Cumrew

Flood Investigation Report No 60

Flood Event 28th June 2013

This flood investigation report has been produced by Cumbria 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
Preliminary	Helen Renyard	Anthony Lane		28th June 2013
Draft	Helen Renyard	Anthony Lane		2nd July 2013
Published	Helen Renyard	Anthony Lane	Doug Coyle	19th March 2014

Contents

Executive Summary

Cumbria County Council as Lead Local Flood Authority has prepared this report with the assistance of other Flood Risk Management Authorities as it considers necessary to do so under Section 19 of the Flood and Water Management Act 2010.

On the 28th June 2012 an extreme rainfall event caused flooding in Cumrew village which is located at the foot of the Pennines. Further significant flood events have also affected Cumrew on 18th May 2013, 28th June 2013 and 28th July 2013.

Ten properties are known to have been affected by flooding in the village with five of those suffering from internal flooding during the 28th June 2012 event. A lesser number of properties were affected during the other 3 rainfall events..

The flooding was caused by the volume of water overwhelming Cumrew Beck which caused flood water to flow into the village via a fell side track, flow along the highway and then flow into properties via vehicle crossings.

The report recommends various options with the main emphasis being placed on the Making Space for Water group to try to identify options to reduce the flood risk including sources of funding for possible options.

Event Background

This section describes the location of the flood incident and identifies the properties that were flooded.

Flooding Incident

Cumrew is located on the western side of the Pennines approximately 12 miles east of Carlisle. The village consists of approximately 23 properties generally spread out along the central road. There are various tracks leading from the fells in to the village.

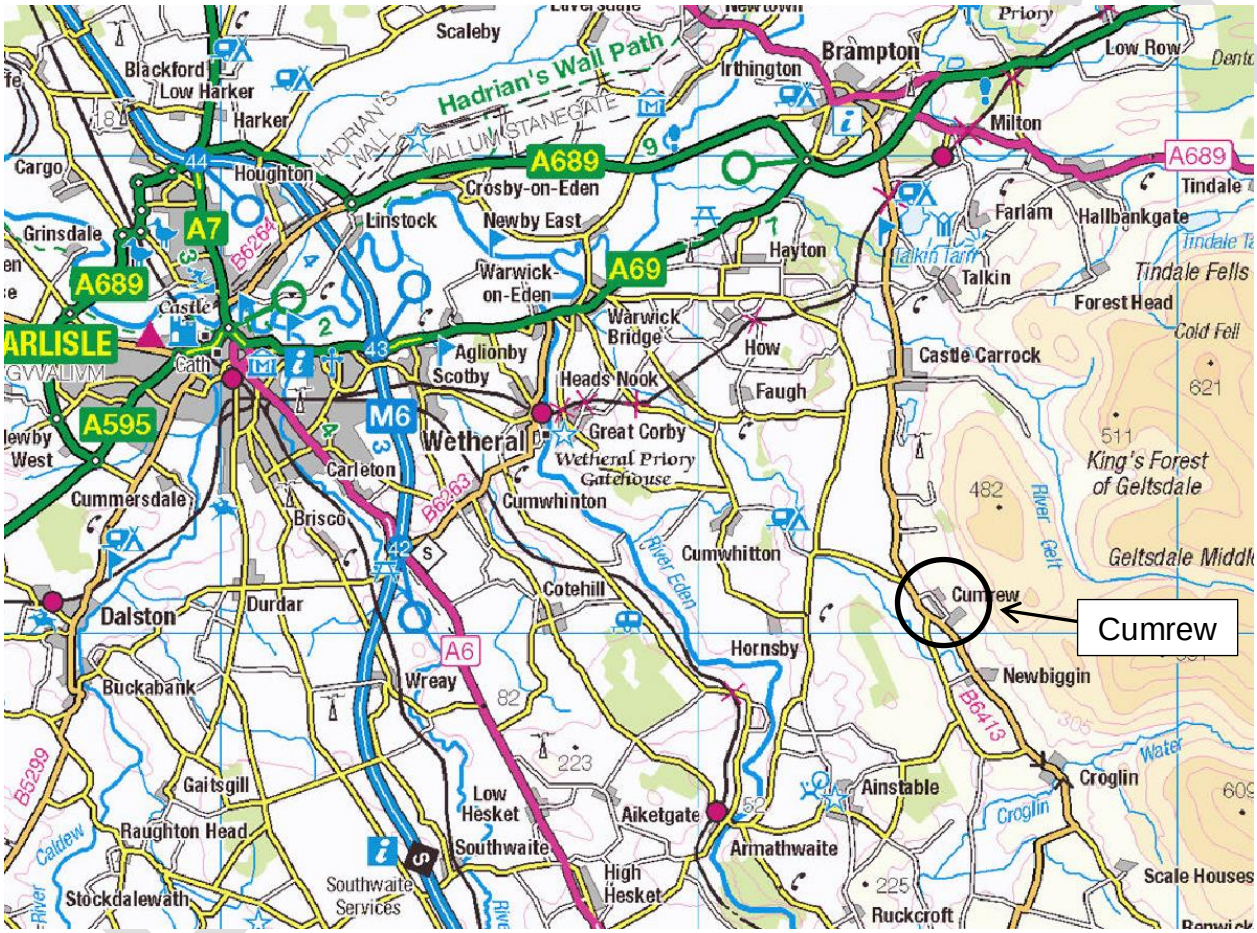


Figure 1: Location Plan.

Ten properties were affected by the flooding ranging in extent from internal flooding to garden flooding. Five properties are known to have flooded internally. The properties were located in various parts on the village and are indicated on the plan on the following page.

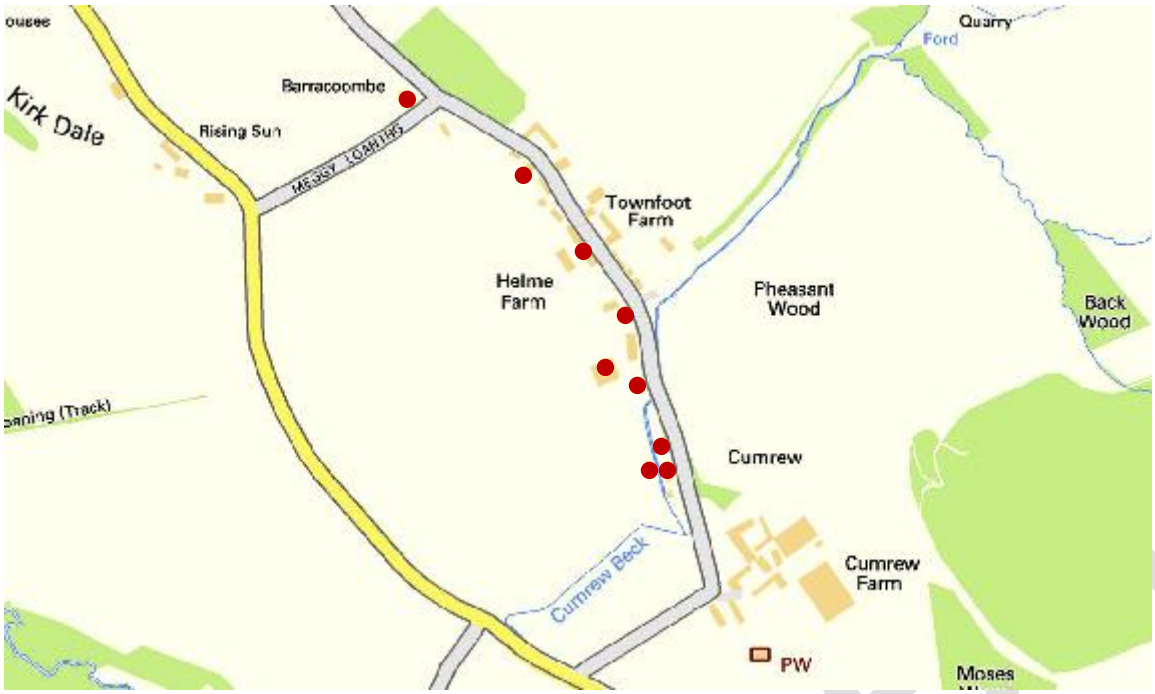


Figure 2: Plan showing properties affected by the flood event.

Investigation

Rainfall Event

A number of Heavy Rainfall Alerts were issued by the Met Office over the days preceding the flooding on the afternoon of the 28th June. These were issued with medium confidence and suggested that some locally high rainfall totals could be observed over Cumbria, although there was uncertainty as to exactly where this rain would fall. High intensity rainfall was forecast as an active frontal system moved in quickly from the south west and traversed Cumbria leaving the north east corner late in the afternoon. High rainfall totals were expected at those locations within a very short period.

Radar information gathered following the rainfall event identified that an area of very intense rainfall occurred over the Cumrew area at approximately 14.00. The radar information indicated that rainfall of intensities up 50mm/hr is likely to have fallen for a very short time. This would have created excessive surface water on the ground below.

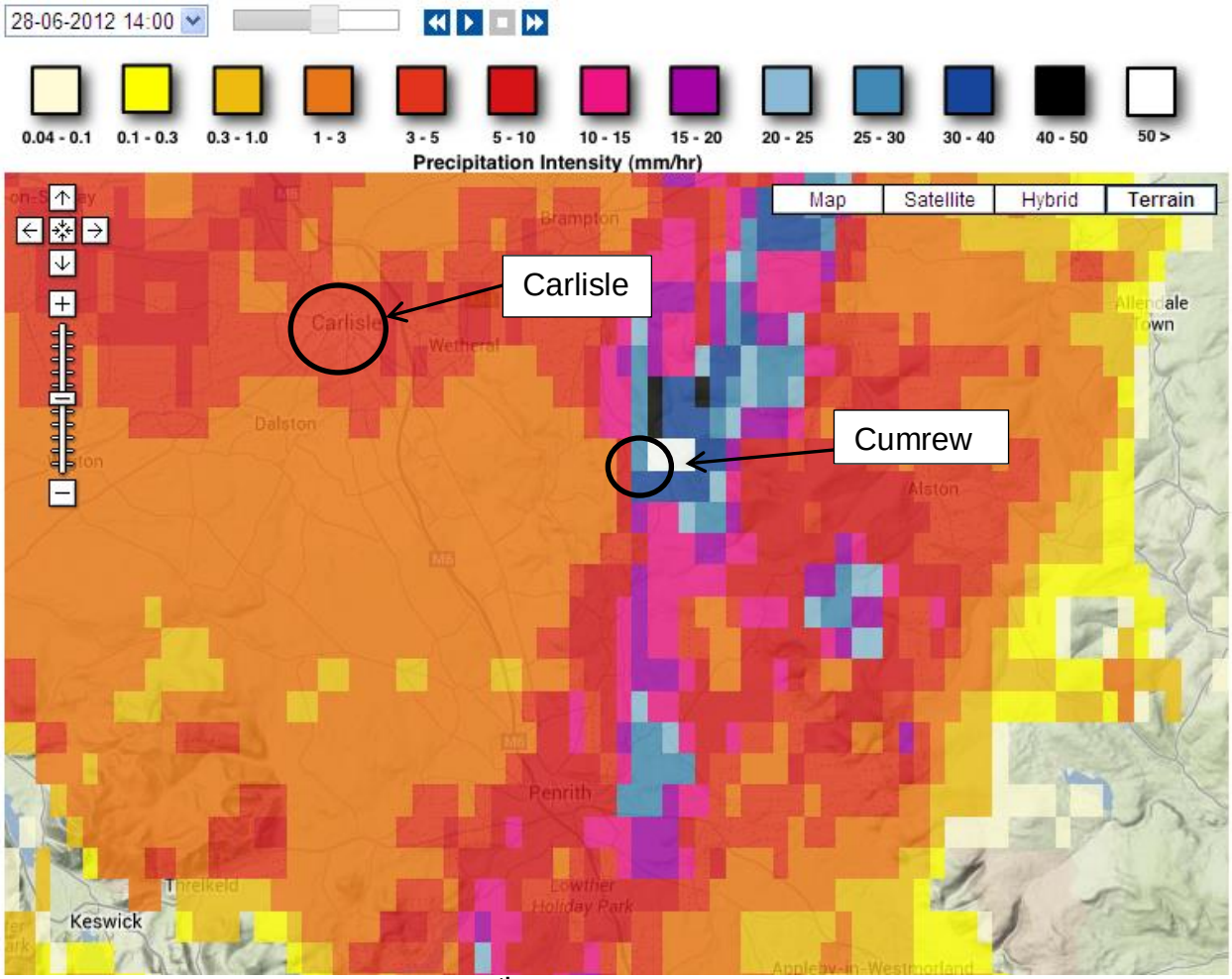


Figure 3: Radar information of 28th June 2013 event

The Environment Agency (EA) also has a rain gauge located at Geltsdale which is approximately 3.5km away from Cumrew. The rainfall information obtained from the EA is

illustrated in the following hyetograph. The graph also indicates the rainfall hyetograph for the event that occurred on 18th May 2013 and 28th July 2013 although not as extreme as the event on 28th June 2012 they were still significant events. Unfortunately the rainfall data for the event that occurred on 28th June 2013 was unavailable.

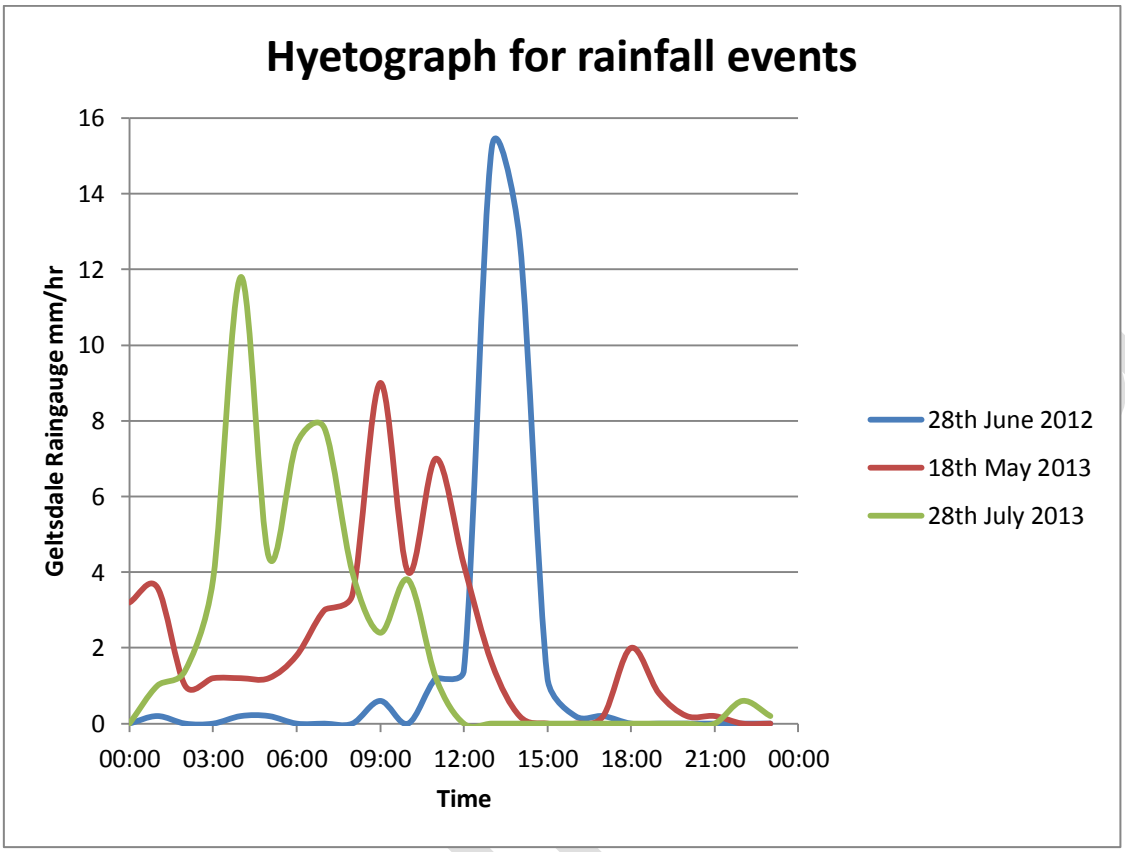


Figure 4: Rainfall hyetograph

Contains Environment Agency information © Environment Agency and database right

Map of Flow Routes

Cumrew is located at the foot of Cumrew Fell which is part of the Pennines. From OS plans it is evident that the fell area is located in an area with significant limestone. This can be identified due to the number of shake holes and issues evident in the area. The source of Cumrew Beck is approximately 1km upstream of Cumrew Village. There are other watercourses connecting into Cumrew Beck upstream of Cumrew Village the most significant being Trowslinn Gill and the unnamed branch with its source near to the site of Dunwalloght Castle. The plan below details the watercourses that contribute to Cumrew Beck before it flows through Cumrew.

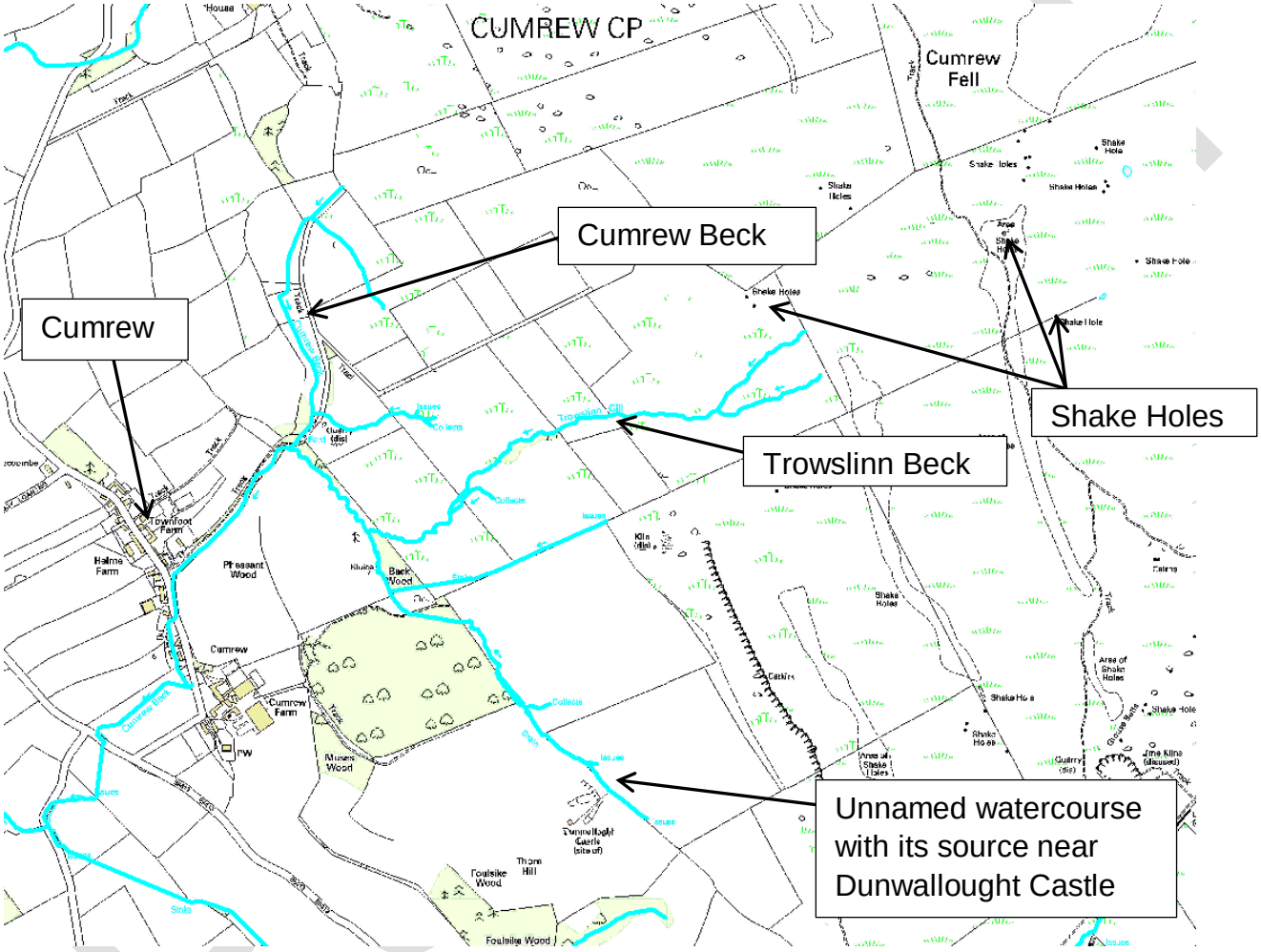


Figure 4: Watercourses contributing to Cumrew Beck

During the event on the 28th June 2012 Cumrew Beck was unable to take the excessive rainfall causing floodwater to overtop the watercourse banks. The overtopping occurred in several places which are indicated on the following plan. Over topping next to the track caused the flood water to run down into the village. The information on the following pages details flow routes from Cumrew Beck and other sources.

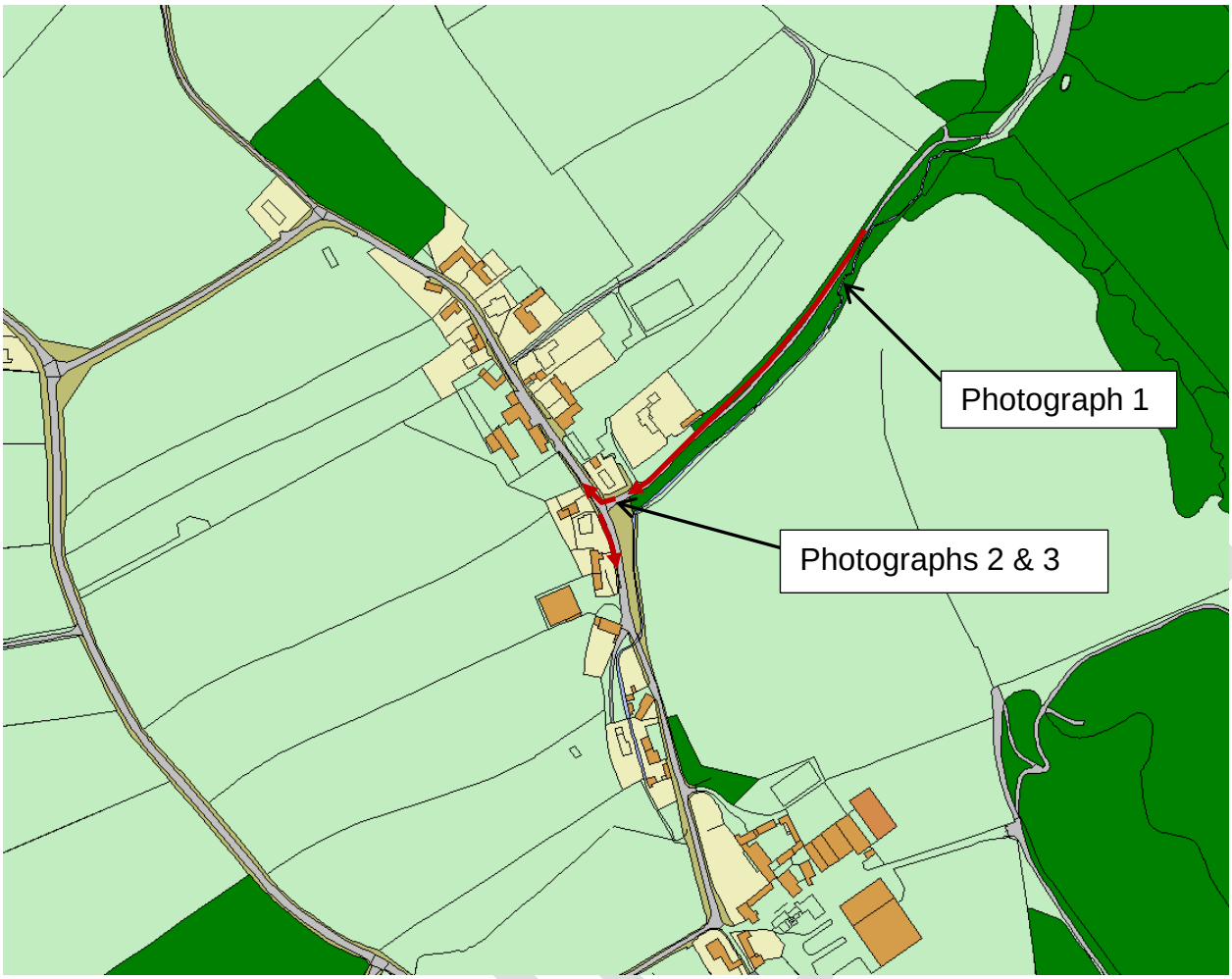


Figure 5: Initial flow route from Cumrew Beck

Photograph 1: Erosion and damage caused to Cumrew Beck upstream of Cumrew Village

The velocity of the flow in Cumrew Beck during the flood event will have caused an increased risk of damage and erosion particularly in the location of meanders and bends in the

watercourse. It is also likely that such issues have created areas that have allowed the watercourse to overtop its banks and allow flow to run down the track into the village.

Photographs 2 & 3: Flow routes from fell side track into village

The surplus flow from Cumrew Beck reached the village where the flow split allowing the flood water to flow to either end of the village. The south flow route was also added to by over flow from Cumrew Beck upstream of the road bridge and the unnamed watercourse that flowed through the dry stone wall near Cumrew House. These flow routes are indicated in figure 6 on the following page.

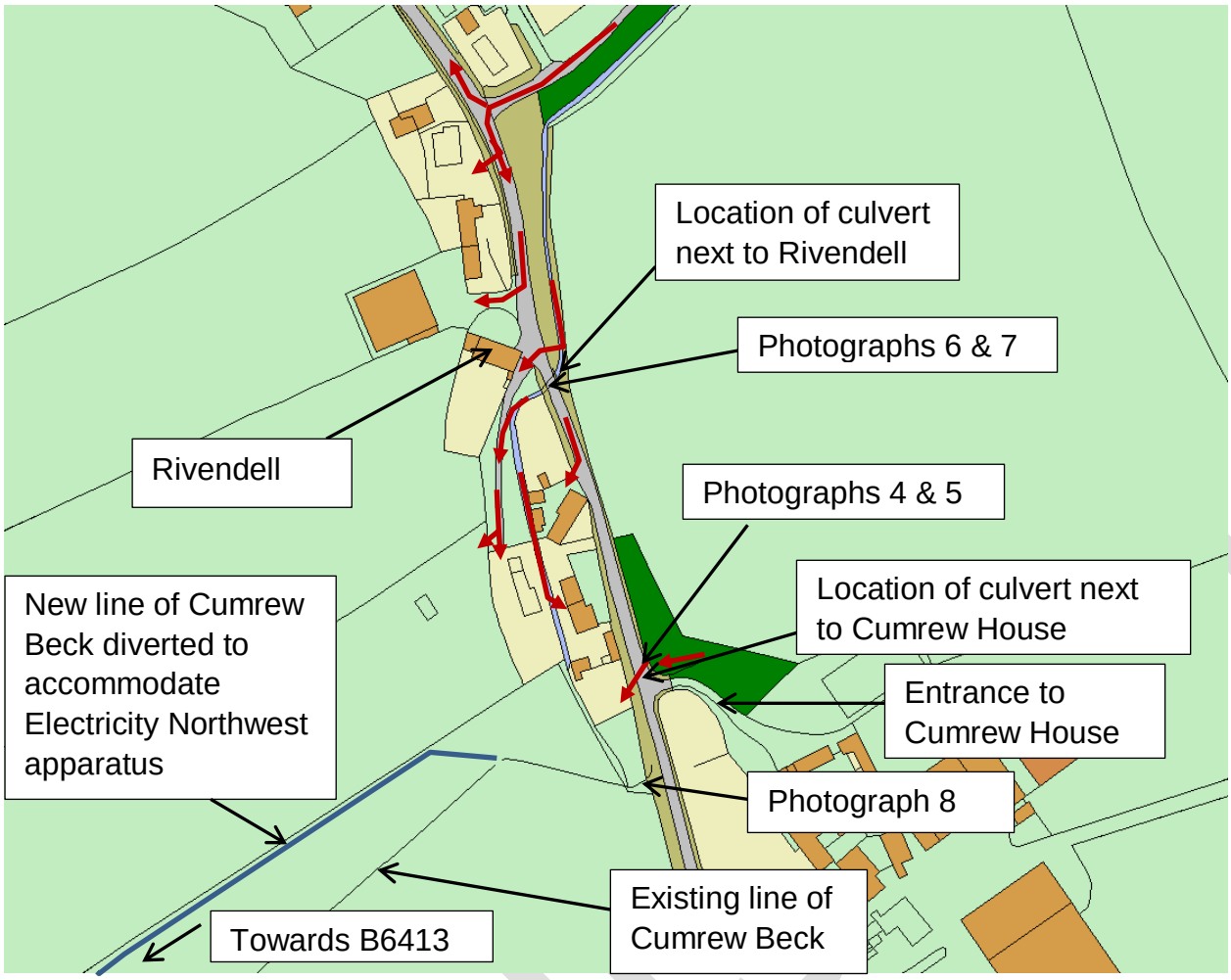
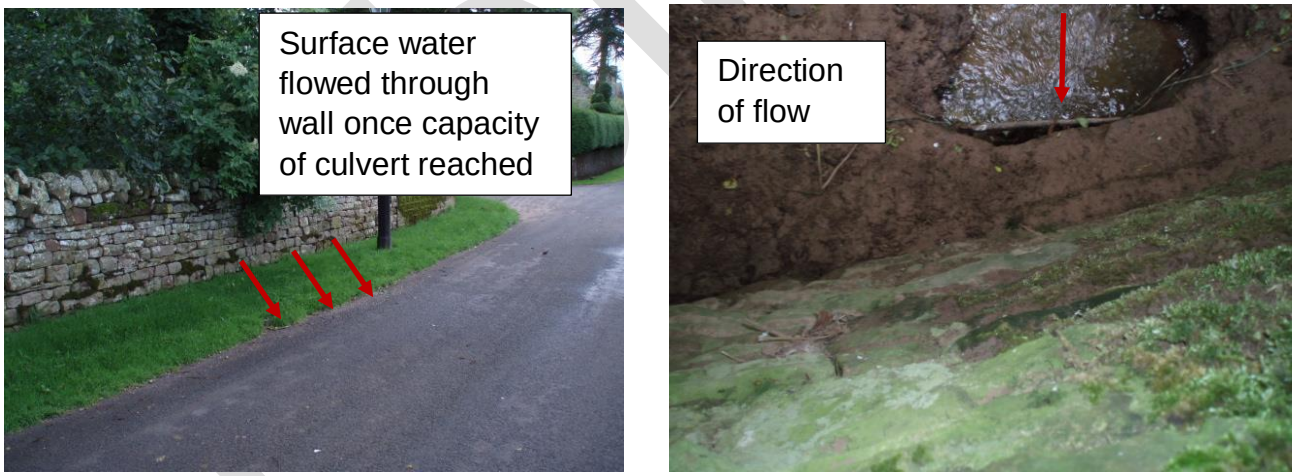


Figure 6: Flow routes at South end of Cumrew



Photographs 4 & 5: flow route through wall and culvert entrance

Photograph 4 indicates the flow routes through the dry stone wall near the entrance to Cumrew House. Photograph 5 shows the entrance to the culvert that runs under the road near to Cumrew House. The photograph was taken a few weeks after the flood event and there was no indication from the rapid flow through the culvert that there were any signs of collapses or siltation within the culvert. From this it is assumed that the water flowing through the wall was caused by excessive rainfall overwhelming the culvert rather than a blockage. However, during October 2013 residents were continuing to inform CCC that there were problems with the culvert next to Cumrew House blocking. Jetting works had been carried out previously but had

not indicated any blockages. A CCTV survey was carried out in December 2013. During this operation a plastic bag was removed and it was identified that a partial obstruction remained in the culvert. An excavation into the culvert allowed the removal of 3no fence posts. The upstream land owner of this culvert continues to ensure that debris is removed to prevent future blockages.

Photographs 6 & 7: Debris left next to the culvert near Rivendell and downstream culvert structure

Residents have raised concern regarding the capacity of the culvert under the road near to Rivendell. The culvert did cause a restriction and did contribute to the overtopping of the watercourse upstream of the bridge. CCC are proposing to remove silt from the culvert near to Rivendell in early 2014. The downstream sections of Cumrew Beck after the culvert are the responsibility of the landowners. As such each land owner should monitor and maintain the bed and banks of the watercourse. Particular attention should be paid to the reaches from the culvert next to Rivendell to the point where it crosses the B6413. Information of a riparian land owner's rights and responsibilities are detailed in the Environment Agency's leaflet 'Living on the Edge'.

Photograph 8: Bend in Cumrew Beck as it exits Cumrew Village

Once Cumrew Beck has flowed through the village of Cumrew it exits the village by means of a sharp bend which may cause a restriction by the slowing of the water course above this point. However, old maps show that the watercourse has followed this bend for many years and is shown on the present course on plans dating from the 1861-1895 Cumberland Series. The latter part of the beck flows down an adjacent field where Cumrew Beck was diverted to accommodate works to Electricity Northwest apparatus. The diversion has had no impact on the flooding that took place. The diversion of Cumrew Beck is shown in Figure 6.

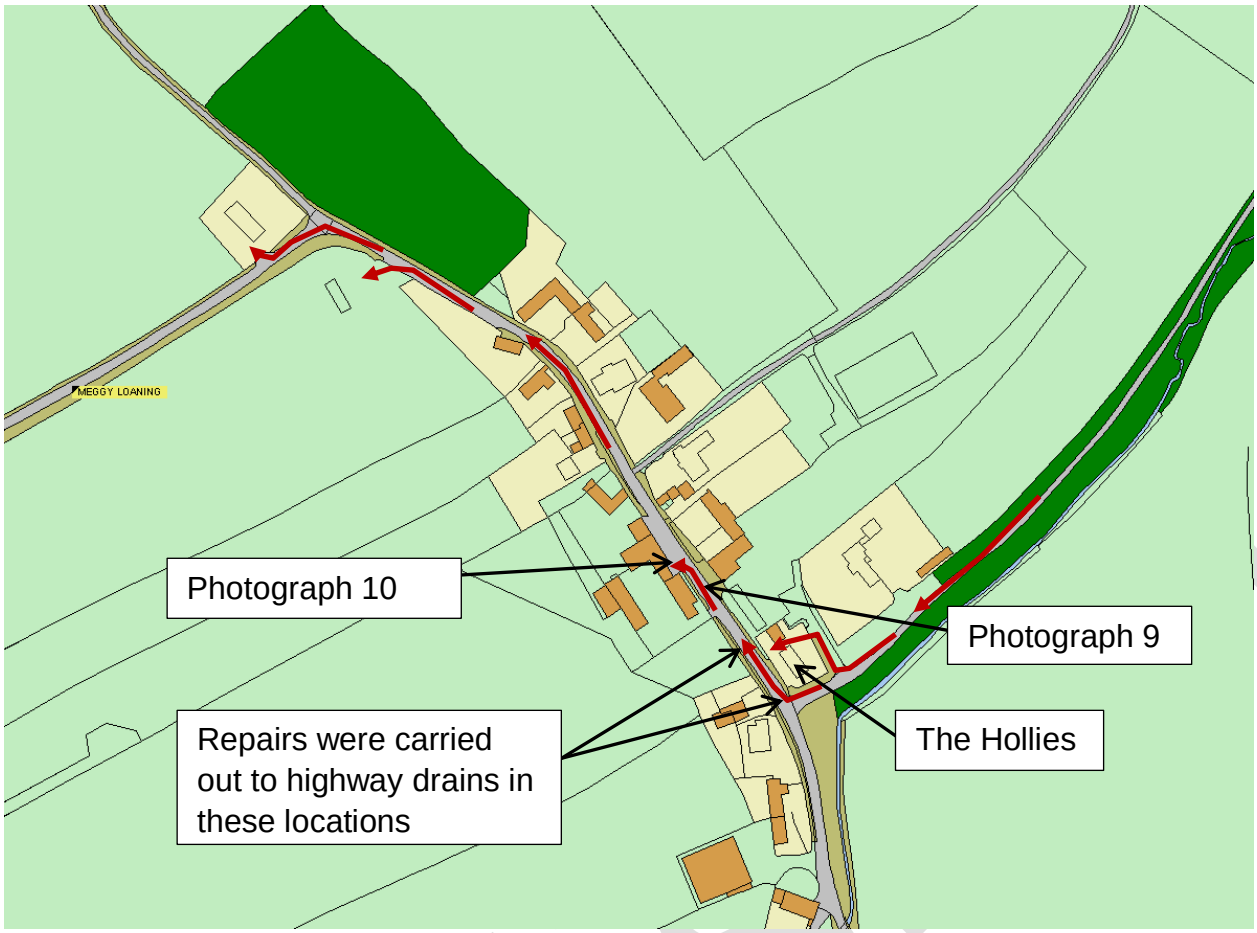


Figure 7: Flow routes towardsnorth end of Cumrew Village

The flow from the fell side track also made its way towards the north end of the village along the highway. Where properties had dropped kerbs for driveways then water overtopped the kerbs as it travelled down the road causing internal flooding to some properties. Following the June 2012 event investigations by County Highways staff identified blockages on the highway drain outside The Hollies which were repaired soon after the June 2012 event.

Photograph 9: Flow route towards north end of Cumrew Village

Photograph 10: Remains of gravel left by flood event

Information gathered from residents on the flood event not only provided details on the flow routes that the flood water had taken but also indicated the issues they had experienced with the volume of gravel that the flood water had deposited in the village. The deposition of gravel in the village can also cause blockages on the highway drainage systems as it can leave the gullies blocked. CCC highways clean gullies once per year but rely on reports from the public if a gully is blocked in the interim time. The gullies were last cleaned in January 2014. Residents have reported that gullies appeared blocked during the event. However, it should be noted that gullies and highway drainage systems are only designed to transfer surface water from the highway and not the volumes of water that was produced during the event on 28th June 2012.

Likely Causes of Flooding

It is evident from the information gathered that the primary cause of flooding was the rainfall event that created large volumes of surface water that overwhelmed the watercourses in the area. The overtopping of Cumrew Beck created flow routes via the fell side track which allowed flood water to flow on to the highway and then via vehicle accesses into driveways and gardens which in some cases also caused internal flooding of properties.

The excessive flow and large amounts of gravel and debris carried by the flood water quickly blocked road gullies which further compounded the flooding. Investigations by County Highway's staff following the flooding also identified partial blockages on the highway drainage systems which were repaired following the June 2012 event. However, it is likely that the

flooding would still have occurred due to the excessive volume of water even if highway drainage had been operating to full capacity.

Flooding History

Flooding from Cumrew Beck has occurred previously in a very similar way to that described in the report but properties were not reported as flooded.

Further flooding events have occurred on 18th May 2013, 28th June 2013 and 28th July 2013. The event on 28th June 2013 caused internal flooding to two properties.

Recommended Actions

Action by	Recommended Action	How
Residents/Businesses	Continue to report flooding issues to the relevant authorities	Use contact details in Appendix 3 to report any future flooding
CCC Highways	Continue to ensure gullies are cleaned and culverts inspected on a routine basis.	Follow routine cleaning schedules. Gullies cleaned annually. ONGOING
CCC Highways	Repairs to highway drainage system following June 2012 event.	Dig-in to carry out repairs. COMPLETE
CCC Highways	Where possible make alterations to kerbs to prevent surface water entering properties	During programmed footpath improvement works alter kerb lines/footpath profile to discourage surface water entering property. COMPLETE
CCC Highways	Remove silt from road bridge next to Stars Cottage	Remove using vactor early 2014.
CCC Highways	Investigation of continuing blockages on highway culvert next to Cumrew House.	CCTV survey and removal of 3no fence posts from culvert. COMPLETE
Making Space for Water group	Continue to assess flood risk to the area and where appropriate investigate further options to reduce flood risk.	Investigate flood frequency within the area to see if a scheme can be identified to prevent future risk of flooding.

Residents and property owners who are aware that they are at risk of flooding should take action to ensure that they and their properties are protected. Community resilience is important in providing information and support to each other if flooding is anticipated. Actions taken can include laying sandbags and moving valuable items to higher ground, to more permanent measures such as installing floodgates, raising electrical sockets and fitting non-return valves on pipes. Anyone affected by flooding should try to document as much information about the incident as possible.

Next Steps

CCC as the LLFA will continue to ensure that any actions identified within the actions table of this report are appropriately taken forward by each Risk Management Authority identified. Actions will continue to be prioritised through the Making Space for Water process and monitored through regular meetings of the group. Details of the MSfWG members and summary of related processes are detailed in Appendix 2.

Appendices

Appendix 1: Glossary

Acronyms

EA	Environment Agency
CCC	Cumbria County Council
UU	United Utilities
LLFA	Lead Local Flood Authority
LFRM	Local Flood Risk Management
MSfWG	Making Space for Water Group
FAG	Flood Action Group
FDGiA	Flood Defence Grant in Aid
FWMA	Flood and Water Management Act 2010
LDA	Land Drainage Act 1991
WRA	Water Resources Act 1991

Appendix 2: Summary of Relevant Legislation and Flood Risk Management Authorities

The Flood Risk Regulations 1999 and the Flood and Water Management Act 2010 (the Act) have established Cumbria County Council (CCC) as the Lead Local Flood Authority (LLFA) for Cumbria. This has placed various responsibilities on CCC 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	District Council	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 Cumbria County Council's work relating to flood risk.

Environment Agency 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) – Cumbria County Council is the LLFA for Cumbria. 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 CCC by the Local Flood Risk Management Team.

District and Borough Councils – These organisations perform a significant amount of work relating to flood risk management including providing advice to communities and gathering information on flooding.

Water and Sewerage Companies manage the risk of flooding to water supply and 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 meeting of the Environment Agency, United Utilities, District/Borough Councils and CCC's Highway and LFRM Teams to develop processes and schemes to minimise flood risk. The MSfWGs meet approximately 4 times per year to cooperate and work together to improve the flood risk in the vulnerable areas identified in this report by completing the recommended actions. CCC 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 Medium Term Plan or a partners own capital investment process.

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

Appendix 3: Useful contacts and links

Cumbria County Council (Local Flood Risk Management):
lfrm@cumbria.gov.uk, www.cumbria.gov.uk, tel: 01228 221330

Cumbria County Council (Highways):
highways@cumbria.gov.uk, www.cumbria.gov.uk, tel: 0845 609 6609
Out of hours emergencies should be reported via the Police on 101

Cumbria County Council (Neighbourhood Forum)

niall.mcnulty@cumbria.gov.uk or **paul.carrigan@cumbria.gov.uk**, **www.cumbria.gov.uk,**
tel: 01228 226570 or 01228 221054

United Utilities:
www.unitedutilities.co.uk, tel: 0845 746 2200

Carlisle City Council:
customerservices@carlisle.gov.uk, www.carlisle.gov.uk, tel: 01228 817200

Environment Agency:
www.environment-agency.gov.uk, General Enquiries: 03708 506 506,
Floodline: 0845 988 1188,

National Flood Forum:
http://nationalfloodforum.org.uk, tel: 01299 403055

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 – 'Living on the Edge' 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

Appendix 4: Summary of feedback to draft report

The following information has been received either at the Flood Forum held on 6th June 2013 or forwarded after from various members of the community which can include residents, the Parish Council and members of the MSFW group.

- Information on the diverted watercourse opposite Cumrew House
- Possible blocked highway gullies
- Boulders falling into Cumrew Beck above the village green
- Silt build-up in the road bridge next to Rivendale
- Issues with the road culvert at the entrance to Cumrew House and requests to upsize the existing culvert
- Correction of flow routes at the south end of the village
- Additional flow routes around the end of the fell side track
- Information on removed areas of woodland and possibility of an old pond
- Possible areas for upstream storage (Trowslinn Beck)
- Information on further flood incident on 28th July 2013

Concerns and information regarding land use upstream of the village were received at the Flood Forum on 2nd July 2013. Some of the information is detailed in the following paragraphs.

It is understood that there was originally a pond upstream of Cumrew but this could not be identified on the 1900 Cumberland series 1:2,500 plans. The residents viewed this as providing potential storage for extreme events. Information has not been provided to inform if the pond was filled in by man or if it simply became silted up over years. It has not been determined if the pond would have been able to reduce the flow during an event.

Residents also commented on the reduction of woodland in the upper reaches of the Cumrew Beck catchment and above Cumrew Farm. Information in T R Nisbet and H Thomas' paper 'The role of woodland in flood control: a landscape perspective' published in proceedings of the 14th annual IALE (UK) 2006 conference on Water and Landscape suggests it can be difficult to assess the impact the removal of woodland can have on a catchment as the effect of the woodland can vary with the percentage of the catchment, type of woodland, density of planting, time of year, soil types etc. There is insufficient information on the type of woodland that was removed but from old maps the percentage of woodland to catchment area is small suggesting that the woodland effect on the flooding was likely to be limited.

Translation services

If you require this document in another format (e.g. CD, audio cassette, Braille or large type) or in another language, please telephone 01228 606060.

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