



APPENDIX A

SECTION 19 REPORT – ARNOLD – JUNE 19

Introduction

Section 19 of the Flood and Water Management Act 2010 states:

1. On becoming aware of a flood in its area, a lead local flood authority must, to the extent that it considers it necessary or appropriate, investigate:
 - (a) Which Risk Management Authorities (RMAs) have relevant flood risk management functions.
 - (b) Whether each of those RMAs 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) of Section 19 it must:-
 - (a) Publish the results of its investigation.
 - (b) Notify any relevant RMAs.
3. The objective of this report is to investigate which RMAs had relevant flood risk management functions during the flooding in June 2019 and whether the relevant RMAs have exercised, or propose to exercise, their risk management functions (as per section 19(1) of the Flood and Water Management Act 2010).
4. The RMAs for this area of Nottinghamshire are the Environment Agency (EA) Gedling Borough Council (GBC), The Nottinghamshire County Council (NCC) as Lead Local Flood Authority (LLFA), VIA as Highways Authority on behalf of (NCC), Severn Trent Water Ltd. (STW) and Nottinghamshire Fire and Rescue.
5. It should be noted that this duty to investigate does not guarantee that flooding problems will be resolved and cannot force others into action.

Background

6. Arnold is a market town and suburb of the city of Nottingham, it is situated to the north-east of Nottingham's city boundary. Arnold's town centre is the largest in the borough of Gedling with a population of approximately 37,700 people.

On the evening of 12th of June 2019 at around 10:30pm and following a prolonged period of heavy rainfall, parts of Arnold suffered a significant flood event. 24 Residential Properties and 20 Businesses were subject to internal flooding with many more suffering flooding to gardens and outbuildings. The areas affected were Hall Drive, Brook Gardens, Bentwell Avenue, Bonnington Drive, Brookfield Road, Gedling Road, Front Street, Market Place and Arnot Hill Road.

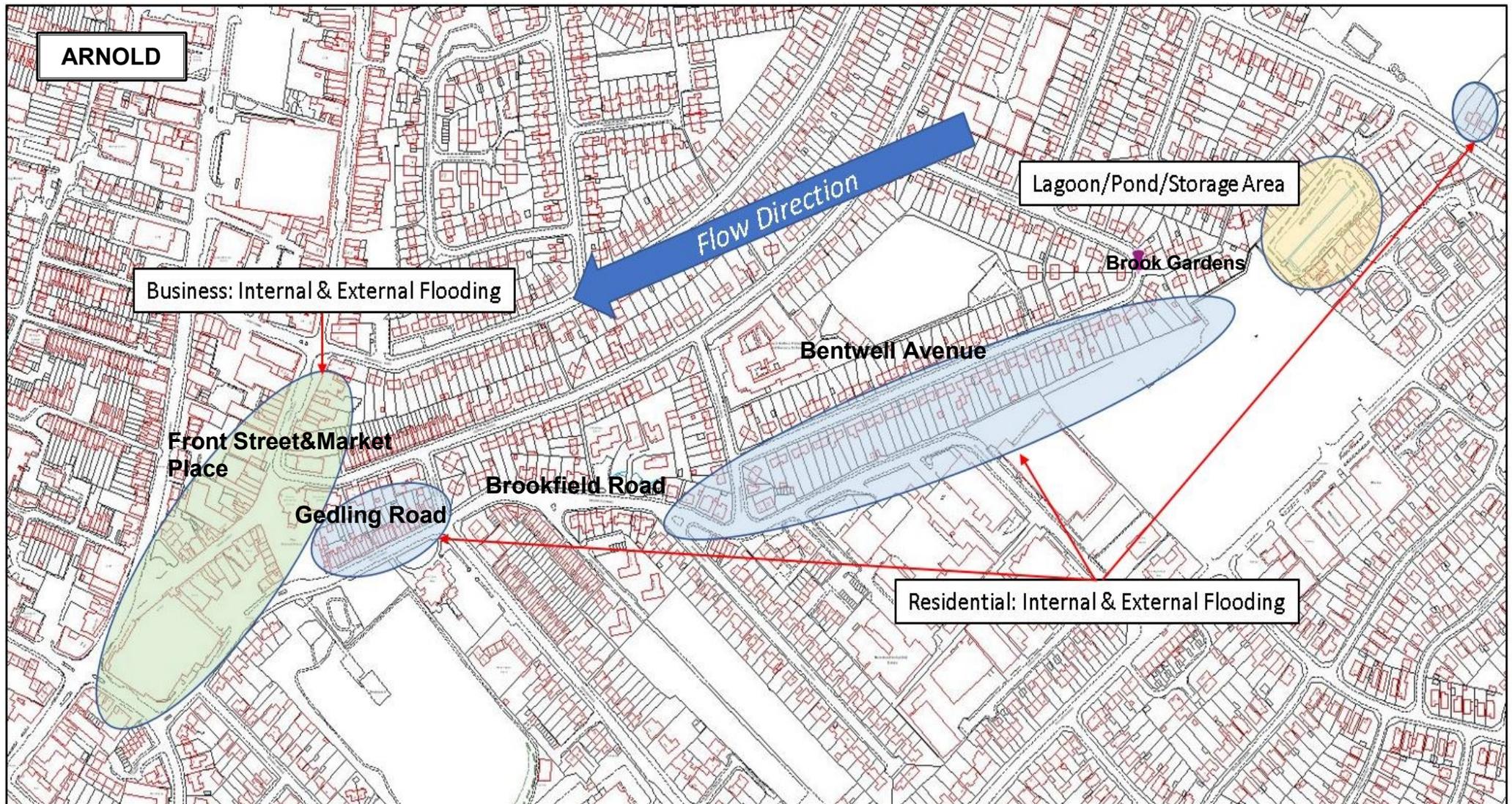


Figure 1. Arnold, sub-catchment of the wider Day Brook Catchment

Summary of flooding and its causes

7. Between the 10th and 12th of June a significant amount of rain was recorded as falling on the Arnold area. The nearest EA rain gauge at Lambley recorded 92mm over the three days, with 59mm falling on the 11th alone. The average rainfall for the month of June in Nottingham is 64mm. This excessive rainfall resulted in 24 residential properties and 20 businesses experiencing significant internal flooding. Figures 2 and 3 describe the source of the flood water and the history of the area. Figures 4, 5 and 6 highlight in more detail the areas affected.

Figure 2 is a plan showing a surface water attenuation area situated between Malin Close to the North East and Brook Gardens to the South West. Immediately to the South of the attenuation area is the Rolleston Drive Highway Depot. The attenuation area is maintained by GBC with a STW surface water sewer permitted to flow into and out of it. When functioning correctly the attenuation area collects water from the STW surface water network upstream and discharges that water back into the STW surface water network downstream but at a controlled rate.

On the evening of the 12th of June, the attenuation area was already at full capacity following the previous days rainfall (see photo adjacent). The storage area then broke its bank allowing the excess surface water to run overland, eventually finding a natural valley along the rear gardens of Bentwell Avenue. This channelled the water downstream at a gradually increasing rate causing extensive damage along its path. The water was following a natural route described on page 4.

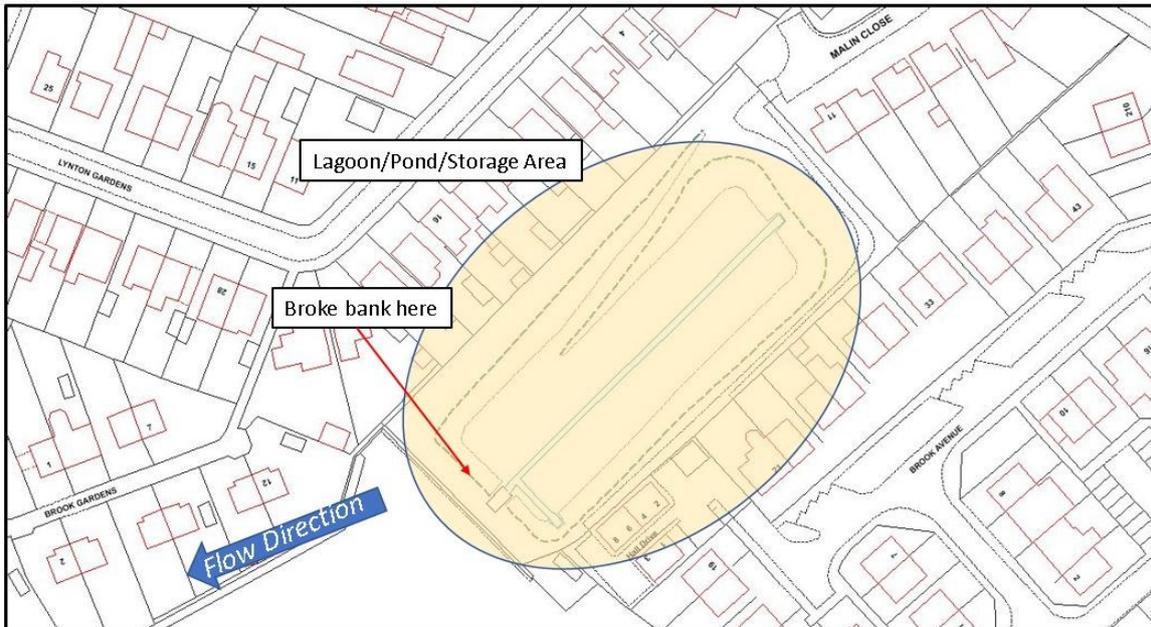


Figure 2. Plan showing location of storage attenuation area

ARNOLD



Figure 3. Historic map showing line of original watercourse.

Figure 3 has to the left an historic map which shows the line of the original watercourse meandering towards Brookfield Road, and the aerial photo to the right clearly shows that now Brook Gardens and Bentwell Avenue are on that historic route. This area of Arnold has flooded along this route on a number of occasions with previous documented events in 1998, 1999, 2006, 2010 and 2013.

This observation is illustrated further by Figure 4 the surface water map of the area provided by The Environment Agency which shows predicted flow routes during periods of heavy rain. As you can see the flow route follows the line of the historical water course now Bentwell Avenue and other residential areas.

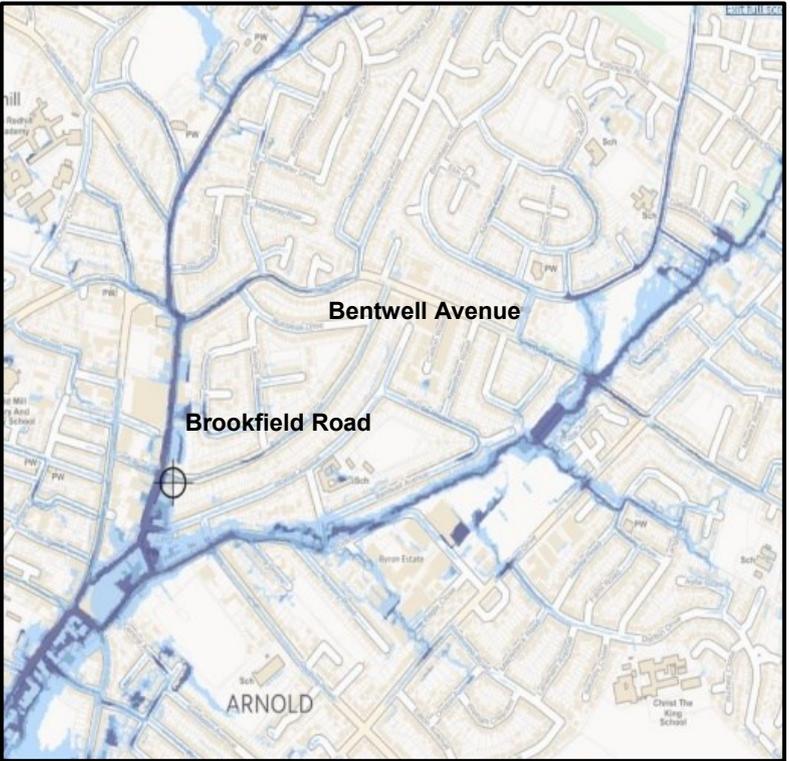


Figure 4. Surface Water Flood Map

Over many years the watercourses serving the area have been culverted and altered, with some lengths shown as public sewer and some as ordinary watercourse. This historic situation can lead to complications in ownership and maintenance responsibilities.

The area that this report considers forms part of the wider Upper Day Brook catchment, a catchment which has been the focus of an in depth study led by NCC and drawing on the expertise available from STW and GBC. After securing £99k of Local Levy in January 2018 the study sets out to deliver the following key outputs:

- An understanding of how the complex surface water system and assets operate and interact.
- Provide evidence to allow the partners to consider rationalising / clarifying the ownership and maintenance responsibilities of the various assets.
- Provide data to update mapping systems and records
- Identification of areas where there may be potential to improve the effectiveness of the system
- Secure data to update the hydraulic model

This study is due to be completed by October 2019.

Once the water in the storage attenuation area had broken bank it began to flow along the route shown in figure 5, channeling the water through rear gardens and into some houses along Brook Gardens, Bentwell Avenue and Bonnington Drive. At some points the water depth was observed to be up to 4ft in depth.

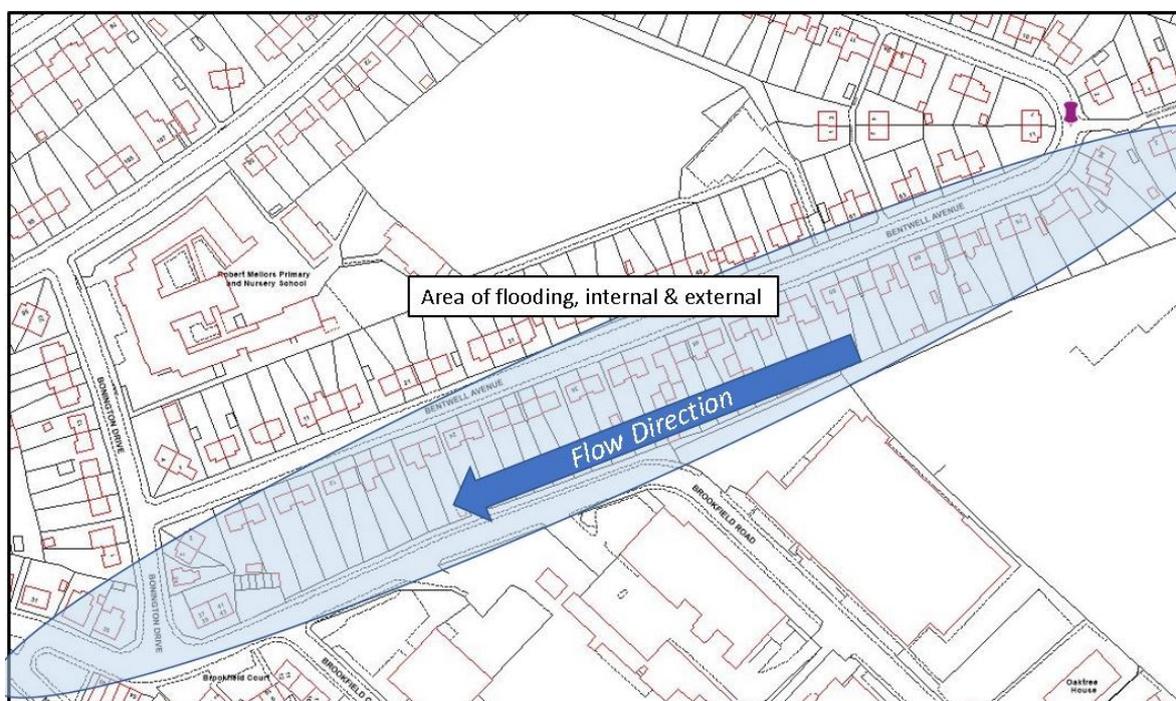


Fig 5. Bentwell Avenue and surrounding area.

Using Brookfield Road as a channel the water continued to flow along Gedling Road and along the frontages of the terrace houses, shown in figure 6. The water was of sufficient depth at this point to enter some of these houses through the front doors. The photo between Figures 4 and 5 above shows damage to slabs along a raised sloping bank, indicating flow depth.

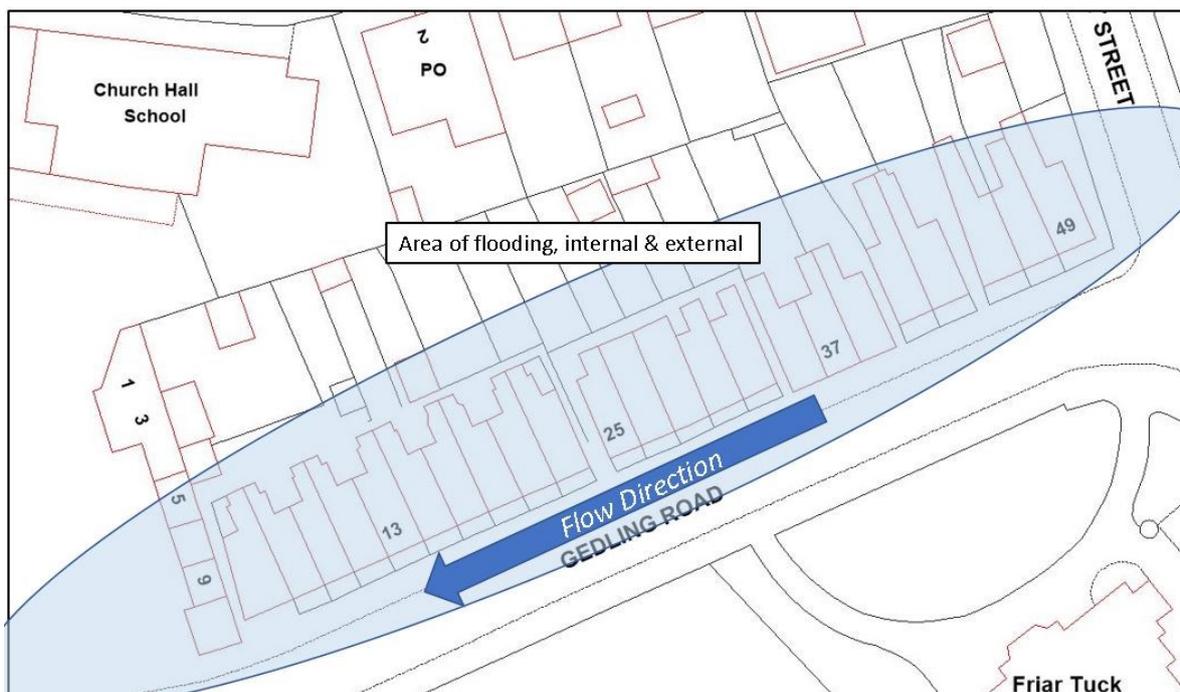


Fig 6. Gedling Road and surrounding area.

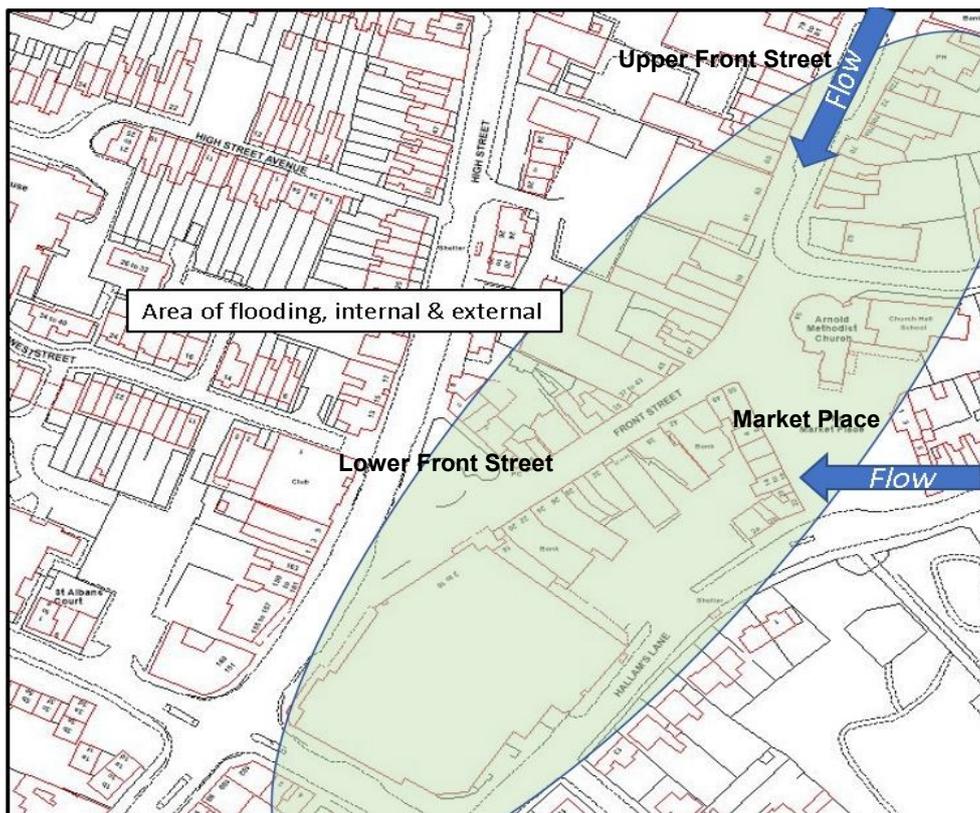
The lower end of Front Street and the Market Place are at the bottom of an urbanised natural valley, so flood water flowed to this point, ponded and flooded a number of businesses. The adjacent photo looks down at the flooding on Lower Front Street and the Market Place.



Evidence suggests that surface water flowed from upper Front Street using the road as a channel, the road was closed to traffic over night for safety.

The flow route mentioned previously also channeled water towards the Market Place where it collected with water from Front Street adding to the flooded area.

The Highway Drainage at this low point is not designed to cope with this amount of water so was simply overwhelmed and could not drain to the Surface Water Sewer quickly enough. The water simply had nowhere to go until the rain began to subside, it was then observed to clear quite quickly.



Risk Management Authorities and their responsibilities

1. The Nottinghamshire County Council
 - a) Lead Local Flood Authority
 - i. Investigate significant local flooding incidents and publish the results of such investigations.
 - ii. Play a lead role in emergency planning and recovery after a flood event.
 - iii. LLFAs also have a duty to determine which risk management authorities have relevant powers to investigate flood incidents to help understand how they happened, and whether those authorities have or intend to exercise their powers.
 - iv. By working in partnership with communities, LLFAs can raise awareness of flood risks.
 - v. LLFAs should encourage local communities to participate in local flood risk management.
 - b) Emergency Planning
 - i. If a flood happens, all local authorities are 'category one responders' under the Civil Contingencies Act. This means they must have plans in place to respond to emergencies and control or reduce the impact of an emergency.
 - c) Highway Authority (NCC/VIA)

- i. Maintenance of the public highways including highway drainage assets.
 - ii. Provided site-based presence and investigations immediately following the event.
- 2. Severn Trent Water Ltd.
 - a) Maintenance of the public sewerage system.
- 3. Gedling Borough Council
 - a) Category one responder under the Civil Contingencies Act. This means they must have plans in place to respond to emergencies and control or reduce the impact of an emergency.
- 4. Nottinghamshire Fire and Rescue Service (Adapted from page 91 of LRF Flood Response Plan)
 - a) Save life (in conjunction with East Midlands Ambulance Service and Nottinghamshire Police)
 - b) Implement water rescue operations
 - c) Conduct search and rescue operations
 - d) Carry out essential damage control operations, such as pumping floodwater (using high-volume pumps) and salvage works
 - e) Assist Nottinghamshire Police in the recovery of casualties

Risk Management Authority Responses to Flood

- 5. The following lists the actions taken by each RMA in response to the flooding both in the immediate aftermath as well as in the longer term:
 - a) The Nottinghamshire County Council:
 - i. Initiated and led the S.19 Flood Investigation.
 - ii. Initiated and co-ordinated Emergency Planning procedures.
 - iii. Continues to work in partnership with STW to survey the wider Day Brook catchment.
 - iv. Provided Highways response team to close Front Street during flood and investigate highway drainage issues.
 - b) Severn Trent Water Ltd:
 - i. Actively engaged in S.19 Flood Investigation.
 - ii. Provided site-based presence and investigations immediately following the event.
 - iii. Inspected and confirmed that the flow control device on the pond was working effectively.
 - iv. Work in partnership with NCC to survey the wider Day Brook catchment.
 - c) Gedling Borough Council
 - i. Provided emergency response support in management of flooding event.
 - ii. Inspected condition of pond immediately following the event
 - iii. Actively engaged in the S.19 Flood Investigation.
 - d) Nottinghamshire Fire and Rescue (Adapted from page 91 of LRF Flood Response Plan)
 - i. Were first responder on site

- ii. Implemented water rescue operations
- iii. Conducted search and rescue operations
- iv. Carried out essential damage control operations, including pumping floodwater

Additional information.

6. This area was also subjected to a similar flood event in 2007 after which STW commissioned some work to install a new foul water tank the aim of which was to alleviate the risk of foul water being mixed with surface water. There was no evidence of foul water being present during this event, so the tank worked effectively.
7. The Upper Daybrook catchment is served by a complex system of surface water assets and is an area with known flooding history. In January 2018 NCC secured £99k Local Levy to carry out a study into these assets. The study is a significant piece of work that has drawn on and been supported by the expertise and knowledge available across NCC, STW and GBC and is due to be completed in October 2019.
8. The study will deliver the following outputs:
 - a. An understanding of how the complex surface water system and assets operate and interact.
 - b. Provide evidence to allow the partners to consider rationalising / clarifying the ownership and maintenance responsibilities of the various assets.
 - c. Provide data to update mapping systems and records
 - d. Identification of areas where there may be potential to improve the effectiveness of the system
 - e. Secure data to update the hydraulic model
9. Information from the study was incredibly useful in the preparation of this report.

Future Actions

10. GBC and STW will carry out a joint investigation into how the pond operated during the flood event.

NCC and STW will look at how the Highway Drainage system works with the Public Sewer system at the Front Street and Market Place area.

NCC and STW with input from GBC will continue the partnership project into the operation of the wider Day Brook catchment.