Section 19 Flood Investigation

Flooding on Cape Road, Warwick on 7th September 2017, 11th & 13th August 2020, 28th December 2020 and 30th July 2021

Warwickshire County Council as Lead Local Flood Authority

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Version 1: Draft	18/01/22	SW & MB
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1 EXECUTIVE SUMMARY

The LLFA has been notified about a series of flooding incidents at a commercial site on Cape Road, Warwick.

As required by Section 19 of the Flood & Water Management Act 2010, Warwickshire County Council (WCC) as Lead Local Flood Authority has a duty to investigate flooding where the appropriate thresholds have been met. Our thresholds for investigation are outlined in our Local Flood Risk Management Strategy (LFRMS). Over five flood reports have been received from the site in the past five years and have triggered the requirement for this report. The LLFA received these flood reports on 7th September 2017, 11th August 2020, 13th August 2020, 28th December 2020, 30th July 2021.

The LLFA have gathered further information following these flood events, however due to the COVID-19 pandemic, data has been gathered using non face to face methods wherever possible.

The investigation highlights the intense rainfall events of an exceptional nature that the site has previously experience in some instances. The volume of rainfall received exceeded the capacity of the existing drainage infrastructure in the site's vicinity. Maintenance practices have been undertaken where possible to help mitigate this and advice has been issued for possible remedies on private property.

2 INTRODUCTION

2.1 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 event. See Appendix B for the responsibilities of the various RMAs involved in this flood event.

Warwickshire County Council's Local Flood Risk Management Strategy (LFRMS) 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

In this instance threshold 6 was met on 30th July 2021 when the LLFA received the fifth flood report at the site within a five year period.

2.2 Scope of this report

This report summarises the completed and ongoing investigations carried out by risk management authorities into the flooding which occurred on Cape Road.

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 WEATHER AND FLOOD INFORMATION

Rainfall data was sourced using HydroMaster 2022 software for the purposes of this investigation. This includes data from Environment Agency rain gauges and Met Office Radar.

3.1 9th September 2017

There are no known records of adverse weather forecasts or readings for 9th September 2017.

At the site of interest, there was approximately 10mm of rain recorded over a 12hour period on the 9th September 2017, according to radar data. This total would be considered to be a 1 in 2year return period event. 5mm of rain was recorded during the same period at a nearby rain gauge at Wellesbourne.

3.2 11th-13th August 2020

The UK experienced extremely hot weather with temperatures in England reaching 35 degrees on the 11th & 12th of August 2020 A thunderstorm warning was in force for parts of England and Wales throughout the week of this flood event. In addition to intense rainfall, high winds and lightning were experienced during the thunderstorm.

The rainfall for the event on the 12th of August 2020 was highly localised. These storms were the result of heating during the day causing isolated thunderstorms to develop~~due to convection~~. These types of storms are characterised by short duration and rapid fluctuations of intensity across small localised areas. Radar data suggests that the site of interest received about 15mm of rain in a 24hour period. Local surrounding rain gauges near Bagington, Wellesbourne and Henley in Arden recorded between 6-11mm of rainfall during the same 24hour period.

The LLFA received two flood reports at the site during this event. The LLFA also received multiple flood reports in Warwick during this rainfall event. These incidents are reported in their own separate Section 19 report.

3.3 28th December 2020

Between 26-27th December 2020 the UK was hit by storm Bella bringing heavy rain and strong winds. This storm was centred in western Scotland but gradually tracked across most of the UK during this period. Advice from the Flood Guidance Statement leading up to the event suggested there was potential surface water and fluvial flood risks with a low likelihood. There were also 2 flood warnings in force in Warwick prior to this event. Warnings for heavy rain and strong winds were in force during this event followed by warnings for snow and ice.

According to radar data the site of interest received approximately 12mm of rain in 12hours overnight between 26th-27th December 2020 as a large front passed over from the north. This total would be associated with a 1 in 2year return period event. Local rain gauges recorded between 10-18mm of rainfall during the same period.

3.4 30th July 2021

During 29-31 July 2021 Storm Evert brought unusually strong winds to the south and south west of England for the time of year. Bands of rainfall associated with this storm tracked over Warwickshire during this period. The Flood Guidance Statement highlighted a potential significant risk of surface water and fluvial flooding with very low confidence prior to this event. Thunderstorm warnings were in force for this event.

On July 30th 2021 a band of rain associated with storm Evert passed over Warwick. Radar data suggests that the site of interest received about 23mm of rain over a 24hour period. This total suggests that the event was no rarer than a 1 in 2 year return period. No rainfall was collected from rain gauges in the vicinity. Surrounding rain gauge data varied between 17-31mm in 24 hours for this event.

4 INVESTIGATION SUMMARY

4.1 Locations included in the investigation

The location of this investigation is shown spatially below in Figures 1 and 2.

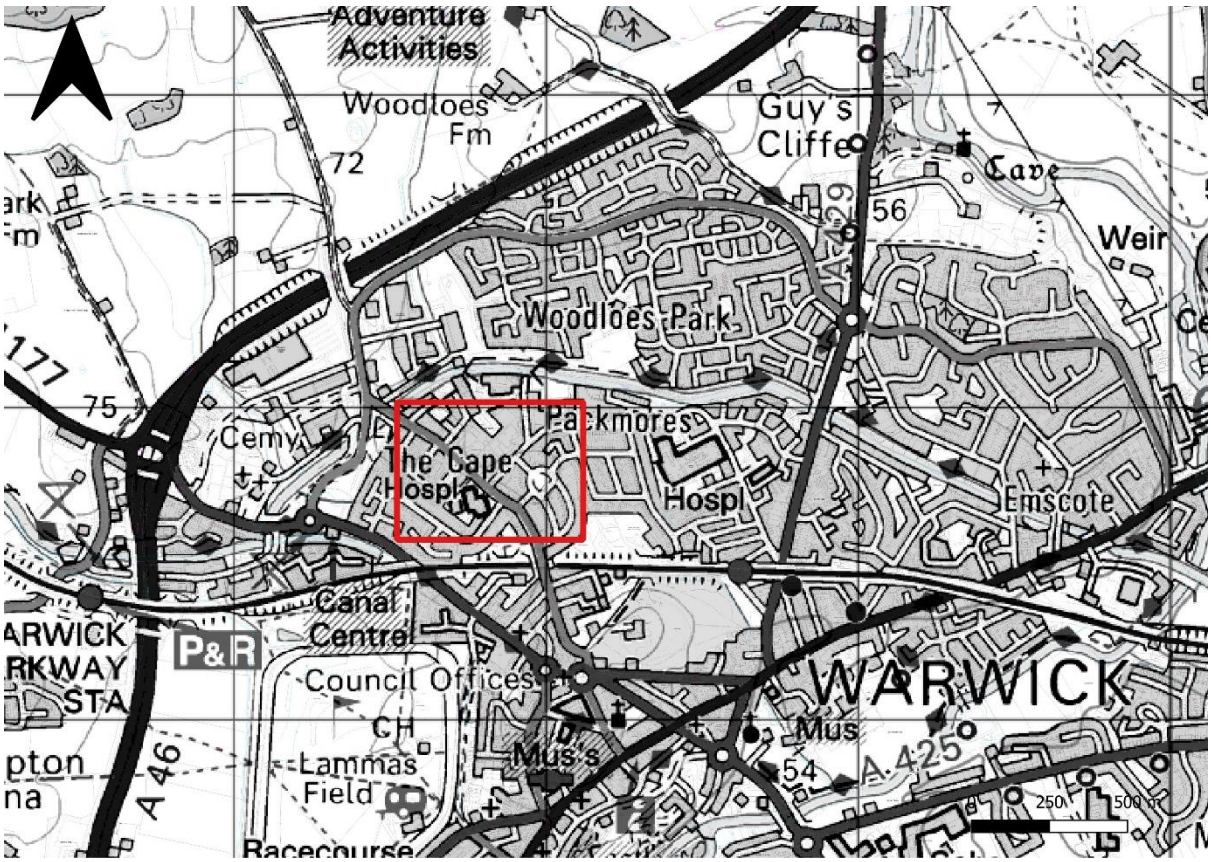

Figure 1 – Map of Warwick. Area of focus within the red box.

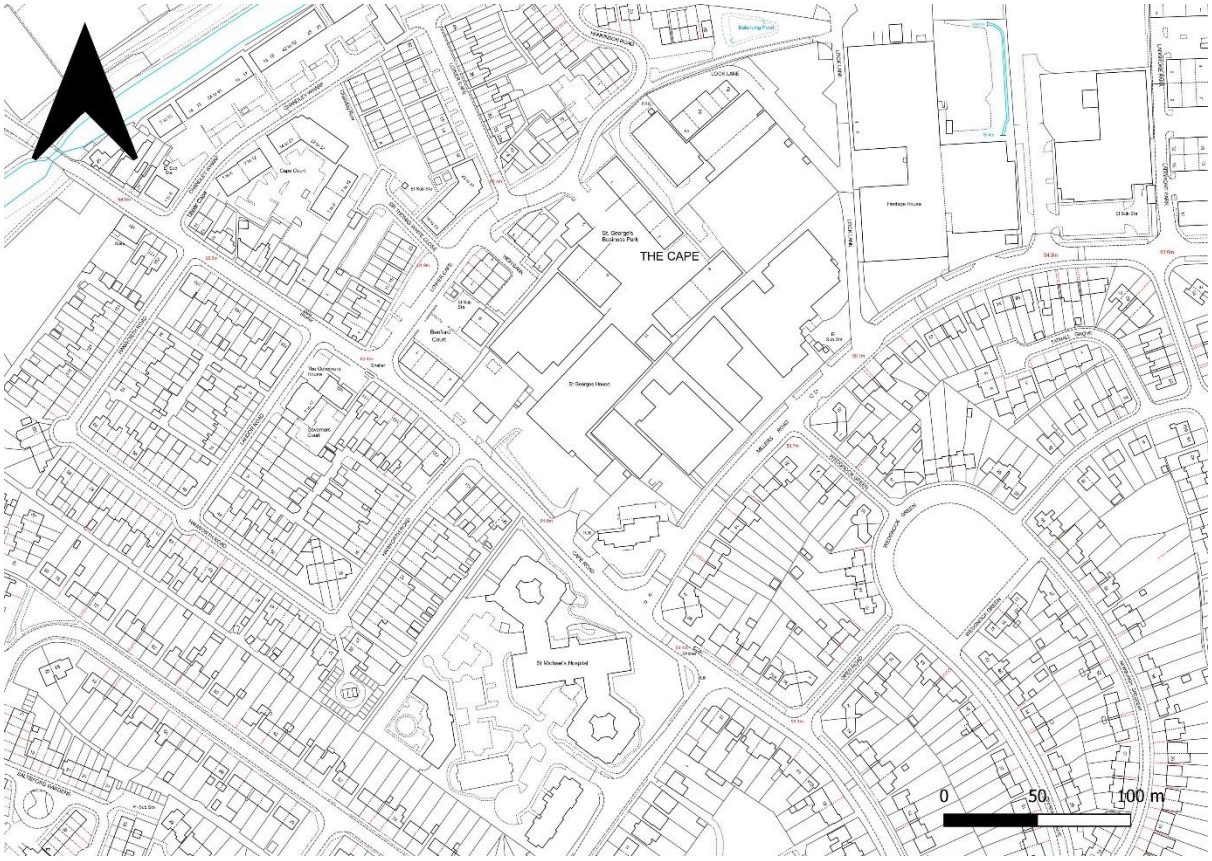

Figure 2 – Map of investigation area

4.2 Wider impact summary

In total, 5 commercial premises and 4 residential properties were internally flooded in the event on the 12th August 2020.The impacts of the event on the 12th of August were mainly contained to the town of Warwick, although some reports of highway flooding were also received for areas of Leamington. WCC received two flood reports from the site of interest during this event. The LLFA has undertaken a separate Section 19 investigation into this rainfall event due to the number of internal flooding reports received in Warwick as a result. This event alone exceeded threshold 3 of the Warwickshire LFRMS and hence why a separate report has been published. Further details on this rainfall event can be found that report (Flooding in Warwick 12th August 2020, December 2021)

No other flood incidents were reported in the wider area during the September 2017, December 2020 and July 2021 events.

4.2.1 Highway flooding

This section details the flood reports received from the wider area by the LLFA regarding standing water on the highways.

There are no records of nearby highway flooding during following the September 2017 rainfall.

The nearest highway flood report during August 2020 event was at the junction of St Johns, Smith Street and Priory Road.

There were no highway flood reports in the vicinity during the December 2020 event.

There were two reports of highway flooding nearby on Castle Lane and by St Nicholas' Church in Warwick following the rainfall event in July 2021.

5 KEY CONCLUSIONS OF THE INVESTIGATION

5.1 Source of flooding

5.1.1 Surface Water

Warwick is an urban setting with a large percentage of impermeable areas and limited permeable surfacing, apart from the areas of public open space such as Priory Park. Following intense rainfall, surface water drainage systems are overwhelmed by high volumes of water which will follow surface water flow routes.

The site of interest is identified within an area of high risk from surface water flooding according to the Environment Agency Risk of Flooding from Surface Water map (RoFSW) (see figure 3 below). The site is predominantly covered with impermeable surfaces and is at a lower elevation than the adjacent highway. This means that rainfall falling on the site will naturally flow and pool on site due to the site topography and lack of ground infiltration. Video evidence shows surface water flows from the highway cascading down the vehicle access drives and pooling by buildings.

Siltation can also be an issue for urban drainage systems such as this, whereby silt and debris are washed from the highways and into the drains during a rainfall event. This debris can block drains and therefore reduce their capacity to carry flow away during a proceeding event.

Figure 3: Flood risk from surface water in the area of investigation, source: Environment Agency

5.1.2 Surface Water Sewer & Highway Drainage

Modern highway gullies, acting as inlets to the highway drainage system, are currently designed to accommodate a rainfall event with a 1 in 5year return period as per CG 501 Design of highway drainage systems. However historic systems may not be designed to meet this specification. The highway system would not have been designed to cope with high intensity rainfall events.

Highway and on site surface water drainage systems are designed to accommodate up to a certain volume of water. Video evidence has been provided from the site demonstrating when the system has received rainfall exceeding the drainage capacity. Blocked and damaged gullies by the site access points have been identified following flood reports which will have contributed towards this issue.

5.2 Gathering data for the investigation

The site owner has provided WCC Flood Risk Management with information following each flood incident via email and the online reporting tool, including pictures and videos. WCC Flood Risk Management and Highways operatives have also visited the site following these incidents for further assessment.

5.3 Summary of investigations

The site of interest has level thresholds to the external areas of the service yard with no increase to the finished floor levels from the external footway, this means that there is no protection from surface water ingress. The LLFA provided recommendations to the business owner investigating Property Flood Resilience measures. Suggestions included site alterations to improve drainage systems or adapt external doors to mitigate future ingress. ~~such as~~ Monitoring flood warnings and storing valuables on raised pallets are also possible measures to reduce the impacts of flooding on site. WCC are not able to access funding for these measures due to the commercial nature of the property meaning it is not eligible for national flood resilience funding.

Highway gullies are cleansed on an annual basis, with some gullies in higher risk areas cleansed at more regular intervals. An assessment of whether the gullies in the area of investigation require more regular cleansing should be undertaken by WCC County Highways. Nearby gullies were cleansed following a site visit in August 2020 to relieve observed blockages. Investigations also identified a collapsed gully by one of the site entrances caused by damage from HGV traffic. WCC County Highways were notified of this and have since completed repairs.

5.4 Recommendations:

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No.	Action	Responsible Authority	Progress
1.	Issue advice to Business and Property Owners regarding drainage improvement opportunities and/or Property Flood Resilience Measures to mitigate the risk of surface water flooding	WCC FRM (LLFA)	Advice issued to Business Owners/Property owners by LLFA.
2.	Continue cyclic gully cleansing	WCC Highways	Business as usual
3.	Complete gully and raised kerb repairs	WCC Highways	Complete. Confirmation from Locality Officer and site visit.

5.5 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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6 APPENDICES

6.1 Appendix A – Glossary of terms

Return Period	This is a technical measure used to indicate how rare and extreme a given rainfall event is. Generally light showers resulting in small water volumes are quite common whereas heavy or prolonged rainfall events resulting in very large volumes of water are rarer. On this basis, the return period quantifies this by giving the probability of a given rainfall event occurring in any given year. For instance, a 1 in 2year event has a 50% or 1 in 2 chance of occurring in any given year and is therefore quite common and unremarkable. A 1 in 100year return period has a 1% or 1in100 chance of occurring in any year and is therefore rarer and more impactful.
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 I.
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 B.

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.
Department for Levelling Up, Housing and Communities	The government department which sets policy on local government, housing, urban regeneration, planning and fire and rescue. They provide funding to and agree expenditure plans for Local Authorities.
National Flood Forum (NFF)	A charity to help, support and represent people at risk of flooding.
Ordinary watercourse	A watercourse that is not a designated Main River. On ordinary watercourses the LLFA 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).
Resilient network	Approximately 16% of the total WCC maintained highway network. The resilient network is given priority during severe weather to minimise any impact on economic activity and access to key services.
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 (STW)	See Appendix B.
Warwickshire County Council (WCC)	See Appendix B.

6.2 Appendix B – 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.

6.2.1 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.

6.2.2 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.

6.2.3 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.

6.2.4 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.

6.2.5 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.

6.2.6 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