

Hertfordshire County Council Flood Investigation Report

High Street, Harpenden
Hertfordshire



Harpenden, 2010
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Revision Schedule

Hertfordshire County Council Harpenden Flood Investigation Report

August 2015
Revision 3

Rev	Date	Details	Author	Checked and Approved by
1	31/07/15	For internal consultation	Suzanne Phillips Project Officer Flood Risk Management HCC	Andy Hardstaff Flood Risk Management Team Leader HCC
2	05/08/15	Text revision following comments from AH	Suzanne Phillips Project Officer Flood Risk Management HCC	Andy Hardstaff Flood Risk Management Team Leader HCC
3	06/08/15	Text revision following comments from Highways/Thames	Suzanne Phillips Project Officer Flood Risk Management HCC	Andy Hardstaff Flood Risk Management Team Leader HCC
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Explanation of Acronyms

Acronym	Explanation
FWMA 2010	Flood and Water Management Act 2010 – Legislation that was developed and enacted as a result of the review in to the serious flooding in 2007. It brings new powers and duties to local authorities and other regulatory bodies.
HCC	Hertfordshire County Council
LDA 1991	Land Drainage Act 1991 – Legislation that sets out a range of roles and responsibilities relating to flood risk management. It is also the legislation that gives powers to local authorities to manage flood risk and highlights the role of the landowner to manage watercourses on their land to maintain the flow of water.
LLFA	Lead Local Flood Authority – This is the role assigned to the unitary or county council for an area with a range of duties and powers to support the management of local flood risk.
RMA s	Risk Management Authorities – Bodies identified in the FWMA 2010 with roles and powers to manage flood risk. In Hertfordshire this includes the County Council, district councils, Highway Authority, the Environment Agency, the Bedfordshire and River Ivel Internal Drainage Board and water companies.

Executive Summary

In Harpenden in June and July 2014, three intense rainfall flood events occurred, causing excessive surface water runoff. Two commercial properties in Station Road and a residential property in Southdown Road subsequently flooded both internally and externally.

Due to the severity of the flooding and the number of properties impacted by this flood event, Hertfordshire County Council (HCC) as Lead Local Flood Authority (LLFA) have investigated the flood incident under Section 19 of the Flood and Water Management Act (FWMA) 2010 and published this report. The aim of this report is to establish the causes of the flooding; identify the relevant Risk Management Authorities (RMAs), highlight their role and responsibilities and confirm if those authorities intend to use their relevant powers to help manage the flood risk to Harpenden.

There is a long history of flooding in this area, with the affected parties confirming flooding from surface water on numerous occasions prior to the summer 2014 events.

It has been concluded that the flooding was primarily a result of excessive surface water runoff from a combined commercial and residential urbanised catchment, which overwhelmed the drainage system.

As part of the Technical Assessment Report, produced by consultants appointed by HCC, a list of potential mitigation options that might help to manage flood risk to Harpenden was put forward. This report looks at the feasibility of each of these options, and which ones are included in our recommendations, along with the relevant RMAs that would need to be involved.

The main recommendations explored are:

- Individual property level protection;
- Survey and clean the highway drainage system;
- Inspect, clean and maintain gullies.

The area was affected by further flooding on 16/17 July 2015. This event has not been included in the technical assessment but will be investigated further to understand the flooding mechanism and whether the causes were similar to the 19 June and July 2014 flood events. An addendum to the Section 19 report will be published in due course.

There is no one solution to resolve the flooding in Harpenden and there is no guarantee that flooding can be prevented. A collaborative approach will be required between all RMAs, landowners and the local community to manage flood risk in the future.

1. Introduction

1.1 LLFA Investigation

Under Section 19 of the Flood and Water Management Act (FWMA) 2010 Hertfordshire County Council (HCC) as Lead Local Flood Authority (LLFA), on becoming aware of a flood in its area, must, to the extent that it considers it necessary or appropriate:

- investigate the incident;
- identify the Risk Management Authorities (RMAs) with relevant flood risk management functions;
- establish if the relevant RMAs have responded to the flood event or are proposing to respond;
- publish its findings; and
- inform the relevant RMAs of its findings.

As defined under Section 6, subsection 13 of the FWMA 2010, an RMA has certain powers to manage, regulate, assess and mitigate flood risk. We have identified the following RMAs as part of this Section 19 flood investigation for St. Albans:

- HCC as LLFA
- HCC as Highway Authority
- St. Albans City & District Council
- Thames Water Utilities Ltd (TWUL)

HCC received a report that several residential and commercial properties had suffered internal flooding in the vicinity of the High Street, Harpenden.

Due to the severity of the flooding, it was determined that this flood incident met the criteria in Policy 2 of HCC's Local Flood Risk Management Strategy (<http://www.hertsdirect.org/services/envplan/water/floods/floodrisk/lfrmsHERTS/>) and HCC subsequently commissioned a detailed Investigation.

1.2 Technical assessment methodology

HCC commissioned NHTB Consultancy to carry out a technical assessment of the flooding events. Below is a summary of their methodology:

- Undertake detailed face-to-face surveys with occupants of all properties within the zone affected by flooding;
- Contact relevant drainage authorities;
- Undertake an initial topographical survey of the local site, flood path and flood zone, plus surrounding areas where any possible mitigation measures might be located;
- Obtain Ordnance Survey map data;
- Obtain rainfall data covering the flooding dates. Assess the flooding conditions and preceding conditions to identify the likely flooding mechanisms

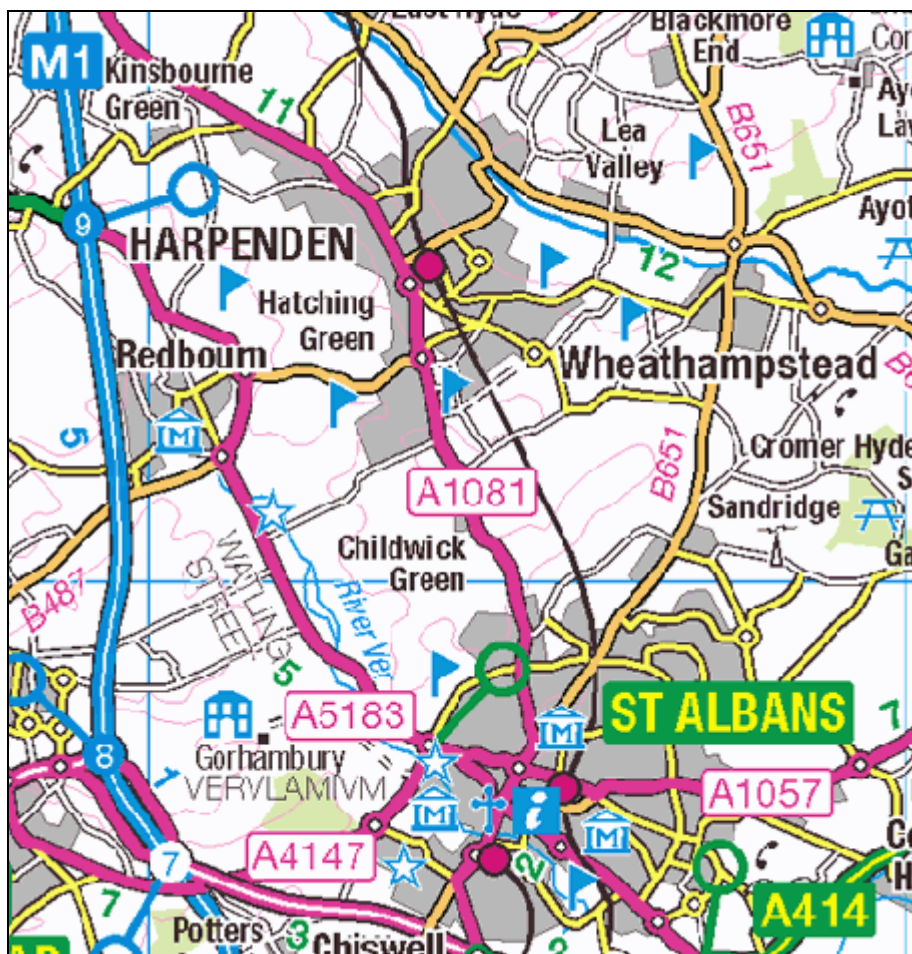
and conditions that lead to a flood. Confirm the flood paths and depths of flooding at strategic locations, including any barriers or constraints to flow;

- Identify potential further investigation work and outline potential mitigation works.

1.3 Site Location

Harpenden is situated towards the south west of Hertfordshire, north west of St. Albans. This is illustrated in Figure 1.1. The site affected by flooding is located in the centre of the town, in Station Road and Southdown Road, as shown in Figure 1.2.

Figure 1.1 Harpenden, Hertfordshire – Location Map



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Figure 1.2 Area affected by flooding in Harpenden



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2. Background and History of flooding

2.1 Previous flood events

Information gathered from affected parties provided some background on historical flooding in the area. All had experienced flooding from surface water prior to 2014 on a number of occasions. One occupier stated that they flooded every 4-5 years.

3. Assessment of June and July 2014 flood events

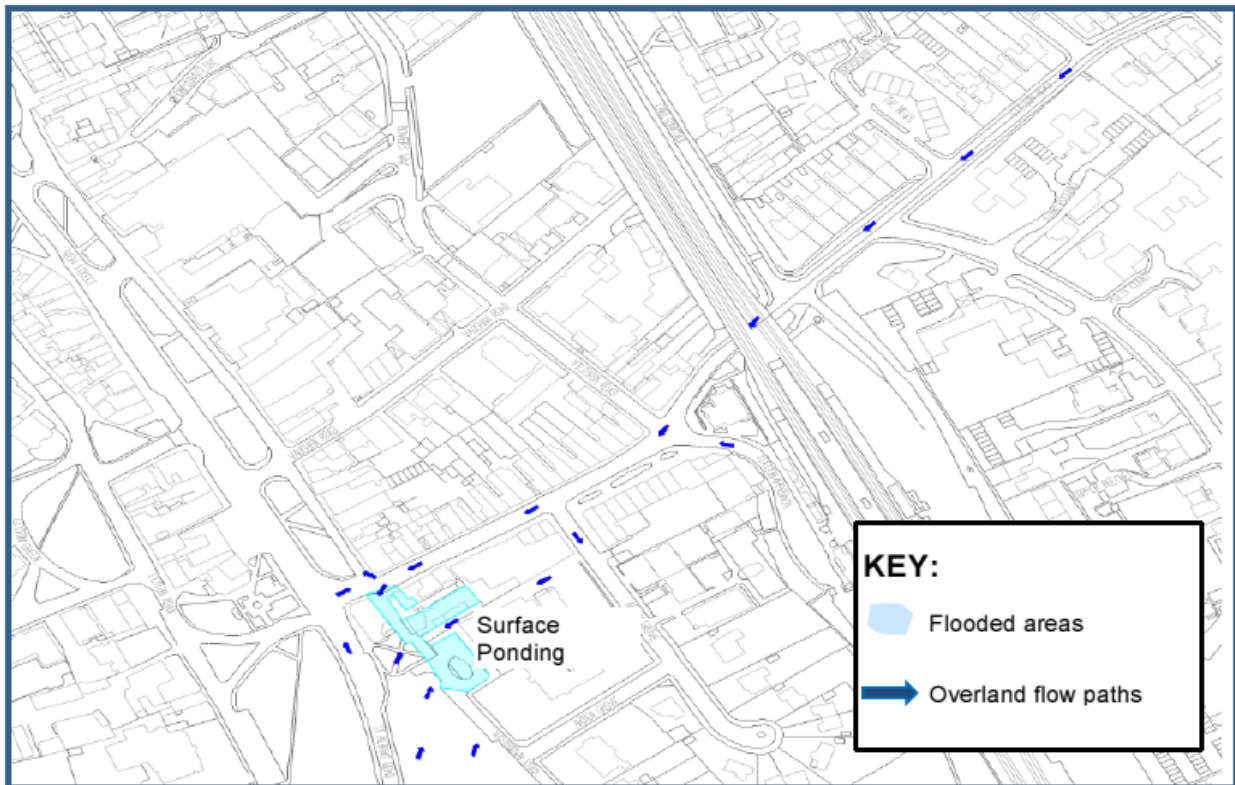
3.1 Observations

Flooding was experienced in Harpenden, on at least one occasion, at the bottom end of Station Road and its junction with the A1081 and Southdown Road. Surface water runoff gathered and flowed down Station Road.

Harpenden sits in a natural valley, once drained by the now culverted River Harp. The sides are relatively steep, and are generally the steepest around Station Road running down toward the A1081 (High Street) that runs through the town.

A total of 3 properties were flooded both internally and externally; 2 businesses and 1 residential property were affected. Figure 3.1 shows the flow route the water took.

Figure 3.1 Overland flow paths



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The area was affected by further flooding on 16/17 July 2015. This event has not been included in the technical assessment but will be investigated further to understand the flooding mechanism and whether the causes were similar to the June and July 2014 flood events. An addendum to the Section 19 report will be published in due course.

3.2 Ground conditions

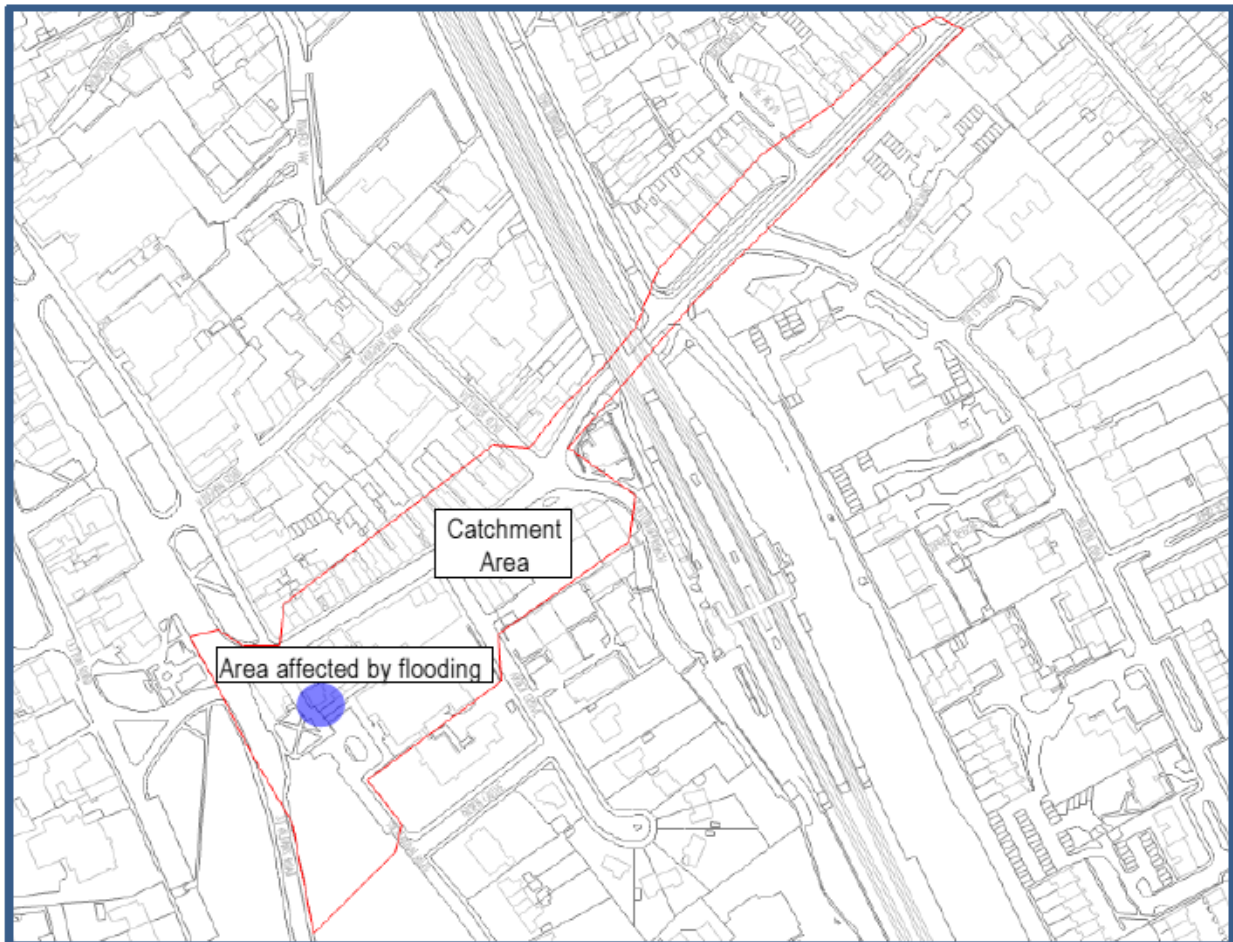
The flooding events were recorded following a period of dry ground conditions. However, as the majority of the catchment is impermeable it is not thought that preceding weather conditions would have had a significant impact on the flow characteristics. It is likely that any event would be of similar effect following dry or wet periods.

3.3 Sources of flooding

3.3.1 Surface water runoff (pluvial)

The catchment that drains to the area which flooded measures approximately 2.3 ha. This is shown in Figure 3.2. The catchment drops relatively steeply from its high point on Station Road, at approximately 124.0m, down to approximately 103m where the water ponds in Station Road/the alleyway.

Figure 3.2 Catchment boundary



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3.4 Surface Water Sewerage (Thames Water)

There is no surface water or foul sewers which contribute to the runoff from the catchment.

3.5 Possible causes of flooding

The following are the key findings of the pluvial analysis and other flooding mechanisms that have been determined as part of this investigation:

- Excessive surface water runoff from a combination of commercial and residential urbanised catchment
- A period of intense rainfall for each of the flooding events
- Highway drainage in Station Road and Southdown Road was overwhelmed and unable to cope with the volume of flood water.

4. Responsible authorities and landowners

HCC as the LLFA has investigated the flooding at St. Albans to establish the relevant RMAs that have Flood Risk Management Functions in accordance with the FWMA 2010. Those RMAs and their relevant powers and functions are set out below.

4.1 Hertfordshire County Council as Lead Local Flood Authority

HCC as the LLFA for Hertfordshire has fulfilled its legal responsibility to carry out a Flood Investigation under Section 19 of the FWMA 2010, to;

1. Identify the relevant RMAs and;
2. Establish if those authorities intend to utilise their own powers and to what extent. The actions that the relevant RMAs have agreed to take are set out in Section 6.

In order to achieve the responsibilities under Section 19, HCC as LLFA must first establish the cause and impacts of the flooding and then identify, where possible, potential solutions as discussed in this report.

HCC as the LLFA for Hertfordshire has powers to carry out flood risk management works for flooding from surface water runoff and ground water in accordance with the Local Flood Risk Management Strategy for Hertfordshire.

4.2 St. Albans City & District Council

St. Albans City & District Council are the local planning authority for the Harpenden area and their role is to determine planning applications for new development, approve and assess any impacts from all sources of flooding and any associated proposed drainage.

4.3 Hertfordshire County Council as Highways Authority

Station Road and Southdown Road are adopted highways. HCC are the responsible authority to maintain and manage adopted highways including associated drainage infrastructure such as gullies, drainage pipes, soakaways and any assets that lie within the highway boundary.

HCC Highways have powers to manage water on an adopted road under the Highways Act 1981, however where this water originates from third party land and not from runoff from the highway these powers are limited.

4.4 Thames Water

Thames Water manages the public surface water and foul water sewer networks in this area of Hertfordshire. The network must operate within the rules laid out as part of the Water Industry Act 1991. Thames is financially regulated by OfWAT.

Thames Water keep a register of internal and external flooding of properties. This register is used as the evidence to justify improvements to the network and is used

to inform performance against Thames Water’s ‘outcome delivery incentives’. Only Thames Water has the authority to alter sewers and to manage the flood risk associated with them.

5. Conclusions, potential mitigation options and recommendations

5.1 Conclusions

The flooding was the result of excessive surface water runoff from a combined commercial and residential urbanised catchment. The surface water runoff resulted from intense rainfall events.

The highway drainage system would have had a limited capacity in reducing the flood flows.

In order to develop and provide a suitable resolution to the flooding, there needs to be a collaborative approach between the LLFA, relevant landowners and all of the identified relevant RMAs.

5.2 Potential mitigation options

NHTB Consultancy produced several mitigation options in their technical assessment report, looking at potential costs, benefits and constraints of each one. They are shown below, along with an assessment by HCC as to their feasibility and whether they are included in our recommendations going forward.

It is also recommended that the entire system is cleaned using high pressure jetting, and a CCTV survey conducted to establish any serious structural defects that may also be inhibiting optimum hydraulic performance.

5.2.1 Improvement to Highway Drainage – Surface Water Collection
There is suitable scope to improve the surface water collection and disposal capacity for run off entering the alley way between Station Road and Southdown Road. The gullies should be inspected, cleaned and maintained to ensure maximum efficiency. Further gullies may also be installed at a greater density across the entrance of the alleyway to assist in draining surface water run-off.
Advantages: Improved collection and disposal of surface water from the natural flow path.
Issues: Increased maintenance liability, may only be effective for low return events.
Budget cost estimate: £3,000 - £5,000
Include in Recommendations? Yes to inspect, clean and maintain gullies. Installing additional gullies is not recommended at present due to their limited value.

5.2.2 Flood Protection Measures to Individual Properties

Emergency protection measures are recommended to be fitted to each of the flood entry points at the properties that have been subject to flooding on Station Road. Ideally these should be automated devices that are activated by the presence of approaching flood water, or a flood resilient door itself. Alternatively they can be fittings that require installation by the residents in advance of anticipated severe storm conditions.

The property in Southdown Road is a Grade II listed structure; flood prevention measures that would alter the appearance of the property would be disallowed. A formalised internal rear door barrier (possible automatic) could be fitted in place of the current privately installed boards. Floodwater does not enter via the front so it is not recommended to undertake any action at the front of the house (a concrete upstand is already in place).

The basement air ventilation on the walls (2 no. vents) along the driveway cannot be altered externally. It might require they need blocking up from the inside and a de-humidifier installed to periodically remove moisture from the basement. This would prevent flood water entering the basement.

Advantages: Protection against internal flooding.

Issues: Requires consent from local landowners, owners intervention required to install non-automatic flood barriers and no protection against external flooding.

Door barrier to commercial properties would restrict commercial activity; however, it is presumed during the short flood events, the shops are inaccessible in any case so no additional loss above that caused by the flooding itself.

Budget cost estimate: £5,000 - £15,000

Include in Recommendations? Yes

5.2.3 Improvement to Highway Drainage – Surface Water Collection

There is suitable scope to improve the surface water collection and disposal capacity for run off crossing the alleyway between Station Road and Southdown Road. An overflow soakaway could be installed within the grassy area parallel to the alleyway to accommodate for an extra flow.

Advantages: Improved collection and disposal of surface water from the natural flow path.

Issues: Increased maintenance liability. May not have enough capacity to avoid potential flooding.

Budget cost estimate: £10,000 - £20,000

Include in Recommendations? The consultants do not recommend this option at present due to the potential size of the soakaway required and the high cost/disruption.

5.2.4 Improvement to Highway Drainage – Further Modelling

There is suitable scope to improve the surface water collection and disposal capacity for run off crossing the alleyway between Station Road and Southdown Road.

Model the existing highway system and gully arrangement to determine the actual capacity; i.e. whether the gullies' location and number are preventing optimum conveyance to the drainage network, or if they are adequate and simply require improved maintenance.

Model future storm events to enable predicted flood damage and benefit/cost analyses for higher order rainfall events, to assist in the production of the most cost effective measures to prepare as a suitable solution.

Advantages: Will be able to accurately determine the correct number of gullies and sizes, to convey flows up to the drainage network for up to a 1 in 5 year event. Potentially, and significantly, reduce flooding events in Station Road.

Issues: Cost may prove there are no issues

Budget cost estimate: £3,000 - £5,000

Include in Recommendations? No. The surface water sewer may have performed as it was designed to do so and Thames Water would not be funded to deliver upgrades above that its regulator permits.

5.3 Recommendations

The following are the recommendations of the county council, in its capacity as LLFA and follow from the main findings from the Section 19 flood investigation carried out into the flood events in Harpenden in June and July 2014.

No.	Recommendations	Comments	RMAs and other parties to be involved
1.	Investigation of Property level protection	That individual properties have flood risk assessments with a view to retro-fitting protection to properties to increase resilience to flooding. This is for individual property owners to organise and fund.	<ul style="list-style-type: none">• Property owner• HCC – LLFA
2.	Survey and clean highway drainage system	That the highway drainage system in Station Road and Southdown Road be surveyed using CCTV to establish any serious structural defects which may be affecting performance. That any identified blockages be removed to ensure that the system is free of debris and silt.	<ul style="list-style-type: none">• HCC – Highways Authority
3.	Inspect, clean and maintain gullies	The gullies should be inspected, cleaned and maintained to ensure maximum efficiency.	<ul style="list-style-type: none">• HCC – Highways Authority

6. Next Steps and Actions

6.1 Lead Local Flood Authority

The following are agreed actions to be undertaken by HCC in its capacity as LLFA;

1. To signpost residents to further guidance on property level flood protection. The National Flood Forum is best placed to assist:
<http://www.nationalfloodforum.org.uk/>

6.2 Highway Authority

The following are suggested actions to be undertaken by HCC in its capacity as Highways Authority;

2. To survey and clean the highway drainage system in Station Road and Southdown Road.
3. To inspect, clean and maintain gullies.

7. Disclaimer

This report has been prepared as part of Hertfordshire County Council's responsibilities under the Flood and Water Management Act 2010. It is intended to provide context and information to support the delivery of the local flood risk management strategy and should not be used for any other purpose.

The findings of the 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 a definitive assessment of all factors that may have triggered or contributed to the flood event. NHTB Consultancy and Hertfordshire County Council expressly disclaim responsibility for any error in, or omission from, this report and the supporting technical assessment Report arising from or in connection with any of the assumptions being incorrect.

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