

Flooding in Lowdham – why it happens and what we can do about it



This booklet is designed to give you information about flooding in Lowdham, and what to do and who to contact in the event of flooding.

We hope you will find it useful and will keep it handy as a guide to what to do if there is flooding in your area.

[It was originally put together by Lowdham Flood Action Group as part of a booklet distributed to every household in Lowdham and which also included information on Covid 19.](#)

What is covered in this booklet?

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Introduction

What is Lowdham FLAG and what does it do?

Lowdham Flood Action Group (FLAG) was set up after the February 2020 flood. Our aim was to co-ordinate a response by organising those who volunteered to help villagers battling to manage their flooded properties. As we were beginning to put this together the pandemic was upon us and people came forward to help those isolating or shielding, and so Lowdham Volunteers was formed.

FLAG aims to help make Lowdham not only resilient against the future possibility of flooding but also to capture the incredible community spirit shown in the pandemic volunteer programme.

We follow National Flood Forum's best practice model and are a community action group using a tried, tested and effective way of tackling flooding issues in Lowdham. We are separate from, but working in close association with, Lowdham Parish Council.

We intend to

- address village concerns about what is not working
- be constantly in touch about what is intended for Lowdham
- know procedures that are already in place about routine maintenance
- give advice as to the future flood risk of Lowdham through consultation
- create wider awareness of flood risk to the whole of Lowdham
- prepare to reduce the impact of a flood should it occur.

Section 1

We all want to make this a safe and pleasant place for our village residents to live.

Why Lowdham floods and what is being done to protect our wonderful village

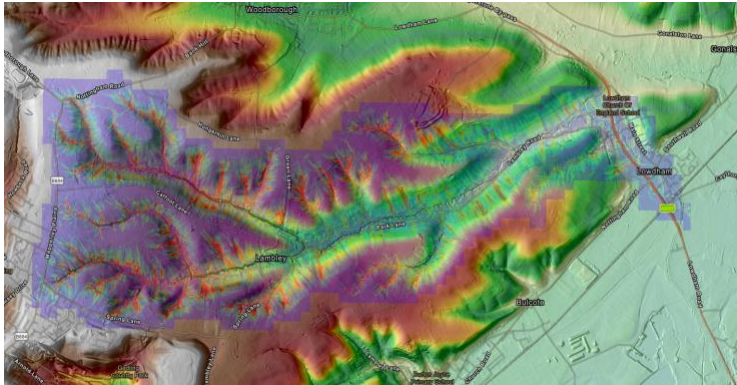
Lowdham sits in a beautiful location with a catchment for the Cocker Beck from Mapperley & the top part of Lambley.

There have been at least **six** major flooding incidents since 1999, and four from June 2019. FLAG believes that to make Lowdham a resilient village against flooding we need to

1. Work with relevant authorities to manage the flow of water through the village (see Appendix section for our partners).
2. Work with relevant authorities to ensure the drainage infrastructure is clear, well maintained and monitored.
3. Build a robust network of volunteers that can not only assist the community in need of help in a crisis, but can also monitor flood defences, and provide early warnings. Volunteers can also help prepare defences for those needing help, and respond during a flooding incident as well as in the recovery phase.

Why does Lowdham flood?

Geographically Lowdham nestles between the very large catchment area of the Cocker Beck and the flood plains of the Carr Dyke / Dover Beck, which makes land drainage a more challenging problem. It also is compromised by several pinch points to the beck as it passes through the village.



Lowdham can be affected by two different kinds of flooding

- **Fluvial Flooding** from the Cocker Beck, as happened in 1999, 2007, 2019 & 2020, when excessive rainfall over a long period caused the river to exceed its capacity and burst its banks. **Flash floods** are characterized by an intense torrent of water triggered by torrential rain falling within a short amount of time. They can also occur via sudden release of water from an upstream levee or a dam when obstructions in the Cocker Beck finally dislodges , as happened when a huge slug of water went into the Primary School grounds.
- **Pluvial flooding** (i.e. rain water) from surface water as happened in 2013 occurs when Lowdham's urban drainage system is overwhelmed and water flows out into streets and nearby properties.

What approach is FLAG taking to try to prevent flooding in Lowdham?

FLAG aim to work with their partners to make the community more resilient to flooding by the following strategy and projects:

- **Control the Flow of Water into the Village.** The Environment Agency (EA) have been working on projects to help Lowdham and are currently working on a reservoir scheme to hold water upstream between Lowdham and Lambley.
- **Speed the flow of water out of the village.** Severn Trent Water (STW) and Nottingham County Council (NCC) are working to ensure the existing drainage infrastructure is clear and correctly maintained. We are working with the Internal Drainage Board to try to find a solution to help move water quickly away from Old Tannery Drive via the Carr Dyke. Meanwhile, new gulleys are being put into the Epperstone Road to take water underground and away from the Priors.
- **Safely store water temporarily in the Village.** The Environment Agency built the 'lagoon' on the cricket pitch in 2000 after the 1999 flood to store excess water that enters the village. A major improvement was made in February 2020 when the Environment Agency installed a new drain to enable the cricket pitch to empty much more quickly. Previously it took 36 hours of pumping, now it self-drains in 6 hours. The lagoon has had issues with bank height inconsistencies over many years which are being addressed by repairs to the left bank which FLAG were pivotal in helping to achieve. STW built a storage tank on the south west side of the roundabout to hold 24 hours of sewerage and overflow surface water

How can our village be protected?

The Environment Agency is, at the time of printing, pursuing a massive capital project which involves the construction of a holding reservoir upstream of the village between Lowdham and Lambley. This will have approximately 10 times the capacity of the cricket field lagoon and will go a very long way in protecting Lowdham from future flooding.

The Parish Council, working with Robert Jenrick MP for Newark & Sherwood, were successful in securing a further £5m grant money to help ensure the scheme goes through.

The EA have created a website for the public to stay abreast of developments <https://consult.environment-agency.gov.uk/>

As well as schemes on the Cocker Beck, FLAG wants all drains cleared in all areas in the village at risk from flooding. They now have a process run by Chris & Tracy Thompson who can both report issues and keep a working record of what has been assessed and action taken.

We now have in place:

Water Course Walkers: Some of the volunteers that have signed up have become water course walkers to keep a check on all of our watercourses on a regular basis and report back with any issues.

Puddlewatchers: Volunteers monitor local gulleys near their home. Any simple debris can be removed to ensure the water course can function correctly and water can flow as designed. Any slow draining systems or blockages can then be quickly monitored and reported.

Please email christhompson598@gmail.com for more information.

Jargon buster!

A culvert is a generic word for a pipe that carries water underground. It can be plastic or concrete. It can also take a watercourse under a bridge or road.

A ditch is an open channel usually not full of water under normal conditions.



A gully is the grill that is usually seen in a pavement or road. Water flows into the gully and then into a chamber or 'pot'. The



pipes leading out of the chamber are 'half' way up to allow water to flow between the chambers. The chamber has a deep base used to catch silt etc.

VIA East Midlands send their cyclical maintenance crews to clear the gulleys / chambers by sucking out the leaves / debris and then firing high pressure water to clean them out. They monitor how quickly this water goes away which gives a good indication of the state of the drains.

Slow draining gulleys are then reported to the Drains Response Team. This is a small crew covering the whole of Notts so they are quite stretched. They have worked very well with FLAG to clear some very important infrastructure. The Response team use 'cameras' mounted on remote controlled cars to see the extent of blockages in a culvert and then clear them.

An offset is a hole in the kerb where it meets the road that allows water to run into a culvert under the pavement and then into a culvert, ditch or watercourse.



What are we doing about drains and surface water flooding?

Drainage has been a major area of concern. When it rains heavily or when flooding is happening, we rely on a drainage system that was installed many decades ago.

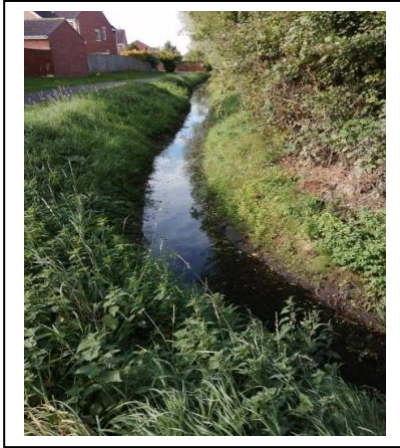
We are working with VIA to get 100% of gulleys and offsets in the village accessible for scheduled cyclical cleansing. Volunteers will ensure leaflets are put through doors to alert residents and leaflets are put on cars to alert commuters. This is a great example of how we can work together with authorities and achieve a much better outcome than them working in isolation.

We are working to get more regular cleansing and in particular following a flooding event when silt etc has been washed into the drainage system and causes decrease in capacity or sometimes complete blockages. There has been a lot of clean up activity this summer as you can see here:



Lowdham has the following main exits for drainage

- The Cocker Beck takes all the Main Street surface water drainage which then enters the Beck under the Magna bridge
- Old Tannery surface water drains empty into the Old Tannery Dyke and flows out into the flood plain with the Dover Beck and Carr Dyke
- The main culverts & drainage ditches down the side of the A6097 south of the roundabout take water away under the railway line
- Three 'grips' forming a spill-weir onto the Severn Trent owned field off Private Road and Caythorpe Road allow the beck to overflow to relieve back pressure in the system.



As of Autumn 2020 the main drainage culverts and ditches alongside the A6097 are in the process of major maintenance. The last time these were cleared was after the 2007 floods and that was following much lobbying by local concerned residents. We are now pushing for more regular monitoring with cameras and inspections to ensure that we are not at risk in the event of possible flooding in the future.



Section 2

How you can protect your home and what to do if there is a flood

How do I know if a flood is imminent? There are a number of ways to help know if a flood is imminent. It all depends on the weather, so obviously nothing is certain! Lowdham FLAG believes everyone must make their own decisions for when they need to take responsible, preventative action for themselves and their own property.

To help provide the information on which to make this decision Lowdham FLAG have started a dashboard where all relevant information can be viewed in one place. This covers the EA alerts / warnings, river levels and weather websites.

The dashboard is at <https://lowdhamvolunteers.org/flooding-key-info/>

Sign up for flood alerts!

Flood warnings - know what to do? Environment Agency

	FLOOD ALERT	PREPARE	<ul style="list-style-type: none">• Prepare a bag that includes medicines and insurance documents• Visit flood-warning-information.service.gov.uk
	FLOOD WARNING	ACT	<ul style="list-style-type: none">• Turn off gas, water and electricity• Move things upstairs• Move family, pets and car to safety
	SEVERE FLOOD WARNING	SURVIVE	<ul style="list-style-type: none">• Call 999 if in immediate danger• Listen to emergency services and evacuate if told to do so

[floodaware.campaign.gov.uk](https://www.environment-agency.gov.uk/flood-warnings) **FLOODS DIRECT** Floodline on 0345 988 1133 #Floodaware

Flood Warnings Direct - Floodline

Anyone is able to sign up to receive free flood messages for your area directly to your phone, mobile, email, SMS text, or fax. Sign up to

receive flood messages by searching 'flood' on the gov.uk website or calling Floodline on 0345-988-1188. Only sign up for the messages you want to receive!

When the risk of flooding is over, you will receive a 'no longer in force' message so that you can start making plans to get life back to normal.

FLOOD ALERTS

The first notification you are likely to receive is a Flood Alert. This is **NOT** an alert for property flooding.

This is an alert for low lying land only. It generally refers to River Trent & Tributaries which includes the Cocker Beck. However, it is possible that you may receive alerts for a different part of the catchment. If you have added an email address to your sign-up details this will generate an email which will tell you the precise area affected. Alerts, without subsequent "warnings", have never preceded a flood event - however they do give an early indication that a flood event may be possible.

FLOOD WARNINGS

Immediate action is required and you are advised to take measures to protect yourself and your property. Monitor weather updates and check Floodline regularly.

Typically, if the Warning refers to the Cocker Beck it will come with approximately 60-120 mins notice of the start of flooding to some properties.

SEVERE FLOOD WARNINGS

Flooding is imminent and could pose a risk to life and cause significant disruption to essential services such as water and electricity supplies. Please co-operate with the emergency services in the event of evacuation. Thankfully Lowdham has never had one of these!

FLAG have been working with the EA to get an unofficial 'heads up' of a possible warning for the Cocker Beck in order to help our volunteers spring into action. This agreement is a 'win win' for Lowdham because it will allow us to make some much-needed preparations, just in case.

If you would like to sign up to this earlier non-official warning then please submit your contact telephone details to FLAG and we will create a group message to give out this early unofficial warning.

*****Please note, this is not an official EA notification, simply a heads up to FLAG that things are looking a little serious*****

Other weather apps to monitor

- Met Office
- BBC Weather
- Accuweather

These maps show the rainfall (in mm/hr) in time segments (usually hourly) that can show the forecast rain levels. In the map below the colours represent the different rates of rainfall across the Midlands at a particular moment in time. There will be a 'play' button so you can see how this will change over time.



River level gauges

Local River Levels are available from the Lowdham FLAG Dashboard linking to the EA Gauges. The specific links are:

Cocker beck level

(<https://flood-warning-information.service.gov.uk/station/2215>).

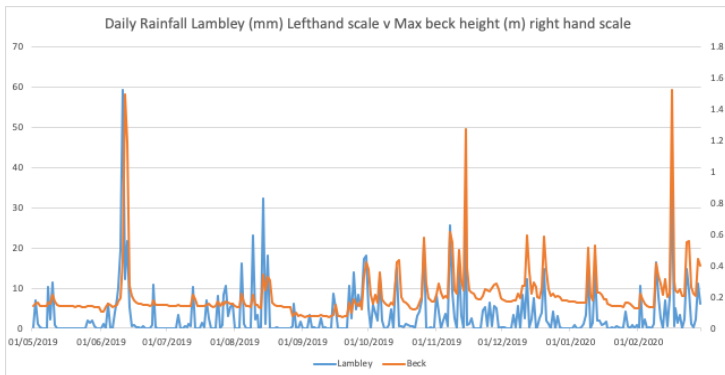
Dover Beck level

(<https://flood-warning-information.service.gov.uk/station/2232>)

This is a useful source of information to see how quickly the Beck is rising. It also shows some historic measures of the highest previously recorded levels.

Rain gauges

FLAG has been told that our catchment has the most rain water gauges in Nottinghamshire which again is a very useful source of monitoring information but as yet we don't have any live feed information to them. We do however have historic information from the EA going back to 2012 and are looking to see how predictive this is of river levels. We are also exploring ways to 'build our own rain gauge'.



The link between rain and river levels is very complex and our current thinking is shown in Appendix 2.

SECTION 2

How can I protect my property?

Make a Flood Plan!

This is a worthwhile exercise to have a clear understanding of what you would need to do in preparation for flooding and what your particular property requires to keep it protected. Consider things like...

Where is my property most at risk?

- Do I need to have flood barriers fitted?
- Do I need to have non return valves fitted?
- Do I require sandbags?

What will I do in the event of a flood?

- How will I save my valuables / lift my furniture?

Prepare for the situation

- Find out where and how to turn off your gas, electricity and water supplies. Consider fitting a Water Stop which is like a light switch which turns your water off. Much easier than trying to get to a stop cock.
- Think about where you keep your important documents
- Check your insurance is enough & up to date. Does the policy cover include 'new for old', matching items e.g. kitchen wall cabinets as well as base units, garden furniture etc (The Government introduced Flood-Re in 2016 which should make it easier to get flood insurance (see appendix)).
- Move treasured things like photographs, books etc up from ground level.
- Keep hidden extension cables away from ground level (if water enters these will be the first thing that will trip your electrics)

- Have a Grab Bag ready (see pages 18-19)

Even though we are in a flood risk area it is only too easy to forget or ignore flooding when the weather is good. Storms and bad weather seem to be upon us relatively quickly and this is what often incites panic.

The idea of a personalised flood plan is to help you approach the situation in a more calm & organised way.

(Have a look at our website at

<https://lowdhamvolunteers.org/flooding/flooding-resources/>)

What can I expect from FLAG if flooding is expected?

When a flood event is likely Lowdham FLAG intends to do the following

- Notify paired volunteers to contact the people / properties they have been assigned in order to help move furniture, place sandbags etc
- set up a command post at the Old Ship Inn where volunteers can assemble. FLAG can then allocate volunteers to new areas where they are needed & where help has been requested
- provide an immediate area where residents can go to for help, reassurance and warmth if needed
- phone people who have registered for phone reassurance in the event of a flood

**The contact number of the command post is
07946 522629**

Property Flood Assessment

There are a number of companies out there who offer this service (see appendix). In particular the National Flood Forum provide some useful ideas at their Property Protection Advisor website (

<https://nationalfloodforum.org.uk/about-flooding/reducing-your-risk/property-protection-advisor/>).

Contact the National Flood Forum on 01299 403055 for advice.

There are also government grants available through NSDC to help with this although you can only apply for these if you previously haven't done so already. You can check this at <https://lowdhamvolunteers.org/flood-info/>

Property Protection

There are a number of options to protect your property. At a basic level consider how the water enters your property. Whilst flood doors are useful bear in mind that water will not only enter via the door but also via the walls, air bricks and drains. It can also enter via the floor. Be considerate in your plans as you do not want to flood your neighbour. Indeed, many of the better solutions are where households work together on a larger scheme to divert water to areas that cause less harm. The Flood assessment above is a good approach.

There are a number of useful leaflets on our website (<https://lowdhamvolunteers.org/flooding/flooding-resources/>)
The National Flood Forum have an independent list of organisations providing flood services at their blue pages website (<http://bluepages.org.uk>).

A Word About Sandbags

Typically, these magically arrive in the village during times of flooding but they are not a given and they often come a little late. Traditional sandbags are heavy, messy & difficult to store and they can contribute to silt build up in the drainage system.

A better alternative is an Aquasac. These can be stored dry & flat. They don't take up a lot of storage space and are quick to deploy.

They do require a fair amount of water to swell up and be effective and therefore pose problems if lying in advance of a flood. They can be reused up to a point but the contents can be dug into the soil for water retention as they are like water retaining crystals. FLAG have been advised to inform people that it is the homeowner's responsibility to supply themselves with sandbags or Aquasacs as NSDC are only obliged to supply to the most vulnerable.

Get prepared for possible flooding

- Make contact with anyone assigned to help you
Some of you may have been contacted by a FLAG volunteer who is assigned to help you in these challenging times. The plan is that they will have made contact but if this hasn't happened either contact them or FLAG on 07922 522629
- Put up any flood defences that you may now have
- Lift belongings to higher ground or onto ready prepared blocks or storage boxes or whatever you have planned to use
- Check again for extension cables at ground level
- Add the additional listed items to your Grab Bag as necessary
- Consider moving vehicles to higher ground
- Prepare some supplies of freshwater

Make a Grab Bag!

A Grab Bag is a useful thing to put together and store with your other flood resilience measures.

It can have certain items you know you may need in a flood plus have a list of things to put together in the event of a flood when you are often not thinking as clearly.

We suggest a small eco-friendly bag to include

- Notebook & Pen
- Small torch or head torch. Keep batteries out of the torch for storage or consider a wind-up version
- A space blanket for warmth
- A bottle of water
- A list of important telephone numbers (including your GP details,)
- A copy of your insurance document (insurance claim line and policy number)
- A list of other items to add 'In The Event'
 - Mobile phone charger
 - Prescription / Medication
 - Essential items for babies, the elderly, those with special needs, pets
 - Food e.g. energy bars
 - Emergency numbers either in your phone or on a piece of paper
 - Clothing e.g. Rainwear, Overnight wear, Waterproof Boots
 - Toiletries, Wet Wipes, Hand Sanitiser, Masks

We can offer help with lifting Furniture!

FLAG have identified homes where occupants have requested help with lifting furniture. It is worthwhile thinking through how you are going to do this in advance.

One option is to cover building blocks or bricks in heavy duty plastic and store them in the garage or even tucked away around the house. They can be quickly deployed to lift furniture and, because they are covered, they will slide on carpet easily and not make a mess. The last thing you want is to ruin carpets in a 'just in case' scenario. Another option is cheap plastic storage boxes that can be stored inside one another but are quite sturdy once turned upside down.

If you are flooded: advice for after the event

- Take extreme care when walking through flood water
- Do not approach any structure that may be unsafe
- Wear gloves and boots and be aware of contaminated water with sewerage
- Should you get a cut or receive any form of puncture wound, check with a Doctor about having a Tetanus booster
- Contact Insurers. The sooner you are able to register yourself as flooded the sooner a loss adjuster & emergency clean up company will get to you. This means you will more quickly be able to get damaged carpets etc out & get your property sanitised. It is strongly advised that you do not dispose of anything until the loss adjuster has contacted you and authorised it.
- Photograph any damage including evidence of water levels both inside & outside the property
- Keep a sample of any carpet or flooring that is being disposed of. Disaster Management companies are usually pretty good at doing this but things can get overlooked in the chaos. If there are ever any disputes over quality or invoices with the insurers this is a good way to support your claim.
- Turn off the electricity supply to the property until a qualified electrician or utility company has checked out the electrics. Use extreme caution in dealing with electricity.
- Ensure that all switches, sockets and appliances are checked prior to use, especially if they have been in contact with floodwater. Once all electrical safety checks have been made, make sure that you use a circuit breaker with any electrical equipment that you may use to clean or repair your property. Watch out for any fallen power lines

and do not approach them – be aware that there is always a potential electric shock hazard.

- Turn off the gas supply to appliances that have been flooded (or where their vents/flues may have been affected).
- Make a note of the reading on your electric meter
- Take a small notebook around with you to note down who you have spoken to, their names, who they work for, what they do, phone number, email, date and time you spoke to them, what they said.
- Always question who people are when they contact you by phone and who sent them. Things can get a little hectic post flood and it's not always easy to understand who people are. Take your time to fully understand all that is being said to you and ask plenty of questions. Always deal only with your loss adjuster and / or the disaster recovery company appointed by your insurer.
- Beware rogue traders

Do not fully re-occupy your property until all standing water has been removed particularly from the underfloor area

- The Fire & Rescue Service can pump out standing water but may charge for non-emergencies.
- Consult Lowdham FLAG who have access to pumps and may be able to assist.

Call 07946 522629 or 07767 797335

Call Lowdham FLAG on 07946 522629 or 07767 797335

Email us at lowdhamflag@gmail.com

Section 3

What you can do to help your fellow villagers

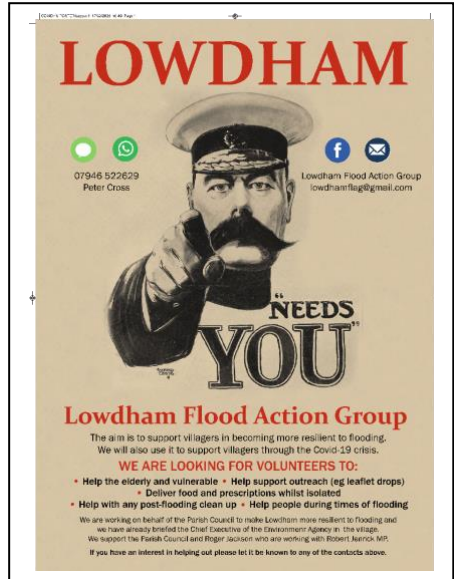
We regularly communicate via our Facebook page (@lowdhamflag) and on Twitter (@lowdhamflag) with up to date information. Please sign up to follow us!

We have a website www.lowdhamvolunteers.org that keeps information easily accessible. It includes links to useful websites.

Lowdham FLAG needs volunteers to help in many many ways. We have a variety of areas people can help from lifting furniture, water course walking, recording events and administration through to building rain gauges.

You can sign up at <https://lowdhamvolunteers.org/flooding/> or send an email to lowdhamflag@gmail.com or contact Peter Cross on 07946 522629.

Phone Support Volunteers. Lowdham FLAG recognises that flooding can cause emotional as well as physical damage and so has a group of **volunteers** who can contact worried / affected residents. The volunteers are able to demystify the EA alerts / warning systems, help access the latest information and explain



what preventative measures are available. Contact Ann and Terry Carpenter on 07815 293786

Paired Volunteer Support. In the event of flooding Lowdham FLAG has organised a group of volunteers who can attend houses / occupants in most need of help. Ideally these people have been identified by our surveys & in some cases phone interviews. Those who are felt to be most vulnerable will have a designated paired volunteer who will have previously met them, know their home and what needs to be done ahead of time. This will speed up response time & aim to be more preventative.

In the Event Volunteers There will also be a group of volunteers to provide emergency help during a flooding event. Help can include placing sandbags, fitting flood doors, lifting furniture and generally doing what needs to be done on the day. Contact Nigel Hunt on 07999 510670.

Lowdham FLAG also has specialist volunteers who maintain communication with Lowdham residents and organisations. These include IT, website and mapping specialists as well as legal and insurance help. We are also engaging with NCC regarding flood warden training.

Contact Russ and Liz Blenkinsop on

07767 797335.



Appendix

More information about organisations that can help you

Who are FLAG's Partners and how do they help us?



Notts County Council (NCC) are the Local Lead Flood Authority for Nottinghamshire and they liaise with these other agencies to work towards effective solutions for flood protection. They are also the main agency for reporting drainage issues.



VIA East Midlands are responsible for drains / culverts in the main roads. They also sub contract their work to ACL and Tarmac. VIA East Midlands are owned by NCC

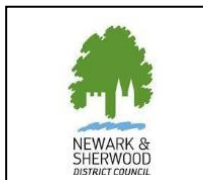
The Environment Agency (EA) have responsibility for the Cocker Beck once it comes into the village under the A6097 in the North part of the village. At this point it is designated a Main River.



Trent Valley Internal Drainage Board (TVIDB) are responsible for maintenance of this water course and are sub contracted by NCC. They

regularly inspect and monitor it for silt, weeds and any other form of maintenance. The IDB are responsible for the dyke that takes water from Old Tannery Drive and other ditches south of the village that link with the Cocker Beck near Lowdham Caravans before reaching the Trent.' It is also responsible for maintenance of the Cocker Beck under a contract from the EA.

The TVIDB's responsibility also extends to the Dover Beck which shares a flood plain with the Old Tannery Dyke.



Newark and Sherwood District Council (NSDC) coordinate local flood wardens and emergency stores, offer help and advice, in some cases provide sandbags for vulnerable people, organise evacuations and emergency shelters if needed and help with flood recovery. They

have been responsible for distributing grants to those flooded and are coordinating the contractors

Trent Rivers Trust (TRT) are a charity that does amazing work with natural water course management. They have done more than 50 interventions upstream of Lowdham designed to slow the flow of water down and in some cases temporarily hold it back.



They use leaky dams, bunds, tree planting etc which have all been shown to be successful as there has been a noticeable difference in the measurements at the Lowdham Grange river gauge and the height that flooding actually occurs. They work very closely with the EA. <https://www.trentriverstrust.org/>



Severn Trent Water (STW) is responsible for the sewer drains in Lowdham. The sewerage system is separate from the surface water system (NCC responsibility)

The National Flood Forum is an excellent source of advice on all aspects of flooding. It can be drafted in to offer emotional and practical support to people during the



immediate aftermath of the flood and to help people move forward with the recovery process.

FLAG have developed good working relationships with the NFF, EA, IDB, VIA East Midlands, NCC, Trent Rivers Trust & Severn Trent Water

The Police coordinate the emergency services during a major flood and help with the evacuation of people when necessary. The senior Police Officer declared a major incident in the February 2020 flood.

The Fire and Rescue Service is primarily responsible for saving life. It has also pumped out buildings during flooding in Lowdham.

Flood risk is normally a part of household insurance in the United Kingdom. Over time, an increasing number of people struggled to access affordable flood cover.



Flood RE (<https://www.floodre.co.uk>) is a temporary measure introduced in 2016 based on the Pitt report recommendations and is planned to last until 2039. It will help more people to access affordable home insurance in areas at risk of flooding by enabling insurance companies to 're-insure' their risk.

Flood RE is funded by a combination of premiums to reinsure the flood risk and a statutory levy on all UK household insurers, calculated in proportion to their share of the market. Not all insurers offering household insurance will offer Flood RE. A list of those that do will be available on the Flood RE website.

There will be a review at least every 5 years to assess Flood RE's progress in managing a transition to a free market. After 2039 Flood RE will end and there will be a free market for flood risk

insurance. Flood RE is an organisation owned and run by the industry, to which insurers can pass the flood risk part of home insurance policies at a fixed premium to Flood RE. It will also report annually to parliament.

APPENDIX 2: RAINFALL AND RIVER LEVEL DATA

This Appendix lays out current thinking by Lowdham FLAG to enable residents to form their own view of likely outcomes of a rainfall event. FLAG is seeking input from stakeholders, notably EA, to help 'sense check' this work.

The major factor in water levels in the Cocker Beck rising is clearly the amount of rain falling although this is not the only factor and must also include the condition of the ground after periods of rain / drought. Therefore, given there are other factors, looking at data can only inform rather than accurately predict what the Beck will do. Indeed rainfall, especially predicted rainfall, is one of the factors the EA consider when issuing flood alerts and warnings.

The EA have provided data going back to 2012 to find a link; and then use that link to help predict what may happen.

The following data is available:

- a) River level of the Cocker Beck at Lowdham Grange from January 2012 (300,000+ data points).
- b) Rain gauge at Lambley which is situated in the 12 km² Cocker Beck catchment area (75,000+ data points).
- c) Rain gauge levels at Calverton - which is outside the catchment area (Dover Beck is informed) (75,000+ data points).

The data on rainfall has been examined in several ways. The process is described below with shortcomings identified and possible ways forward examined. The analysis started with the hourly rainfall and determined the maximum downfall in the month and compared that to the months in which Lowdham flooded. This is shown in [Table 1](#).

It is recognised that a heavy downpour could lead to flash flooding but unless the soil was baked and the rain quickly flowed into the Beck, then one hour's heavy rain is unlikely to cause a flood. Recognising that, longer periods of rainfall from 3 hours as shown in [Table 2](#) were examined. This does show a greater correlation with the flood events. However, there are months when heavy downpours do not lead to flooding. The duration of rainfall was then extended to cover all periods from one hour's rainfall to 10 hours rainfall. This shows better correlation but, again, is not conclusive.

A comparison was then made between rainfall and river levels on an hourly basis in these high rainfall events. Examples are in [Tables 3a and 3b](#). This highlights several issues to understand and then discuss:

- a) The Beck is filled by rain falling in the catchment area other than just at the Lambley gauge, and there is a lag between rainfall and river level at Lambley and the flooding in Lowdham. To begin to address this the rainfall at Calverton has been shown.
- b) When interpreting the information we need further data. For instance, in February 2020 the Beck rose but didn't flood around midnight and then over topped circa 3am. One interpretation could be that the total rainfall from 11pm to 1am of 10.4mm

wouldn't have caused a flood but the extra 9.6 at 2am to make a total of 20mm which is what caused the flooding.

- c) In terms of understanding the time lag we need accurate knowledge of when the flood occurred, possibly more granular detail on time of rainfall (if the lag is measured in minutes) and the condition of the ground.
- d) Ultimately the objective is not to fully explain each event but to gain an insight into the cause so that different measures (such as predicted rainfall and approximate soil condition) can be used to predict if a flood event is likely to happen.

An analysis (which is yet to be completed) of 7 near flood events is shown in [Table 4](#). The tentative working conclusion / hypothesis from the tabular data is that at rainfall over a 7-hour period of 30mm, there is a 50+% chance of leading to a flood. The conclusion from February 2020 is that heavy rainfall (over 8mm/hr) after persistent rainfall (10mm in 3 hrs) will lead to a flood.

Access to forecast data from the Met Office which shows the forecast rain levels is available. There is further work to be done to ensure that we are measuring the same thing (e.g. rain in mm that fell into the Gauge at Lambley being the same as forecast rainfall in mm/hour over the geographical area of Lambley). If these are the same, then the Met Office maps may give a good indication. We then need to adjust the 30mm figure to take account of ground conditions (see below)

Ground conditions. Ground conditions are reported by the EA on a weekly basis. In some parts of the country they are monitored more frequently. In terms of 'sodden' ground then the previous week's rainfall may be a good proxy. In terms of 'baked' ground, a low previous month's figure may be an appropriate measure. The EA will have more accurate information but one crude indicator is the average amount of monthly rain that has fallen in the last three months. This is shown in [Table 5](#).

Monitoring. If additional monitoring is the answer, then the suggestion by TRT is that we could purchase the parts (at cost) to build our own measuring station to be sited at an appropriate location. Lowdham C of E Primary school has already said they would be interested in hosting the project.

Availability of Information. The Pang Valley Flood Forum has a dashboard that is automatically updated from the data available on the EA websites. Once we know what data we want it should be possible to have a similar system if we can access the expertise to build such a site.

When does heavy rain/flooding occur and is it getting more frequent? There is no pattern. [Table 6](#) shows the data we have from our rain gauges since 2012. It is difficult to draw firm conclusions but the wettest months are June, October and November followed by December and August. February was the lowest until Feb 2020!

Tables 1 and 2 - Maximum rainfall in one hour (or 3 hourly) period in each month/year. **Yellow** shows when river flooding occurs, **orange** when surface water flooding occurs.

Table 1

Hourly rainfall rate in mm

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012	3	2	4	6	3	7	11	11	8	6	5	4
2013	4	2	3	5	5	6	18	4	3	10	4	4
2014	7	4	7	4	5	4	8	18	2	4	6	3
2015	4	3	3	2	5	3	7	7	8	10	4	5
2016	3	4	5	3	2	11	6	4	5	6	8	4
2017	2	4	3	2	4	5	7	6	7	4	3	4
2018	4	4	3	5	8	8	1	7	3	4	3	5
2019	2	3	3	4	6	9	4	12	6	5	6	4
2020	4	10	3	3	2	12	6	12				
<u>Total</u>	7	10	7	6	8	12	18	18	8	10	8	5

Table 2

3 Hourly rainfall rate in mm

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012	5	4	8	13	7	13	24	12	16	11	11	9
2013	10	6	5	6	12	7	31	5	4	16	6	8
2014	14	9	7	5	11	5	9	31	2	10	8	8
2015	5	7	8	3	10	8	10	11	8	17	6	8
2016	7	6	11	8	6	18	12	8	6	13	18	7
2017	4	7	5	3	8	9	14	12	16	5	7	10
2018	6	8	7	8	16	12	3	14	6	8	4	9
2019	3	7	8	8	11	14	10	16	14	9	15	7
2020	10	19	5	3	2	12	10	20				
Total	14	19	11	13	16	18	31	31	16	17	18	10

Table 3a

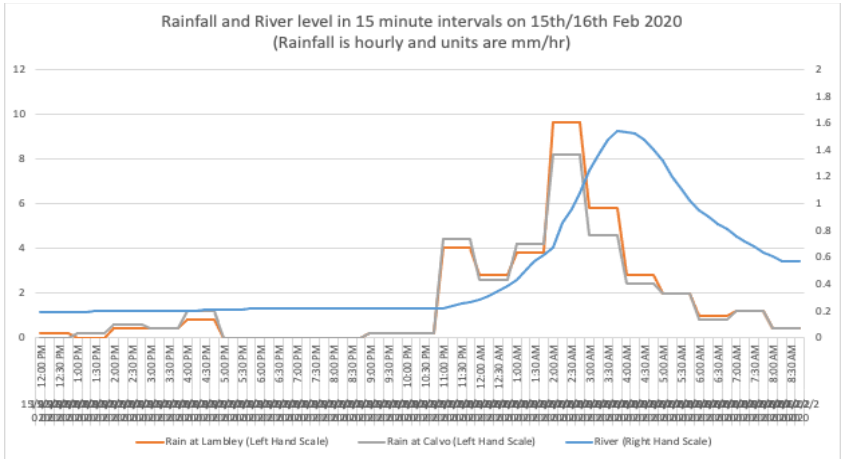


Table 3b

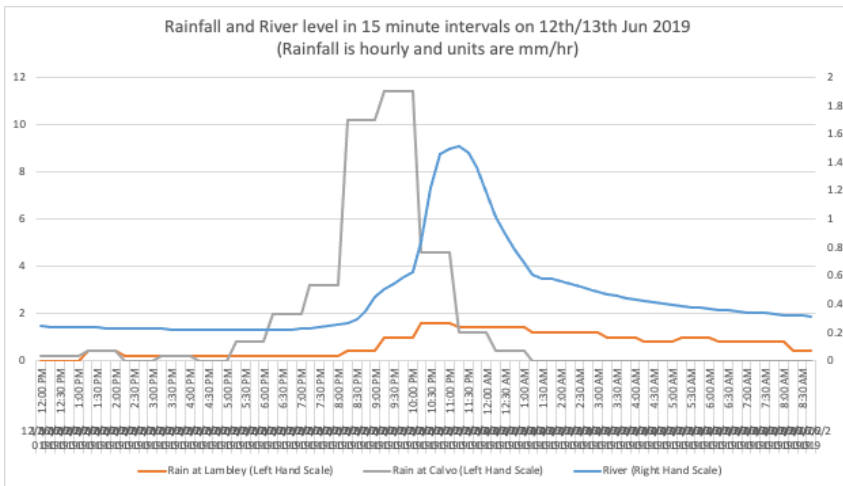


Table 4

During 7 recent flooding events, the rainfall per hour and river levels have been compared to identify when flooding occurs. The table below shows this

Av Rainfall (mm/hour)	Duration (hrs)	Beck height (m)	Date	Results in a Flood Y/N	Lag (mins) heavy rain to river peak	Annual Exceedance Probability (to be completed)
3	5	0.6	Dec 19	N	300	
Initially 2 then further 7 - 8	3 2	0.208	Aug 18	N	No change	
6	2	0.831	Jan 14	N	150	
5	5	1.261	Nov 19	Y	300	1 in 5-10 years rainfall

Initially 4 then further 8	3 2	1. 53 9	Feb 20	Y	300	1 in 20-30 river level
1.6 (Lambley) 10 – 11 (Calverton)	4	1. 50 8	Jun 19	Y (minimal)	180	
Initially 18 then further 13	1 1	0. 54 6	Jul 13	Y (surface)	Concurrent	1 in 5 year river level

Table 5

Average Rainfall in last three months

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012			31	66	74	109	116	129	104	74	81	101
2013	90	65	43	34	55	51	72	54	46	68	68	75
2014	68	71	69	39	55	52	58	58	51	64	56	76
2015	60	48	42	36	47	49	60	56	52	61	66	79
2016	71	64	64	66	60	80	72	75	43	44	53	47
2017	47	37	47	37	41	48	76	79	85	61	52	42
2018	57	55	59	65	70	52	29	31	37	48	39	54
2019	47	47	41	41	44	75	89	112	94	106	116	105
2020	87	91	74	64	16	38	55	83				

Table 6

Monthly Rainfall (mm)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
2012	41	20	33	146	43	139	165	84	64	74	106	123	1037
2013	42	31	57	14	95	45	75	41	22	140	41	45	648
2014	117	51	38	29	100	29	45	100	7	85	78	64	741
2015	38	40	47	20	74	53	53	61	41	82	76	78	664
2016	58	57	77	63	41	135	38	51	40	40	80	20	701
2017	42	49	52	10	60	74	94	68	94	21	39	65	669
2018	66	34	77	83	50	24	12	58	40	45	31	87	607
2019	23	31	69	25	39	161	69	106	108	104	136	75	945
2020	50	148	25	18	4	90	70	88					494
<u>2012-</u>													
<u>19</u>	<u>427</u>	<u>314</u>	<u>449</u>	<u>388</u>	<u>502</u>	<u>660</u>	<u>551</u>	<u>569</u>	<u>415</u>	<u>592</u>	<u>588</u>	<u>555</u>	<u>6011</u>