

Low Mill, Dalston

Flood Investigation Report No.CC4



Flood Event 22/23 May 2024

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

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1. Executive Summary

Exceptionally wet weather was experienced across parts of England, North Wales, Southern and Eastern Scotland between the 21st and 23rd May 2024. A slow-moving weather front associated with a low pressure in the North Sea resulted in 50mm of rain over a wide area of northwestern England with over 100mm experienced in the worst hit locations. On the 22nd May northern England recorded its wettest spring day since 1891, with many stations recording their wettest May day on record.

High rainfall totals in small, agricultural catchments that don't generally experience such high rainfall totals resulted in rivers and watercourses rising quickly, with very little warning in some instances. Over 100 properties in and around the Carlisle area were flooded internally during the event and this Section 19 report investigates the flood event, considers the causes, and makes recommendations for further actions at Low Mill, Dalston.

Low Mill is a small, residential development of 10 properties on low lying land on the west bank of the river Caldew. It lies adjacent to the railway that runs from Carlisle to the west coast of Cumbria, to the north of the Nestle creamery at Dalston and to the south of Carlisle. A United Utilities Waste Water Treatment Works sits to the north of the residential development. During the flood 6 properties are believed to have flooded direct from the River Caldew. During the development of the site a series of raised flood banks have been constructed and residents are interested to know what if any role these banks had in the flooding that was observed. A watercourse that runs through Low Mill from the west had an impact on the access road to the development but is not believed to have contributed to the flooding of the residential properties.

Cumberland Council as the Lead Local Flood Authority has prepared this report with the assistance of other Risk Management Authorities (RMA) as it considers necessary to do so under Section 19 of the Flood and Water Management Act 2010. The River Caldew is classified as a main river (see Appendix 1) and as such the Environment Agency have contributed significantly to this report.

Any additional information that residents and others can provide to the Environment Agency and Cumberland Council to help develop our understanding of the flooding is welcomed. Information has already been provided, much of which has been used to inform this report. Any additional information should be provided to lfrm@cumberland.gov.uk.

1.1 The flood investigation report

Under Section 19 of the Flood and Water Management Act (2010) Cumberland Council, as Lead Local Flood Authority (LLFA), has a statutory duty to produce Flood Investigation Reports for areas affected by flooding. Section 19 of the Flood and Water Management Act states:

- 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.*

This section of the Act leaves the determination of the 'extent' of flood investigation to the LLFA. It is not practical or realistic for Lead Local Flood Authorities to carry out a detailed investigation into every flood incident that occurs, but every incident with basic details will be recorded by the LLFA. Only those with 5 or more properties/businesses involved will have investigations published on the council's website.

An investigation will be carried out, and a report prepared and published by the LLFA when the flooding impacts meet the following criteria:

- Where there is ambiguity surrounding the source or responsibility of flood incident.
- Internal flooding of one property that has been experienced on more than one occasion.
- Internal flooding of five properties has been experienced during one single flood incident.
- There is a risk to life as a result of flooding.

As a flood Risk Management Authority (RMA), the Environment Agency have partnered with Cumberland Council to produce this flood investigation report.

1.2 Scope of this report

This Flood Investigation Report **is**:

- An investigation on what, when, why, and how the flooding took place resulting from the 22nd to 23rd May 2024 event.
- A means of identifying potential recommendations for actions to minimise the risk or impact of future flooding.

This Flood Investigation Report **does not**:

- Interpret observations and measurements resulting from this flooding event. Interpretation will be undertaken as part of any subsequent reports.
- Provide a complete description of what happens next.

The Flood Investigation Report outlines recommendations and actions that various organisations and authorities can do to minimise flood risk in affected areas. Once agreed, the reports can be used by communities and agencies as the basis for developing future plans to help make areas more resilient to flooding in the future.

Published

2. Event Background

2.1 Geographical setting

The River Caldew is a major tributary of the River Eden, the confluence of the Eden and Caldew is at Sheepmount in Carlisle. The Caldew catchment (figure 1) is located south of Carlisle in North Cumbria. The Caldew runs largely north to south and runs from the northern slopes of Skiddaw to Carlisle picking up various tributaries including the Cald Beck, Gilcambon Beck and the River Roe. The catchment is rural with a dispersed population incorporating a number of communities including Dalston, Caldbeck and Millhouse.

Low Mill sits on low lying land to the north of Dalston and to the south of Carlisle, on the west bank of the River Caldew. It sits to the east of the Carlisle to Cumbrian west coast line and close to the Nestle factory. It is accessed via a private 'no-through' road off the B5299 Dalston to Carlisle road. United Utilities has a treatment works on an adjacent site. The community consists of what appears to be 10 residential properties.

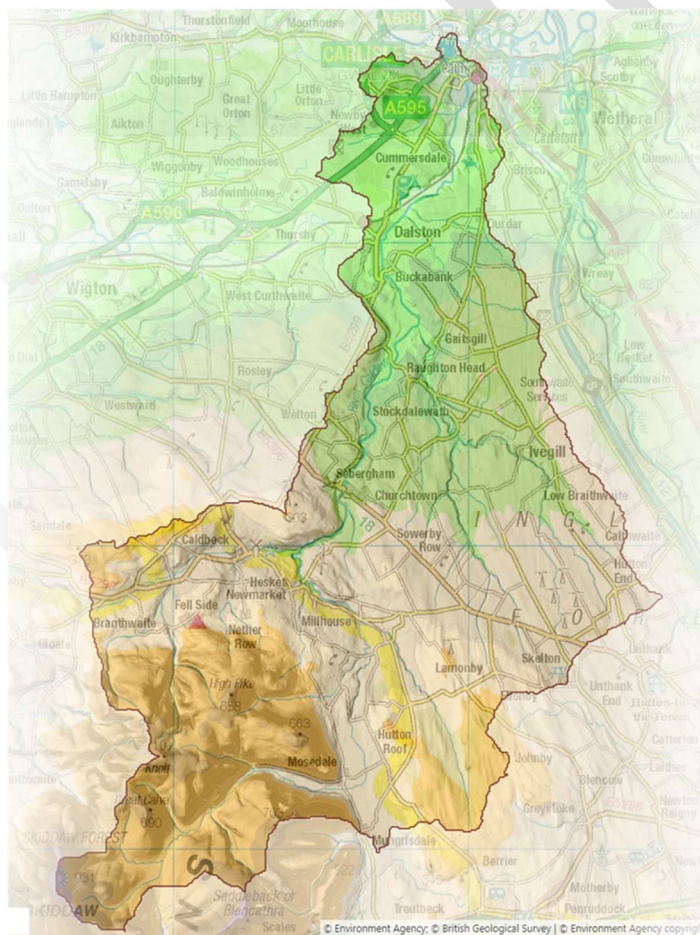


Figure 1: Map of Caldew catchment.



Figure 2: Low Mill, Dalston location

2.2 Flood history

There is limited information relating to the flood history of properties at Low Mill. This event was the highest level recorded on the Caldey at Cummersdale. Evidently floods in 2015 and 2012 (the previous highest recorded flow) were lower than this event so it is important to understand if properties experienced flooding in these events (particularly the 2012 event, the previous highest recorded flood on the Caldey). The peak flow in May 2024 was 326m³/s which is 4% larger than the June 2012 event (314m³/s) and 17% larger than December 2015 (279m³/s). This information would also be useful to inform the collective understanding of the impact of the flood banks constructed on the site from 2015 to 2018 (see recommendations).



Figure 3 and 3a below: Environment Agency Risk of Flood map for planning (Rivers and the Sea)

Although there isn't a detailed flood history for Low Mill the Environment Agency flood risk mapping indicates that the development sits entirely within flood zone 2 (medium risk) and partially within flood zone 3 (high risk).



Figure 3a New national flood Nafra 2.

The new mapping shows that the Low Mill area is at more risk of flooding than previous mapping estimates.

“An assessment of the long term flood risk of areas can be accessed by using the following link [Check the long term flood risk for an area in England - GOV.UK](#). Climate change predictions are now included in the assessment”

3. Flood event 22/23 May 2024

3.1 Background

The month of May was relatively dry prior to the event. From the 1st to the 21st May, the north-west region received 46 mm of rainfall which represents 62% of the long term average monthly rainfall for May. Local rain gauges suggest there was no rainfall from 15th May to the 22nd May, and therefore catchment conditions would not have been unusually wet at the start of the event.

The majority of the heavy rainfall associated with this event fell between 21st and 23rd May 2024, as depicted in figure 4. Rainfall on 21st May was focused across central England and East Anglia, with 20-30mm falling widely and over 50mm falling in the wettest locations. On 22nd May, the main rain-bearing front tracked north with the focus of the rain across North Wales, much of northern England, southern and eastern Scotland, with over 50mm falling widely. This rainfall event continued throughout the 23rd May in the Edinburgh area before the rain finally ceased as the area of low pressure weakened and filled.

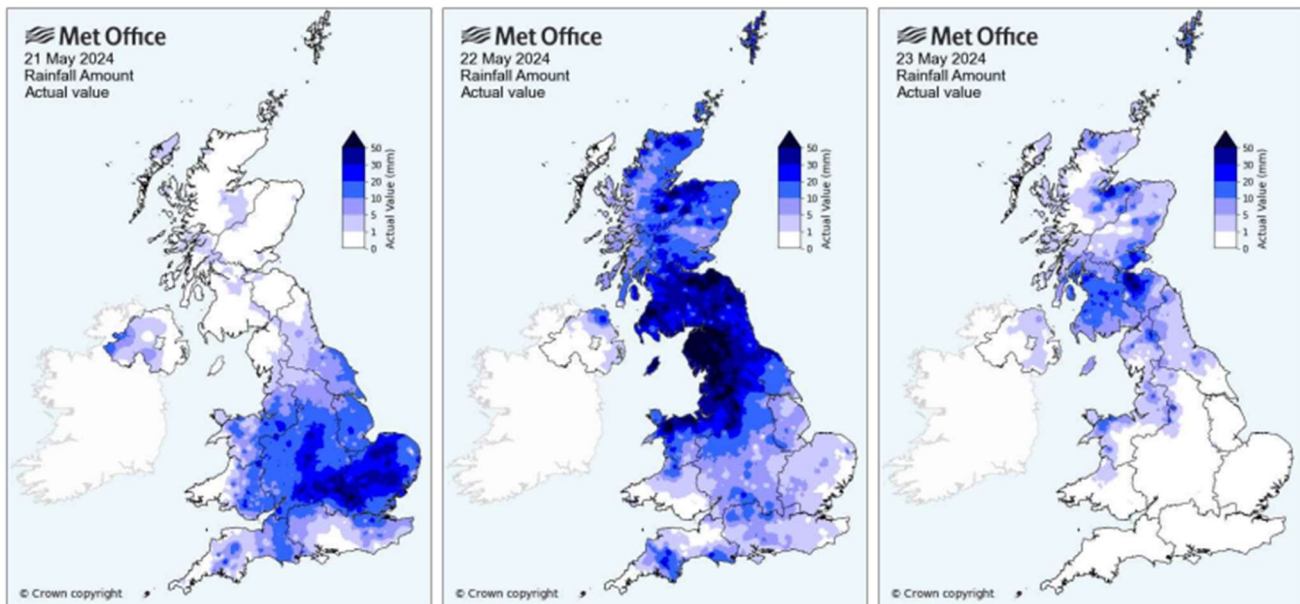


Figure 4: Met Office rainfall values

3.2 Rainfall event

On Wednesday 22nd May to Thursday 23rd May 2024 locations in North-West England experienced heavy rainfall resulting from a slow-moving low-pressure system moving across England and Wales. Rain fell consistently from the morning of 22nd May until the afternoon of 23rd May, with the heaviest totals between 5pm on 22nd May and 2am on 23rd May. 24-hour rainfall totals exceeded 100 mm at several rain gauge sites, approximately twice the long-term average rainfall for the month of May.

The meteorological conditions at the time led to the system crossing the North-West region from the east, rather than from the more typical westerly direction. This led to higher levels of precipitation than usually experienced in the easterly catchments, which lie in the rain shadow of westerly storms. Figure 5 shows total rainfall accumulations (derived from Radar data) for an area of north Cumbria as well as highlighting the catchment area upstream of Stockdalewath. The white catchment outlined is the Roe and Ive catchment extent. The Caldew catchment is larger and extends further south and west to northern slopes of Skiddaw, near Keswick. This figure shows how some of the most intense rainfall was centred over the Roe and Ive catchment but does include part of lower Caldew catchment. The River Roe flows into the Caldew upstream of Dalston and approximately 5.5 km upstream of Low Mill. This information is included here as the Roe Beck catchment contributed significantly to the river levels observed on the River Caldew at Low Mill.

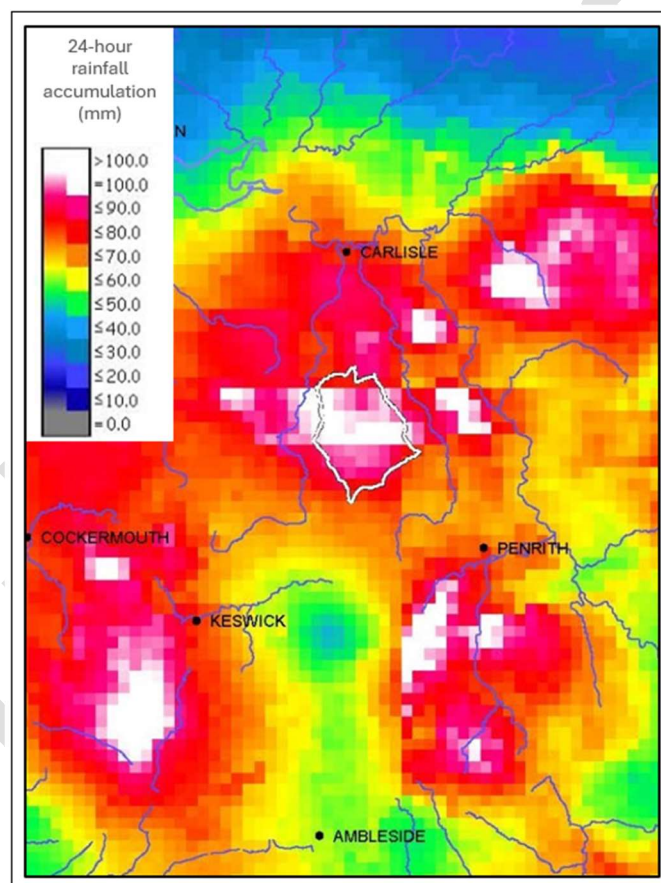


Figure 5: 24-hour rainfall accumulation from 08:00 on 22/05/2024. The white polygon shows the Roe Beck catchment area upstream of Stockdalewath.

Rainfall data was analysed at selected rain gauges based on the spatial pattern of heaviest rainfall. The rain gauges recorded between 46 and 119 mm of rainfall across the event (48 hour totals), with 24-hour maximum totals of 40 to 105 mm. The rain gauge at Skelton recorded 95mm in 24 hours.

Return period estimates for the rainfall across north Cumbria for this event vary from less than 1 in 2 AEP to between 1 in 200 to 1 in 300 AEP. In general, the 12 to 24-hour totals have the

more extreme return periods. This indicates the persistent nature of the frontal rainfall. The 24-hour rainfall totals also exceeded 100% of the long-term average rainfall for May in 8 of the 11 rainfall sites assessed (i.e., more than a month’s rain fell in one day). Figure 6 shows the locations of the rain gauges analysed and the maximum return period of the rainfall recorded at each. The rarest rainfall was recorded at rain gauges just south of Carlisle (Thursby, Cumwhinton and Geltsdale).

Whilst rain gauges provide an accurate record of the rainfall that fell in a specific location weather radar can be used to provide an estimate of rainfall across larger areas or to estimate average rainfall across whole catchment. This data indicates that 94mm of rain fell across the catchment upstream of Stockdalewath in 24 hours (from 08:00 GMT on 22/05/2024). These rainfall totals are significant and extremely large for catchment average rainfall. However, estimating return periods for radar rainfall totals is problematic. We consider it reasonable to suggest that the event rarity for the catchment average rainfall was in the order of 1 in 75 to 1 in 100 AEP. Figure 7 plots catchment average rainfall accumulations at 15 min intervals and cumulative totals over 48 hours.

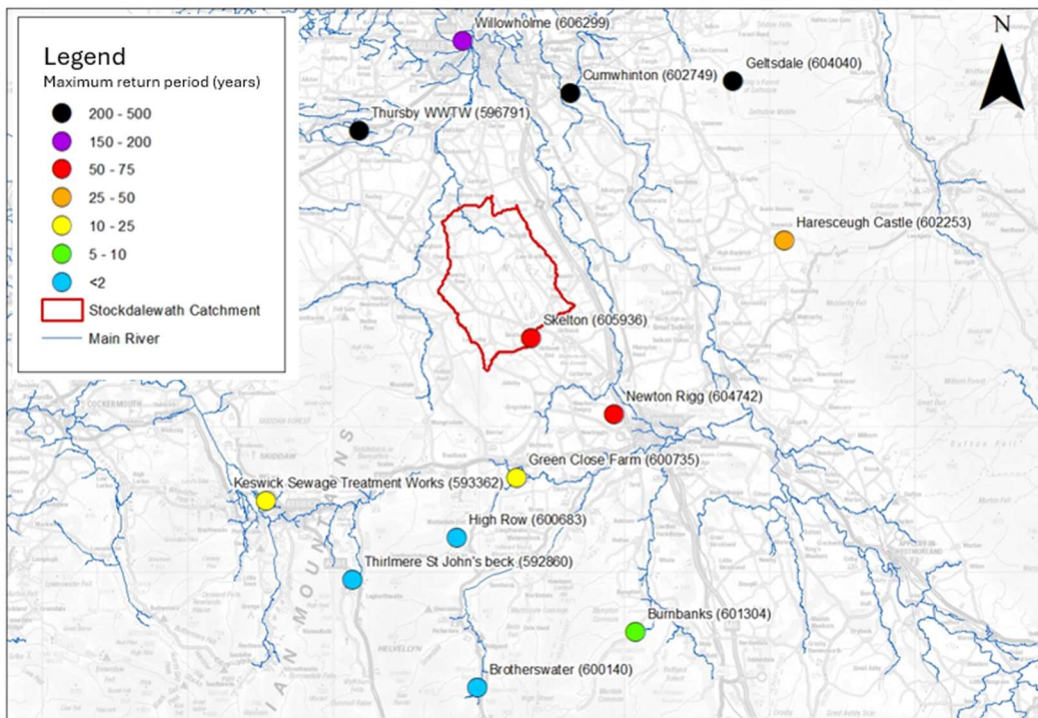


Figure 6: Rainfall return period at selected gauges

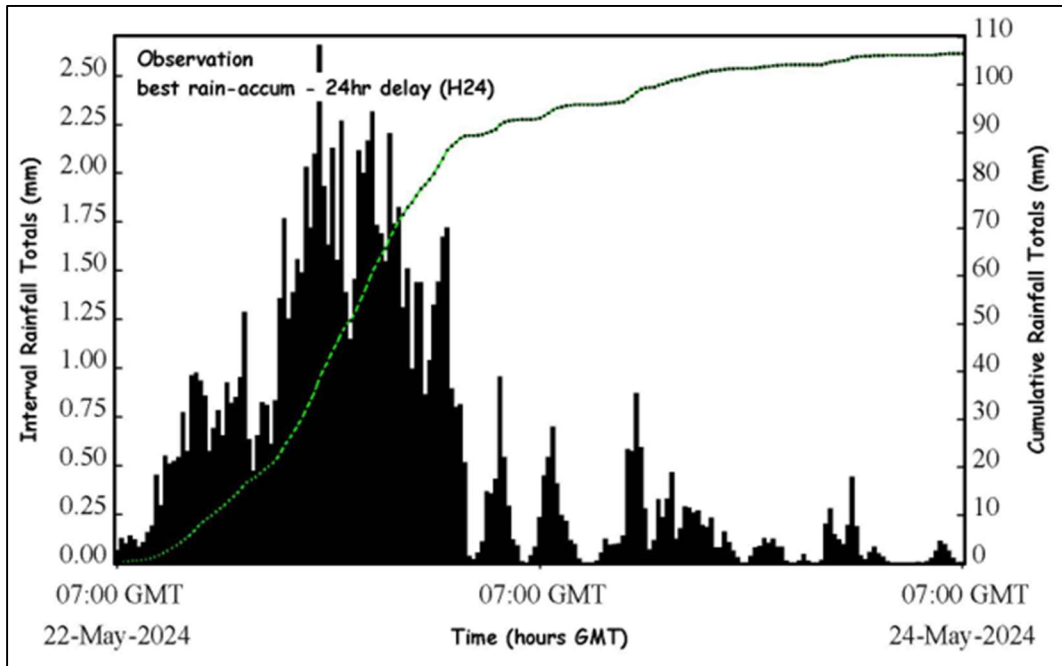


Figure 7: Catchment-averaged rainfall for the Roe Beck catchment upstream of Stockdalewath

3.3 River levels

The Environment Agency operates a river gauging network which records river levels and flows on watercourses throughout England. Peak river levels recorded during the May 2024 event at selected gauges within the Caldew and Petteril catchments were ranked alongside the other largest events in the gauged record. This analysis is summarised in figure 8 which shows that the river levels were the highest on record the River Caldew. For the River Petteril, the event was exceeded by December 2015 (Storm Desmond) and January 2005 events.

The nearest gauge to Low Mill is at Cummersdale, approximately 2.7km downstream. The Cummersdale gauge is downstream of the Roe Beck River Caldew confluence.

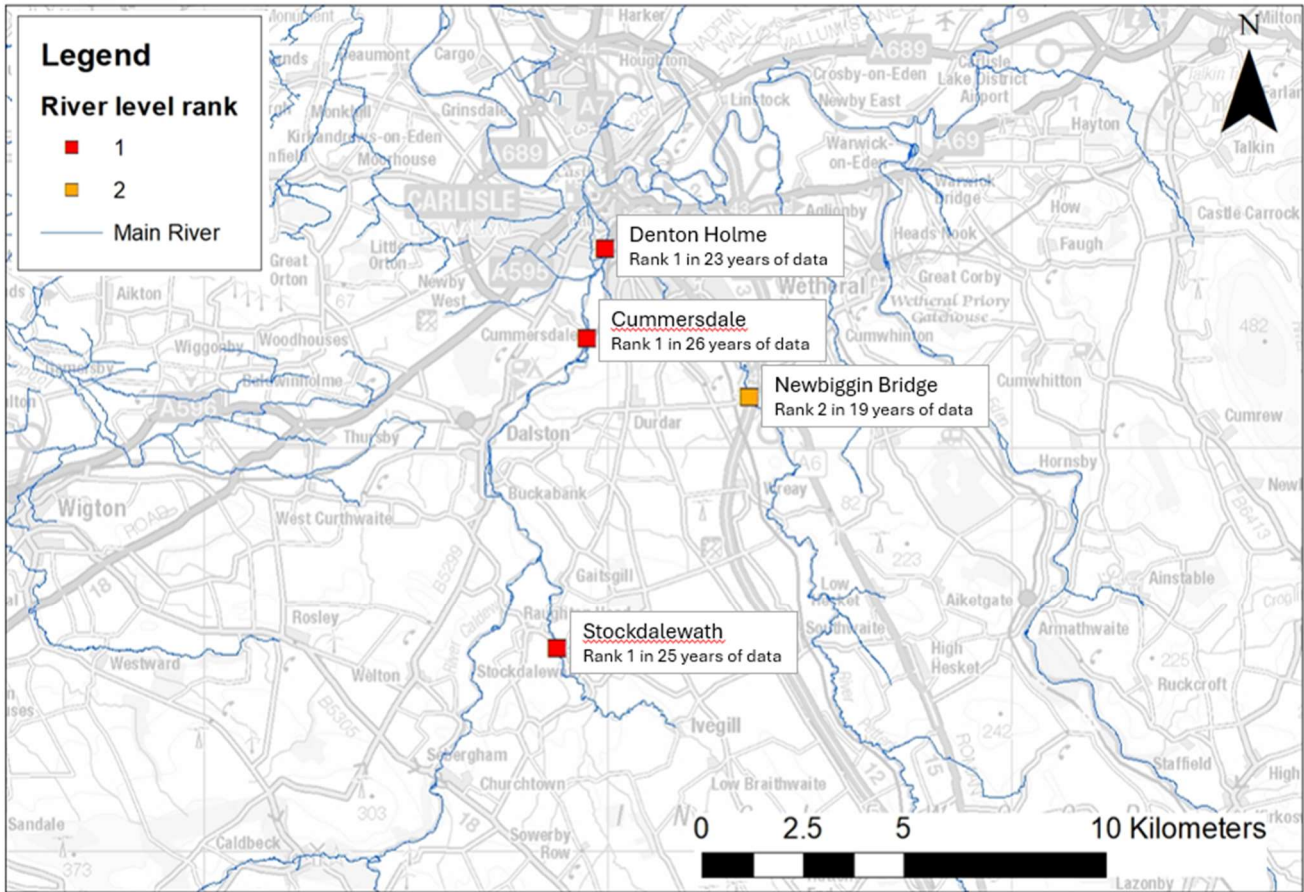


Figure 8: Ranking of the peak river level recorded during the May 2024 event at selected river gauges relative to other large events in the gauged record. A rank of 1 means this event was the largest on record.

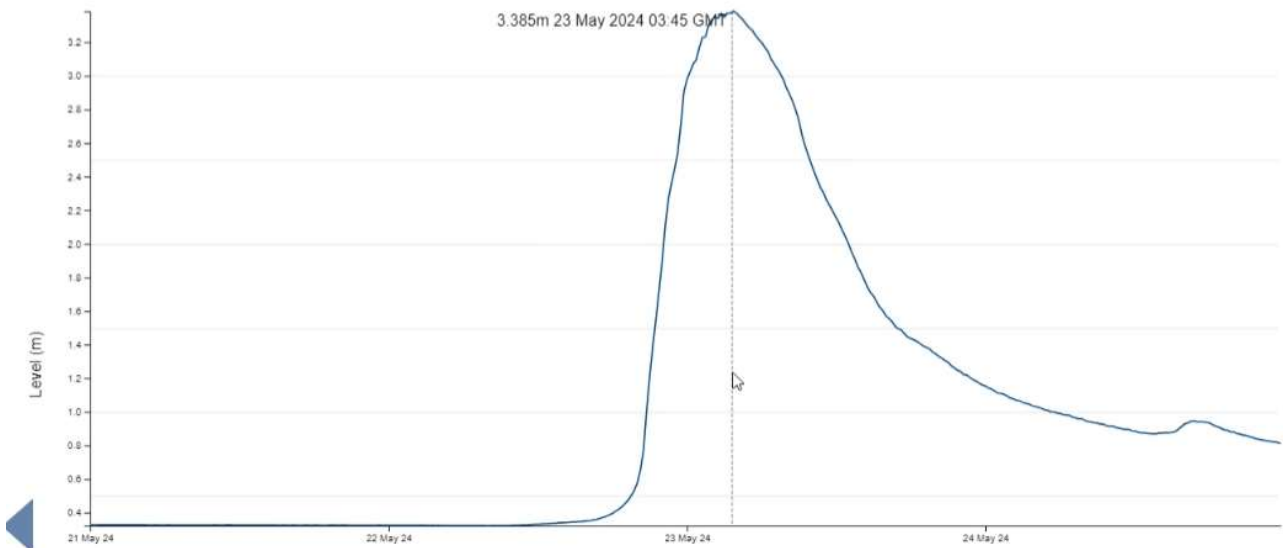


Figure 9: River Caldew level in Cummersdale May 22/23

The level of the River Caldew was .323 m at approx. 11 AM on the 22nd of May and peaked at 3.385m at 03:45 on the 23rd May, a rise of nearly 3m over a short period of time. Roe Beck peaked between 01:00 and 02:00 hrs on the morning of the 23rd May. Much of the flow that contributed to the high river levels on river Caldew are believed to have come from the Roe

Beck catchment, the confluence of Roe Beck and River Caldew is about 5.5 km upstream of Low Mill.

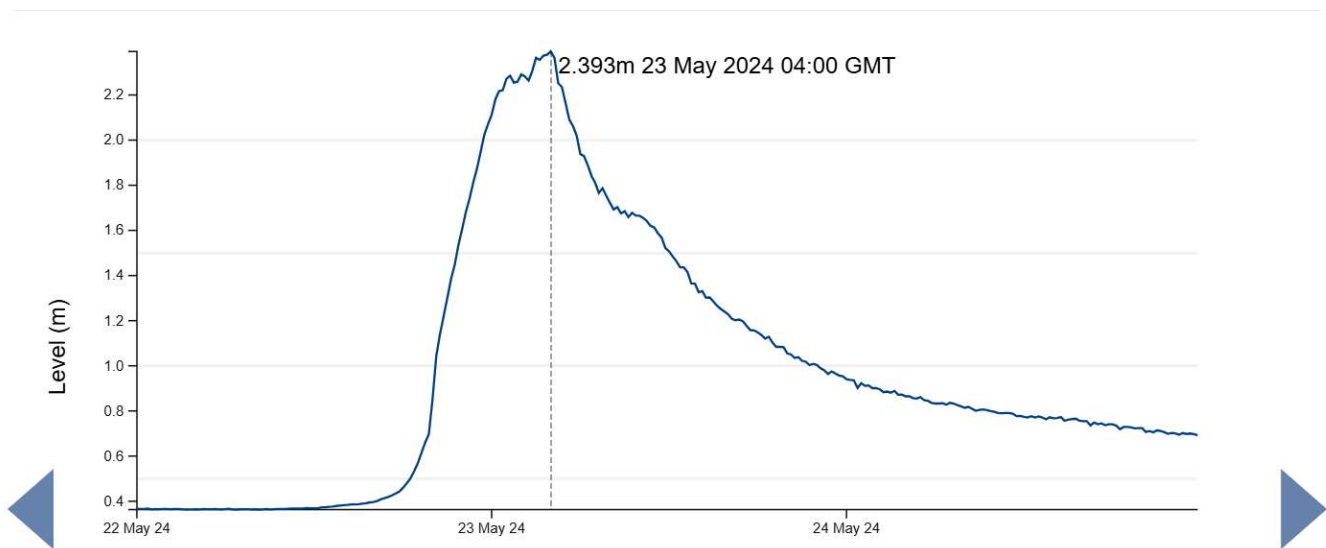


Figure 10: River Caldew level at Sebergham May 22nd to 24th

The peak recorded level on the River Caldew at Sebergham was ~ 2.393m. This is not the highest level recorded at this gauging station since it was installed in June 1999. There have been ~ 5 higher levels recorded at this gauging station historically. This tends to support the observation that the bulk of the flow that resulted in the highest level recorded on Caldew at Cummersdale came from the Roe catchment. The Caldew at Sebergham also peaked after the peak observed at Cummersdale, further supporting the observation made above.

3.4 River flows

The peak flow on the River Caldew at the Cummersdale gauge in May 2024 was 326m³/s which is 4% larger than the June 2012 event (314m³/s) and 17% larger than December 2015 (279m³/s).

River flow return periods have been assessed at the following gauging stations, the location of these gauging stations is shown above in Figure 8.

- Roe Beck at Stockdalewath
- River Caldew at Cummersdale
- River Petteril at Newbiggin

Table 1 provides current estimates of peak river flow (m³/s) recorded at each site during the May 2024 event and estimates the rarity of this event, presented as an annual exceedance probability. The rarity estimates for river flow are very similar to those for rainfall accumulations, indicating that the flooding was driven by the extreme rainfall totals of the event.

	Roe Beck at Stockdalewath	Caldew at Cummersdale	Petteril at Newbiggin
Observed peak flow, May 2024 (m ³ /s)	133	326	78
Annual exceedance probability	Between 0.5 and 0.2%	Between 1.33% and 1%	Between 4% and 2%

Table 1: estimated peak river flow presented as annual exceedance probability

The annual exceedance probabilities presented in table 1 are based on current climatic conditions and are indicative of the likelihood of such an event happening in any given year over the next few years. However, climate change is already impacting our climate and in many places the frequency of large flood events. As we look further into the future climate change will mean that events such as this will occur more frequently. The impact that climate change will have on increasing the frequency and magnitude of large floods and the intensity of extreme rainfall is more extreme in Cumbria, and the River Eden catchment in particular, than in many other parts of the country.

4. Investigation

This investigation has been compiled by the Environment Agency and Cumberland Council using information collected on the ground after the event and residents accounts, where available.

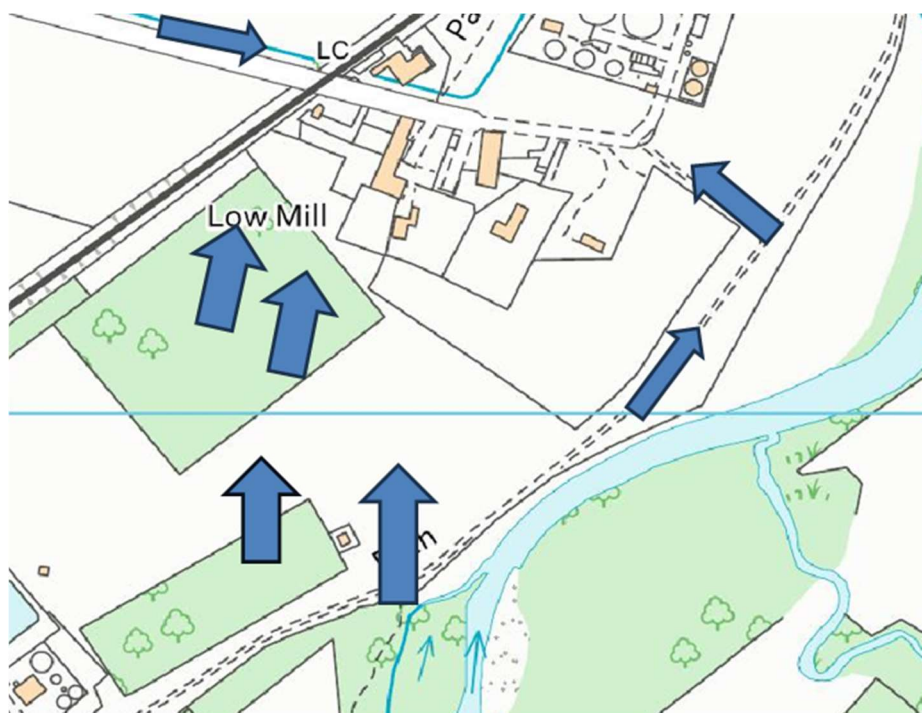


Figure 11: Likely flow routes following comments from the EA, United Utilities and affected resident's.



Figure 12: Post flood photograph showing wrack mark on the fence that had carried flood water from the Caldew.



Figure 13: Flow route description provided by the Environment Agency

Flood mechanism as described by residents and risk management authorities

Resident accounts indicate that the flood water came from the river Caldew. The rainfall event resulted in the highest recorded river levels at the Cummersdale gauging station.

Due to the peak happening through the early hours of the 23rd of May residents woke up to the flood water surrounding and entering their properties. Evidence on the ground supports residents' accounts as wrack (debris deposited by the river) could be seen on fences and on the ground in and around Low Mill, post event.

It is believed that this is the first time the properties have recorded any flooding. It can be seen that the Caldew flowed from the south of the properties around the bunded area and also through the footpath as can be seen from the photographs above.

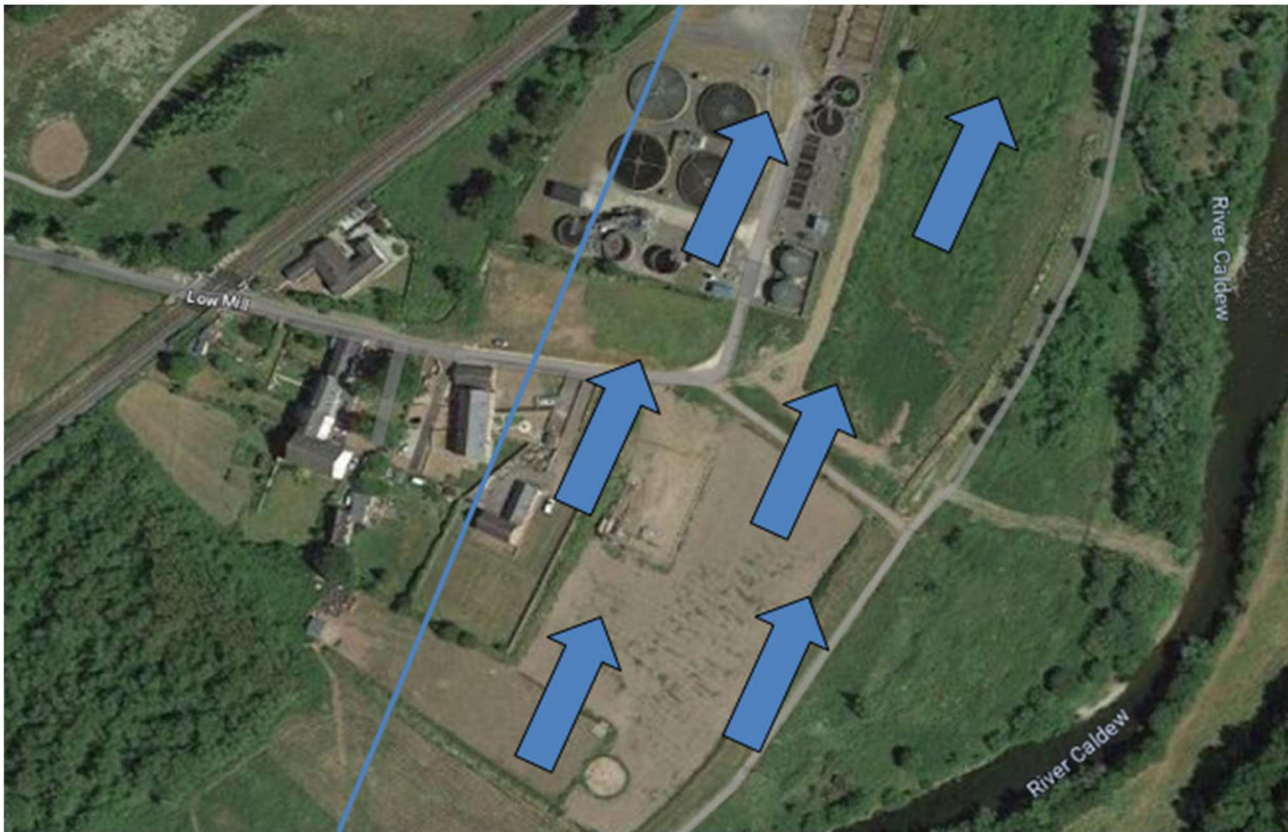


Figure 13: Approximate flood extent in 2015



Figure 14: United Utilities treatment works

Comments from United Utilities “ The site had flooding into the works via the road and entrance to the works, causing localised flooding around our tanks and the old drying beds, site was inaccessible on the 22nd but photo evidence was taken on the 23rd of the water that was left in the area in and around the works.”

4.1 Timeline

Table 2 below shows the times of key events during the flooding event.

<u>Date</u>	<u>Time</u>	<u>Event</u>
21 st May	10:30	Yellow rain warning issued by Met Office covering all of central and northern England as well as central and northern Wales.
	10:30	Yellow flood guidance statement issued covering all of central and northern England as well as central and northern Wales.
22 nd May	05:57	Amber rain warning for by Met Office covering north Wales, north midlands, Cheshire and southern Lancashire. Cumbria was not included.
	10:32	Flood guidance statement remains yellow for Cumbria but has an amber area of concern covering N. Wales, Cheshire and Lancashire.
	13:15	Flood forecasting centre advised of potential for 100mm of rain in west Cumbria
	16:23	Flood Alert issued for Rivers Caldew and Petteril
23 rd May		When did properties report onset of flooding?
	03:45	EA river level gauge in Cummersdale peaked at level of ca. 3.385m until 03:30 23 rd May when river level started to fall below this level.

Weather forecast
Flood warning
River levels
Reported flooding

Table 2: Timetable of key events

4.2 Impact of the flood event

6 residential properties are thought to have suffered internal flooding from main river Caldew at Low Mill. Other properties suffered flooding and damage to the gardens, outbuildings and garages. The United Utilities works were flooded. The network rail line is not reported to have flooded. Access to Low Mill was flooded.

The residents reported that the flow of water came round the back of the properties before breaching the thresholds. Up to 500mm of water was reported internally, the residents then opened the front doors to let the water back out as river levels on the Caldew dropped.

There was also water flooding on the access road and in the field to the north west of the development. It was reported that the railway embankment would have reduced the impacts of flooding associated with this mechanism.

An earth embankment was constructed around 2015/2017 around the Low Mill Barn and surrounding areas as part of renovation/development work. Residents have asked if this could have affected the flow routing. Without modelling it is unclear if this is the case. It should also be noted that this was an unprecedented storm, higher volumes than Storm Desmond so the 2015 event should not be used as a benchmark.

There is a complicated planning history associated with the earth embankments that have been constructed around Low Mill since 2015/2016. The bank, which is crossed by an access track, runs along the river Caldew from a point downstream of the UU works to a point upstream of Low Mill. It then turns 90 degrees away from the river bank towards an area of woodland to the north west. Sections of the banks were constructed at different times. Planning applications were made for sections of banks at different time periods. Planning approvals, with conditions, were obtained over a number of years. It is recommended that the applications and permissions are reviewed to help understand what parts of the bank have planning permission and if what was built reflects the permissions. It is also recommended that an assessment of the role of the banks in the flooding experienced in May 2024 is undertaken.

These properties are not in a flood warning area. These properties do not have a history of flooding from the River Caldew. The rapid onset of the flooding along with the fact that it occurred overnight and had not been forecast the previous day meant that many residents were unable to take measures to protect their property.

4.3 Flood incident response

There is no flood warning area here. There is a flood alert area here, namely; *Rivers Caldew and Petteril*

Rivers Caldew and Petteril from the Lakeland Fells to Carlisle including Greystoke, Newton Reigny, Plumpton, Stockdalewath, Sebergham and Denton Holme in Carlisle

The code for the flood alert area is *FWD TA code: 011WAFPC* (see recommendations).

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4.4 Recommendations

No.	Action by	Recommendation	Timescale
1	Environment Agency and residents	Confirm if residents have signed up to flood alerts for the area. Investigate Flood Warning options.	TBC
2	EA and Cumberland Council planning 15/0783, 17/0753 and 17/0534	Check bund design against planning approvals, consider modelling options, investigate what remedial action/enforcement can be taken if appropriate.	Spring/summer 25
3	Residents	Ensure properties have flood resilience built in, look at PFR measures	TBC

Appendices

Appendix 1: Glossary

Acronyms

AEP	Annual Exceedance Probability
ARI	Annual Recurrence Interval
AOD	Above Ordnance Datum
CC	Cumberland Council
EA	Environment Agency
FIAG	Flood Action Group
FWD	Flood Warnings Direct
FWMA	Flood and Water Management Act 2010
LDA	Land Drainage Act 1991
LLFA	Lead Local Flood Authority
LFRM	Local Flood Risk Management
MSfWG	Making Space for Water Group
RMA	Risk Management Authority
UU	United Utilities
WRA	Water Resources Act 1991

Term	Definition
Aquifer	A source of groundwater comprising water-bearing rock, sand or gravel capable of yielding significant quantities of water.
Annual Exceedance Probability	The AEP describes the likelihood of a specified flow rate (or volume of water with specified duration) being exceeded within a given year.
Attenuation	In the context of this report - the storing of water to reduce peak discharge of water.
Catchment Flood Management Plan	A high-level planning strategy through which the EA works with their key decision makers within a river catchment to identify and agree policies to secure the long-term sustainable management of flood risk.
Culvert	A channel or pipe that carries water below the level of the ground.
De facto flood defence	A feature or structure that may provide an informal flood defence benefit but is not otherwise designed or maintained by the Environment Agency.
Flood defence	Infrastructure used to protect an area against floods as floodwalls and embankments; they are designed to a specific standard of protection (design standard).
Floodplain	Area adjacent to river, coast or estuary that is naturally susceptible to flooding.
Flood resilience	Measures that minimise water ingress and promotes fast drying and easy cleaning, to prevent any permanent damage.
Flood risk	The level of flood risk is the product of the frequency or likelihood of the flood events and their consequences (such as loss, damage, harm, distress and disruption).
Flood Risk Regulations	Transposition of the EU Floods Directive into UK law. The EU Floods Directive is a piece of European Community (EC) legislation to specifically

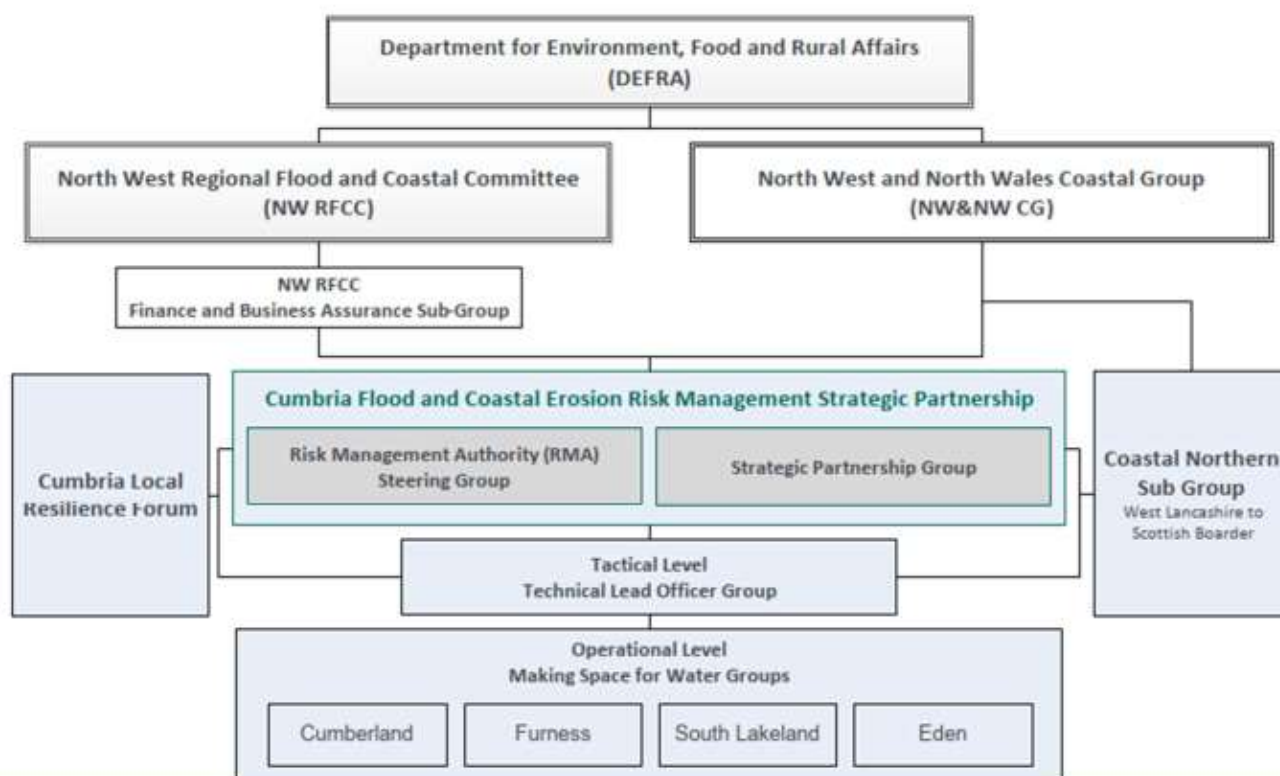
	address flood risk by prescribing a common framework for its measurement and management.
Flood and Water Management Act	Part of the UK Government's response to Sir Michael Pitt's Report on the Summer 2007 floods, the aim of which is to clarify the legislative framework for managing surface water flood risk in England.
Flood storage	A temporary area that stores excess runoff or river flow often ponds or reservoirs.
Flood Zone	Flood Zones are defined in the NPPF Technical Guidance based on the probability of river and sea flooding, ignoring the presence of existing defences.
Flood Zone 1	Low probability of fluvial flooding. Probability of fluvial flooding is < 0.1%.
Flood Zone 2	Medium probability of fluvial flooding. Probability of fluvial flooding is 0.1 – 1%. Probability of tidal flooding is 0.1 – 0.5 %.
Flood Zone 3a	High probability of fluvial flooding. Probability of fluvial flooding is 1% (1 in 100 years) or greater. Probability of tidal flooding is 0.5%(1 in 200 years)
Flood Zone 3b	Functional floodplain. High probability of fluvial flooding. Probability of fluvial flooding is >5%.
Fluvial	Relating to the actions, processes and behaviour of a water course (river or stream).
Fluvial flooding	Flooding by a river or a watercourse.
Freeboard	Height of flood defence crest level (or building level) above designed water level.
Functional floodplain	Land where water has to flow or be stored in times of flood.
Groundwater	Water that is in the ground, this is usually referring to water in the saturated zone below the water table.
Inundation	Flooding.
Lead Local Flood Authority	As defined by the FWMA, in relation to an area in England, this means the unitary authority or where there is no unitary authority, the county council for the area.
Main river	Watercourse defined on a 'Main River Map' designated by DEFRA. The EA has permissive powers to carry out flood defence works, maintenance and operational activities for Main Rivers only. Also see "ordinary watercourse".
Mitigation measure	An element of development design which may be used to manage flood risk or avoid an increase in flood risk elsewhere.
Ordinary watercourse	The LLFA and Internal Drainage Boards have permissive powers to carry out flood risk management work, maintenance and operational activities. Also see "Main river".
Overland flow	Flooding caused when intense rainfall exceeds the capacity of the drainage systems or when, during prolonged periods of wet weather, the soil is so saturated such that it cannot accept any more water.
Residual flood risk	The remaining flood risk after risk reduction measures have been taken into account.
Return period	The average time period between rainfall or flood events with the same intensity and effect.
River catchment	The areas drained by a river.
Sewer flooding	Flooding caused by a blockage or overflowing in a sewer or urban drainage system.
Sustainability	To preserve /maintain a state or process for future generations.

Sustainable drainage system	Methods of management practices and control structures that are designed to drain surface water in a more sustainable manner than some conventional techniques.
Sustainable development	Development that meets the needs of the present without compromising the ability of future generations meeting their own needs.
Sustainable Flood Risk Management	Sustainable Flood Risk Management promotes a catchment wide approach to flooding that uses natural processes and systems (such as floodplains and wetlands) to slow down and store water.
Topographic survey	A survey of ground levels.
Tributary	A body of water, flowing into a larger body of water, such as a smaller stream joining a larger stream.
Watercourse	All rivers, streams, drainage ditches (i.e. ditches with outfalls and capacity to convey flow), drains, cuts, culverts and dykes that carry water.
Wrack marks	An accumulation of debris usually marking the high water line.
1 in 100 year event	An event that on average will occur once every 100 years. Also expressed as an event, which has a 1% probability of occurring in any one year or 1% AEP.
1 in 100 year design standard	Flood defence that is designed for an event, which has an annual probability of 1%. In events more severe than this the defence would be expected to be overwhelmed and for flooding to occur.

Appendix 2: Summary of relevant legislation and the remit of Flood Risk Management Authorities

The table below shows the governance chart for Cumbria's risk management authorities.

Cumbria FCERM Governance Chart



Cumbria governance chart

The Flood Risk Regulations 1999 and the Flood and Water Management Act 2010 (the Act) have established Cumberland Council (CC) as the Lead Local Flood Authority (LLFA) for Cumbria. This has placed various responsibilities on CC including Section 19 of the Act which states:

Section 19

- (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.

A 'Risk Management Authority' (RMA) means:

- (a) the Environment Agency,
- (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.

The table below summarises the relevant Risk Management Authority and details the various local source of flooding that they will take a lead on.

Flood Source	Environment Agency	Lead Local Flood Authority	Water Company	Highway Authority
RIVERS				
Main river				
Ordinary watercourse				
SURFACE RUNOFF				
Surface water				
Surface water on the highway				
OTHER				
Sewer flooding				
The sea				
Groundwater				
Reservoirs				

The following information provides a summary of each Risk Management Authority’s roles and responsibilities in relation to flood reporting and investigation.

Government – DEFRA develop national policies to form the basis of the Environment Agency’s and Cumberland Council’s work relating to flood risk.

Environment Agency (EA) – has a strategic overview of all sources of flooding and coastal erosion as defined in the Act. As part of its role concerning flood investigations this requires providing evidence and advice to support other risk management authorities. The EA also collates and reviews assessments, maps and plans for local flood risk management (normally undertaken by LLFA).

Lead Local Flood Authorities (LLFAs) – Cumberland Council is the LLFA for Cumbria (excluding Carlisle, Allerdale and Copeland areas). Part of their role requires them to investigate significant local flooding incidents and publish the results of such investigations. LLFAs have a duty to determine which risk management authority has relevant powers to investigate flood incidents to help understand how they happened, and whether those authorities have or intend to exercise their powers. LLFAs work in partnership with communities and flood risk management authorities to maximise knowledge of flood risk to all involved. This function is carried out at Cumberland Council by the Flood and Development Management Team.

Water and Sewerage Companies – manage the risk of flooding to water supply, sewerage facilities and the risk to others from the failure of their infrastructure. They make sure their systems have the appropriate level of resilience to flooding and where frequent and severe flooding occurs, they are required to address this through their capital investment plans. It should also be noted that following the Transfer of Private Sewers Regulations 2011 water and sewerage companies are responsible for a larger number of sewers than prior to the regulation.

Highway Authorities – have the lead responsibility for providing and managing highway drainage and certain roadside ditches that they have created under the Highways Act 1980. The owners of land

adjoining a highway also have a common-law duty to maintain ditches to prevent them causing a nuisance to road users.

Flood risk in Cumbria is managed through the Making Space for Water process which involves the cooperation and regular meetings of the Environment Agency, United Utilities, District/Borough Councils and Cumberland Council's Highway and Local Flood Risk Management (LFRM) teams to develop processes and deliver schemes to minimise flood risk. The Making Space for Water Groups (MSfWG) meet approximately 4 times per year to cooperate and work together to reduce the flood risk to vulnerable communities, including those areas identified in this report, by undertaking specific actions. Cumberland Council, as LLFA, has a responsibility to oversee the delivery of these actions.

Where minor works or 'quick-win' schemes can be identified, these will be prioritised and, subject to available funding and resources, will be carried out as soon as possible. Any major works requiring capital investment will be considered through the Environment Agency's capital programme or a partners own capital investment process.

Flood Action Groups (FIAG) are usually formed by local residents who wish to work together to resolve flooding in their area. The FIAGs are often supported by either Cumberland Council or the EA and provide a useful mechanism for residents to forward information to the MSfWG.

Appendix 3: Useful contacts and links

Cumberland Council (Local Flood Risk Management):
lfrm@cumberland.gov.uk, www.cumberland.gov.uk

Cumberland Council (Highways):
<https://www.cumberland.gov.uk/parking-roads-and-transport/streets-roads-and-pavements/road-maintenance-closures-and-improvements/report-problem-street-or-road>
Tel: 0300 373 3736
Out of hours emergencies should be reported via the Police on 101

United Utilities: www.unitedutilities.com, tel: 0845 746 2200

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

Water Resources Act 1991:
<http://www.legislation.gov.uk/all?title=water%20resources%20act>

Land Drainage Act:
<http://www.legislation.gov.uk/all?title=land%20drainage%20act>

Highways Act 1980:
<http://www.legislation.gov.uk/all?title=highways%20act>

EA – Owning a Watercourse Guidance: A guide to the rights and responsibilities of riverside occupation:
<http://www.environment-agency.gov.uk/homeandleisure/floods/31626.aspx>

EA – ‘Prepare your property for flooding’ how to reduce flood damage including flood protection products and services:
<http://www.environment-agency.gov.uk/homeandleisure/floods/31644.aspx>

EA - [Hydrology Data Explorer](#). This is a data portal enabling you to access live and historic hydrometric and water quality data from the Environment Agency.

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