

Flood Investigation Report

Otter Valley Floods 9 May 2023

(Including all reported flooding within the County on this date)



Front cover image:

Road flooding in Tipton St John and Metcombe on 9 May 2023. Photo Credit: Alex Wren via BBC at: <https://www.bbc.co.uk/news/uk-england-devon-65537882>

This flood investigation report has been produced by Devon County Council as a Lead Local Flood Authority under Section 19 of the Flood and Water Management Act 2010.

Version	Undertaken by	Reviewed by	Approved by	Date
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Final	Thomas Aldridge Jago Burris	Jessica Bishop	Martin Hutchings	17/10/2023

This report covers the flooding incident on 9 May 2023 and has identified all flooded properties within the County that we have been able to determine or brought to our attention. Based on the criteria set out in our Local Strategy this single report covers the requirement for a total of 5 Section 19 Flood Investigation Reports together with information relating to other flooding within the county that does not reach the normal criteria for S.19 investigation.

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1. Introduction

The Flood Risk Regulations 2009 and the Flood and Water Management Act 2010 (the Act) have established unitary and upper tier local authorities as the Lead Local Flood Authority (LLFA) for their area. This has placed a number of responsibilities on the LLFA in relation to flood risk management and in particular Section 19 of the Act which states:

Flood and Water Management Act 2010: 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.

Flood and Water Management Act (2010), S.19, c.29, London: HMSO

A 'Risk Management Authority' (RMA) means:

- (a) the Environment Agency (EA),
- (b) a lead local flood authority,
- (c) a district council for an area for which there is no unitary authority,
- (d) an internal drainage board,
- (e) a water company, and
- (f) a highway authority.

When considering if it is necessary or appropriate to investigate a flood event Devon County Council (DCC) will review the severity of the incident, the number of properties affected and the frequency of such an occurrence. Devon's Local Flood Risk Management Strategy clearly sets out the criteria to be used when considering a Flood Investigation Report.

Although not all of the locations in this report meet the significance threshold of 5 or more properties flooded, to ensure that the full extent of the flooding is appreciated and recorded it has been decided to include all locations brought to our attention which experienced any internal property flooding, and also other areas of particular concern.

In partnership with the other RMAs in Devon this report has been produced to comply with legislation and to determine the main causes of the flooding. It should be noted that in order to progress with their flood risk management

function DCC has opted to develop this report further by considering the various actions that should be considered by the relevant RMA. DCC as the LLFA will continue to monitor the list of actions with all of the RMAs and will assist in the delivery where practical to do so.

It should be noted that this report is only based on the information brought to the attention of DCC through its professional partners, the media and the public and where further investigation by the authorities have identified additional flooded properties. Therefore, it cannot be guaranteed to contain an exact or exhaustive list of individual properties or affected communities.

Please note, reports of flood depths vary between metric and imperial measurements depending on whether they have been measured or reported by others. To avoid giving the impression of precise depth measurements it has been actively chosen to not convert any imperial measurements provided by members of the public into metric measurements. For the purposes of clarity 1 inch would normally convert to 2.54cm.

Each affected area or group of smaller areas investigated within this report will have a number of recommended actions to be considered by the relevant RMAs or in some cases, by the landowner or local community action group. There are various levels of action that can be taken depending on the severity of the situation and the practical solutions available to reduce the risk of further flooding. The recommended actions will generally fall into one of the following categories:

Delivery of Quick win schemes: a solution that can be implemented quickly by the Risk Management Authorities or Local Authority at relatively low cost; some of these have already been completed as this report has been progressed.

Further investigation/research: Further investigations such as catchment studies and hydrological/hydraulic assessments to understand the flow rates and directional paths and evaluate the extent of flooding. These would provide evidence for future capital investment.

Development of future schemes: Where immediate action is not financially viable or a solution not readily available then a larger scale flood alleviation scheme may be required. In such cases national funding would need to be secured together with additional contributions from others, such as local levy, local authorities and other third parties.

Landowner action: Members of the public who own land adjacent to watercourses have riparian responsibilities and therefore have a duty to maintain their section of watercourse to ensure there is no impediment of flow. Other works to protect their property may also need to be funded by themselves to ensure delivery within their timescales.

Community action: In some cases, it may be prudent for community groups to join forces and deliver and maintain their own local schemes. There may be opportunities to generate further contributions from other Risk Management Authorities.

This investigation report will provide a starting point, with suggested actions being further refined in the light of further studies and where possible, through further dialog with the affected communities.

Recommended Actions:

The purpose of this report is to act as a tool for all of the relevant RMAs to understand and appreciate the extent of flooding in their area and to consider and prioritise those actions relevant to their authority. Due to the extent of flooding, not only from the events covered in this report, but the level of recommended actions also far exceeds the budgets and resources available to enable them to be delivered immediately. Although we take all flooding issues seriously it should therefore be appreciated that some actions may not be progressed within the timescales expected by some residents or communities. Every effort will be made to progress the actions if and when suitable funding is obtained.

The recommended actions highlighted in this report will be used by the LLFA to monitor progress achieved by the RMAs.

2. Risk Management Authority

2.1 Recording Flood Incidents

LLFAs must record flood incidents as part of their duties under the Flood and Water Management Act. The information below shows the national guidance given as part of the Preliminary Flood Risk Assessment Spreadsheet submission to the EA, which outlines information to be collected by LLFAs.

Information the LLFA must record

Devon County Council (DCC) will record this on the DCC flood incident database:

- Start Date
- Days duration
- Probability
- Main source: Surface water runoff; Groundwater; Ordinary watercourses; Artificial infrastructure; Main rivers; The sea; No data
- Main mechanism: Natural exceedance; Defence exceedance; Failure; Blockage or restriction; or No data
- Main characteristics: Natural flood; Flash flood; Deep flood; Snow melt flood; No data
- Significant consequences:
 - To human health (residential properties)
 - To economy (non-residential properties)
 - To the environment (designated sites flooded)

2.2 Key Responsibilities

RMAs in Devon all have their own roles and responsibilities. The general RMA responsibilities in relation to flood risk and surface water management are outlined below:

The Environment Agency (EA) is responsible for managing the risk from the sea, Main Rivers and reservoirs and has a strategic overview role for all flood risk management, making it a key local partner for DCC, especially when managing the risk from combined sources and in the event of a large flood incident. The EA also provides a flood warning service throughout England and Wales in areas at risk of flooding from rivers or the sea.

Devon County Council as the Lead Local Flood Authority is responsible for overseeing the flood risk from Ordinary Watercourses, groundwater and surface water runoff. They are also responsible for consenting to works on Ordinary Watercourses and enforcing the removal of any unlawful structure or obstruction within the watercourse. And, as previously stated they must ensure that a flooding investigation is carried out by the relevant authority and publish a report. DCC must also prepare a Local Flood Risk Management Strategy and maintain a register of flood risk assets.

Local District Councils are classified as land drainage authorities with discretionary powers under the Land Drainage Act, such as the implementation and maintenance of flood defences on ordinary watercourses.

They also have powers under the Public Health Act to ensure the removal of any blockage within an Ordinary watercourse that is considered a nuisance. As a planning authority they are responsible for the preparation of development plans and making decisions based on planning policy.

Devon County Council as the Highway Authority maintains the highway drainage system to reduce the amount of standing water on the highway. This is achieved by limiting the water on the roads and ensuring that they are kept clear of rainwater, including the maintenance of highway gullies and culverts.

National Highways is responsible for managing, maintaining, and improving the Motorway and trunk roads across England and any associated drainage and flood risk.

Land/Property Owners that have a watercourse in or adjacent to their land have riparian responsibilities on that watercourse. This means the landowner must:

- Let water flow through their land without any obstruction, pollution or diversion which affects the rights of others.
- Accept flood flows through their land, even if these are caused by inadequate capacity downstream.
- Keep the banks clear of anything that could cause an obstruction and increase flood risk, either on their land or downstream if it is washed away.
- Maintain the bed and banks of the watercourse and the trees and shrubs growing on the banks and should also clear any litter or debris from the channel and banks, even if it did not come from their land.
- Keep any structures, such as culverts, trash screens and debris grills, weirs and mill gates, clear of debris.

The LLFA must also take an overseeing role to ensure that all flood risk is being managed appropriately.

In small, localised groundwater and surface water flooding incidents which do not reach the threshold level to trigger a flood investigation by the LLFA under Section 19, the Local Authorities will work in partnership to consider the appropriate action.

All RMAs have a duty to co-operate and to share information in relation to their flood risk management functions.

Table 3.1 List of towns and villages affected

Location	Number of properties flooded	Source of flooding
East Devon		
Newton Popleford (Inc Burrow & Goosemoor)	61	Main River/Surface Water/Ordinary Watercourse
Tipton St John	11	Main River/Ordinary Watercourse/ Surface Water
Venn Ottery	9	Surface water/Ordinary Watercourse
Colaton Raleigh	8	Surface water/Ordinary Watercourse
Metcombe	7	Main River
Harpford	4	Surface water/Ordinary Watercourse
Stoneyford	3	Surface water/Ordinary Watercourse
Fluxton	2	Surface water/Ordinary Watercourse
Woodbury Salterton	2	Ordinary Watercourse
Ottery St Mary	1	Surface Water
Woodbury	1	Ordinary Watercourse
Teignbridge		
Christow	3	Surface Water
Exeter		
Quarry Lane	4	Surface Water/Ordinary Watercourse
Honiton Rd	2	Sewerage
Mid Devon		
Greenham	3	Ordinary Watercourse
West Devon		
Buckland Monachorum	2	Surface Water
Milton Combe	1	Surface Water
Total properties flooded: 124		

Antecedent conditions for this incident were wet within the Otter catchment with over 10mm of rainfall recorded on 8th May. Rain gauge data from the 9th May recorded unexceptional rainfall figures with the EA estimating the most significant recorded was a 1 in 9 year annual exceedance probability at the Exeter Met Office rain gauge (Table 3.2).

Table 3.2 Peak rainfall totals, estimated return periods, and rainfall as a percentage of the monthly long-term average provided by the EA

Devon 9th May 8 - 10 May 2023	Exe, Otter & Axe					
	BEER QUARRY LANE RG (45268)	EXETER MET OFFICE RG (45184)	EXMOUTH RG (45164)	KILLERTON BEARE (45169)	OTTERY RG (45230)	WOODBURY RG (45186)
Easting, northing	321177, 89615	295991, 93133	302700, 81900	298841, 101082	311450, 95600	300552, 87657
Peak rain rate (mm per hour)	10.8	44.0	6.0	19.6	15.2	19.2
Peak rain accumulation (mm)						
1 hour total	7.3	20.9	6.0	8.2	11.5	7.0
2 hour total	12.7	26.1	9.4	13.9	18.7	9.5
3 hour total	15.8	37.4	12.1	17.2	22.8	11.5
4 hour total	16.3	39.7	12.5	19.3	24.9	13.9
6 hour total	16.6	41.4	12.7	19.3	26.1	14.5
Return period (years) for FEH22						
Note: These results are calculated from linear interpolations of the FEH Web Service DDF files, and may deviate slightly from the actual FEH13/FEH22 model.						
Peak 1 hour total	<2	5.1	<2	<2	<2	<2
Peak 2 hour total	<2	3.9	<2	<2	<2	<2
Peak 3 hour total	<2	9.0	<2	<2	<2	<2
Peak 4 hour total	<2	8.0	<2	<2	<2	<2
Peak 6 hour total	<2	5.9	<2	<2	<2	<2
% LTA						
Peak 1 hour total	14.8	N/A	11.8	N/A	N/A	N/A
Peak 2 hour total	25.7	N/A	18.5	N/A	N/A	N/A
Peak 3 hour total	32.0	N/A	23.9	N/A	N/A	N/A
Peak 4 hour total	33.0	N/A	24.7	N/A	N/A	N/A
Peak 6 hour total	33.6	N/A	25.0	N/A	N/A	N/A

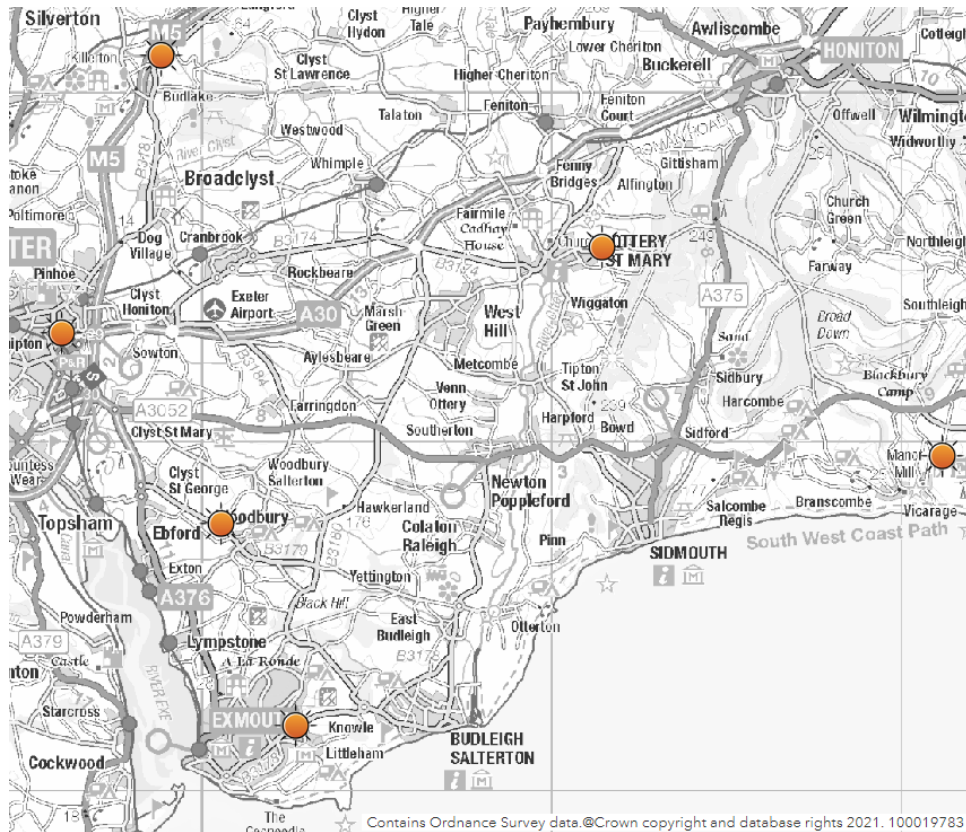


Figure 3.2. OS Map highlighting the EA rain gauges referenced in Table 3.2.

The hydrology team at the EA have compared this to the radar data (Figure 3.3) and highlighted that the heaviest rainfall seen near Newton Poppleford and Greenham, Wellington weren't captured by the rain gauge network.

A local resident's gauge on the edge of Newton Poppleford recorded over 65mm of rainfall on 9th May with 29.8mm falling within a 1hr period, whilst other private rain gauges have suggested 50-70mm in a 2hr period. One of which recorded the 2 hr rainfall as higher than any they've recorded in a 24hr period since 2000. The accuracy of this can't be confirmed and there is also the chance it was impacted by hail, it does give an indication of the intensity of the rainfall affecting the Otter Valley settlements and the localisation of this rainfall. The private gauge data has not been utilised in the EA Hydrology team's assessment of the event.

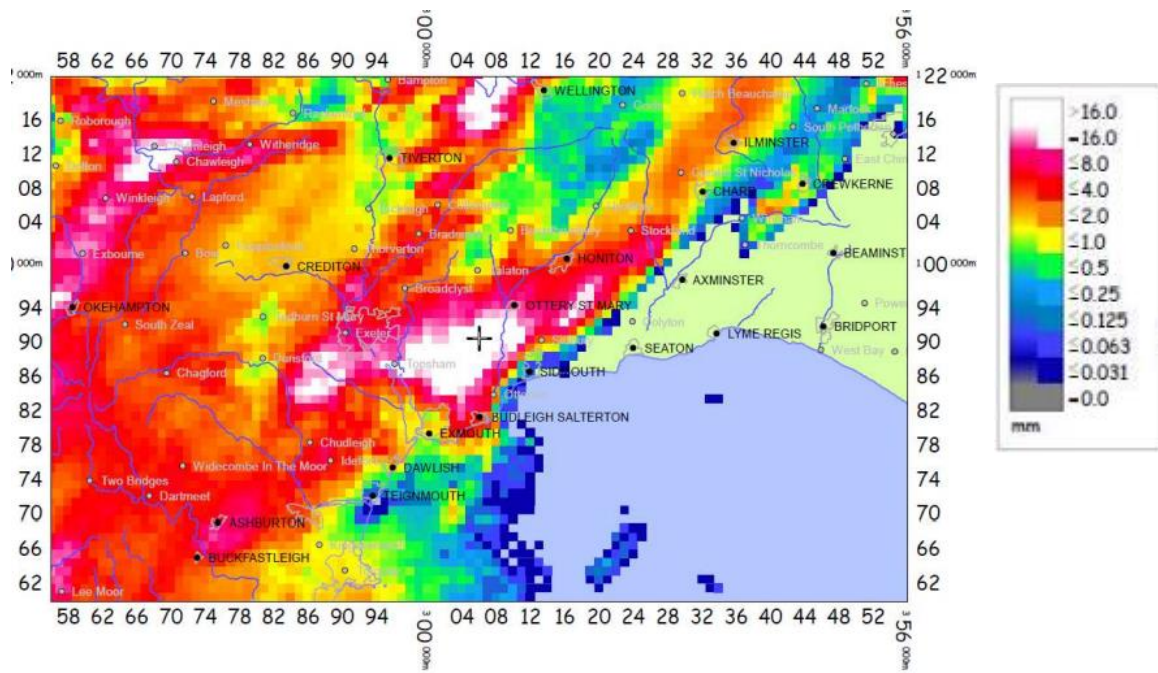


Figure 3.3 - 1 hour rainfall accumulation for the 9th May to 14:00 GMT based on radar data (H24 merged radar – rain gauge data product) - reproduced from the EA’s Flood Hydrology Report: 9th May 2023 River Otter, Devon.

Whilst it is not possible due to the reliance on radar data to be able to estimate a return period precisely. The EA Hydrology Report “consider it reasonable to suggest that the event rarity likely exceeded a 1% (1in100) AEP return period in the most intense storm centre”. DCC’s own radar rainfall data service assessed the event as between a 1in100yr and 1in150yr event. Separately SWW have also indicated up to 1 in 150yr event within their network although no data has been provided to evidence this from SWW.



Figure 3.4. OS Map highlighting the EA river level gauges referenced in Table 3.3.

EA river level gauge data show that on 9th May local watercourses were close to normal base flow when levels started to rise at 12:30pm with a peak between 3pm and 4pm. The sharp peak is visible for Dotton, Goosemoor and Pophams in Figure 3.5 and makes a clear contrast to other gauges at East Budleigh and Ottery St Mary which sit within the Otter Valley but didn't see similar rainfall or impacts. At Goosemoor upstream of Newton Poppleford water levels rose by 1.1m in a 2 hour period and saw a peak river level 0.23m higher than any event previously recorded ranked as the largest event in 47 years of data. At Salston the second largest event in 47 years of data for the Salston station. At Pophams it was the third largest event in 50 years of data. The below graph and table reproduced from the EA's hydrology report provide further information on this.

Whilst Goosemoor saw a 1.1m rise in 2 hours this is almost exactly replicated in Devon County Council's gauge on the Metcombe Brook which saw levels at 0.094m at 12:15 on 9th May rising to a recorded peak of 1.212m at 14:30.

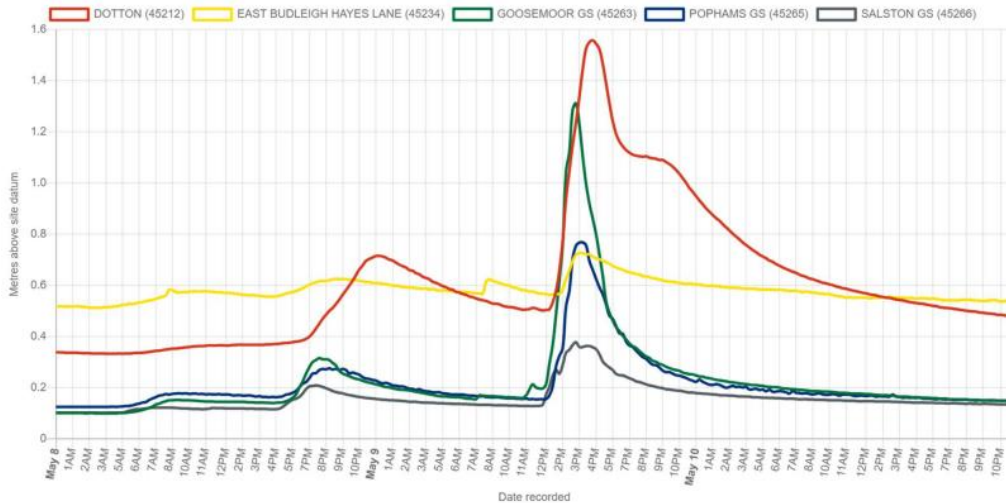


Figure 3.5 River level gauges graph from May 8th 2023 to evening of 10th May 2023, provided by the EA.

Table 3.3. Comparison of peak level reached during the event (highlighted in orange) with the previous highest 15 peaks on record using peaks-over-threshold events for each location, provided by the EA

Devon 9th May 8 - 10 May 2023		Exe, Otter & Axe				
		DOTTON (45212)	EAST BUDLEIGH HAYES LANE (45234)	GOOSEMOOR GS (45263)	POPHAMS GS (45265)	SALSTON GS (45266)
Easting, northing		308665, 88435	306440, 84890	306959, 89247	307222, 87670	308815, 94545
Number of years in record		61	14	47	50	47
Rank	1	3.620	0.893	1.311	0.837	0.865
	2	2.845	0.892	1.082	0.797	0.378
	3	2.630	0.873	1.070	0.768	0.366
	4	2.627	0.822	0.975	0.761	0.365
	5	2.604	0.809	0.959	0.755	0.363
	6	2.533	0.799	0.950	0.656	0.363
	7	2.488	0.795	0.932	0.652	0.361
	8	2.477	0.777	0.929	0.651	0.357
	9	2.416	0.773	0.875	0.648	0.353
	10	2.404	0.772	0.851	0.644	0.353
	11	2.353	0.767	0.846	0.641	0.349
	12	2.350	0.765	0.844	0.610	0.347
	13	2.279	0.764	0.830	0.580	0.344
	14	2.266	0.756	0.801	0.571	0.343
	15	2.235	0.755	0.794	0.562	0.343
<15	1.558	0.726	N/A	N/A	N/A	

3.2 Impacts on the highway network

During this event on the 9th of May 2023, significant surface water flooding affected the Highway network across Devon. Highway drainage systems in several areas particularly the A3053 in Newton Poppleford, Sidmouth Road in Ottery St Mary, Brookvale in Tipton St John struggled to cope with the drastically increased flows, sometimes causing them to overflow onto the highway. Typically, these highway drainage and sewer systems are not designed to cope with such intense rainfall events. As part of the investigation, it will be recommended that Devon County Council Highways review the highway gullies and consider whether any maintenance issues require attention.

Notable areas of the highway affected during the event were:

- Flooding to Honiton Road, East Wonford Hill, Quarry Lane and Rifford Road in Exeter
- Flooding to the A377 in Umberleigh
- Flooding to the B3193 in Christow
- Flooding to the A381 between Kingsbridge and Salcombe
- Flooding to the B3213 in Bittaford
- Mud and debris on Venn Ottery Road, Newton Poppleford
- Mud and debris on Road from Trace Bridge to Brinscott Cross, Holcombe Rogus
- Mud and debris on Hawkerland Road, Colaton Raleigh
- Mud and debris on Road past Lower Coombe Farm & Claypitts Farm, Ottery St Mary
- Surface water flooding of Exeter Road (A3052)
- Flooding and debris on Burrow Lane, Newton Poppleford
- Flooding to Southbrook Lane, Cranbrook
- Flooding along Village Way, Aylesbeare
- Debris and mud on Rectory Road, Kentisbeare with surface water pooling in private accesses and gardens
- Public Right of Way along Back Lane (unmetalled private road), Northmostown with utility services exposed by flows
- Flooding to Woolbrook Road, Sidmouth



Figure 3.6 Road closed sign preventing access to Burrow Lane where soil and debris was deposited following the event. BBC News [Online] - Emotional rollercoaster since flash floods in Devon' - Accessed 4 September 2023 URL: <https://www.bbc.co.uk/news/articles/c3g9j4eyj0yo>)

3.3 Incident Response and Recovery

Initial community engagement and drop in events:

When a flood event occurs, it is immediately followed by an emergency response and then recovery phase. There are many roles involved in this process, covered by the Emergency services, Environment Agency and local authorities. Details of this are included in the [Multi-Agency Flood Framework](#). As LLFA, DCC's Flood & Coastal Risk Management team becomes involved at the recovery phase, through recovery coordination, community engagement and investigation.

Following any flood event, DCC will engage with relevant District Councils, Risk Management Authorities, local Parish and Town Councils and community members to gather information. This information is shared with other agencies to determine the extent of impact.

Several Flood 'drop in' events were held across East Devon throughout May 2023 to provide an opportunity for affected residents to share information about the events and to get help and advice. This information has been used to piece together what is known about the flood extent and mechanisms and to help inform any recommended actions to take forward.

Immediate actions taken:

As part of the initial response and recovery phase, relevant Risk Management Authorities have been quick to take actions to aid the recovery of communities:

Devon County Council Lead Local Flood Authority: Sent out members of staff to conduct reconnaissance in the affected areas, whilst coordinating with the EA to collate information and build up a picture of the impacts.

Devon County Council Highways: Teams were immediately out in affected areas to clear highway gullies and silt from the roads. Table 3.4 lists the main affected areas and the works carried out or requiring attention following the event.

Table 3.4. Summary of impacts on DCC Highways and subsequent works in the main affected areas

Location	Impacts and actions for DCC Highways
West Hill	Jetting on Lower Broad Oak Road
Metcombe	Surfacing damage, gullies jetted. Significant damage to highway structures. Inspected and repair scheduled
Tipton St John	Debris Removal/sweeping, gullies jetted, culverts cleared
Wiggaton	Debris removal/sweeping and unblocking of pipe inlet
Southerton	Collapsed headwall and damaged road edge, inspected and repair scheduled

Venn Ottery	Debris removal/sweeping, surfacing damage, gullies jetted. Significant damage to highway structure which has been inspected and a repair scheduled.
Harpford	Debris removal/sweeping, jetting and unblocking of pipe inlet
Newton Popleford	Surfacing damage, gullies jetted
Burrow	Debris Removal/sweeping, gullies jetted, surface damage. Significant damage to highway structure. Inspected and repair scheduled
Northmostown	Debris Removal/sweeping Significant damage to highway structure. Inspected and repair scheduled
Colaton Raleigh	Debris Removal/sweeping, gullies jetted and unblocking of pipe inlet
Hawkerland	Debris Removal/sweeping, gullies jetted Significant damage to highway structure. Inspected and repair scheduled
Otterton	Surface damage

DCC Bridges and Structures teams carried out inspections in the affected areas to assess the condition of larger and potentially vulnerable highway structures and bridges, carrying out clearance works and scheduling repairs where appropriate.



Figure 3.7 Clearance works at Tipton St John Sidmouth Rd culvert (Photo from DCC contractor)

East Devon District Council: Responded by removing litter and debris from some affected areas (predominantly Tipton St John, Venn Ottery and Newton Popleford) and carrying out on-site damage assessments, repairing damaged fences and removing flood-damaged items.

Additional sandbags were provided at Newton Popleford to replace those lost in the incident.

Kerb-side collections were arranged to remove damaged household goods, carpets, flooring, garden equipment and garage items.

Environment Agency (EA): Responded to the event, sending reconnaissance staff to effected areas to gather information on the extent of the flooding, which has supported this S.19 investigation report.

The EA were also able to focus the Land Management Project team on surveying the Lower Otter catchment with an aim to identify land management practices that contributed to flooding and soil erosion.

It is hoped that land management advice can be rolled out throughout the catchment to address surface water runoff and help landowners to make more informed decisions around timing of grazing and trafficking of field operations, in addition to identifying any opportunities for NFM interventions.

South West Water: Responded to sewer flooding incident near Honiton Road, Exeter, carrying out a CCTV survey on site to confirm sewer size and condition.

4. Flood Incident Extent and Impact

4.1 Newton Poppleford

The catchment that feeds the Back Brook, which flows through Newton Poppleford, experienced the most intense rainfall on the afternoon of 9 May 2023 as highlighted in the Incident Summary radar and gauge data. Intense rainfall caused significant surface water flows and a rapid rise in local watercourses including the Back Brook, resulting in 63 properties suffering internal flooding with many others experiencing flooding to garages and external areas. This figure is inclusive of the area of Burrow which has been separated out within this report, see section 4.2, for ease of reading and due to different mechanisms of flooding.

Flooding affected multiple properties in Newton Poppleford on the following roads, with internal depths reported in buckets; Chestnut Way (up to 6 inches), Hazel Close (up to 1ft), High St (up to 4 inches), Lark Rise (up to 4 inches), Meadow Drive (up to 12 inches), Venn Ottery Road (up to 3ft). Residents reported the duration of flooding was between 1.5 and 2 hours.

A single property at the downstream end of Back Lane also reported flooding to 2 inches deep. A single property in Parsons Close was also flooded to 5 inches deep.

Badger Close was also affected with two properties flooded internally. This was from surface water runoff from adjacent higher land which is reported to have been recently ploughed.

Upstream areas of the Back Brook in Hawkerland, Stoneyford, Goosemoor and on Harpford common and Aylesbeare Common all saw out of bank flows and associated flooding to land and property.

The most widespread flooding on the Back Brook was seen in the downstream reaches of the Back Brook after the two tributaries join east of Goosemoor, see Figure 4.1, and enters the more urbanised areas of Burrow and Newton Poppleford.

Unfortunately, the Back Brooks floodplain through Newton Poppleford has been encroached upon through human activity which has locally raised levels in the Back Brook. The Environment Agency note that Lark Rise, Hazel Close and Chestnut Way were built against EA advice following the 1972 floods.

Opportunities to provide space for greater conveyance of flows through Burrow and Newton Poppleford are limited but should be considered wherever possible. Existing riparian owners will need to consider this themselves at the micro scale to help aid conveyance and avoid

encroachment of bank protection as well as consider the levels of footbridges, many of which were damaged significantly.

Previously the community has been affected by the levels of the River Otter however, during the event the River Otter was not in flood and had no primary bearing on the flooding of any property in Newton Popleford.

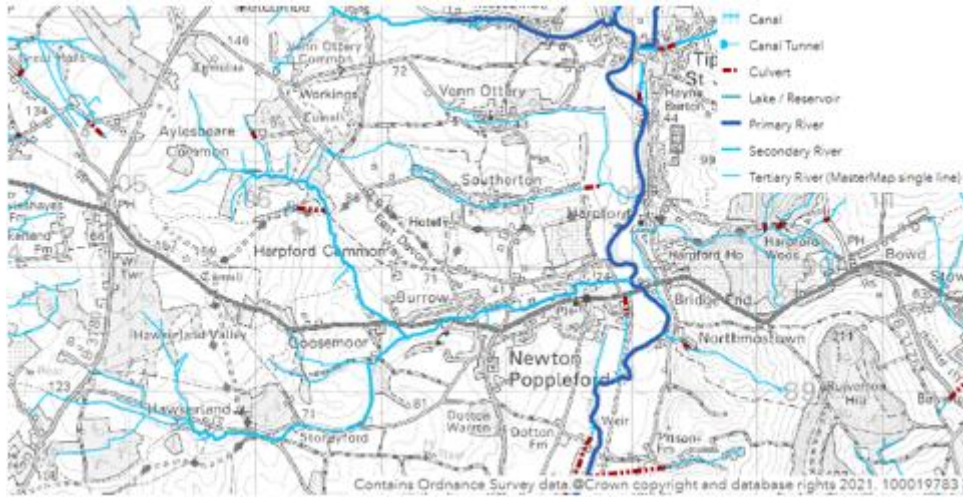


Figure 4.1 OS greyscale map with watercourses highlighted showing points of confluence for tributaries of the Back Brook upstream of Newton Popleford



Figure 4.2 EA flood reconnaissance photo with EA staff/blue line marker highlighting the flood level reached on the bus stop at the end of Burrow, approximately Grid Reference: 307640, 089557.



Figure 4.3 Still image taken from video post peak flows. This is looking north along Back Lane in Newton Poppleford before the Back Brook reaches the River Otter. Even following peak flows the bridge is shown as overtopping. (Resident's video submitted to EA/DCC).

One property in Newton Poppleford and another upstream of Newton Poppleford avoided internal flooding due to flood door(s) privately installed by the residents.

Environment Agency records and resident's flood memory suggest that the event was similar to 1972 where approximately 100mm of rain was recorded in 2 hours and mapped flood outlines suggest widespread flooding from the Back Brook.

On publication of this report in October it is known that multiple residents are yet to return to their homes following the flooding.

DCC, EA, DCT and EDDC will work together to support the community in the production of a community flood group with setup meetings arranged for the end of October 2023.

The EA have undertaken an assessment of the Back Brook and the potential clearance of key areas where silt and sediment has built up post event. They are liaising with the relevant riparian landowners.

Historic Flooding

21 Nov 2012: Three properties (two from Back Brook and one from River Otter) flooded

29/30 Oct 2008: Seven properties internally flooded and 10+ external from Back Brook

20 Dec 1989: Flooding to properties in Hazel Close

18 Jul 1972: Widespread flooding to Newton Poppleford

4.2 Burrow



Figure 4.4 OS map marked to show the flow paths experienced in Burrow on 9 May 2023

Burrow Lane experienced an isolated surface water flooding event. 15 properties were internally flooded in Burrow Lane. Burrow Lane residents experienced ingress of soil from the adjacent land with flood water depths of one to two inches internally for most of the affected properties rising to six inches in the worst affected. Multiple properties along the Northern edge of Burrow Lane were flow paths for water onto Burrow Lane and experienced damage to garden walls, banks and deposits of silt and material to significant levels.



Figure 4.5 Photo of silt deposit post event on Burrow Lane. East Devon News [Online] 'Flash floods turns East Devon roads to rivers' - Accessed 13 September 2023. URL: <https://eastdevonnews.co.uk/2023/05/10/east-devon-flood-photos-and-video/>

The surface water flows onto Burrow Lane during the event were not as the national surface water flood mapping suggests (shown in figure 4.6 below). Accesses to agricultural land acted as major flow paths as well as flows direct into rear gardens where rear walls and banks collapsed due to heavily soil laden flows. Updates to the flood risk mapping in Burrow Lane may be necessary in the longer term.

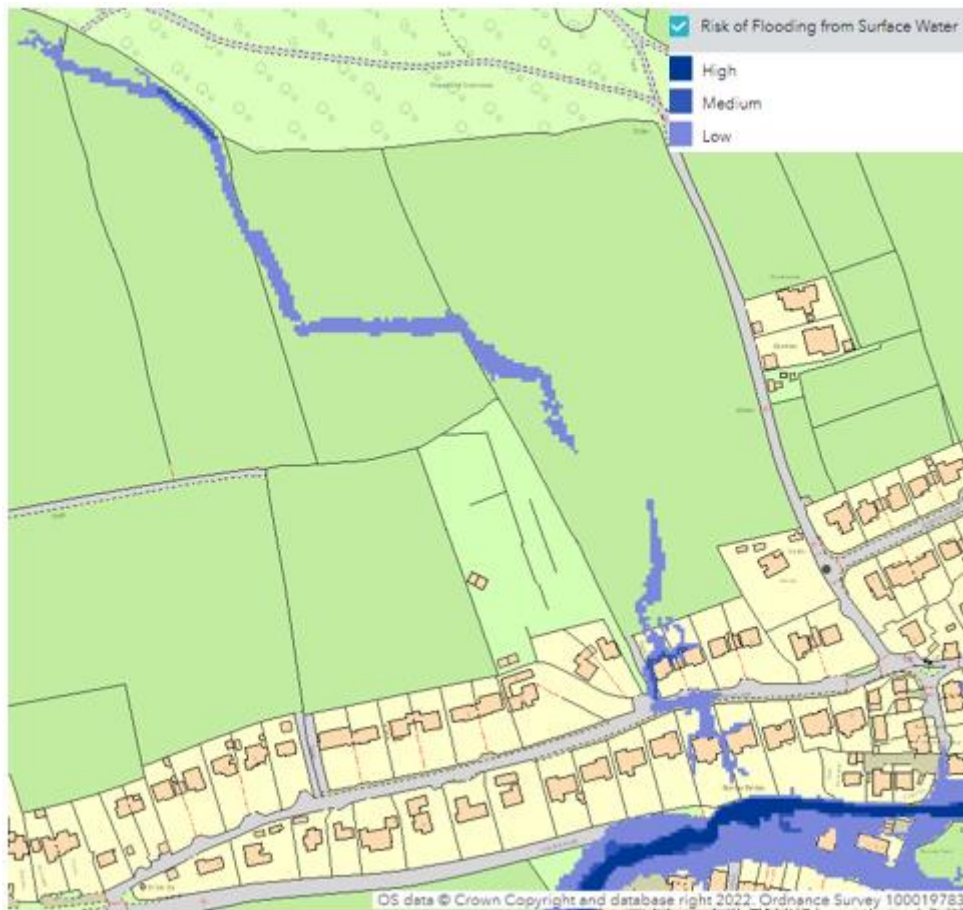


Figure 4.6 OS map of national surface water flood risk in Burrow Lane

Burrow Lane experienced significant flows of sediment laden water from higher land to the north. Upslope fields had been sown with maize and EA assessments have adjudged that the main cause of runoff was due to heavy rain sealing the bare soil surface reducing porosity. This in turn led to surface saturation and rapid runoff down slope. In depth investigations here found that “there was no evidence of bad practice” but maize growing on three degrees slope or more can lead to excessive soil erosion and rapid runoff like that experienced in Burrow.



Figure 4.7 still image from video showing flows from adjacent agricultural land running down onto Burrow Lane via a field access (Resident's video submitted to EA/DCC).

The Back Brook also led to flooding where flows backed up where it passes beneath the A3052 (Exeter Road) in Burrow, shown in Figure 4.8, flooding four commercial units up to eight inches internally. Residential properties along the Back Brook in Burrow on Exeter Road experienced internal flooding with depths of up to three foot deep for the worst affected.

A single property in Goosemoor, just upstream of Burrow, was impacted by internal flooding to a few mm whilst garages and external areas of properties here saw depths up to 23 inches. Goosemoor also has a gauging station, as referenced, where record levels within the watercourse were recorded with a 1.1m rise in two hours showing the rapid rise in the Back Brook.



Figure 4.8. EA recon photo showing flow paths marked by blue arrows and water levels marked by blue line at Burrow Bridge where it passes beneath the A3052, structure had inadequate capacity to cope with the May 9th event.

Historic Flooding

Surface water runoff flooding of the road with issues relating to soil and maize has been recorded previously in Burrow Lane. Residents spoke of lesser incidents occurring previously over the last 20 years.

On 9 June 2021, “highways received a report of mud and debris coming down the road from field sown with maize”.

On 7 November 2022, “standing water due to soil blocking drains both sides of road”. Historically there has been issues here which led to some extensive highway surface water drainage completed in March 2014 with justification for the works being “*During heavy rain, water has flowed out of field gate and across road into private land flooding property...*”.

4.3 Tipton St John and Metcombe

4.3.1 Tipton St John



Figure 4.9 OS Map showing flow paths, marked by arrows, of surface water and Coombe Stream through Tipton St John during event

Tipton St John experienced significant flooding due to heavy rainfall leading to surface water flows from East Hill and Coombe channelled down into the village, as well as into the Coombe Stream.

The Coombe Stream runs under Sidmouth Road where it becomes categorised as main river. It overtopped primarily where it is culverted under Chrystal Close upstream of the local public house. The watercourse also experienced overtopping downstream of Ellacombe Cottages where the EA retain an access point to the inlet of the Coombe Stream culvert. It is believed that woody debris and silt build up may have influenced the capacity of the culvert here.

11 properties were flooded internally. One of these properties was to the east of the village in Coombe. The other ten properties internally affected were along the main road (also known as Station Road) where the watercourse overtopped. Two of which were commercial properties. Depths were recorded between 5mm and 150mm internally.

The main road through Tipton was recorded to have flooded around 2.15pm until 4.15pm at which point a sudden torrent came down the road between 4.15pm and 4.45pm. Blockage of the culvert near Ellacombe Cottages is thought to be a possible cause for this torrent. During which the millstream, which was not in spate as it's fed by the Otter, acted as an exceedance flow

route and overtopped affecting the rear of properties. Had the Otter and therefore Millstream been in spate this could have exacerbated the flooding in Tipton significantly.



Figures 4.10 and 4.11 Photo on left shows woody debris sat above the culvert inlet, post event. Photo on right shows access gate with padlock which had been forced open assumed due to the force of floodwater impounded by woody debris, both taken by EA during flood reconnaissance.

The culvert that runs under Sidmouth Road, shown in Figure 4.12, was post-event found completely buried in fine material and woody debris and the channel itself infilled. Highlighting the debris and material that the stream carried in this event. Landslips had occurred within the watercourse upstream of Sidmouth Road. It is possible that this area may have offered some informal online attenuation during peak flows, reducing flows downstream.



Figure 4.12 - Sidmouth Road culvert inlet in Tipton St John pictured following DCC clearance of structure which had been completely buried in fine sediment and woody material following the 9th May event, DCC recon photo.

Whilst clearance works of the channel and structures has been undertaken, the Environment Agency, with support of other relevant authorities, will consider options going forward to reduce the risk of flooding and of blockage to existing structures from the Coombe Stream.

4.3.2 Metcombe

In Metcombe, six properties in total and the local primary school reported internal flooding. Metcombe has experienced flood incidents and near misses on many occasions and this event saw similar flow paths to October 2008 where flows come out of bank upstream of Metcombe onto Brookvale Road.

Two properties at the western edge of Metcombe towards Higher Metcombe were flooded up to 150mm internally from surface water flows and the watercourse, which remains Ordinary Watercourse at this point. The watercourse is constrained along Brookvale where it becomes classified as Main River with further overtopping occurring along sections adjacent to properties. This leads to uncontrolled flows along the road until reaching Tipton Vale and the lower areas of Metcombe where flooding to a single property occurred and five plus properties experienced near misses. Three properties along Brookvale reported internal flooding with depths of approximately 50mm internally. Most of these properties also flooded in October 2008.



Figure 4.13 EA recon photo showing damage to the public highway along Brookvale at one of many points where flows came out of bank joining existing flows along the road network.



Figure 4.14 OS map showing flow paths during event in Metcombe marked by arrows.

The local primary school experienced significant impacts with a classroom flooded and pupils having to spend weeks learning in the nearby village hall setup as alternative accommodation.

A river level gauge has been in place to provide a warning mechanism for the school to undertake evacuation procedures due to historic flooding and the risk posed to the lower school site. Unfortunately, due to the rapid rise of the watercourse and the limited warning time the school were forced to shelter on site during the event.

The gauge itself is towards the end of its design life and whilst functioning was unable to check in to send an alarm on the first warning level at 0.2m and 0.4m at 12:30 and 12:45. It wasn't until 13:46 over 46 minutes after the 3rd level set for flood warning had been reached at 13:00 that a warning was sent. At this point the watercourse was out of bank and flowing at high velocities across the road. School pupils were evacuated by the Fire Service along with support from the local community during the event. The school, following campaigning by the local MP, County Councillor and wider community, now has funding for re-location.

Whilst it unfortunately didn't provide adequate warning for this event, there remains a benefit to the warning gauge currently in-situ. DCC's Flood Risk Management team have agreed to fully fund the Metcombe gauge, for the next year.

One of the lowest lying properties in Metcombe avoided internal flooding through planned re-design, where the property is now built on stilts to place it 1m above historic flood levels plus climate change scenarios. This is understood to have been an effective water resilient design in this event.

Historic Flooding for Tipton and Metcombe

1 Jan 2000: Eight properties recorded as flooding due to Main River in Tipton

29/30 Oct 2008: Nine properties flooded from ordinary watercourse in Metcombe

24 Nov 2012: Seven properties recorded as flooded from Main River

20 Oct 2021: Primary School recorded as flooded due to Ordinary Watercourse

4.4 Venn Ottery

In Venn Ottery, nine properties were internally flooded. The mechanism for flooding and flow paths of floodwater were very similar to those recorded for the 2008 flood incident in the village.

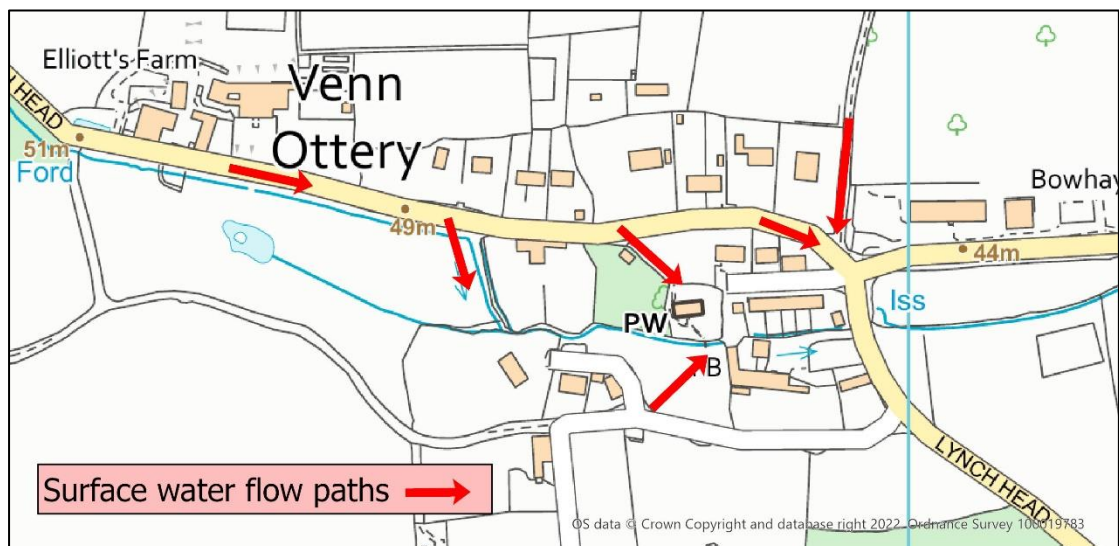


Figure 4.15 OS Map showing the flow paths experienced in Venn Ottery on 9 May 2023

Upstream of Venn Ottery there is an informal ford crossing at which point flows in the watercourse are unconstrained and therefore, during larger incidents can easily end up flowing down the road network before re-entering the watercourse. The watercourse, as it flows past the church, contains informal structures that impacted upon flows. A cattle grid type culvert, private bridges and a brick wall all pose obstructions to flow. The EA have discussed with a resident regarding the removal of an existing structure which impacts upon exceedance flows along the watercourse. DCC and the EA have spoken with upstream and downstream landowners regarding riparian responsibilities and land management.

There is a final constraint upon flows where there is an old arch culvert which runs at a dogleg under Lynch Head, and outfalls into an informal sump before

culverted again back into the watercourse. The informal sump which is exposed is believed to have been completely buried with vegetation and debris during the event limiting flows from passing under the arch culvert, whilst the overflows that run directly into the watercourse were also blocked, shown below.

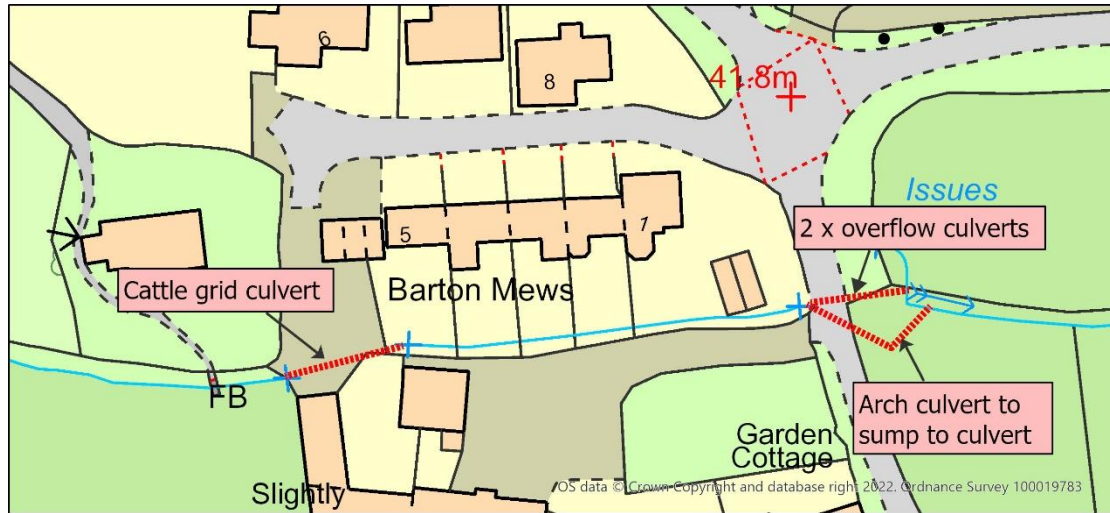


Figure 4.16 OS Map showing structures on the watercourse that exist within Venn Ottery

The road network along Lynch Head Road saw significant damage from surface water flows and overtopping of the watercourse in part due to heavily silt-laden flows. Residents in Venn Ottery were also left with extensive deposits of material in their property and external areas, shown in Figure 4.17.



Figure 4.17 DCC Flood Recon photo in Venn Ottery from 12 May 2023 showing silt deposits and damage to a residential garden.

Following the event, DCC have engaged a consultant to undertake an initial assessment of possible options available to help reduce the risk to the community.

Historic Flooding

Venn Ottery has been subject to many near misses and incidents where gardens and outbuildings flooded. There has been previous flooding experienced to property in Venn Ottery, with the following incidents recorded;

4 Mar 1994: Up to eight properties affected near Barton Mews, cause not specified.

30 Oct 2008: Three properties and widespread external flooding

4.5 Colaton Raleigh

Eight properties in Colaton Raleigh were flooded internally with a handful of others experiencing near misses. Five properties of the eight were flooded west of Exmouth Road and an external outbuilding damaged as well.

The largest event in recent memory for the village was in November 2012. In that event the Exmouth Road culvert's parapet walls exacerbated the flooding experienced, since which these were removed and letterbox openings created in the wall to allow flows back into the watercourse. In May 2023 flows were however, found to be out of bank upstream of the Exmouth Road culvert during the event, in part due to the sheer volume of water but also impacted by an unconsented in channel weir type structure where flows came out of bank immediately upstream. This is believed to have been introduced since 2012 and means the right hand bank (looking downstream) is little more than 200mm in height.

As the watercourse overtopped and flowed onto Exmouth Road it merged with surface water flows and continued down Church Road until rejoining downstream of the play park following the route of the Church Road leat.

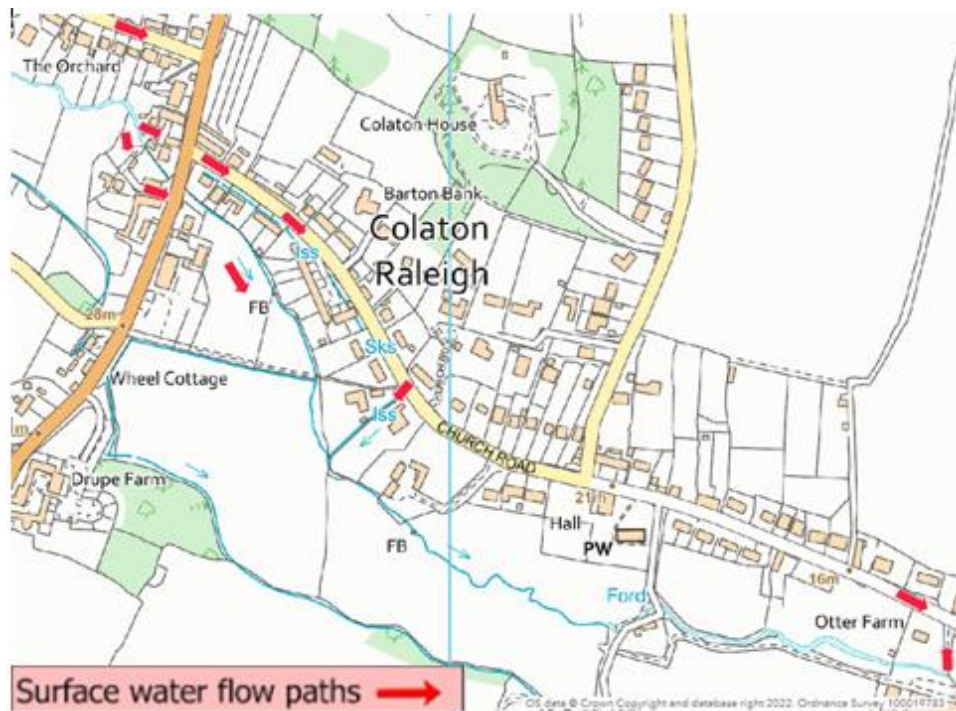


Figure 4.18 OS Map showing flow paths in Colaton Raleigh during the incident



Figure 4.19 DCC Flood recon photo showing weir structure upstream of Exmouth Road, Colaton Raleigh

Two properties toward the eastern extent of Colaton Raleigh off Church Road were also flooded from the ordinary watercourse overtopping which was overtopping on both banks. At Brook Lane flood depths affecting the ford and lane itself were significant due in part to reduced channel capacity.



Figure 4.20 Brook Lane Ford in flood during the incident (Resident's photo submitted to EA/DCC)

Flows from the watercourse returned onto Church Road via an access route to Otter Farm as water backed up from the two access culverts to Otter Farm.

Colaton Raleigh has previously been subject to a detailed study to review the risk and potential options in 2022 by a consultant on DCC's behalf. This led to the proposed option of property flood resilience. As a result of this recent flooding event DCC chose to pause the significant progress on this scheme to reach out to those properties who had suffered flooding but had previously declined the offer of property resilience, and also to extend out the offer to affected properties in nearby hamlets. There are numerous constraints and mechanisms of flooding affecting Colaton Raleigh and careful consideration has been made to avoid passing the risk onto others, for example improving conveyance at Exmouth Road that would exacerbate issues downstream on Church Road. This has led to PFR being promoted for the village and reduce the risk of properties flooding internally.

Contact has been made by DCC with relevant landowners to improve conveyance within existing drainage channels and along the Back Brook, some of this work commenced in late 2022 with the parish council creating a working group to undertake works prior to the May 2023 floods which may have offered some minor mitigation to properties on Church Road during the event. Further clearance works are to be coordinated with the Parish Council and relevant riparian owners responsible for maintaining their section of the channel.

Historic Flooding

There has been previous flooding in Colaton Raleigh, with the following incidents recorded:

24 Nov 2012: 11 properties due to ordinary watercourse

13 Dec 2008: One property reported due to ordinary watercourse

July 1968: Ordinary watercourse flooding

Sept 1960: Ordinary watercourse flooding

Flooding has also been reported in 1972, 1983, 1997 and July 2012.

4.6 Harpford



Figure 4.21 Out of bank flows onto Lower Way, Harpford on 9 May 2023 (Resident's photo submitted to EA/DCC).

On 9 May 2023, four properties reported flooding internally due to the ordinary watercourse overtopping. Two on Lower Way (few inches deep internal) and one on Higher Way (Two foot deep internal) associated with the watercourse, whilst there was also a report of low-level surface water flooding on Higher Way to a single property. Some properties have informal homemade barriers in place to divert exceedance flows away from their properties, it is unclear how successful these were during the event. A few properties along Lower Way experienced near misses and the only access to and from many of these properties was also impacted.

Harpford sees regular flooding incidents due to low lying land sitting close to the level of the River Otter floodplain however, the river Otter flows were not a factor on 9 May for Harpford. The ordinary watercourse that runs through Harpford Wood eventually discharging into the Otter downstream of Harpford itself was associated with the flooding to property.

The upstream catchment has a number of small-scale landslips seen at regular intervals along the watercourse within the woodland area. The catchment is flashy and steep leading to a fast-flowing watercourse carrying large amounts of greensand and tree material, which impacts quickly upon the capacity of the culvert at Higher Way and also the channel as it passes into Lower Way. Multiple landowners have accesses over the channel which may also further impede flows during an event.

Due to the topography of Lower Way, which is at the floodplain level of the Otter, the condition of the channel and exceedance flow routes are sensitive

and will need consideration for any improvements and continued management in the future.



Figure 4.22 DCC Flood Recon photo showing Higher Way culvert on 10 May 2023 partially blocked even after significant clearance works

Upstream landowners have been proactive in their management through natural flood management measures. Devon County Council have met and engaged with landowners and Westcountry Rivers Trust to consider furthering natural flood management efforts in this location.

DCC have engaged a consultant to undertake an initial assessment of any other options available to reduce the risk of flooding in Harpford.

Historic Flooding

The road in Lower Way is subject to multiple flooding events in a year.

24 Nov 2012: Five properties flooded, four of which from ordinary watercourse

7 July 2012: Three properties flooded from ordinary watercourse

30 Oct 2008: Lower Way flooded by River Otter

14 Nov 2002: One property and road flooded from ordinary watercourse

July 1968: Lower Way Road and properties flooded by River Otter

4.7 Wider East Devon

The flood event also effected several other East Devon communities outside of the main locations detailed individually in this report.

Fluxton: Just outside of Tipton St John, two properties in Fluxton were flooded from the ordinary watercourse that flows through the hamlet and surface water flows from surrounding land. See Figure 4.23. Both properties have been previously flooded and have been offered property level protection through DCCs countywide funding scheme.



Figure 4.23. Flooding scenes at Fluxton on 9th May 2023 (Resident Photo submitted to DCC)

Ottery St Mary: One property on Cornhill was flooded during the event from low level surface water flows entering their basement from the footpath. There is no history of flooding for this property.

External flooding and flooding of Sidmouth Road was reported in Wiggaton and in Higher Broad Oak Road, West Hill.

Stoneyford: In the small settlement between Colaton Raleigh and Newton Popleford, three properties are known to have suffered internal flooding from a nearby ordinary watercourse and surface water runoff. One of which experienced depths of up to five inches internally. A few properties also experienced flooding to external areas. Flood outlines recorded from 1972 were similar to those experienced in May for Stoneyford and Hawkerland.

In addition to this, significant damage was caused to a bridle way which crosses the watercourse. Culverts along the Back Brook were damaged and blocked during the event most significantly at Hawkerland Cross. Significant repair works to the culvert and the adjacent bank of the watercourse has been designed and planned for repair this Autumn/Winter by the DCC Structures Team.

The affected properties have been offered property level protection through DCCs wider Colaton Raleigh property flood resilience scheme.



Figure 4.24. EA Flood recon photo showing damage to watercourse and existing gabions at Stoneyford with blue arrow showing flow path

Woodbury: One property was internally flooded in Woodbury due to a culverted ordinary watercourse backing up upstream of Fulford Way and overflowing into property. There appears to be no history of internal flooding at this location in Woodbury however, external events are known to have occurred previously and the risk is recognised within national flood mapping. Opportunities to improve conveyance within the channel will be considered.

Woodbury Salterton: Two areas were affected; the main village and the area East of Greendale Business Park.

In the Main village, no properties were affected internally. The local school grounds however were flooded, where an undersized culvert by the school caused flows to go on to the road. This caused difficulties for access to the primary school during the event (see Figure 4.25). Exceedance flows then ran down the road where they re-joined the watercourse at Honey Lane via a Highways drainage ditch.



Figure 4.25 Photo showing surface water flows and ordinary watercourse overtopped outside Woodbury Salterton Primary School on 9th May 2023, Resident's photo submitted to East Devon District Council/DCC.

Two properties in the area East of Greendale Business Park were internally flooded although several other properties came very close to flooding, including residential properties, holiday lets and industrial units. Surface water flows contributed to the watercourse coming out of bank with water levels reaching their highest point for approximately one hour before receding.

The extent of the flooding experienced appears to be a similar extent to historic flood records, however, there is no record of those properties affected on this occasion having been previously flooded.

Due to the constant high level of the flood waters, it is possible that a blockage in the culvert could have contributed, in addition to the channel conditions up and downstream of the culvert. Reconnaissance information also revealed that a build-up of debris in the watercourse and large trees were also limiting the performance of the culvert, which will require clearing.

Other areas where improvements could be considered to reduce the local flood risk include, removing some nearby hedges and banks to enable better functioning of the floodplain and the potential of natural flood management measures in the upper catchments to reduce peak flows. Residents have, under their own initiative, undertaken significant clearance works to improve conveyance of channels in the village, and options are being considered for the removal of a section of wall which affected an exceedance flow route down Honey Lane back into the watercourse and exacerbated external flooding in this event.

4.8 Wider Devon

4.8.1 Honiton Road, Exeter

As the very intense storm passed through Exeter, there were two main locations which were affected:

On Honiton Road at the bottom of Quarry Lane, the Northbrook watercourse is culverted underneath Honiton Road. It is believed that excessive surface water flows overwhelmed the highway drainage here and were unable to get into the watercourse. This caused significant ponding in the area resulting in a road closure and internal flooding to four properties. The fire service was in attendance during the incident to pump water out from properties. All highway assets have been mapped and cleaned as necessary since the flood event.

Devon County Council are now proceeding with modelling the Northbrook watercourse at this location including the highway drainage to look at possible improvement works.



Figure 4.26. Fire service in attendance at the bottom of Quarry Lane (Photo DCC)



Figure 4.27. Northbrook watercourse entering the culvert underneath Honiton Road can be seen to still have some capacity during the flood event (Photo DCC)

At Ringswell Avenue, just off Honiton Road, the sewer network appears to have been overwhelmed by surface water, causing sewerage flooding to two properties. Devon Highways have since checked and mapped all systems in the area to be clear with no issues. South West Water have investigated the system using CCTV cameras, checking for inconsistencies in the system and debris build up. Options are also being considered for future plans to separate the surface water system from the foul system within the catchment.

Devon County Council LLFA are currently progressing property surveys in the area to consider Property Flood Resilience measures through the Council's funding scheme.

There is no record of previous flooding at Ringswell Avenue, however, three of the flooded properties at the Quarry Lane/Sweetbrier Lane location were previously affected during the October 2014 flood event.

4.8.2 Christow, Teignbridge

At Christow Bridge, at least three properties along a terrace were internally flooded. It is believed that highway drains at this location were overwhelmed by the intense rainfall resulting in surface water flowing towards the affected properties.

DCC is currently assessing the feasibility of PFR measures through the DCC funding scheme for some of the affected properties. DCC Highways will consider the impacts of any future resurfacing on flow routes to try to minimise any impacts.

The area has a history of flooding regularly to a lesser extent without affecting properties internally. Four of the properties affected on this occasion have been recorded as having flooded once previously.

4.8.3 Greenham, Mid Devon

Two rural properties situated between Greenham and Holcombe Rogus near the Devon/Somerset border were subject to internal flooding. A culvert maintained by DCC on behalf of the Grand Western Canal was overwhelmed due to the intense localised rainfall causing very high water levels within the watercourse and mill structures leading to very high volumes of water entering the culvert. Debris and scour within the culvert itself led to blockages downstream. Properties flooded internally to 100mm and 200mm depths. A previous event occurred in March 2012 where the highway network and external property areas flooded near the downstream end of the culvert.

DCC has had Property Flood Resilience surveys undertaken for the affected properties with the hope that both will have measures installed this Autumn/Winter through our countywide scheme. This will help to mitigate any increased risk whilst DCC investigate options for repair and any potential for an improved design for the existing damaged culvert.

A property was also flooded from surface water flows in Dunns Hill with bow waves from passing vehicles worsening the situation.

4.8.4 West Devon

One property off The Leys, Milton Combe was internally flooded. The intensity of the rainfall caused large volumes of water and mud to run off nearby fields and down the unnamed track beside the property. A blocked culvert higher up the track contributed to the flooding causing more water to flow down the track.

Two properties in Cuxton Meadows, Buckland Monachorum were flooded internally during the event. The properties flooded from surface water caused by a blocked highways easement and intense rainfall. The properties are set below road level and therefore surface water from the road flowed toward and into the properties.

The property in Milton Combe has been flooded four times in the last nine years since the current residents moved into the property. Each time the flooding has been caused by surface water flowing down the track and into the property. The internal flooding had not previously been reported to DCC but the Environment Agency had visited the area and asked the neighbouring landowner to upsize the culvert and install cross drains.

One of the properties in Buckland Monachorum had flooded previously in October 2021 from surface water.

5 Recommended Actions

As a result of this investigation report, several recommendations have been made for actions to be taken in specific locations. These are either as a result of initial site or desktop investigations, or the continuation of works or investigations already in progress. DCC as the LLFA will continue to monitor and record all flood incidents that come to our attention and consider this within our action plan and future investment programme. The current action plan can be found on the DCC Flood Risk Management Website at <https://www.devon.gov.uk/floodriskmanagement/>. Table 5.1 below summarises the recommended actions for this flood incident. It should be noted that these recommended actions will need to be considered by the relevant authority or responsible property/landowners and prioritised accordingly within their existing and future investment programmes. All flooding is taken very seriously however, to manage expectations, it will not be possible to carry out all actions immediately along with existing workload and available funding. Some may require further detailed investigations with the development of a robust cost beneficial business case to secure funding, prior to any scheme design and delivery. In practice this can take many years to deliver.

Table 5.1. Recommended actions for the affected communities in Devon.

Action By	Recommended Action	How
General actions recommended for the areas featured in this chapter:		
EA /LLFA / Local communities	Increase community resilience to all affected communities.	Where applicable assist with the development of community emergency/flood action plans. Advice and possible funding available from Devon Community Resilience Forum.
DCC Highways / National Highways	To ensure efficient operation of highway drains and culverts.	Review and carry out maintenance in problem areas
District Council / EA / LLFA	To ensure flood risk is managed from new development.	Encourage sustainable drainage practices for new developments.
Property Owners / LLFA / EA	Consider flood risk to own properties.	To install property level protection where necessary in liaison with appropriate Risk Management Authorities.
SWW	Ensure efficient operation of public combined and surface water sewers.	Continue maintenance regime and consider storm separation where appropriate.
EA	Land management advice and investigation	EA teams have completed soil assessments of critical areas and land management recommendations given. EA to consider wider Otter Valley guidance to ensure all landowners are aware of what

		crops and areas are considered high risk to soil erosion and surface water runoff and pollution of watercourses.
In addition to the general actions the following should be considered at specific locations:		
Action By	Recommended Action	How
Newton Poppleford		
LLFA/EA	To investigate issues regarding upstream land management issues and surface runoff	Through detailed investigations and modelling
EA/EDDC/LLFA	To support the community in the production of a community flood group	Meetings setup from Autumn 2023 with support from Devon Communities Together
EA	To assess Back Brook and support improvements for conveyance	EA offered advice and fast track process for flood defence consents on existing bank works. EA have undertaken a one-off clearance of key areas where silt and sediment built up post event.
EA	Improve flood warning	EA to consider feasibility of a gauge to be added on the Back Brook to offer the possibility of a potential flood warning
EA	To undertake assessment as to the potential for a community wide flood risk reduction scheme for the main river	Initial assessment underway
Burrow		
LLFA	To consider options for improvements to managing surface water in the Burrow Lane area	DCC initial assessment underway
EA	To undertake assessment as to the potential for a community wide flood risk reduction scheme for the main river	Initial assessment underway
Tipton St John/Metcombe		
LLFA/EA	To consider upstream options for slowing the flow and managing debris in Tipton St John	Natural flood management to be considered in upstream catchment alongside land management advice. Improvements to Sidmouth Rd inlet to reduce the amount of debris able to be passed downstream to be considered.
EA	Undertake brief assessment of potential for a community wide flood risk reduction scheme for the main river	Pursue most viable option of a community PFR scheme for Tipton and Metcombe
LLFA	Flood warning improvements	DCC to fund minor improvements to existing gauge for the next calendar year

Venn Ottery		
LLFA	Assess feasibility of community wide scheme to manage surface runoff and watercourse conveyance	DCC initial assessment underway
LLFA	To look at existing obstructions to flow in the Ordinary watercourse and potential for these to be removed/improved	DCC assessment considering channel capacity
Colaton Raleigh		
LLFA/Riparian Owners	To investigate options for improving the capacity of the culverts on the western extent of Colaton Raleigh to assist the passage of flows into the Otter floodplain.	DCC undertaken options appraisal previously which deemed upsizing not a viable option. DCC spoken with riparian owners regarding regular maintenance.
LLFA	Community wide scheme for PFR	DCC paused existing scheme which was ongoing prior to the May flooding to enable all those who hadn't signed up and nearby properties affected in the incident to be incorporated into PFR scheme. Currently out to tender for a contractor for the PFR scheme.
Harpford		
LLFA/SWW	To investigate collaborative opportunities to address water quality and flooding issues upstream through assessment of potential for Natural Flood Management (NFM)	DCC are working with SWW's Upstream Thinking advisor and a major landowner to develop a NFM proposal
LLFA	To consider alternative options to NFM that could help manage flood risk in Harpford	DCC undertaking initial assessment
Woodbury		
LLFA/EDDC	Options to improve conveyance within channel and NFM upstream	EDDC to undertake minor works to channel banks. DCC/EDDC to speak with landowners to assess willingness for NFM
Woodbury Salterton		
LLFA	Ensure efficient operation of watercourse	Ensure riparian owners are carrying out maintenance duties as required, taking enforcement action if necessary.
LLFA	Investigate feasible options for reducing peak flows	Investigate feasibility of upstream natural flood management measures in line with other DCC priorities as outlined in the Local Strategy.
Exeter		
LLFA	To investigate improvement options at Quarry Lane/Honiton Road area to reduce flood risk to the road and properties.	To progress with hydraulic modelling work to inform potential flood scheme options.

SWW	To investigate improvement to sewer network at Ringswell Avenue and to confirm current condition	SWW undertaking investigation
Christow		
LLFA	Consider options to improve and/or manage surface water flows	DCC offered PFR to affected properties through countywide scheme. DCC discussed with Highways to ensure any potential works on the adjacent highway carefully consider flowpaths and drainage here
Greenham		
DCC	Undertake culvert repair	DCC Structures inspected and investigating options for repair and potential for improvements. In the meantime, to reduce the risk to property DCC LLFA offered properties PFR through countywide scheme
Buckland Monachorum		
LLFA	Discuss with Highways regarding clearance of easement to help improve surface water management	DCC highways investigating options and responsibilities
Milton Combe		
EA	Consider options for improvements upstream	EA spoke with upstream landowner and recommended upsizing of culvert and installation of land drains

6 Next Steps

The next steps following this report will be for DCC as the LLFA to ensure that the recommended action tables in each chapter are presented to the responsible Risk Management Authority. DCC will consider their actions in line with other priorities and monitor delivery through regular reviews, whilst working in partnership with the EA, District Councils, South West Water and the local communities affected.

There is an expectation from DCC of itself and its partners that all authorities involved will cooperate and work together to improve the flood risk in the vulnerable areas identified in this report by progressing the recommended actions. As the LLFA, DCC has a responsibility to oversee the delivery of these actions.

Where minor works and quick win schemes have been identified, these will be prioritised and subject to available funding and resources will be carried out as soon as possible by the relevant authority or landowner. Any major works requiring capital investment will be considered through Defra's current or future six year Programme.

A review of the actions will be carried out by DCC as the LLFA to monitor progress and encourage delivery of recommended actions.