

Northumberland County Council

Flood Investigation Report

Investigation of the winter 2015/16 floods



REVISION SCHEDULE

Northumberland County Council – Flood Investigation Report
Investigation of the winter 2015/16 Floods

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1. Introduction

1.1 Background

During the winter of 2015/16, numerous storms resulted in widespread flooding across the north of England, affecting approximately 16,000 properties. The most damaging incident occurred across the weekend of 5th and 6th December when storm Desmond, in combination with an already saturated catchment, resulted in flows not observed in the River Tyne since 1771.

Further storms followed (storm Eva and storm Frank), resulting in flooding to over 200 dwellings and over 80 businesses during a two month time period. By comparison, a total of 12,500 properties were protected during storm Desmond and 10,900 during Storm Eva.

Northumberland is the most northerly county within England. It is bordered by Cumbria to the West, the Scottish Border to the North, Tyne and Wear to the South East and County Durham to the South. The North Sea provides 103km of coastline on the east of Northumberland.

Northumberland has an area of 5,013km² which makes it the sixth largest in England. Despite the large size of the county, it only has a population of 316,000 (2011 Census, ONS), which makes Northumberland one of the lowest densely populated counties in England.

Northumberland was particularly affected by three storms which occurred during December 2015 and January 2016. While the worst affected areas were along the Tyne Valley, from Haltwhistle in the west of the county, to Prudhoe and Ovingham downstream, there were other isolated incidents elsewhere, in Berwick, Morpeth, Rothbury and Ponteland.

1.1 Lead Local Flood Authority (LLFA) Investigation

Northumberland County Council, as the Lead Local Flood Authority (LLFA), has a responsibility under Section 19 of the Flood and Water Management Act 2010 to investigate flooding incidents in its area to the extent it considers necessary and appropriate. Section 19 states:

1. *On becoming aware of a flood in its area, a lead local flood authority must, to the extent it considers necessary or appropriate, investigate –*

Which risk management authorities have relevant flood risk management functions.

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 section (1) it must –*

Publish the results of its investigation.

Notify any relevant risk management authorities.

The circumstances for triggering a Section 19 investigation in Northumberland are defined within the Northumberland Local Flood Risk Management Strategy, in particular where flooding results in:

- Internal flooding to 5 or more residential or commercial properties; and / or
- Critical infrastructure disruption for over 5 hours.

As Northumberland is predominantly rural, the effect of internal flooding of a property can have a significant economic and social impact on the local community, which is why we have decided to set the threshold at this low level. Internal flooding is when flooding enters the threshold of a property; this does not include gardens and detached garages.

Essential infrastructure includes the essential services and networks on which we depend to function, such as key transport, power and water treatment assets. The full definition of essential infrastructure is taken from the National Planning and Practice Guidance; Flood Risk and Coastal Change.

While every reported flood incident may not trigger a formal s.19 investigation, we are always keen to receive details and information of flooding incidents, regardless of scale. Such information assists us in understanding how the drainage network operates and where weaknesses might exist.

This report provides a concise review of the flood events during the winter of 2015/16, the areas affected and the rights and responsibilities of all risk management authorities involved. The report will outline each Risk Management Authority's functions and whether these have been / are intended to be exercised.

It should be noted that, at the time of writing, recovery efforts continue and our understanding of the issues is evolving while we study the flood mechanisms. As such, the information within the location specific investigation reports in section 5 is timestamped. Please contact the respective risk management authority if you require an update on a particular issue. Contact details can be found at the end of this report.

2. Flood Incidents

There were three major rainfall events over the winter of 2015 that resulted in widespread flooding from different sources across Northumberland. These events occurred on 5th - 6th December 2015, 26th December 2015 and 5th January 2016. Each event is analysed individually below.

2.1 5th - 6th December 2015

The flooding that occurred within Northumberland on the 5th – 6th December 2015 was a result of the huge amount of rainfall released by the extratropical cyclone, named storm Desmond by the Met Office. Storm Desmond passed to the North West of the UK bringing with it severe gales and strong winds. The mild, moist South Westerly airstream and the frontal systems associated with storm Desmond resulted in heavy rainfall across the North of England. The rainfall was so severe that in Carlisle the storm broke all previous rainfall records, releasing 341.4mm of rain in the 24 hours between the 5th and 6th December.

In the North East Area (NE) the heaviest rainfall occurred over the high ground in the West, mostly on the Western slopes of the Pennines. The gale force winds drove the rainfall against the Pennines, resulting in a conveyor of heavy rainfall due to orographic enhancement. The River Tyne catchment located in the NE area received an intense amount of precipitation. This caused the River Tyne to rise to record breaking levels, resulting in numerous flooding incidents along the river.

Due to the high levels of rainfall from storm Desmond, the Environment Agency (EA) responded by issuing 24 Flood Warnings in the NE area, 16 of these being in Northumberland including 2 Severe Flood Warnings at Corbridge.

2.1.1 River Tyne Data

Table 1 shows the River Tyne's levels across the South of Northumberland, comparing typical river levels to experienced river levels during the 5th and 6th December. The data shows that in 10 areas the River Tyne reached its highest levels since records began. It is clear that these high river levels are not just bound to one area but are a recurring theme throughout the length of the River Tyne

Table 1: Peak river levels in the River Tyne associated with storm Desmond. (Environment Agency) (2016)

Catchment	Gauge	Typical range (m from site datum)	Flooding is possible over (m from site datum)	River Level (m from site datum)	Date	Rank (in record)
North Tyne	Ugly Dub (1)	0.29 – 1.30	1.30	2.57	05/12/2015	1
North Tyne	Falstone (2)	0.07 – 1.95	1.95	3.34	05/12/2015	1
North Tyne	Bellingham (3)	0.03 – 3.00	3.00	3.83	05/12/2015	1
North Tyne	Reaverhill (4)	0.36 – 3.35	3.35	5.07	06/12/2015	1
North Tyne	Chollerford (5)	0.20 – 0.44	0.44	3.40	06/12/2015	1
South Tyne	Alston (6)	0.16 – 1.90	1.90	2.47	05/12/2015	5
South Tyne	Featherstone	0.12 – 1.90	1.90	2.46	05/12/2015	3
South Tyne	Haltwhistle	0.17 – 2.00	2.00	3.27	05/12/2015	2
South Tyne	Haydon Bridge	0.24 – 2.70	2.70	4.65	05/12/2015	2
Tyne	Warden Bridge End	0.00 – 3.80	3.80	5.71	05/12/2015	1
Tyne	Hexham	31.17 – 33.30 mAOD	33.30 mAOD	34.843 mAOD	05/12/2015	1
Tyne	Corbridge	0.13 – 3.30	3.30	5.76	05/12/2015	1
Tyne	Riding Mill	0.33 – 2.10	2.10	5.99	06/12/2015	1
Tyne	Bywell	0.41 – 4.60	4.60	6.96	05/12/2015	1

2.1.2 Areas Affected

The floods on the 5th and 6th December 2015 were widespread and affected many communities across Northumberland. Table 1 shows the significant increase in river level at these locations. Many houses and businesses in these areas were damaged by flooding, with water depths of up to a meter within some properties. In Corbridge, the water was so high that residents had to be rescued from their upper floors.

Although the greatest impacts were seen along the River Tyne, there were isolated incidents to the East and the South East of the county, including a landslide incident that occurred as a result of the heavy rainfall. One of the only other rivers to flood apart from the Tyne was the River Rede, which over topped its banks at West Woodburn, flooding three properties.

Several roads across the county experienced some degree of flooding; these varied from small accumulations of water on the surface of the road to heavy flooding and road closures. Detailed reports of each individual area affected can be found in Section 5 of this report, and Appendix A.

2.2 26th December 2015

On the 26th December 2015, Storm Eva brought 70mph winds and heavy rainfall to Wales, the North of England and the South of Scotland. The Environment Agency issued 149 flood warnings (several of which were severe) and 123 alerts, mostly across the North of England and Wales, with 4 warnings and 11 alerts being across Northumberland. Much like Storm Desmond, the North of England was worst affected particularly Cumbria, Lancashire, and Yorkshire. A small number of areas in Northumberland were affected by Storm Eva. Rainfall across the Tyne catchment caused river levels to rise, although not to the levels experienced on the 5th and 6th of December.

2.2.1 Areas Affected

The affected area was far less extensive than on the 5th and 6th of December. Corbridge was subject to further flooding, with a small number of residential properties experiencing repeat internal flooding. An incident in West Woodburn saw one of the properties in the hamlet flood from the River Rede over topping its banks. Detailed reports of each individual affected area can be found in Section 5 of this report.

2.3 5th - 6th January 2016

On the 5th - 6th January, heavy rainfall (storm Frank) occurred across Northumberland on already saturated catchments as a result of the preceding rainfall throughout December. Reduced infiltration into the ground resulted in increased direct runoff and further flooding. On this occasion, numerous surface water and ordinary watercourse flooding incidents were experienced, mainly confined to the east of the county. The Environment Agency issued 12 Flood Alerts and 6 Flood Warnings across Northumberland during storm Frank.

2.3.4 Areas Affected

The Wansbeck catchment received a significant amount of rainfall which resulted in flooding to one property and a catering van in Morpeth, from surface water. The recently completed fluvial flood defences in Morpeth prevented more widespread flooding across the town.

An incident in Berwick-upon-Tweed occurred when an unnamed watercourse blocked, resulting in water surcharging from an underground culvert to the north of the town. Ovingham flooded, again, on this occasion from surface water and the Whittle Burn. Several other isolated incidents also occurred across the county.

2.4 NCC Investigation

As the flooding that occurred was widespread and affected all areas of Northumberland, we asked for information on the floods via a number of different sources. As well as contacting parish councils in Northumberland, we attended many community meetings and visited the affected areas to speak to residents. As a result, we received much information and thank everyone who contributed.

In total more than 30 towns or villages within Northumberland were affected by flooding to some degree. All received reports of flooding have been recorded on a database. Some issues were resolved over the phone or via email, while the majority required more detailed investigation with our partners, for which site visits by the Council's FCERM team took place.

2.5 Data Sharing with other Risk Management Authorities

Throughout and since the flood incidents, the Environment Agency, Northumbrian Water and NCC have co-operated with each other to share information and identify opportunities to address issues in partnership. Such efforts include delivering communications in partnership and carrying out site investigations and recovery works jointly, where appropriate. This approach has ensured that issues have been identified and addressed in a timely manner.

3. Roles and Responsibilities

3.1 Northumberland County Council (NCC)

Northumberland County Council is both the Lead Local Flood Authority (LLFA) and the Highway Authority (HA) within Northumberland.

As LLFA, NCC has a responsibility to investigate flood incidents under Section 19 of the Flood and Water Management Act (2010). The nature of the investigation will depend upon the extent of the flooding and the outcome from any investigation will be used to help prioritise future bids for funding. Funding to manage flood risk is prioritised and allocated on a national basis. Therefore, we cannot guarantee to address all issues.

Land Drainage Consent is required from NCC for any works that are likely to impede the flow of water within an Ordinary Watercourse. This is to ensure that the risk of flooding does not increase and that any ecological issues are addressed.

NCC is a category 1 Responder under the Civil Contingencies Act 2004 and therefore has a responsibility for developing emergency plans, contingency plans and business continuity plans to mitigate the effects of an emergency in Northumberland.

As Highway Authority, NCC has a duty to maintain the highway under Section 41 of the Highway Act (1980). This includes the management of road drainage such as gullies and highway drains.

Culverts under a Highway are most likely to be the responsibility of NCC and blockages or any damage to these culverts should be reported to NCC.

NCC does not have an obligation to provide sand bags and they will not be available from Council depots. Members of the public are advised to self-help by purchasing sandbags in advance from hardware stores and builders merchants where alternative flood protection devices can also be acquired.

3.2 The Highways Agency

The Highways Agency is responsible for managing road drainage including gullies and highway drains, from the trunk road network in England, including the slip roads to and from trunk roads. Within Northumberland this includes the A1, A19 and A69.

Culverts under a trunk road are most likely to be the responsibility of the Highways Agency. Any blockages or any damage to these culverts should be reported.

3.3 Environment Agency (EA)

The Environment Agency (EA) is a category 1 responder under the 2004 Civil Contingencies Act and has the strategic overview of all flood risk, from main rivers, estuaries and the sea.

The EA has discretionary powers to maintain Main Rivers under Section 165 of the Water Resources Act (1991) and uses these powers to ensure flood risk to properties is managed appropriately.

Any work in, over, under or near a main river or flood or sea defence may require a flood risk activity permit from the Environment Agency.

The EA provides a flood warning service throughout all feasible areas of England and Wales at risk of flooding from rivers or the sea. They do this by monitoring rainfall, river levels and sea conditions 24 hours a day to forecast the possibility of flooding.

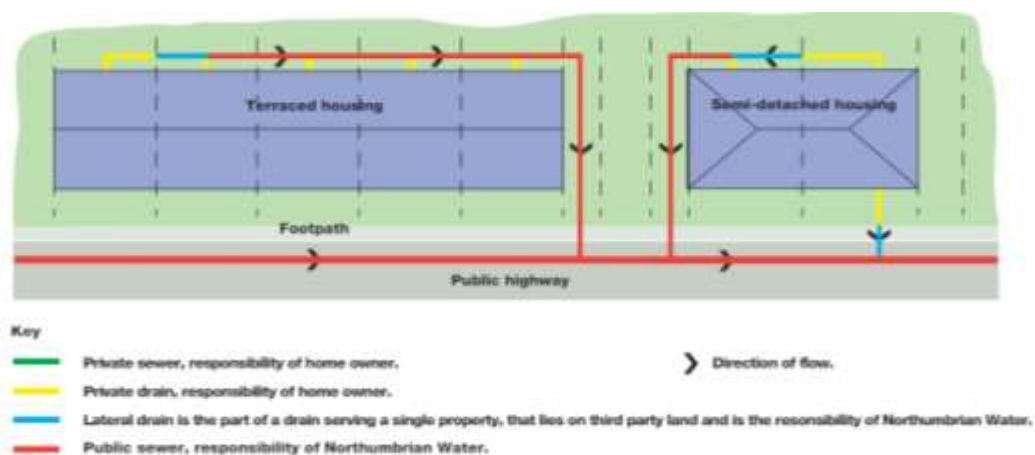
3.4 Northumbrian Water (NW)

Under the Water Industry Act 1991, Northumbrian Water is responsible for the main sewerage system within Northumberland and their wider area which extends down to Teesside.

The majority of properties are connected to a drain; this is the responsibility of the property owner. Property owners are responsible for maintaining and resolving any problems within the drain up to the boundary of their property, as described in Figure 1 below. If a property owner has a blocked drain, they will need to contact a plumber or drain unblocking service to unblock it for them.

The drain is connected to a sewer usually in the street or road near the property. In most cases this will be a public sewer; it belongs to NW and is their responsibility. If you are concerned that there may be a blockage in the public sewer, please call 0845 717 1100 (24 hours).

Figure 1 – Responsibilities for drains and sewers



3.5 Riparian Landowners

Riparian landowners own land adjoining a watercourse. As detailed within the Environment Agency document 'Living on the Edge', they are presumed to own the land up to the centre of the watercourse – unless it is known to be owned by someone else. Riparian landowners have certain rights and responsibilities, including the following:

- They must maintain the bed and banks of the watercourse, and also the trees and shrubs growing on the banks;
- They must clear away any debris, even if it did not originate from their land. This debris may be natural or man-made;
- They must keep any structures that they own clear of debris. These structures include culverts, trash screens, weirs and mill gates;
- If they do not carry out their responsibilities, they could face legal action.

Riparian landowners must understand and act upon these responsibilities.

Riparian owners have the right to protect their property from flooding and their land from erosion. These activities may require a Land Drainage Consent from Northumberland County Council if the

works are by an Ordinary Watercourse or a Flood Risk Activity Permit from the Environment Agency if the works are by a Main River.

For more information on the responsibilities of riparian ownership please read 'Living on the Edge' at <https://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities>

Further information on protecting your property from flooding can be found via the Flood Forum Blue Pages – <http://www.floodforum.org.uk/>

4. Risk Management Functions Exercised

4.1 Response

4.1.1 Northumberland County Council (NCC)

The immediate response to these flood events from NCC was to activate the Emergency Community Assistance and Flood Action Plans. NCC's Incident Rooms were opened several times during the two month period of flooding, along with Rest Centres at Hexham, Morpeth, Rothbury, Ponteland and Longframlington. A liaison with the Environment Agency, Police and Town and Parish Councils was put in place and over the period of 5th - 6th December. NCC contacted 90 vulnerable clients. NCC also contacted all independent Care Home and Home Care providers in the affected areas.

4.1.2 Environment Agency (EA)

The Environment Agency's North East Area (NE) Incident Room was opened on numerous occasions throughout the winter period, totalling over 100 hours. The EA also issued 54 Flood Alerts and 42 Flood Warnings during the winter flooding period to over 2,200 properties. 32 of these Flood Alerts and 26 Flood Warnings were in Northumberland. 2 Severe Flood Warnings were also issued for the River Tyne at Corbridge and Wellbank Riverside.

4.2 Recovery

4.2.1 Northumberland County Council (NCC)

Following the initial response, the Recovery and Restoration Plan was initiated. A Recovery Coordination Group was established and met several times over the winter flooding period. An Impact Assessment and Action Plan were prepared and numerous public meetings were organised to relay information and progress to affected communities, with the support of partner Risk Management Authorities.

NCC led the recovery activities by immediately cleaning-up the silt and debris left by the floods and providing skips to affected communities. At Corbridge, a High Volume Pump was immediately deployed to assist the clean-up activity and restore the area in time for the Christmas Market event. To minimise disruption, diversions and one way systems were quickly set up in areas where landslips occurred. A thorough inspection of the highway infrastructure was conducted by NCC, and a recovery plan is being implemented with a prioritised approach to restore infrastructure asset to an acceptable standard.

The Government has made funding available to assist affected communities via the Community and Business Recovery Scheme, which is being administered by NCC and includes:

- Community Recovery Scheme (£500 payment to each household)
- Business Support Scheme (emergency grants of up to £10,000 for SME's)

- Property Resilience Scheme (grant of up to £5,000 per household/business for flood 'resistance' and 'resilience' measures)
- Council Tax Relief (whilst a home is uninhabitable, including relief on temporary accommodation)
- Business Rates Relief (whilst a business is unable to trade from its premises)

4.2.2 Environment Agency (EA)

Over 3500 properties were protected by the EA's flood defences; however the winter flooding period caused damage to some of the flood defences, especially the flood banks at Corbridge. The EA immediately made emergency repairs and all other defences in the county were inspected. The EA has also developed a programme of permanent repairs for identified defects which is being delivered from summer 2016.

The EA, in partnership with NCC and NW, have actively engaged with local communities, impacted by flooding in the Northumberland area, to inform them of the recovery progress and also to support communities in developing or reviewing their community flood plans. Further details are included in Appendix A.

Post event data collection was also carried out by the EA which has been used to validate and improve the flood warning system. The data collection process has also informed flood modelling and initial economic assessments to better understand the magnitude of the events and determine the feasibility of potential future flood alleviation schemes.

4.2.3 Northumbrian Water (NW)

NW immediately set about investigating reported incidents of sewer flooding, surveying assets and cleansing sewers inundated with flood water.

5. Maps of affected areas

This section of the Flood Investigation Report looks in detail at specific locations that were affected by the Winter 2015/16 floods. The individual reports can be found in Appendix A. It should be noted that some areas, mainly those where just roads or where the gardens of properties were flooded, have been omitted from this report. However, all known flooding incidents have been recorded on a Geographical Information System (GIS) database.

The maps produced are based on information that we received and observed on site visits to the affected area. Therefore, there may be occasions where we have missed certain buildings and roads being flooded.

If you are aware of any irregularities within the individual reports for affected areas, then please contact us and we can amend them accordingly.

Appendix A contains further information on the following areas:

1. Berwick upon Tweed
2. Corbridge
3. Haydon Bridge
4. Hexham
5. Low Prudhoe
6. Ovingham
7. Ovington

8. Riding Mill
9. Warden
10. West Woodburn

6. Future Funding

Funding to manage flood risk is primarily provided by Government via Grant-in-Aid. This funding is prioritised and allocated on a national basis. There is no guarantee that funding will become available to address all issues and address the flood risk realised over the winter of 15/16. The Environment Agency (EA) has an overall responsibility for administering FCERM Grant in Aid (GiA) for flood and coastal erosion risk management schemes, strategies and projects. The EA have recently commissioned an update to the River Tyne model, the outputs of which will form the basis of future investment decisions.

The information collated from flood investigations will enable relevant risk management authorities to prioritise bids for funding, for more detailed studies and works, if eligible.

7. Conclusions

2015 was one of the wettest years for the UK since records began, with a number of heavy rainfall events.

The event on 5th and 6th of December 2015 was an exceptionally rare and extreme rainfall occurrence. Storm Desmond caused unforeseen river levels across Northumberland. The River Tyne rose to the point where it breached its banks and flooded numerous areas along the length of the River. The worst hit areas were Corbridge, Hexham and Haydon Bridge in terms of the number of properties affected where water rose to exceptionally high levels and caused a large amount of damage to both residential and business properties.

On the 26th December 2015, Storm Eva passed through the County. Rainfall followed a similar route as it did during Storm Desmond. As a result the river levels along the Tyne Valley rose and flooded the surrounding areas; the worst hit areas on the 26th December 2015 were Ovingham and Corbridge in terms of the number of properties affected. However Storm Eva was not as large as Storm Desmond, therefore, the impacts were less extensive.

The final significant event occurred on the 5th - 6th January 2016. On this occasion, land across the county was saturated which limited infiltration into the ground and increased surface runoff. On this occasion numerous surface water and ordinary watercourse flooding incidents were experienced, the areas most affected were Berwick upon Tweed, Ponteland and Ovingham in terms of the number of properties affected.

The rainfall events that occurred in the winter 2015/16 resulted in the flooding of over 200 dwellings, 80 businesses and numerous highways across Northumberland.

As a result of these flood events, Northumberland County Council are working with other Risk Management Authorities, including the Environment Agency and Northumbrian Water, to identify the areas at greatest risk and prioritise those where funding can be secured to alleviate future flooding.

With regards to our duties stipulated in the Floods and Water Management Act (2010), we have investigated each individual flooding incident where it was deemed necessary, as determined by the

Northumberland Flood Risk Management Strategy; have informed each respective Risk Management Authority; and we have published the results of this investigation via our website.

8. Disclaimer

The findings of this report are based on a subjective assessment of the information available by those undertaking the investigation and therefore may not include all relevant information. As such it should not be considered as an absolute assessment of all factors that may have caused or contributed to the flood events.

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

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

The opinions, conclusions and any recommendations in this report are based on circumstances encountered and information evaluated at the time of preparation and Northumberland County Council expressly disclaims responsibility for any error in, or omission from, this report arising from or in connection with those opinions, conclusions and any recommendations.

Northumberland County Council does not accept any liability for the use of this report or its contents by any third party.

Glossary

EA – Environment Agency

FCERM – Flood and Coastal Erosion Risk Management

GiA – Grant in Aid

LLFA – Lead Local Flood Authority

NCC – Northumberland County Council

NW – Northumbrian Water

Culvert

A covered pipe or channel designed to prevent the obstruction of a watercourse or drainage path by an artificial construction.

Groundwater

Groundwater is all water that is below the surface of the ground and in direct contact with the subsoil or ground.

Lead local flood authority (LLFA)

In England this means—

- (a) the unitary authority for the area, or
- (b) if there is no unitary authority, the county council for the area.

Main rivers

Main rivers are usually larger streams and rivers, but some of them are smaller watercourses of local significance. In England Defra decides which watercourses are the main rivers, and the Welsh Government does this in Wales. Main rivers are marked on an official document called the main river map. Environment Agency local offices have copies of these maps. Main rivers can include any structure that controls or regulates the flow of water in, into or out of the channel.

Ordinary watercourse

An ordinary watercourse is every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows, but which does not form part of a main river.

Return Period

A return period is an estimate of the likelihood of a rainfall event which is expressed in years, i.e. 1 in 20 year return period.

Risk management authority

The following risk management authorities have powers over and responsibilities for watercourse management:

- the Environment Agency;
- Lead Local Flood Authorities (LLFAs).

Surface water runoff

Surface water runoff is rainwater, including snow. It is water on the surface of the ground, whether or not it is moving, which has not entered a watercourse, drainage system.

Useful links and contacts

Northumberland County Council

County Hall
Morpeth
Northumberland
NE61 2EF

Tel: 0845 600 6400
Email: ask@northumberland.gov.uk
Website: www.northumberland.gov.uk

Environment Agency

North East Area Office
Tyneside House
Skinnerburn Road
Newcastle Business Park
Newcastle-upon-Tyne
NE4 7AR

Tel: 03708 506 506
Email: enquiries@environment-agency.gov.uk
Website: www.environment-agency.gov.uk

Northumbrian Water

Boldon House
Wheatlands Way
Durham
DH1 5FA

Tel: 0845 717 1100 Floodline 0800 328 7648
Website: www.nwl.co.uk/sewer-flooding.aspx

Highways Agency

Lateral
8 City Walk
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LS11 9AT

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Email: ha_info@highways.gsi.gov.uk
Website: www.highways.gov.uk