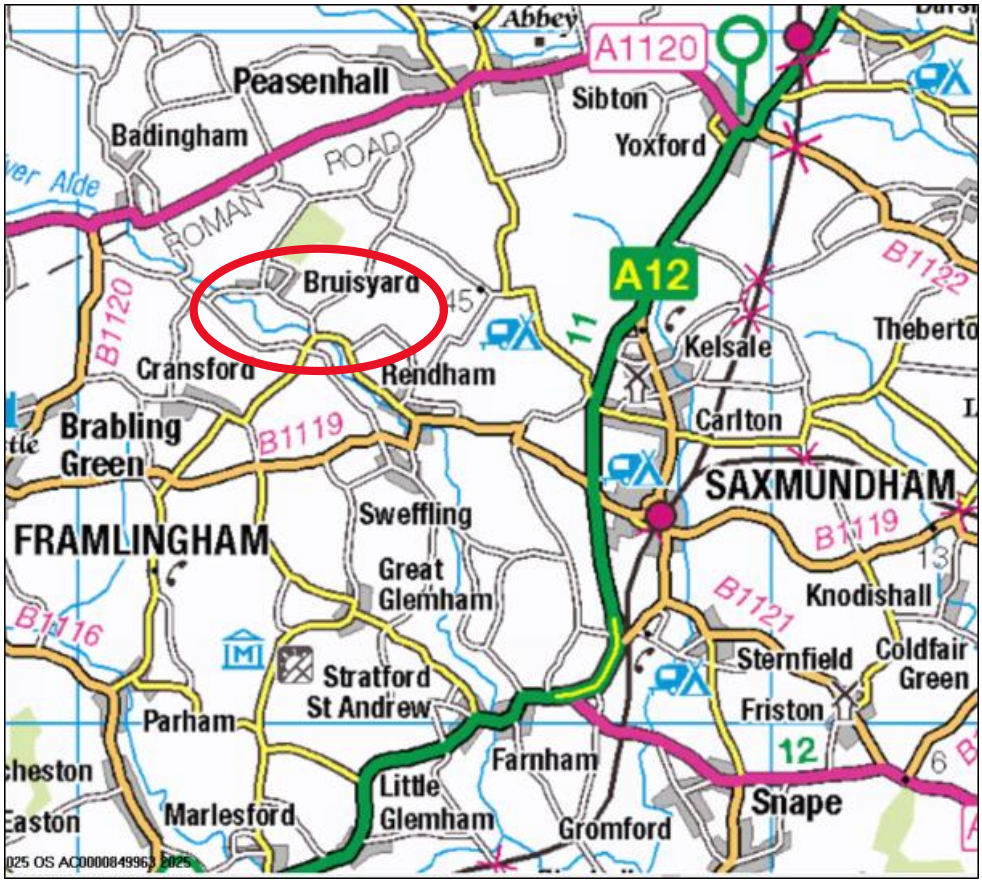
Section 19 Flood and Water Management Act 2010

Bruisyard Flood Investigation –

Storm Babet 2023



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Executive Summary

Storm Babet caused significant disruption to communities across Suffolk between 18th-21st October 2023. Bruisyard was a community that was significantly impacted, with 5 properties suffering internal flooding as well as disruption to infrastructure and services. Suffolk County Council, as Lead Local Flood Authority, have therefore undertaken a Section 19 Flood Investigation. The resulting report will:

- highlight the probable causes of flooding
- identify options to reduce future flood risk and increase property resilience
- make recommendations for actions by relevant responsible organisations, landowners or homeowners.

Bruisyard lies in an area with a high risk of fluvial (river) flooding, along with some localised pluvial (surface water) flood risk. The surrounding topography and geology further increase the community's vulnerability to flooding.

Areas of Bruisyard are low-lying, surrounded by a reasonably steep rural catchment. There are multiple flow paths flowing into Bruisyard from the higher ground from the north, northeast and Southwest of the village, before converging in the village where the gradient is noticeably shallower. The local geology and soils are characterised as having low permeability and high run off, making a high number of properties in Bruisyard vulnerable to flooding due to intense rainfall events.

Storm Babet delivered significant rainfall to the catchment, following an extended period of above average rainfall. Impacts within Bruisyard were localised and for the purposes of this report, the affected areas have been categorised into one distinct zone. The description of the flood events detailed in the report have been compiled using data submitted to Suffolk County Council, as well as information from Risk Management Authorities (e.g. Suffolk County Council Highways and Anglian Water) and the community.

A comprehensive summary of the location of internal flooding is provided within the report, outlining the context of the event and the impact. Key findings are that Bruisyard was severely impacted by flooding due to the intensity of rainfall, that overwhelmed the natural flow routes and the capacity of watercourses and drainage infrastructure.

Short, medium and longer term recommendations have been published and each have a potential role to improve resilience and reduce the risk of flooding to Bruisyard. For short term measures, key highlights include the implementation of community flood plans, maximising Property Flood Resilience (PFR) grants, as well as investigations into local drainage infrastructure. For medium to longer term recommendations, there

is emphasis on the management of water from rural land and the creation of new natural flood management features, to reduce flood risk within the catchment.

Justification for Investigation

Suffolk County Council, Lead Local Flood Authority (LLFA) has determined that in accordance with our criteria, it is considered necessary and appropriate to carry out an investigation into this flood event.

This is in accordance with Section 19 (1) of the Flood and Water Management Act 2010, and in accordance with Section 19 (2) of the Flood and Water Management Act 2010, to publish the results and notify the relevant risk management authorities (RMAs).

Section 19 Local authorities: investigations

(1) On becoming aware of a flood in its area, a lead local flood authority 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 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*

Criteria for an investigation (as per Appendix D of the Suffolk Flood Risk Management Strategy):	
There was a risk to life because of flooding?	
Internal flooding of one property (domestic or business) has been experienced on more than one occasion?	
Internal flooding of five properties has been experienced during one single flood incident	✓
Where a major transport route was closed for more than 10 hours because of flooding	
Critical infrastructure was affected by flooding	
There is ambiguity surrounding the source or responsibility of a flood incident	

Understanding the flood context

1. What happened during Storm Babet

A succession of weather fronts between the 11th and 13th of October 2023 brought significant rainfall to the region. Readings indicate that between 30mm and 50mm of rain fell across Suffolk compared with an average of just less than 65mm across the whole month of October according to Met Office weather data (Met Office, 1991-2020). This significant rainfall occurred in a short space of time and resulted in saturated land and rivers reaching their capacity. Shortly after this, Storm Babet followed on the 18th to 21st of October 2023. The storm brought between 50 mm and 80 mm of rain to much of central and northern East Anglia, with some Suffolk weather stations recording the wettest October day on record.

The Environment Agency river level measuring stations indicated many flows close to or exceeding their highest on record, and the weather remained wetter than average for the rest of the month. October 2023 was the joint wettest on record in the east of England since 1871. During Storm Babet, Suffolk saw the heaviest rainfall across East Anglia causing significant flooding of roads and properties. The river systems rose rapidly across whole catchments due to the existing conditions, which was unusual as storms will often impact a small area and result in a steady progression of flood water downstream. A major incident was declared by the Suffolk Resilience Forum (SRF) in the afternoon of the 20th of October due to significant impacts on communities and disruption to the road and rail networks.

The following maps illustrate the extent to which the rainfall in the months preceding Storm Babet exceeded the average monthly rainfall for July to October in recent years in Suffolk.

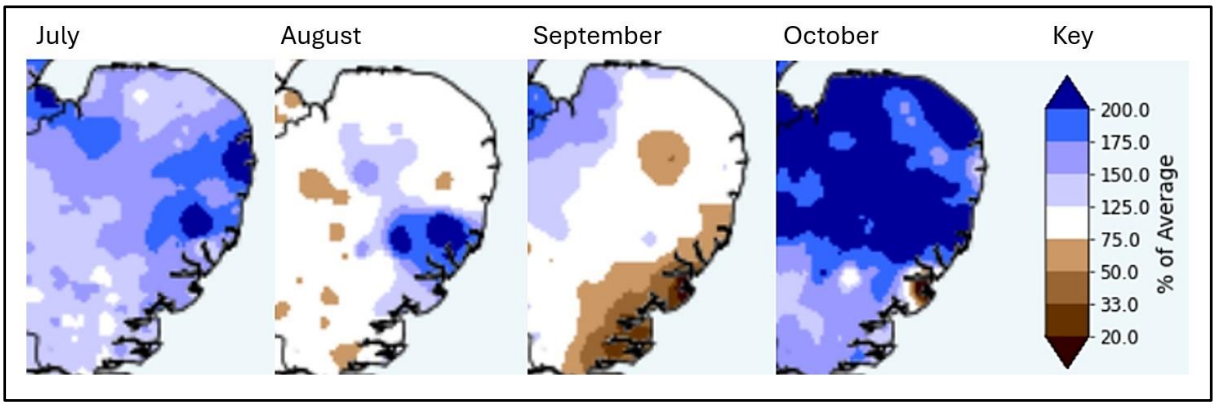


Figure 1 - Average rainfall in East Anglia between July and October 2023 as a percentage of the historical average monthly rainfall

The following report acknowledges that October 2023, and in particular Storm Babet, was an extreme event and will assess the likely causes and impacts. The report will recommend measures to reduce the risk of flooding within the location, in line with best practice, ranging from large to small scale interventions and be targeted at a range of stakeholders. It should be noted that Storm Babet was a significant event, with a low probability of recurrence. The recommendations will provide advice about reducing flood risk; however, they should not be relied upon as a guaranteed failsafe to mitigate against all future flooding.

2. Location of flooding

Bruisyard Street is part of Bruisyard, a village and parish situated in the Alde River valley. It is in the local authority district of East Suffolk. The village is approximately 4.5 miles northeast from the market town of Framlingham.

Figure 2 - Investigation area map

The Environment Agency has permissive powers to carry out maintenance, improvement or construction work on main rivers to manage flood risk. The Internal Drainage Boards (IDBs) have similar permissive powers but instead relate to ordinary watercourses within their board area.

Lead Local Flood Authorities (LLFAs) and Internal Drainage Boards (IDBs) manage the flood risk from ordinary watercourses but responsibility for maintaining watercourses rests with the Riparian landowner, defined as those who have a river, stream or ditch which runs next to or through their land or property.

Figure. 3 below, shows the most significant watercourses (designated main river) in and around Bruisyard. The river Alde is a main river which flows from west to southeast, passing Bruisyard Street and then flowing east towards Saxmundham. The river becomes tidal from Snape, joining the North Sea in the northeast.

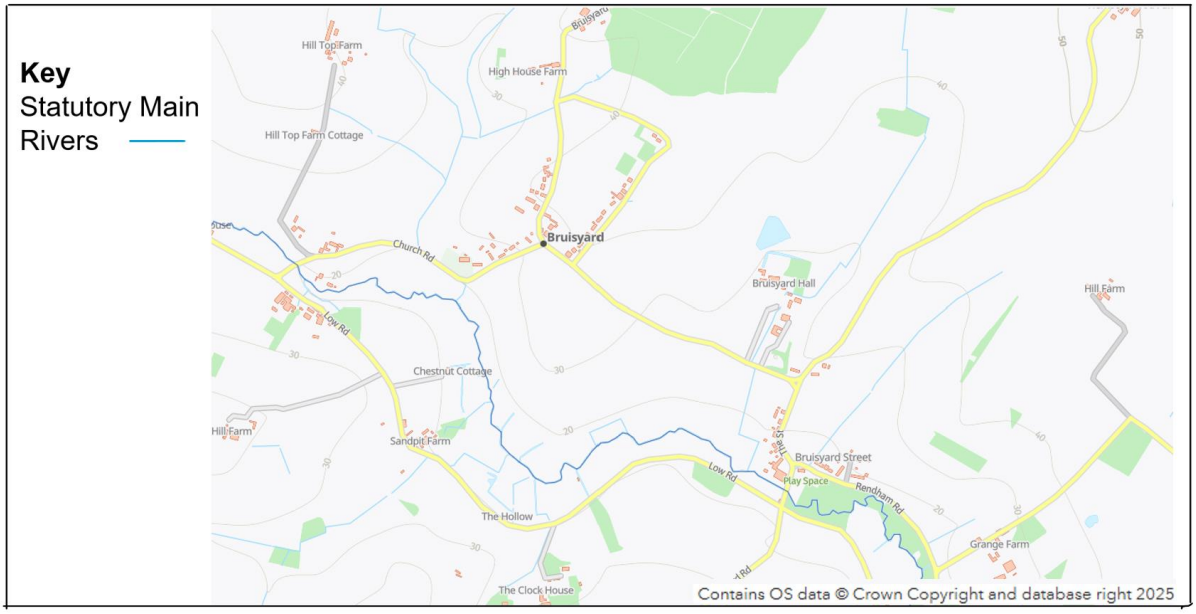
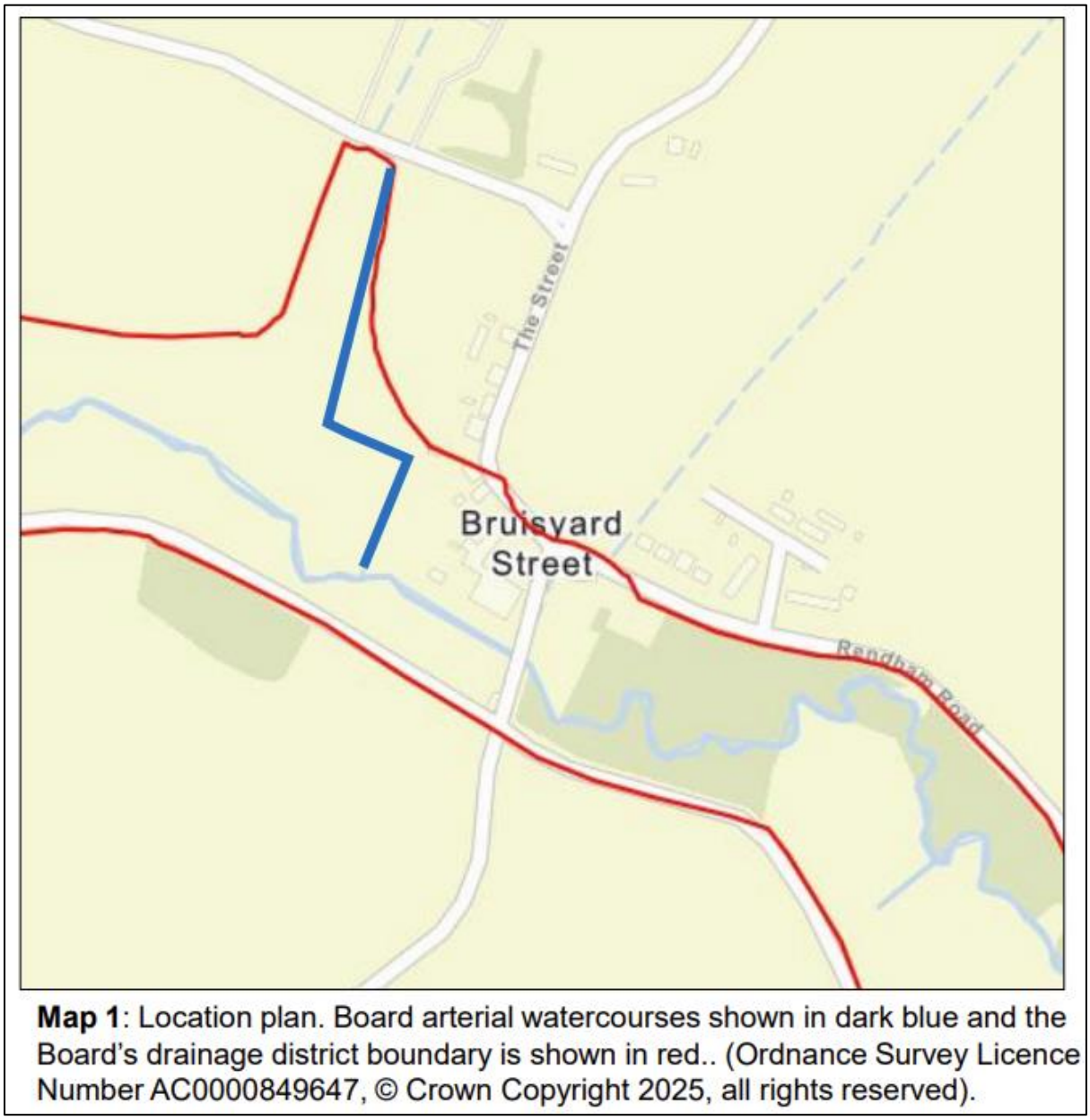


Figure 3 - Location of statutory main river and ordinary watercourses

The East Suffolk Water Management Board (ESWMB) manages flood risk for the ordinary watercourses flowing into the River Alde. Figure 4 outlines the Boards arterial watercourse which is located within Bruisyard and is known as ‘Bruisyard Hall Drain’ (DRN175G0501). As a Board arterial watercourse this is subject to an annual maintenance regime from the Board’s operatives.



Map 1: Location plan. Board arterial watercourses shown in dark blue and the Board's drainage district boundary is shown in red.. (Ordnance Survey Licence Number AC0000849647, © Crown Copyright 2025, all rights reserved).

Figure 4 - Area of East Suffolk Water Management Board responsibility for flood risk in ordinary watercourses

On the 20th of October 2023, Storm Babet resulted in significant rainfall in Suffolk on top of an already wetter than average October. This caused internal flooding to properties, residential and commercial, across the county from various flooding sources. Bruisyard Street was impacted with 5 properties reporting internal flooding. Flood water was described as coming from multiple sources including surface water runoff from surrounding fields and highways (pluvial) and the overtopping of local watercourses (fluvial).

For the purposes of this investigation the areas affected by flooding have been separated into one distinct location (see Figure 5). The location is as follows:

1. The Street

Figure 5 - Bruisyard investigation area map with locations

3. Records of any historical flooding

The Environment Agency holds one historical record of flooding for the area of Bruisyard. The record notes 4 properties reported flooded around The Street between 11th -15th October 1993.

The Internal Drainage Board (IDB) have no records of flooding following storm Babet

Suffolk Highways have historical records of flooding on the road at Blacksmiths Corner, opposite The Forge on The Street.

4. Predicted Flood Risk

Several areas of Bruisyard Street are at risk of flooding from pluvial and fluvial sources.

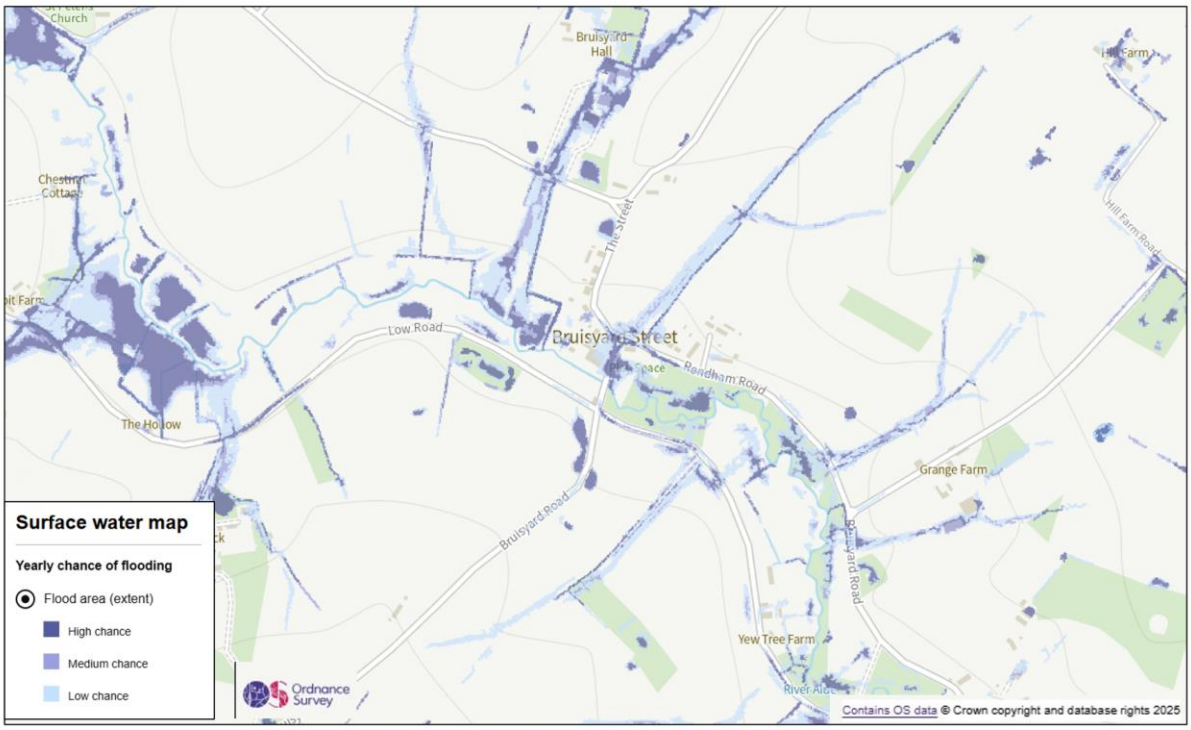


Figure 6 - Flood risk from surface water

Figure 6 highlights the predicted pluvial (surface water run-off from surrounding land and highways) flood risk in Bruisyard Street, with multiple flow paths from the north, northeast and, southwest, coming into the village and joining the river Alde.

There is a medium chance of surface water flooding on sections of The Street. This aligns with the flood risk mapping for the area.

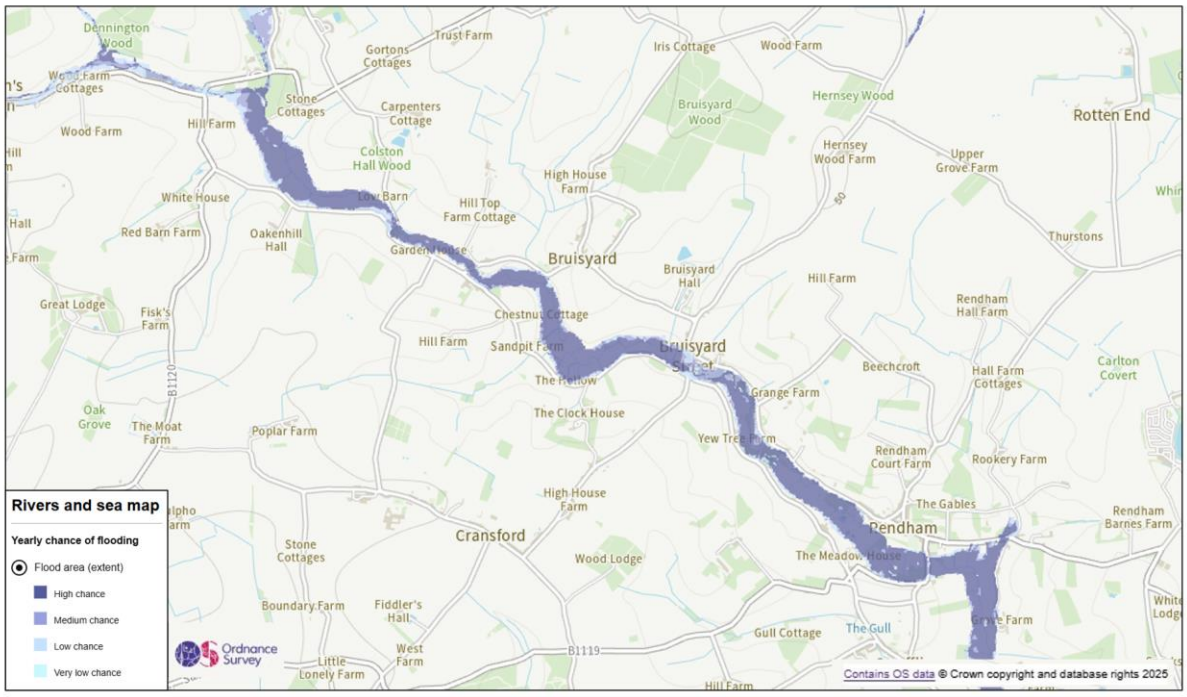


Figure 7 - Flood risk from rivers and sea

Figure 7 shows the predicted fluvial (from designated main river and ordinary watercourses) flood risk in Bruisyard Street. The fluvial flood risk in Bruisyard is predominantly associated with the river Alde, which flows northwest to southeast through the village.

There is a low to medium chance of fluvial flooding on sections of The Street. This area was affected by flooding during Storm Babet.

5. Catchment characteristics

Bruisyard Street is east of the main village of Bruisyard and is situated in the Alde valley. The village is surrounded by higher ground to the north, east and west. Ordinary watercourses flow into the village from the upper catchment to the north and south.

At the bottom of the catchment, Snape sluice marks the tidal limit for the Alde and Ore estuary which flows to the North Sea. Snape is approximately 9 miles southeast of Bruisyard.

The low-lying nature of Bruisyard in the valley of the river Alde means that during high rainfall events, considerable overland flowpaths converge upstream and flow through Bruisyard bringing floodwater in close proximity to many properties in the village. Overwhelmed drainage infrastructure may frequently be observed during these intense rainfall events.

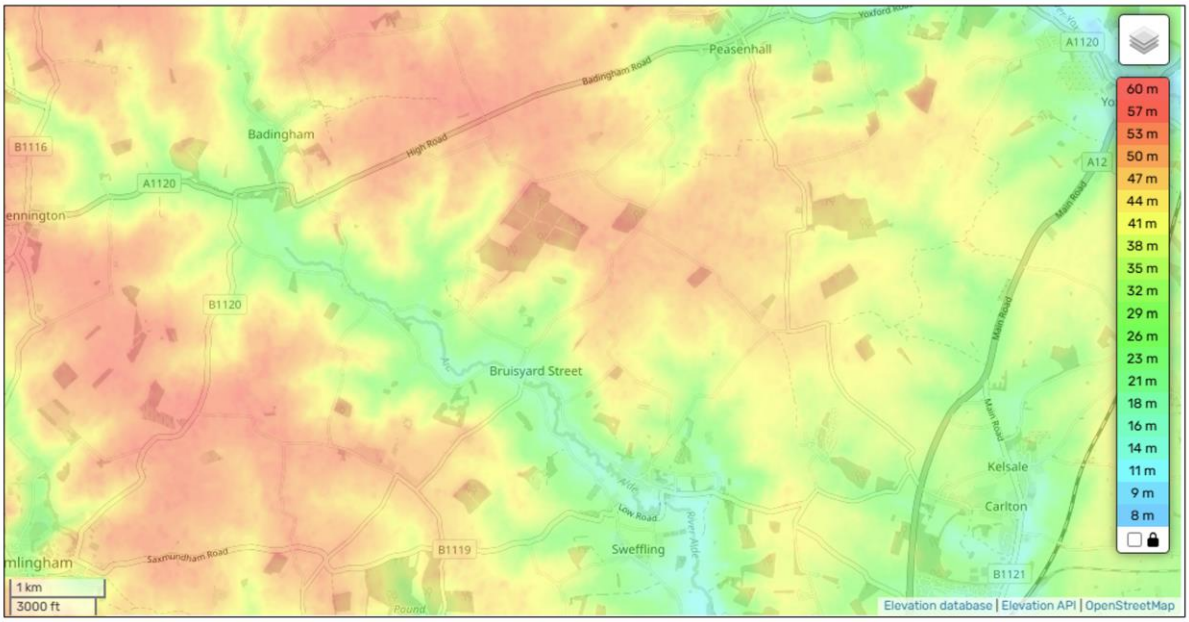


Figure 8 - Bruisyard and surrounding topography (TessaDEM as cited in topographic-map.com)

Figure 8 shows the topography surrounding Bruisyard with gradient changes across the wider region. Bruisyard village is situated low in the landscape generally and some of the lowest points in Bruisyard are along The Street. This location was identified as being some of the worst affected areas during Storm Babet.

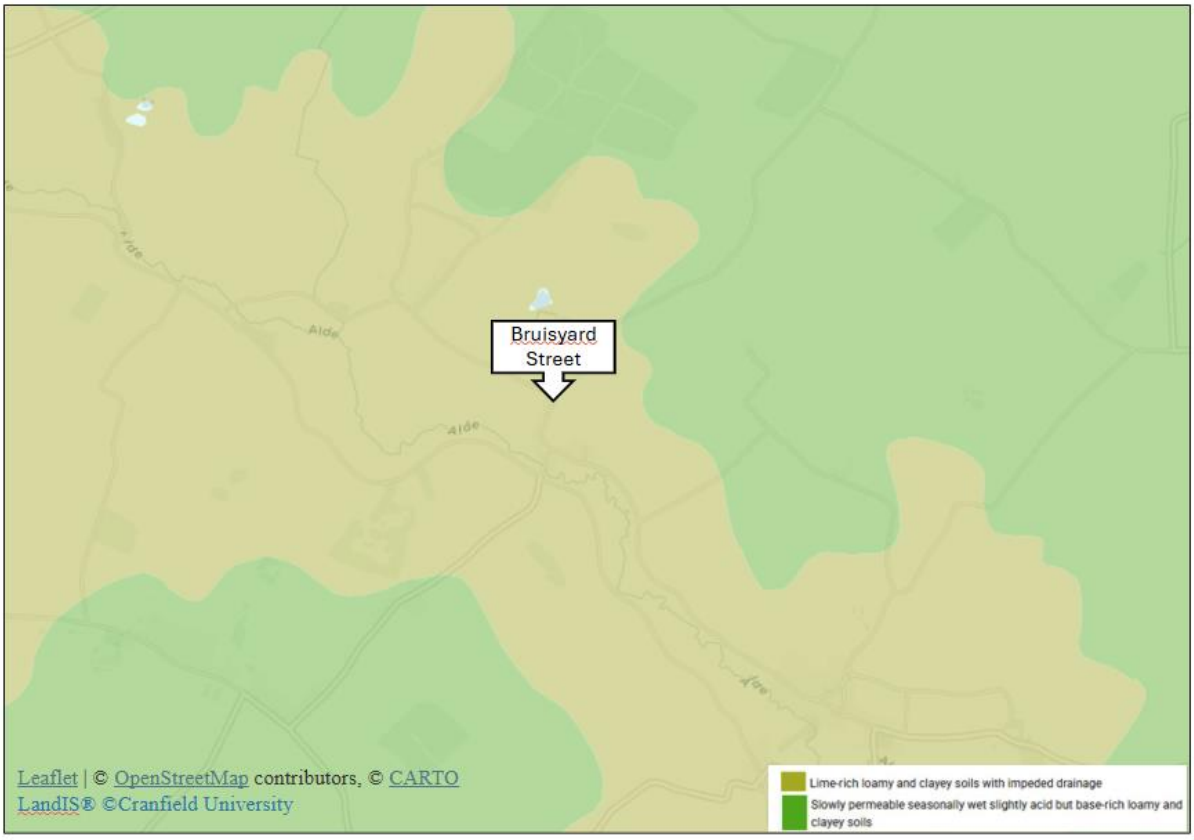


Figure 9 - Soil map (LandIS Soilscapes)

The soils surrounding Bruisyard are loamy and clayey with impeded drainage, meaning that water permeates more slowly and surface water runoff is greater, particularly during intense rainfall. The saturated nature of the soils leading up to storm Babet, would have also prevented some infiltration, increasing runoff.

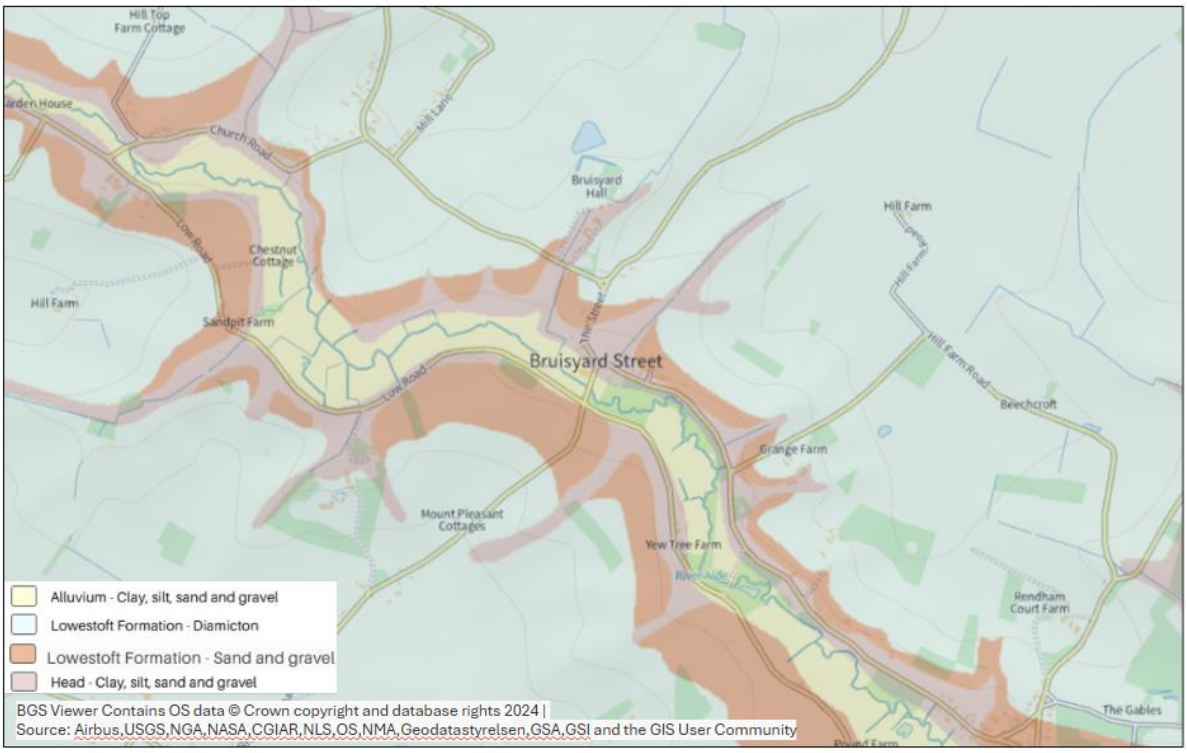


Figure 10 - Superficial Geology (BGS Viewer)

Lowestoft Formation 'Diamicton' surrounds Bruisyard which is described by the British geological survey as a diverse mixture of clay, sand, gravel, and boulders varying widely in size and shape. This generally has a low permeability, meaning water will tend to flow off it before it can be infiltrated.

The low-lying nature of much of Bruisyard, with surface water flow paths merging into the river Alde and the low permeability of the surrounding soils, make it susceptible to flooding in extreme rainfall events.

Flooding Source(s), Pathway(s) & Receptor(s)

Storm Babet was an extreme event which came at a time when Suffolk had experienced a significant amount of rainfall in the preceding week.

Storm Babet delivered significant rainfall in the catchment between 19 and 20 October. The nearest rainfall gauge to Bruisyard is in Benhall Green. At the Benhall Green rainfall gauge there was 44mm of rain recorded in a 12-hour period. At the Woodbridge rainfall gauge there was 52.4mm of rain recorded over a period of 17hrs between 19 Oct and 20 Oct. More than half (31.4mm) of the rainfall was received in just over 4hrs between 06:45am to 11:00am on 20 October.

The Environment Agency issue two types of warning when flooding is possible from a main river. These are:

1. Flood Alert – Flooding is possible. Be prepared. - usually issued between 2 and 12 hours before flooding.
2. Flood Warning - Flooding is expected. Immediate action required – usually issued 30 minutes to 2 hours before flooding.

Bruisyard is not covered by the Environment Agency Flood Warning Service.

The description of the flood events described below will discuss the probable sources of flooding, the observed flow paths through the community and the receptors which have been affected. The term ‘floodwater’ may be used to describe both fluvial (water from a watercourse) and pluvial (surface water run-off) flooding. This section has been prepared using reports submitted to Suffolk County Council via the online Highways Reporting Tool and information gathered by Risk Management Authorities (RMAs) and the community.

A detailed description of the investigation area can be found in the following section.

1. The Street

All properties were reported as being flooded directly from the river Alde overtopping its banks. Properties began flooding from behind, with flood water coming through back gardens at pace and then entering thresholds. One property also experienced surface water flooding from nearby fields and the highway. One resident reported seeing sewerage within the flood water in their back garden. Depths were reported as being approximately 30cm internally and 25cm externally.

The majority of the highway drainage assets in this area were recorded as being operational. At the crossroads with The Street and Bruisyard Road, it was noted that one asset was slow running, and one being non-operational prior to Storm Babet. Two assets located at the junction of The Street and Rendham Road were possibly not operational at the time of the event. Nevertheless, due to the intensity of rainfall and

the large volumes of runoff generated, it is considered unlikely that the gully's operation would have materially reduced flooding in this location

One resident reported highway assets in the area being covered with debris, hindering water being able to escape. It is likely large amounts of silt and sediment had been carried from the surrounding fields onto the highway by the massive surface water flows seen during Storm Babet. The bridge nearby (Bruisyard Arch) was also reported to have held up the water. The last inspection for this asset was in November 2024 and it was found to be clear, with no concerns.

During Storm Babet the existing highway drainage assets on The Street were overwhelmed by the sheer amount of floodwater. It is likely the water had nowhere to drain to, as the watercourse into which the gullies drain, was so high and flooding out of bank itself.

The floodwater flowpaths observed on The Street during Storm Babet closely match the national fluvial flood risk mapping (see Figure 11). Sections of The Street are characterised as having a low to medium yearly chance of fluvial flooding. The yearly chance of pluvial flooding on The Street ranges from low to medium in different areas (Figure 5).

One of the properties also experienced flooding from the front, with water draining off the fields. One resident reported sewage in the flood water, in their garden and stated that Anglian Water were undertaking works nearby. We spoke to Anglian Water, who do not have assets in this area, Essex and Suffolk water provide drinking water. It was suggested the foul water could have been from a private sess pit which had been overwhelmed with flood water.

One resident commented that the flood water levels may have been affected by the sluice gates at Snape. On the day of the flooding, the high tide at Iken Cliffs was at approximately 04.56 and 17.17. The sluice gate at Snape (through which the river Alde flows to the Alde and Ore estuary and subsequently into the North Sea) is a passive structure without external power supply, which operates in relation to the relative fluvial and tidal water levels. At high tide the pressure of the tidal waters closes the gates to protect the upstream freshwater environment from undesirable saltwater incursion. Low tide was 11.24 and 23.31 respectively, therefore this would not have impacted the flooding in Bruisyard.

In Summary:

- Following heavy rainfall, high water levels flowed down the River Alde and other local watercourses. Water levels exceeded the capacity of the channel in multiple locations and flowed into the back gardens of affected properties.
- Drainage assets on Bruisyard Street were overwhelmed by the sheer amount of floodwater. It is likely the water had nowhere to drain to, as the watercourse into which the gullies drain, was so high and flooding out of bank itself.

- Some highway assets located along The Street were possibly not operational at the time of the event.
- Surface water from the fields along Bruisyard Street also compounded flooding to properties.

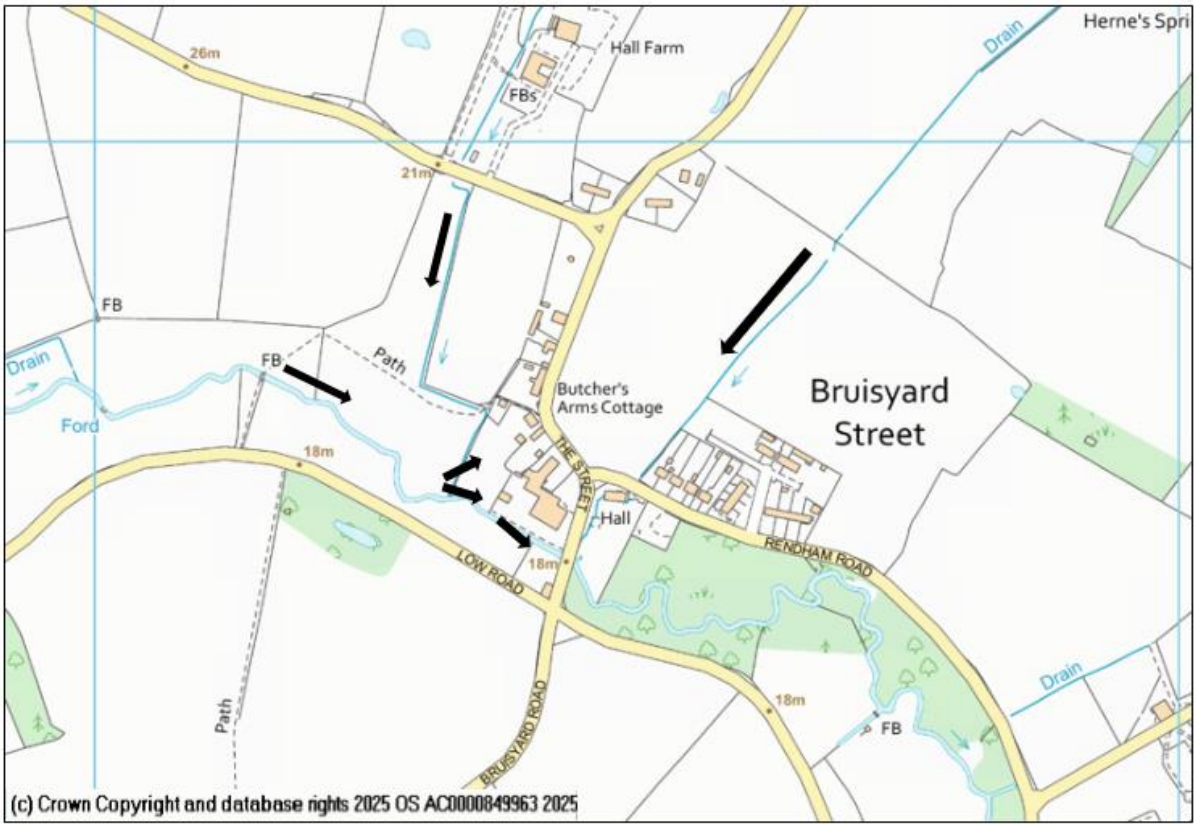


Figure 11 - Approximate flood water flow routes along Bruisyard Street

Figure 12 - Fluvial flood risk on The Street

LLFA recommended action(s):

- Residents to install Property Flood Resilience (PFR).
- Riparian landowners to carry out appropriate watercourse maintenance to reduce flood risk as necessary as per their riparian responsibilities.
- Explore potential NFM projects to 'slow the flow' and attenuate water on overland flow paths northeast of Bruisyard Street, E.g. storage ponds, wetland areas, field bund.
- Suffolk Highways to ensure the completion of highway drainage asset cyclic maintenance on The Street.
- Suffolk Highways to investigate non-operational and slow running assets on the junction of The Street and Bruisyard Road
- Landowners / General public to report any observed blockages below Bruisyard Arch on the Suffolk Highways Online Reporting Tool.
- Bruisyard Parish Council to investigate utilising the Suffolk Highways Community Self Help scheme to help manage localised flooding.

Risk Management Authorities, Non Risk Management Authority and flood risk function(s)

The following section acknowledges both RMA's and Non-RMA's relevant to the location and provide an overview of their flood risk functions. The table has been compiled from information collated as part of the investigation. It is not exhaustive and it should be acknowledged additional organisations and groups may be active within the community.

Risk Management Authority	**Relevant Flood Risk Function(s)**
Suffolk County Council	Lead local Flood Authority (LLFA), Highways Authority & Asset Owner
The Environment Agency (EA)	Lead organisation for providing flood risk management under its permissive powers and issuing warnings of flooding from main river
Essex and Suffolk Water	Asset owner supplying water and water recycling services
East Suffolk District Council	Local Planning Authority (LPA) & Asset Owner
Internal Drainage Board (IDB)	Internal Drainage Board (IDB) Supervising land drainage and flood defence works on ordinary watercourses
Non-Risk Management Authority	**Relevant Flood Risk Function(s)**
Private Landowners	Riparian responsibilities and management of water from land or watercourses
Private Homeowners	Improving flood resilience to property and some riparian responsibilities if adjacent to watercourses.
Bruisyard Parish Council	Manage flood risk at a community level, prepare and produce flood action plans and maintain watercourses where present on land they own

Action(s) completed to date:

The following section acknowledges actions that RMA's and Non-RMAs have implemented or are currently in progress since Storm Babet and prior to publishing of this report.

Action	Risk Management Authority	Progress
Offer of Property Flood Resilience (PFR) measures to the properties that flooded during Storms Babet.	Suffolk County Council Lead Local Flood Authority	Application window now closed. Installation of PFR measures on approved applications has been extended to December 2025.
Ensure riparian landowner responsibilities are understood with regard to watercourse management.	Suffolk County Council Lead Local Flood Authority	SCC published "Flood Smart Living" online and hard copy guide to increasing flood resilience for residents, landowners and communities, December 2024.
Understand the annual event probability of the rainfall & river flow across the region.	The Environment Agency (EA)	Complete. Details of the report can be found on the SCC website or at the following https://www.suffolk.gov.uk/roads-and-transport/flooding-and-drainage/storm-babet

LLFA Recommended Action(s):

The following section provides a range of flood mitigation measures that could be implemented to reduce the risk of flooding in Bruisyard Street. They have been derived from data and evidence collated as part of the report and have been included having been considered realistic in their implementation. The implementation of actions falls to the responsible party. Progress on the action will be monitored by Suffolk County Council, but it should be acknowledged that the council has limited powers to enforce the implementation of recommended actions.

Action	Responsible Party	Timescale for response	Latest Progress Update for Actions
Short Term Actions (e.g. standard maintenance activity and initial investigation of options that can be undertaken with limited need for forward planning)			
Establish a Community Emergency Plan that includes plans to manage future flood events – Liaison with Suffolk Joint Emergency Planning Unit.	Bruisyard Parish Council	6 months	
Residents to consider installing Property Flood Resilience (PFR) measures to property to reduce damage caused by flooding.	SCC LLFA / Residents	N/A	DEFRA PFR Grant has now closed for new applications. Installation of PFR measures on approved applications has been extended to December 2025. Further information on PFR measures can be found within SCC published "Flood Smart Living" handbook. There is currently no active PFR schemes being managed by the LLFA in Suffolk.
Riparian landowners to carry out appropriate watercourse maintenance to reduce flood risk as necessary as per their riparian	Riparian landowners	N/A	Further information on Riparian Ownership can be found within SCC published "Flood Smart Living" handbook.

responsibilities (See Appendix A).			
Investigate utilising the Community Self Help scheme to help manage localised flooding	Bruisyard Parish Council / Suffolk Highways	6 -12 months	Further information can be found at the following https://www.suffolk.gov.uk/roads-and-transport/highway-maintenance/community-self-help-scheme
Suffolk Highways to ensure the completion of highway drainage asset cyclic maintenance on Bruisyard Street, including the junction with Rendham Road and the junction with Low Road	Suffolk Highways	Annually	Ongoing. Routine cleansing of the gullies will be completed in line with the set cycles (annual or biennial).
Suffolk Highways to investigate operational performance of assets at the junction of Bruisyard Street and Low Road.	Suffolk Highways	6-12 months	
Medium Term Actions (e.g. longer planning timescales and potential need to source funding but potential for greater impact)			
Explore potential NFM measures which aim to attenuate water and 'slow the flow' on overland flow paths in the catchment's northeast of Bruisyard Street e.g. Storage ponds, wetland areas, field bunds	Landowners, supported by relevant authority, resource dependant (SCC LLFA, EA)	12 - 24 months	
Investigate opportunities to update	Local Planning Authority, SCC LLFA	12 months+	

development plan policy in Neighbourhood Plans or any potential Joint Local Plan site allocation(s) which identify risks and opportunities to mitigate flood risk issues as development comes forward.			
Long Term actions (significantly longer timescale and budget required with potentially greater positive impact)			
Installation of NFM features within upper catchments to attenuate and slow flood water if investigation works suggest it is viable.	Landowners, supported by relevant authority, resource dependant (SCC LLFA, EA)	TBC	
Deliver any capital interventions that are economically, technically and environmentally feasible and acceptable to improve flood resilience	Landowners, supported by relevant authority, resource dependant (SCC LLFA, EA)	TBC	

Approval

This report will be reviewed and updated every 6 months until actions are marked as complete.

Reviewer	Date of Review

Disclaimer

This report has been prepared and published as part of Suffolk County Council's responsibilities under Section 19 of the Flood and Water Management Act 2010. It is intended to provide context and information to support the delivery of the local flood risk management strategy and should not be used for any other purpose.

The findings of the report are based on a subjective assessment of the information available by those undertaking the investigation and therefore while all reasonable efforts have been made to gather and verify such information 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. Should there be additional information available to develop the report, please email to floodinvestigations@suffolk.gov.uk

The opinions, conclusions and recommendations in this Report are based on assumptions made by Suffolk County Council when preparing this report, including, but not limited to those key assumptions noted in the Report, including reliance on information provided by third parties.

Suffolk County Council expressly disclaims responsibility for any error in, or omission from, this report arising from or in connection with any of the assumptions being incorrect.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the time of preparation and Suffolk 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 Flood Investigation Reports 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 Suffolk County Council highlighting flooding to properties at a street level. Property owners and prospective purchasers or occupiers of property are advised to seek and rely on their own surveys and reports regarding any specific risk to any identified area of land.

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Appendix A – Indicative locations for NFM and watercourse maintenance