

# How Man

## Flood Investigation Report 28



**Flood Event 30/8/2012**

Version	Undertaken by	Reviewed by	Approved by	Date
Preliminary	Colin Parkes	Anthony Lane		1 <sup>st</sup> May 2013
Draft	Colin Parkes	Anthony Lane		7 <sup>th</sup> June 2013
Published	David White	Anthony Lane	Doug Coyle	9 <sup>th</sup> Oct 2013

Published

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# Executive Summary

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

The report identifies that How Man suffered from flooding on 30<sup>th</sup> August 2012 and on many other occasions both before and since this event. Surface water runoff from adjacent farm land flowed towards the low point flooding the B5345 and the property of How Man.

Nine actions have been identified in the report which would minimise the risk of future flooding. The key recommendation is that the ditches should be restored to allow water to flow away from the flooded area unrestricted.

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# Event background

## Flooding Incident

Figure 1 illustrates the location of How Man which was flooded on 30<sup>th</sup> August 2012 following extreme and sustained heavy rainfall. Less extreme events have caused flooding both before and since. Much of the water originated from the slopes to the north of How Man. These are part of an un-named hill which has been named in this report as Loughrigg Hill for consistency with report number 37 into the flooding of the same date in nearby St Bees. The summer was the wettest in England since records began and so surrounding fields were unable to absorb any new rainfall.



Figure 1. Map showing location of How Man flooding area.

How Man, The Flat, Egremont, CA22 2UA  
298250, 510240

# Investigation

## Rainfall Event

Radar data taken from weather provider records for the area over Loughrigg Hill show peak rainfall was 25mm/hr and occurred at about 00:20am. The rain started at 9:00pm and finished at 3:00am with 28mm in 6hrs.

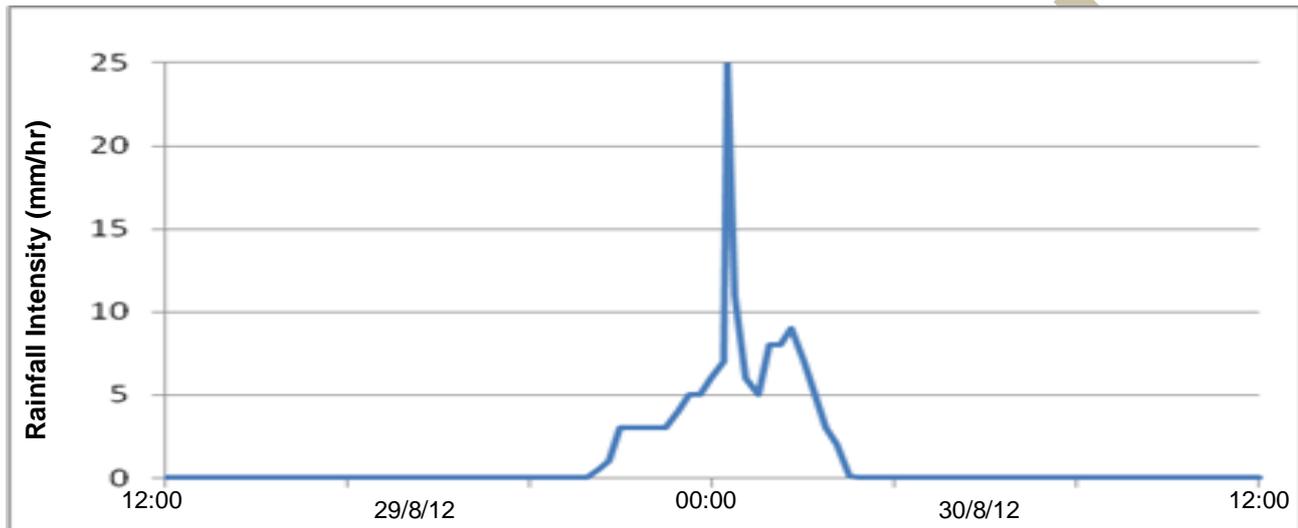


Figure 2. Rainfall data from 29-30th August 2012

Met Office data from a rain gauge at St. Bees Head recorded a total of 45mm over the duration of the storm, 29<sup>th</sup> – 30<sup>th</sup> August 2012. The average total rainfall for the whole of August is 92mm (1981-2010).

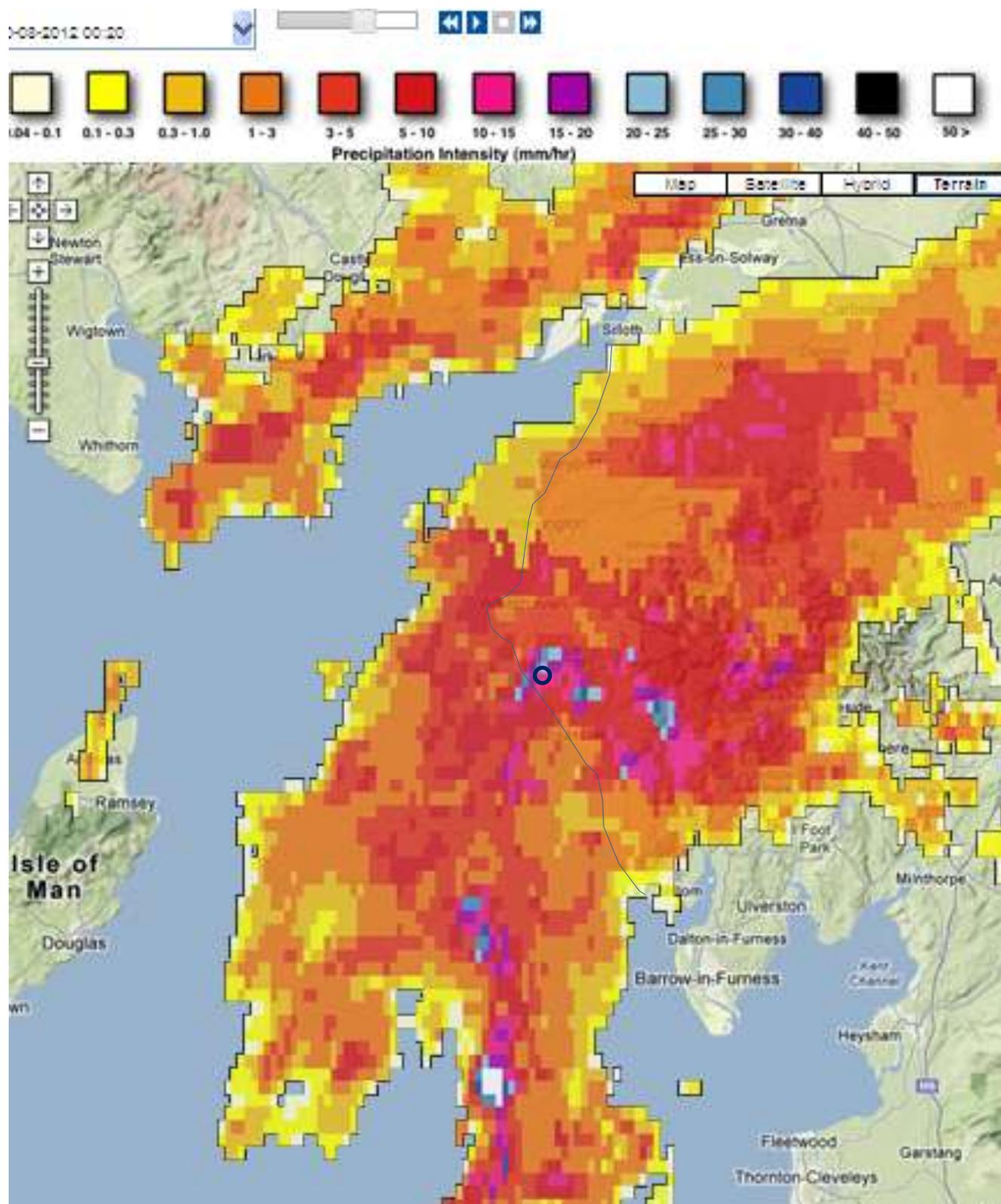


Figure 3. Rainfall radar image 30th August 2012. A snapshot of the storm over How Man (circled).

## Likely Causes of Flooding

### Surface Water

Because of the wet summer, there would have been very little opportunity for rainfall to infiltrate into the soil. By 29<sup>th</sup> August 2012 there had already been six days recorded in August where over 10mm of rain fell at St Bees. All of the water which fell within the shaded area shown in Figure 5 below, would eventually pass through the flooded area at How Man.

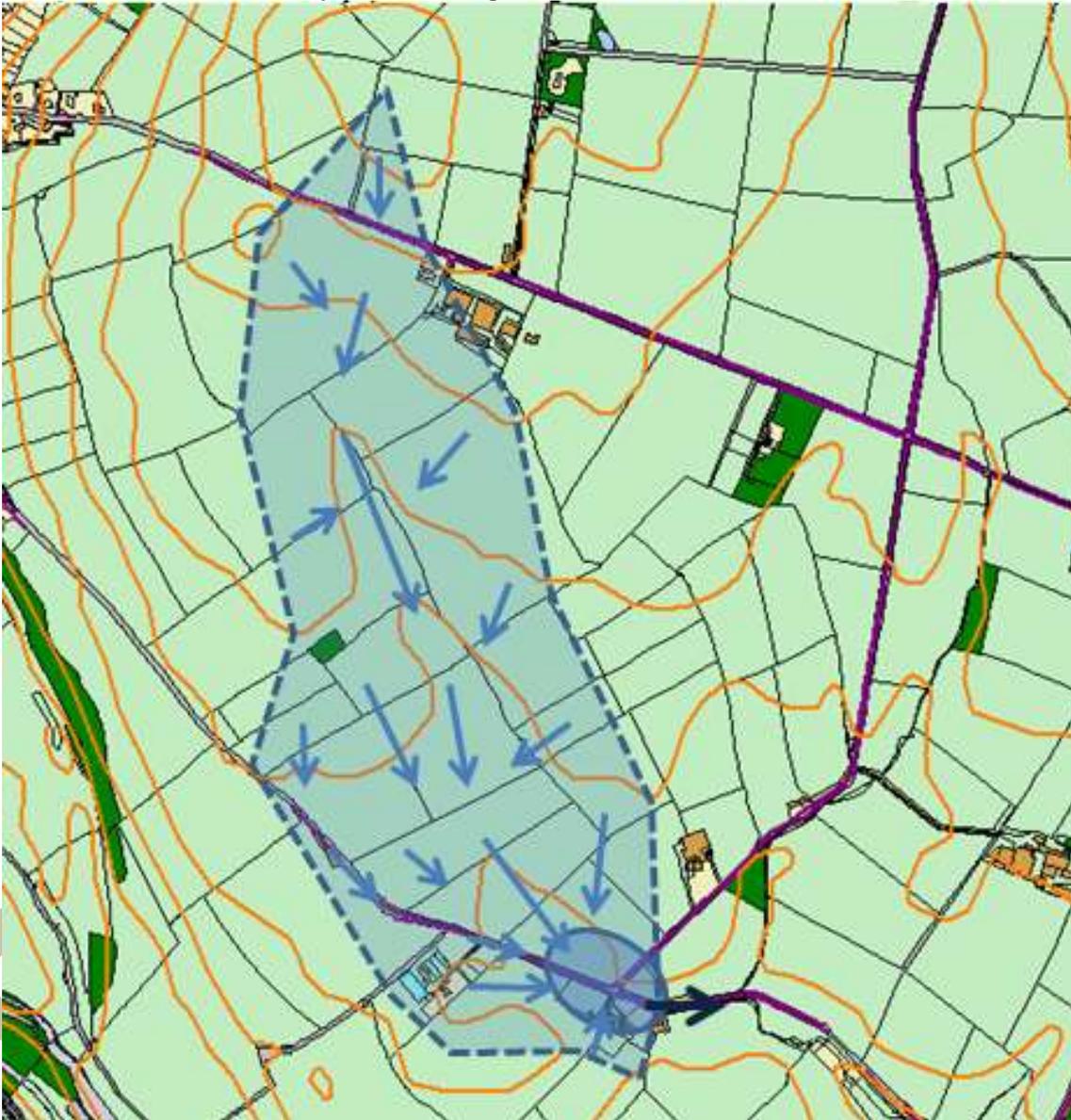


Figure 4. Flow routes towards the flooded area at How Man

At How Man surface water collects and pools in the field on the other side of the road to the north of the property. Excessive water draining off the field overloads the drainage system which is entirely piped in this area. When the water exceeds the capacity of the drainage system the pool of water in the field builds up until it flows out of the corner of the field, flooding onto the highway. As these flows continue, floodwaters from the road enter the garden and then the house at How Man.

The water collects on this section of highway because the road alignment rises slightly towards Ellergill Beck, the watercourse draining the runoff to the east. The lowest point is adjacent to the house.

The flooding is further compounded because of traffic using the B5345. Even when cars drive slowly through the flood water, bow waves cause flooding in the house, even if the main body of water has not reached that far. As well as the property flooding, the pool in the road may also present a danger to life as cars fail in the floodwater and are abandoned. This results in drivers walking in the road where they are unaware of dislodged gully and manhole covers.



**Figure 5. Flood water flowing out of the corner of the field (bottom inset) and flooding the road where a dislodged gully grating shows above the water. Flood water had not reached the house (top inset). Photos taken 22/11/12.**

Surface water flood risk cannot be eliminated as it is dependent on the capacity of the drainage systems available. This residual risk of flooding will remain significant as the property is surrounded by higher ground on three sides.

### Drainage System

Before the 1970s, the owner of How Man understands that highway areas were drained by a road side ditch, but this was replaced by a gully and 150mm pipe system and the ditch was filled in. This significantly reduced the capacity for water to flow away from the area. Downstream from How Man the ditch still exists and connects to Ellergill Beck. A 300mm diameter pipe system outfalls into it from under the garden of How Man. This pipe is in riparian

ownership meaning that the owner of How Man has the responsibility to maintain it. The LLFA had no powers to investigate the state of this pipe during its investigations. After a more recent flooding event County Highways installed a 300mm dia. pipe to replace the 150mm dia. pipe highway drainage system. This runs parallel to the riparian pipe and ditch and was extended to outfall into Ellergill Beck directly. This pipe would have provided six times more capacity for conveyance when it was installed but unfortunately flooding has continued.

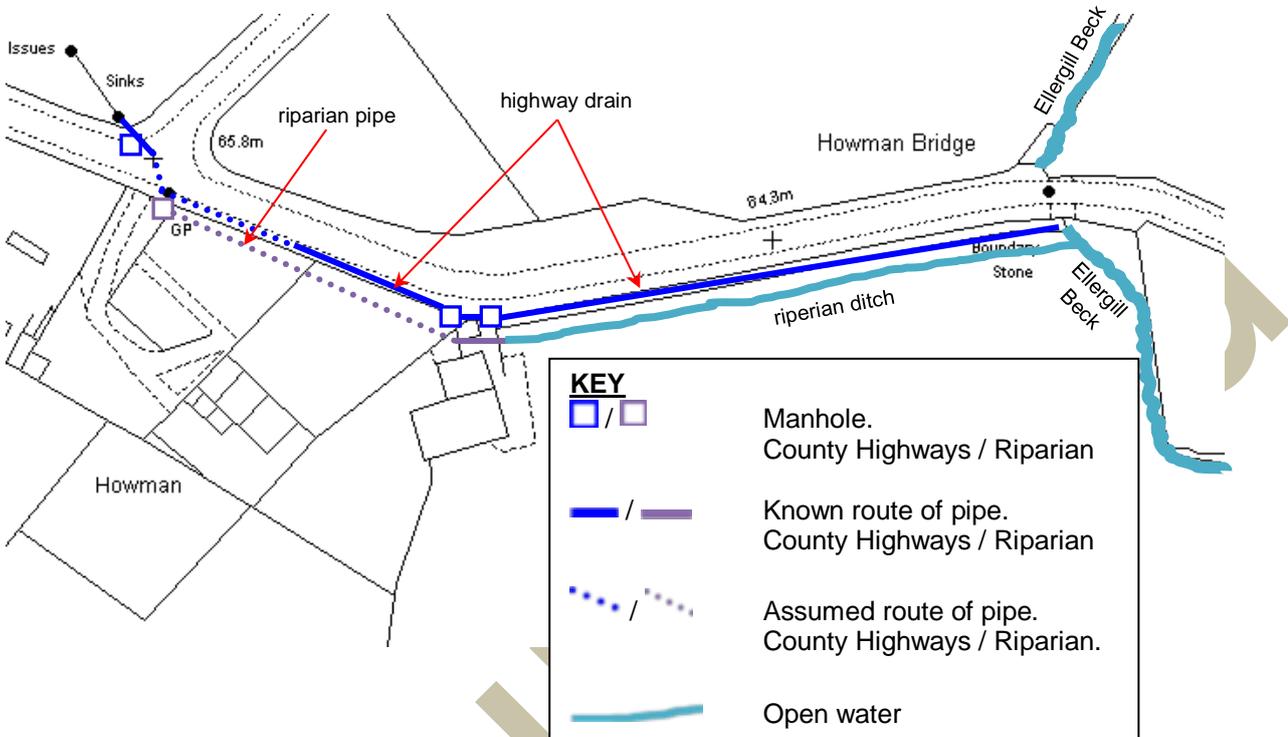


Figure 6. Plan of drainage system around How Man (gullies not shown).

CCC as Highway Authority inspected and jetted their part of the system. They reported that the highway drainage was maintained and functioning satisfactorily.

CCC as Lead Local Flood Authority, when carrying out this investigation observed both systems running. The part of the system owned by the Highway Authority was inspected. It starts as a broken pipe in the field providing some land drainage, vulnerable to blockage, and not in control of the Authority. It was expected that the system would be restricted with silt and debris but there was no evidence of this from manhole inspection. The main manhole adjacent to the field has no catchpit arrangement but the system was clear.

## Flooding History

This is an on-going issue and flooding has been occurring frequently here for at least ten years.

On 17<sup>th</sup> October and 22<sup>nd</sup> November 2012 How Man was flooding again and the owner reported that flooding has occurred in the area several times since August 2012.

# Recommended Actions

Action by	Recommended Action	How
County Highways	Check highway drainage is functioning	Jetting, gully cleaning, COMPLETED.
County Highways	Identify any defects in highway drainage so that system can be repaired and work at full capacity.	CCTV survey, repairs if necessary.
County Highways	Reduce risk of flooding to How Man and danger to life for motorists using B5345.	Work with the Police Authority to identify criteria and process for closing road when in flood.
Riparian Owner (How Man)	Identify any defects in riparian drainage so that system can be repaired and work at full capacity.	CCTV survey, jetting, gully cleaning, repairs if necessary. COMPLETED
Land Owners	Reduce the volume of run off that reaches the B3545.	Trial soil improvement measures. Rural SUDs
Land Owner	Allow water to flow into the drainage system rather than over the surface.	Improve the connection between the field drainage and the highway drainage.
Riparian Owner (How Man)	Increase capacity of land drainage and intercept runoff above How Man	Convert the 300mm pipe system within How Man to open ditch.
County Highways	Increase capacity of highway drainage and intercept flood waters off B3545 above How Man	Restore the 300mm dia. highway drain to open ditch.
Property Owners (How Man)	As flood risk can never be eliminated, residents who know they are at risk of flooding should ensure any future flooding, in all areas, causes minimal damage.	Ensure own <a href="#">properties are protected</a> by resilience measures.

## 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 are likely to be prioritised through the Making Space for Water process and monitored through regular meetings of the group. Details of the MSfWG members and a summary of related processes are detailed in Appendix 2.

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# Appendices

## Appendix 1: Glossary

EA	Environment Agency
CCC	Cumbria County Council
LLFA	Lead Local Flood Authority
LFRM	Local Flood Risk Management
MSFWG	Making Space for Water
Defra	Department for Environment Food & Rural Affairs
IC	Inspection chamber

### Measurements

ha	Hectares (1ha = 10000m <sup>2</sup> or 2.5 acres)
km <sup>2</sup>	Square kilometre (1km <sup>2</sup> = 1000000m <sup>2</sup> or 0.4mi <sup>2</sup> )
l/s	Litres per second

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

The Flood Risk Regulations 2009 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' 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
<b>RIVERS</b>					
Main river					
Ordinary watercourse					
<b>SURFACE RUNOFF</b>					
Surface water					
Surface water on the highway					
<b>OTHER</b>					
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 process or a partners own capital investment process.

Flood Action Groups (FAGs) 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.

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## Appendix 3: Analysis

### Peak Flow Analysis. (Rational method)

Peak Rainfall = 25mm/hr	Total catchment area = 62ha	Road Surface Area within catchment = 1ha
Rainfall rate x Area = Flow	= 4300l/s	= 70l/s
Slope at How Man = 1 in 70		
Pipe size needed to deal with this flow	=1130mm diameter	= 250mm diameter
Pipe size existing	2 x 300mm diameter	300mm diameter



Figure 7. The Flood Map for Surface Water for a 1 in 30 year storm from the EA shows that How Man is expected to flood to a depth of at least 300mm (red). Surrounding areas will flood to at least 100mm (yellow).

## Appendix 4: Feedback from meeting with residents.

A draft version of this report was issued to the residents of How Man on 12<sup>th</sup> June 2013. A meeting was held on-site with members of the LFRM team and the residents present on 1<sup>st</sup> July 2013 to receive feedback.

- A 300mm dia. pipe provides an outfall from a field diametrically opposite How Man, in Moor Platt Farm, into an inspection chamber (IC 1) in the highway verge. This IC also has connections from highway gullies. The owner of How Man reported that this then crosses the road and discharges into a manhole in his drive.
- Covers to the highway drainage manholes downstream, just outside the property's north-east corner are frequently lifted during heavy rainfall events.
- It is understood that a highway ditch in the highway verge running along the front of How Man was culverted for safety reasons.
- Agreed suggestions for improvement
  - a.) A grated cover to the inspection chamber IC 1 in the verge could provide an additional entry into the drainage system for surface water runoff from the adjacent field;
  - b.) Put in drainage on both sides of road;
  - c.) Replace the 300mm dia. drain from the field with a 600mm dia. pipe;
  - d.) De-culvert the highway drain all the way down to Ellergill Beck;
  - e.) De-culvert the highway drain just outside of How Man and discharge into the short length of open ditch in How Man garden.
- Actions by the LLFA
  - a.) Contact the owner of the field opposite How Man and issue a copy of the Final Draft of this flood investigation report, seeking comment.
  - b.) Investigate options for increasing the capacity of the highway drain. This could be done by enlarging pipework or returning the system to open ditch.
  - c.) Investigate drainage from the field under the road and act to clear any blockages.
  - d.) Examine the discharge arrangement for the highway drain into Ellergill Beck which is understood to restrict flows.
  - e.) Consider options for attenuation of surface water runoff in the field opposite How Man and if viable will discuss proposals forward to the landowner.

## Appendix 5: Useful contacts and links

**To report flooding: Incident hotline** tel: 0800 80 70 60 (24hrs)

**Floodline:** tel. 0845 988 1188

**Cumbria County Council (Local Flood Risk Management):**

[lfrm@cumbria.gov.uk](mailto:lfrm@cumbria.gov.uk), [www.cumbria.gov.uk](http://www.cumbria.gov.uk), tel: 01228 211300

**Cumbria County Council (Highways):**

[highways@cumbria.gov.uk](mailto:highways@cumbria.gov.uk), [www.cumbria.gov.uk](http://www.cumbria.gov.uk), tel: 0845 609 6609

**Cumbria County Council Neighbourhood Forum:** tel: 01946 505022

[cumbria.gov.uk/sayit](http://cumbria.gov.uk/sayit)

**United Utilities:** tel: 0845 746 2200

**Copeland Borough Council**

[info@copeland.gov.uk](mailto:info@copeland.gov.uk), [www.copeland.gov.uk](http://www.copeland.gov.uk), tel: 0845 054 8600

**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>

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