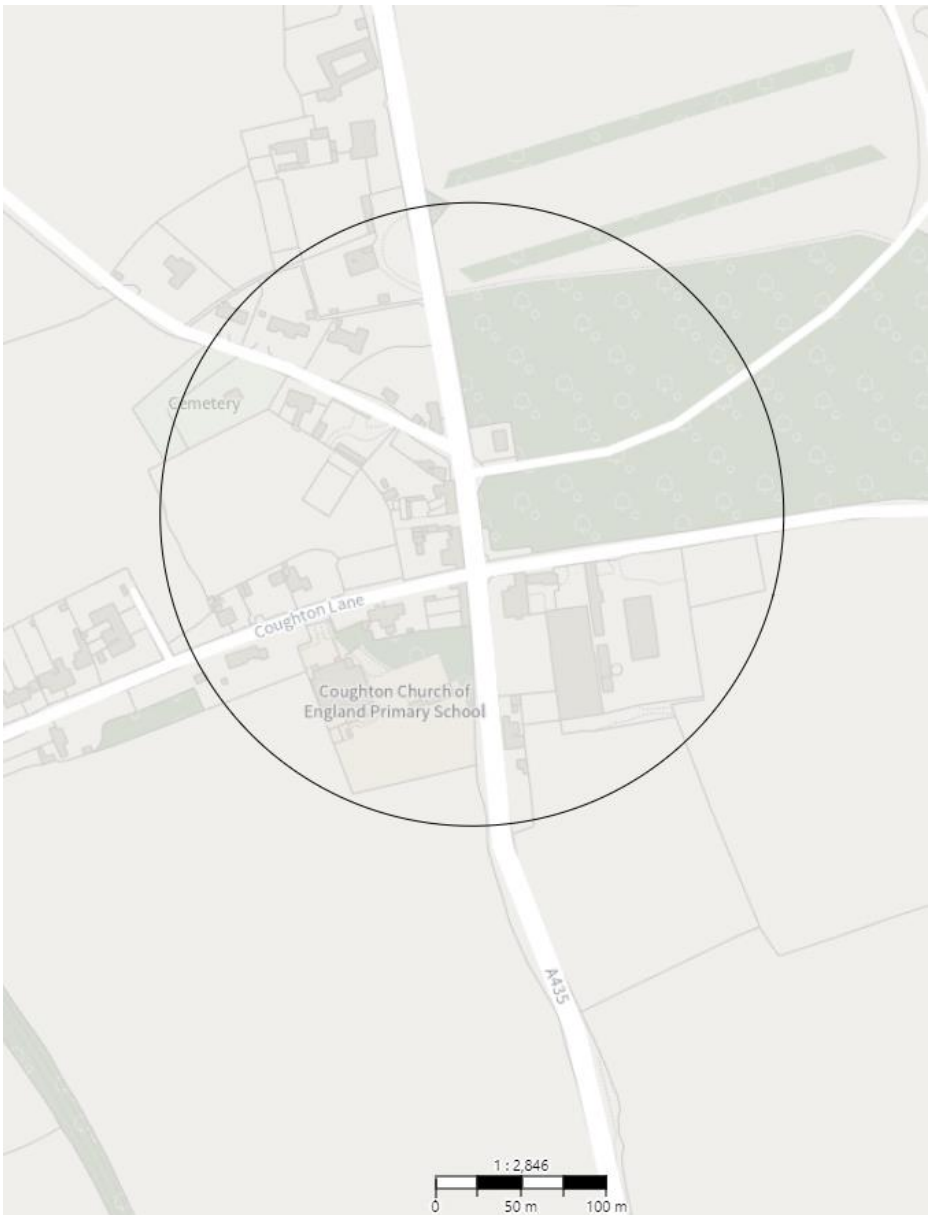


Figure 6 – Map of Coughton showing location of investigation focus.

6 KEY CONCLUSIONS OF THE INVESTIGATION

6.1 Source of flooding

The flood impacts in Coughton during this event were a result of surface water run off from fields and inundation of the artificial drainage network such as Severn Trent Water surface water sewers and highway drains.

Where surface water flows were present, many of the resulting flow routes exploited the built environment, such as the highway, with the resulting effect of channelling water and inhibiting infiltration. This was evidenced by the large amounts of surface water ponding on the highway and routing towards properties as a result of the existing highway drainage systems quickly reaching capacity.

The Environment Agency's Risk of Flooding from Surface Water mapping shows the modelled data for Coughton. The flow routes seen during Storm Babet mimic those seen on the modelled data.

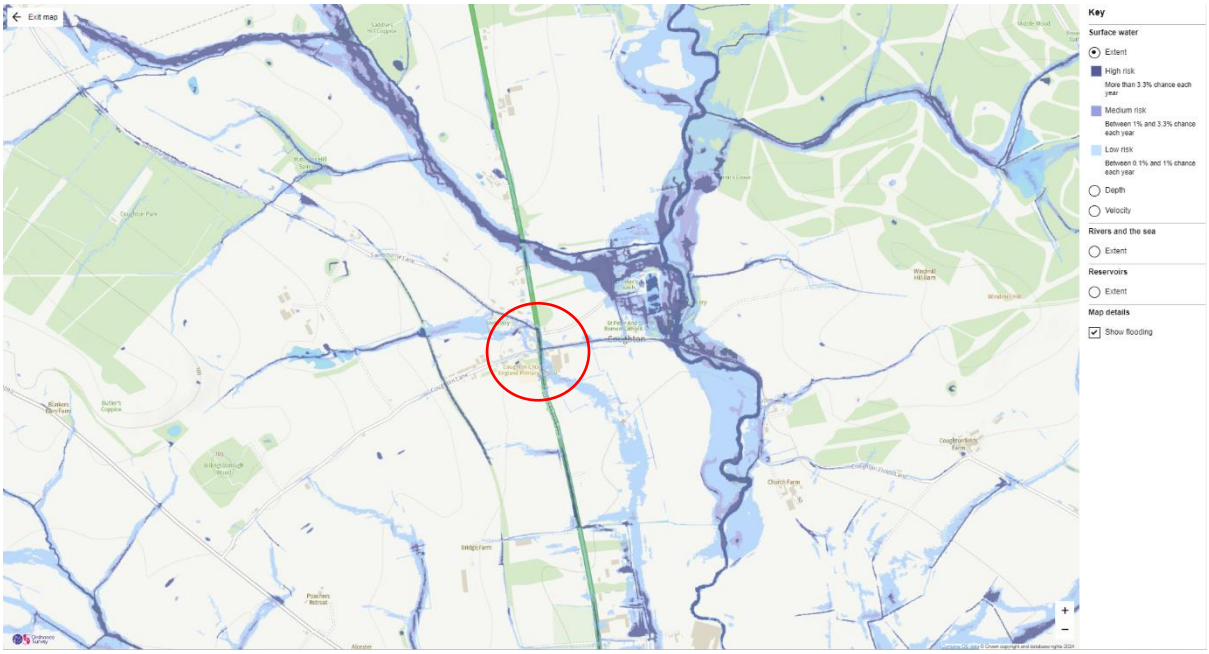


Figure 7 – Risk of Flooding for Surface Water modelled data

Flooding was reported in three main areas of Coughton:

- Birmingham Road
- Coughton Lane
- Birmingham Road south of the village

Birmingham Road

Three properties on Birmingham Road were all affected by surface water run off and inundation of the highway drainage network. The field (privately owned) behind the properties slopes towards the properties, leading to run off from this field flowing downhill, onto the car park behind the properties and into gardens and homes from behind. Water also flowed off the field further uphill and down Sambourne Lane where

it overwhelmed drainage systems. Sambourne Lane then became a pathway for the exceedance flows to flow down the hill and round the bend to affect the same properties from the front.

A further property, whilst sitting in the same line with the nearby properties mentioned above, flooded from a different flood source. This property has a pump system in place to alleviate flooding from surface run off towards the property. This system coped with the runoff water and the property did indeed avoid flooding from this source. However, unfortunately the water table was rising and the water table level underneath the lower part of the house reached the surface and the property flooded from groundwater, possibly an old well, with water coming up underneath the downstairs bathroom floor.

Coughton Lane
Three properties on Coughton Lane have flooded in the past however for this flood event only one property did flood. The surface water run-off from the field behind the Birmingham Road properties came down the field and along the back of properties along the field edge. This water then flowed on to the highway on Coughton Lane, and across into the driveway of the properties, leading to both internal and external flooding.

Birmingham Road south of the Village
Two properties flooded at this location, and also have a previous history of flooding, most notably in 2007. The surface water flowed along the Birmingham Road towards the properties, overwhelming the drainage system and flooding the properties from the front and side. The thresholds of the properties are level with or below the level of the highway, this led to internal and external flooding of both properties.

6.2 Gathering data for the investigation

After the flood event officers from WCC (Flood Risk Management and County Highways) attended Coughton to provide advice and to better understand the flooding mechanisms. Several site visits have been conducted with members if the public and parish council to discuss the areas of concern.

WCC spoke to several residents during site visits, and where residents were not available to talk to in person, questionaries and information packs were left at properties. Questionnaires responses have now been received from all properties that received one.

6.3 Summary of investigations

WCC Highways have been investigating the flow of water down Sambourne Lane that then affects properties on Birmingham Road. This flow of water gathers in front of the properties and due to the camber of the road it cannot drain away eventually leading to property flooding. The current approach is considering extra drainage to move the water away from properties before it causes an issue. This will continue to be worked on by WCC Highways.

The highway drainage network has been surveyed by WCC Highways team. A collapsed manhole was found and repaired to allow ease of future jetting, whilst the rest of the system is running smoothly. Next steps are to monitor the system during heavy rainfall.

Natural Flood Management (NFM) or a change in land management practices on the large field above the houses on Birmingham Road could potentially make a small difference to the flood risk of the properties. This land is under several different ownerships, the community have been provided information on NFM and will be approaching the landowners to begin these discussing with support of WCC Flood Risk Team where required. The location has also been passed to the Environment Agency and Severn Rivers Trust to consider in the NFM projects they are working on in the local area.

WCC Flood Risk Team are gathering information and looking into the potential for a Property Flood Resilience Scheme for the at risk properties. Whilst the information for a scheme is being gathered this in no way ensures that a scheme would be economically viable and therefore all options for reducing risk should be considered by residents.

7 APPENDICIES A-B: LOCATION REPORTS

Appendix A: Coughton Location
Appendix B: Coughton Actions and Opportunities

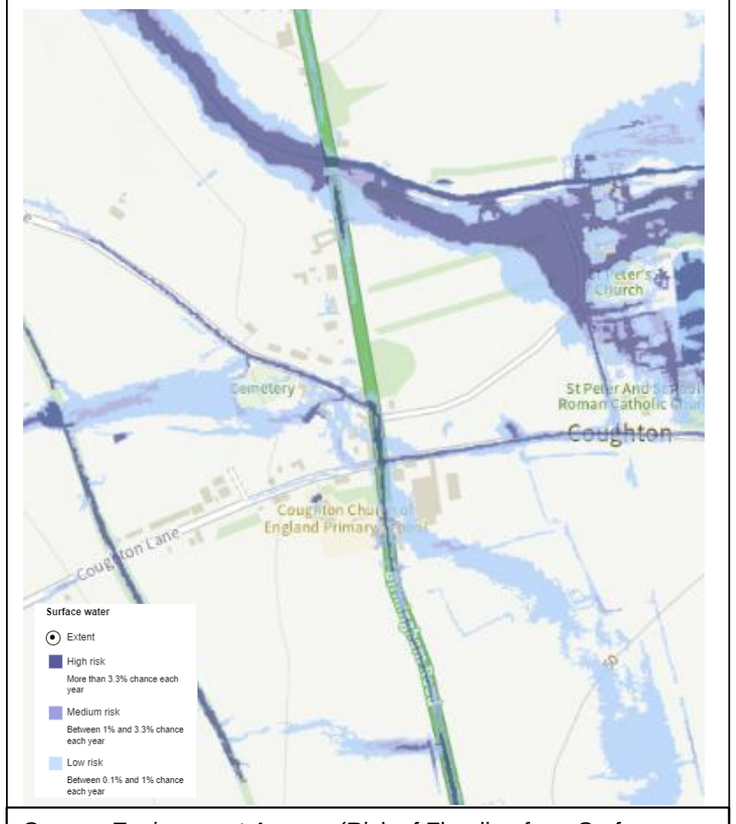
Coughton, Stratford District

What was affected?

Confirmed residential properties internally flooded	6
Confirmed commercial properties internally flooded	0
Properties externally flooded	1

Source of flooding

Surface water	✓
Sewers	✓
Main river	✗
Ordinary watercourse	✗
Other	✓



Source: Environment Agency (Risk of Flooding from Surface Water, Main River Mapping). Note this is modelled information indicative of the main risk areas. It does not indicate the areas that flooded in October 2023. Darker blue shades correlate with higher risk to surface water flooding.

What are the existing surface water mechanics and systems in Coughton?

The village of Coughton is situated in Stratford District Council around 2 miles north of Alcester.

The village is positioned on Birmingham Road, with two intersections of highway in Coughton Lane and Sambourne Lane. These two lanes are shown on the surface water maps to be flow routes for the passage of surface water during flood events.

The field between Sambourne Lane and Coughton Lane to the west is also shown to serve a surface water flow route towards Coughton, contributing to three different routes of passage onto Birmingham Road, and during heavy rainfall event, the volume of water pressures the existing highways system into reaching capacity.

However, there also appears to be groundwater elements at play here as a property on Birmingham Road had prevented surface water from breaching the front of the building, but it was groundwater rising from the lavatory that caused flooding within the property.

There is also a Severn Trent combined sewer system that travels along Sambourne Lane to the north of the village, alongside a system on Coughton Lane, with both systems connecting to the main sewer run underneath Birmingham Road. Due to the age of the sewer system within Coughton, foul is collected throughout the village and connects onto the main combined sewer run, which travels south of Coughton.

What happened here on 20th October 2023?

Surface water run-off from the field to the west and the two highway lanes had quick passage onto Birmingham Road and the drainage network in Coughton, during the heavy rainfall event on the 20th October. Rainfall on the 19th October had saturated the ground and systems, so in the instance of heavy rainfall on the 20th travelled quickly as surface water onto Birmingham Road and the volume of water caused the highway system to reach capacity, reducing the amount of rainfall that was able to enter the drainage network.

When this occurred, there was surface water ponding outside properties on Birmingham Road where the highway drainage system had reached capacity. Surface water flowing down Sambourne Lane from the north of Coughton added to the issues with surface water on the highway. There are suggestions that raising of the highway level may have also contributed to the pooling of water.

It is likely the flow route from the fields west of the village also contributed to the volume of water pooling within the highway, as indicated by the surface water flow route between the properties towards Birmingham Road. Flow from the fields also passed at a high rate onto Coughton Lane, which put properties adjacent to this highway at risk as it also travelled along the highway towards Birmingham Road.

The multitude of different contributing surface water flow routes onto Birmingham Road resulted in flooding of different areas of Coughton. However, upon reaching Birmingham Road, surface water generally travelled south. The volume of surface water utilising the highway as a passage south, alongside the surcharging of the combined network from chambers located within the highway, also resulted in combined sewer flooding from the highway of properties further south on Birmingham Road.

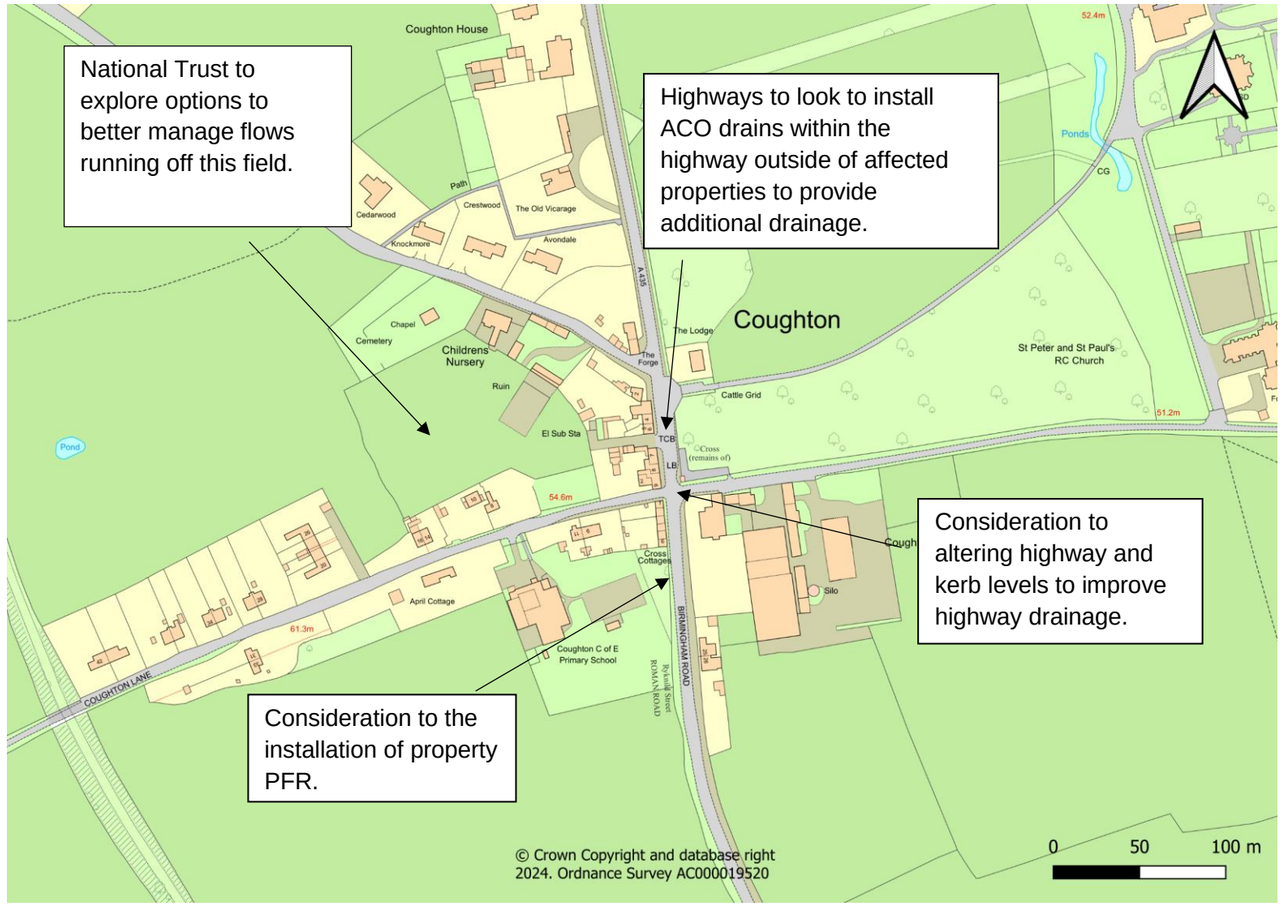
Is there a history of flooding in this location?

WCC as LLFA hold historic records of flooding occurring in Cougton, with reports ranging from 1998 to 2024, with surface water run-off reported as a constant throughout these reports. Post October 2023, Coughton has continued to suffer from flooding in the village during events such as Storm Henk in January 2024, which has also brought to light more historic flood reports within the village, highlighting the issues at hand.

Coughton, Stratford District

No.	Action	Responsible authority	Progress
1	National Trust to explore options to better manage flows running off land owned by themselves.	National Trust	Ongoing
2	Ensure that highway cyclic gully cleansing is scheduled and undertaken at an appropriate interval across adoptable highway within Coughton.	WCC Highways	Ongoing
3	Consideration to the implementation of PFR scheme for Coughton.	LLFA	Ongoing
4	Offer advice to residents that have been internally flooded from this flood event.	LLFA	Completed
5	Consideration to altering highway and kerb levels to improve highway drainage.	WCC Highways	Ongoing
6	Highways to look to install ACO drains within the highway outside of affected properties to provide additional drainage.	WCC Highways	Completed

What are the future opportunities that may reduce flood risk here?



8 APPENDIX C – GLOSSARY OF TERMS

Critical infrastructure	Infrastructure which is considered vital or indispensable to society, the economy, public health or the environment, and where the failure or destruction would have large impact. Examples include hospitals, communications, electricity sub-stations, water treatment works, transport infrastructure and reservoirs.
Department for Environment, Food and Rural Affairs (Defra)	The government department responsible for policy and regulations on environmental, food and rural issues. This includes all aspects of flood risk management.
Environment Agency (EA)	See Appendix D.
External flooding	Flooding of areas of property that are not under the definition of internal flooding. Examples include gardens, driveways, parking areas and outbuildings such as sheds and garages.
Flood Risk Management (FRM)	FRM aims to reduce the likelihood and/or the impact of floods. This typically includes the following elements: prevention, protection, preparedness, response and recovery. In the context of this report, FRM also refers to the team at WCC which undertakes the LLFA role.
Exceedance flows	Excess surface water flow that occurs when the capacity of the drainage system is exceeded.
Flood and Water Management Act 2010 (FWMA)	Legislation which came into effect in April 2010. The Act takes forward a number of recommendations from the Pitt Review into the 2007 floods and placed new responsibilities on the Environment Agency, local authorities and property developers (amongst others) to manage the risk of flooding.
Internal flooding	Flooding of habitable living or business areas of a property. This does not include gardens and outbuildings such as sheds, garages etc. and not normally basements and porches.
Lead Local Flood Authority (LLFA)	See Appendix D.
Main River	Watercourses designated as ‘main’ are generally the larger arterial watercourses, as shown on the Statutory Main Rivers Map. The Environment Agency has permissive powers, but not a duty, to carry out maintenance, improvement or construction work on designated main rivers.
Ordinary watercourse	A watercourse that is not a designated Main River. On ordinary watercourses the LLFA (or Internal Drainage Board if relevant) have permissive powers, but not a duty, to carry out maintenance, improvement or construction work.
Pluvial or surface water flooding	Caused by rainfall exceeding the capacity of the ground or drainage system and occurs due to water ponding on or flowing over the ground surface before it reaches a drain or watercourse.

Property Flood Resilience (PFR) measures	Measures that are designed to keep flood water out of properties and businesses, and could include flood barriers and doors, non-return valves and airbrick covers. Sometimes also known as Property Level Resilience (PLR).
Riparian landowners	Someone who owns land or property adjacent to a watercourse. Under common law, a riparian owner has a duty to maintain the watercourse and allow flow to pass through freely.
Risk management authority (RMA)	An authority which is defined as such in the Flood & Water Management Act 2010. Such authorities have powers that they can use to carry out their flood and coastal erosion risk management responsibilities. See Appendix I for a summary of these responsibilities.
Risk of Flooding from Surface Water map (RoFSW)	National-scale long-term risk mapping on gov.uk website showing the areas of England at risk of flooding from surface water. Extent, velocity and depth information is available for a range of flood probabilities.
Section 19 Flood Investigation	An investigation of a flood event by the Lead Local Flood Authority under Section 19 of the Flood and Water Management Act 2010.
Severn Trent Water (ST)	See Appendix D.
Warwickshire County Council (WCC)	See Appendix D.

9 APPENDIX D – RISK MANAGEMENT AUTHORITIES

Risk Management Authorities (RMAs) have defined roles and responsibilities with regards to flood risk management, as defined within the Flood and Water Management Act 2010.

All RMAs under the Flood and Water Management Act (2010) have a responsibility to cooperate and coordinate with regards to their flood risk management functions, including raising awareness of flood risk and the sharing of information.

The section below outlines the key roles and responsibilities of the RMAs relevant to this Section 19 flood investigation.

9.1 Environment Agency

The Environment Agency (EA) is responsible for taking a strategic overview of the management of all sources of flooding and coastal erosion in England and Wales. They have prepared strategic plans which set out how to manage risk, provide evidence (for example, their online flood maps), and provide advice to the Government.

They provide support to the other RMAs through the development of risk management skills and provide a framework to support local delivery. The EA also has operational responsibility for managing the risk of coastal erosion and flooding from main rivers, reservoirs and the sea. Main Rivers are defined through an agreed map which is updated annually. These tend to be the larger rivers in the country.

The EA are category 1 responders regarding flood risk (Civil Contingencies Act 2004). They are required to warn and inform of flood risk.

9.2 Water and sewerage companies

Severn Trent Water (STW) holds responsibility for managing risks of flooding from water supply and sewerage within the majority of Warwickshire. Thames Water have a small area of responsibility in the south of the county.

Water and sewerage companies (WaSCs) as category 2 responders to national emergencies placing on them duties to share information with other responders in an appropriate manner. They are also responsible for managing risks associated with assets or processes that may cause or be affected by flooding.

Relevant actions include the inspection, maintenance, repair and any works to their water and sewerage assets which typically includes pipes, manholes, attenuation tanks or other infrastructure such as pumping stations.

9.3 Warwickshire County Council as Lead Local Flood Authority

Lead Local Flood Authorities (LLFA) have the lead operational role in managing the risk of flooding from surface water and groundwater.

Flood risk management functions include (but are not limited to); the provision of a Local Flood Risk Management Strategy (LFRMS) and Surface Water Management

Plan, designation and maintenance of a register of structures or features that have a significant effect on flood risk, consenting and enforcement works on Ordinary Watercourses, undertaking works to mitigate surface water and groundwater flooding and undertaking Section 19 investigations.

The LLFA are a statutory consultee on major planning applications for surface water drainage. By working with developers and local planning authorities, the LLFA role is to ensure that runoff arising from major development sites is appropriately managed to avoid increasing flood risk.

9.4 Warwickshire County Council as Highway Authority

WCC also has responsibilities as a Highways Authority which may relate to flooding. Highway authorities are responsible for providing and managing highway drainage which may include provision of roadside drains/ditches and must ensure that road projects do not increase flood risk.

The Highways Authority has a duty under the Highways Act 1980 to maintain existing highways drainage. They also have powers to improve drainage systems but no duty to do so.

Highway drainage systems are designed to take highway surface water. Highway drainage systems are not designed as “storm drains”, and do not have the capacity for the level of rainfall from an extreme flash flood.

9.5 District and Borough Councils

District and Borough Councils can carry out flood risk management works on ordinary watercourses. Through the planning processes, they control development in their area, ensuring that flood risks are effectively managed. This includes the development of plans and strategies to limit or mitigate development in flood risk areas.

Within Warwickshire there are 5 district/borough councils: Stratford-on-Avon District Council, Warwick District Council, Rugby Borough Council, Nuneaton and Bedworth Borough Council, North Warwickshire Borough Council.

9.6 Landowners

Landowners have riparian responsibilities under the Flood and Water Management Act (2010) to maintain and undertake any necessary works on assets on their land (with consent from the relevant RMA) which may have an effect on flood risk including watercourses and drainage assets.

Further information on riparian responsibilities is available on www.gov.uk/guidance/owningawatercourse