FLOOD INVESTIGATION REPORT

Investigation Ref:	**41**
Location:	**Paterson Place, Shepshed**
Date of Flooding:	**24th April 2018**

STATUTORY CONTEXT

Section 19 of the Flood and Water Management Act 2010 (FWMA) states that, on becoming aware of a flood which meets certain predetermined criteria, the Lead Local Flood Authority (LLFA) must, to the extent it considers necessary or appropriate, undertake a flood investigation. This investigation should determine the relevant flood risk management authorities (RMAs) involved, their functions and whether the RMAs have exercised or propose to exercise those functions. The LLFA must publish the findings and notify the RMAs.

LEICESTERSHIRE'S FLOOD INVESTIGATION CRITERIA

Mandatory	
Loss of life or serious injury	☐
Critical infrastructure flooded or nearly flooded from unknown or multiple sources	☐
Internal property flooding from unknown or multiple sources	☒
Discretionary	
A number of properties have been flooded or nearly flooded	☐
Other infrastructure flooded	☐
Repeated instances	☐
Investigation requested	☐
Risk to health (foul water)	☐
Environmental or ecologically important site affected	☐
Depth/area/velocity of flooding a cause for concern	☐

SUMMARY OF IMPACTS AND FINDINGS

Source(s) of flooding

Ordinary Watercourse	Main River	Surface Water	Groundwater	Public Sewer	Canal	Land Drainage	Highway Drainage
☐	☐	☒	☐	☒	☐	☐	☒

Impact (number)

Residential	Business	Other Buildings	Roads	Critical Infrastructure
3	1	N/A	N/A	N/A

RISK MANAGEMENT AUTHORITIES (RMAs)

The following RMAs were identified as relevant to the flooding incident:

- Leicestershire County Council – Lead Local Flood Authority
- Leicestershire County Council – Local Highway Authority
- Severn Trent Water Ltd (STW) – Statutory undertaker for public wastewater assets

FINDINGS OF INVESTIGATION

On the 24th April 2018 three residential properties and a single commercial property internally flooded following an intense rainfall event; this triggered a formal investigation in accordance with Section 19 of the FWMA. Anecdotal reports indicate that the large volumes of water that fell ran off the impermeable road/driveway surfaces over a dropped kerb towards the properties situated at the local low point. Flood water was described to enter properties internally through low level air bricks.

Paterson Place is located in the town of Shepshed in Charnwood Borough. The residential properties affected are situated on Paterson Place and the commercial business affected is situated just behind the affected residential properties off Brook Street (a key local highway route into Shepshed from Hathern).

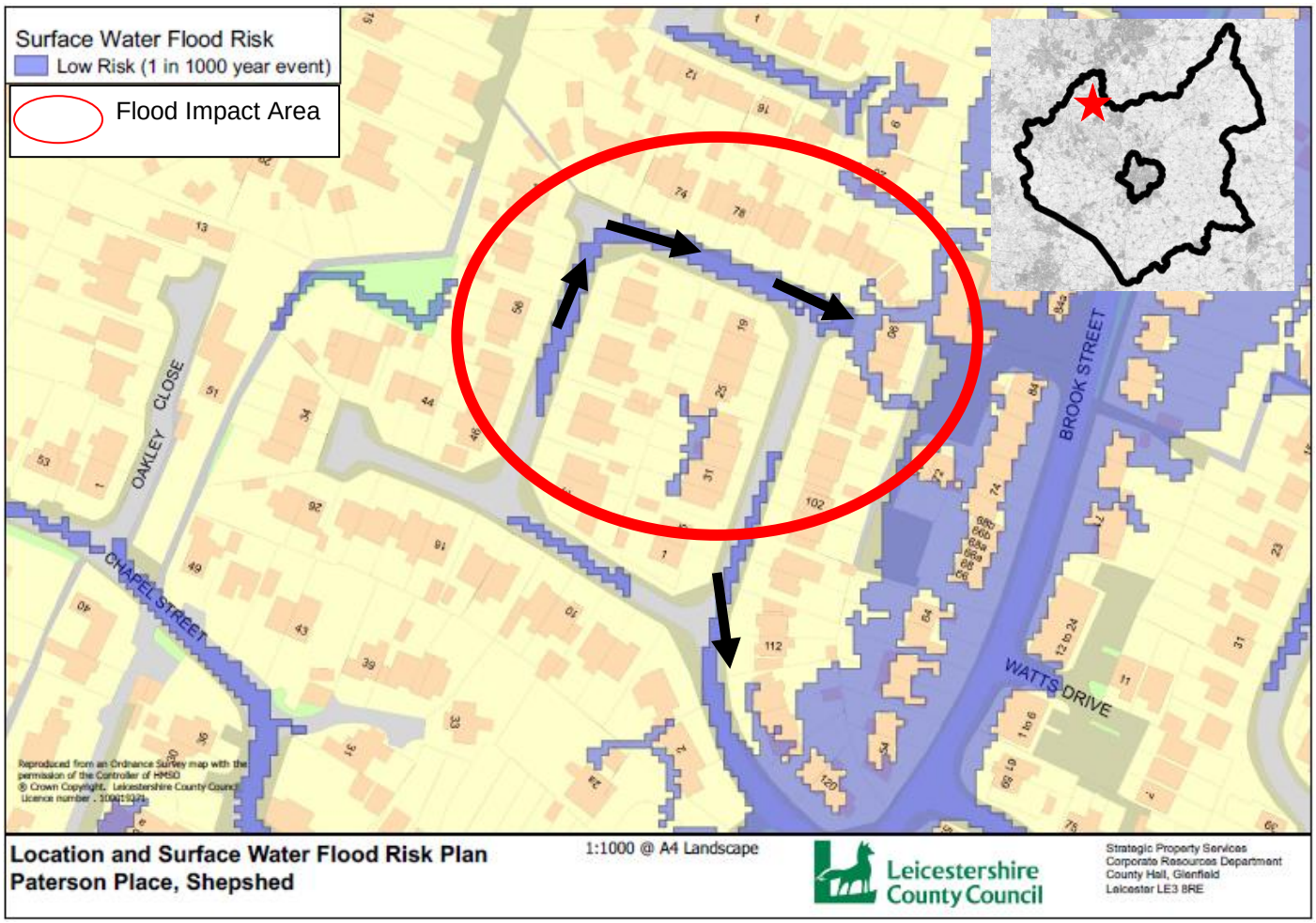

Figure 1: Location plan and low risk surface water flood risk map (black arrows indicate direction of water flow)

There are no watercourses in close proximity to the area of investigation. The Risk of Flooding from Surface Water Map (replicated in Figure 1) has been produced by the Environment Agency (EA) and porduced using high-level modelling which represents where water would fall during certain rainfall events[1]. The arrows on Figure 1 indicate the predicted flow directions of the flood water which closely replicates anecdotally reports following the flood event.

[1] [1] https://flood-warning-information.service.gov.uk/long-term-flood-risk/map

Paterson Place is served by a traditional highway drainage system which discharges to a surface water system operated and maintained by STW. This surface water system originates adjacent to No. 70 and flows south easterly in an 150mm diameter pipe towards the affected properties before turning 90 degrees in a westerly direction towards the centre of Shepshed and discharging into 225mm diameter system at the far western section of Paterson Place (see Appendix 1).

Prior to the flooding event, the Council was aware of a single historic flooding incident at this location from 2014. Following the reports of this incident, the Council issued letters/questionnaires to affected residents to establish the nature of the event and the extent of the impact. A meeting was also arranged with affected residents and a site walkover was conducted.

A site walk over confirmed that the affected properties were located at the lower end of the steep northern transect of Paterson Place. A manhole and single road gulley were identified to be located within the highway adjacent to the affected properties; a dropped kerb was also identified (Photograph 1). Anecdotal reports and site visits confirmed that the reported flooding resulted from the speed of the runoff of water towards the property which quickly breached the dropped kerb (inundating the highway drainage within the road). Flood water accumulates within the highway and results in surface water flowing towards the lower ground at the properties. Evidence therefore suggests that the flood water comes from:

a) direct runoff from the highway and impermeable areas upstream on Paterson Place,
b) surcharge from highway gullies, and
c) surcharge from surface water sewer manholes.

Photograph 1: Dropped kerb with sediment build up and gulley positioning (top left) (arrow indicates direction of flow)

After the flood event, LCC and STW completed joint reactive maintenance to the surface water sewer system, comprising of CCTV surveys and cleansing of the drianage network. Additional surveying the wider surface water sewer network was completed in order to assess the extent of the catchment of the sewer network at this location. Following the assessment of the catchment, it was noted that the public surface water sewer system took a 90 degree turn while flattening from a 1:12 gradient to a 1:220 gradient adjacent to the properties affected by flooding. A feature of this nature may result in a hydraulic inefficiency in the surface water sewer network, resulting in a restricted capacity at the 90 degree turn. This followed by a low-energy section of pipework in the 1:220 gradient which will likely cause deposition of silt. The manhole at this location is therefore prone to surcharge during high intensity-short duration rainfall events and will require more frequent maintenance to try to mitigate the potential for increased flooding.

Anecdotal reports suggested that the highway drainage may have been have require maintenance at the time of the incident. Investigations after the event confirmed that the highway drainage connected onto the STW surface water system which was identified to also require some maintenance.

Through the course of this investigation, it was established that residents had taken steps to protect their own properties by covering ground level air-bricks with sandbags as a means of blocking the primary means of surface water egress to the properties. It was also identified that flooding of a similar nature and extent had occurred on multiple occasions, following an initial event in 2009.

EXPLANATION OF FINDINGS

Internal property flooding affected three residential properties and a single commercial unit on 24th April 2018 as a result of a range of factors, outlined below:

- An intense rainfall event fell on the day which resulted in large volumes of overland flow which overwhelmed the local drainage infrastructure.
- The catchment surrounding the affected properties is heavily urbanised and impermeable resulting in large volumes of surface runoff during intense rainfall events.
- The northern transect of Paterson Place falls steeply towards the affected residential properties, directing any surface water flow and any surcharge from the local drainage system to properties located at the localised low point.
- The impact of the urbanised catchment is exacerbated by ‘urban creep’ including the construction of extensions, outbuildings, garages and driveways, contributing to the increased impermeable area draining towards the highway and surface water sewer system in Paterson Place.
- The change in gradient and direction of the surface water sewer at the corner of No. 88 / 90 / 92 Paterson Place means that it is prone to surcharge in this location during short duration high intensity rainfall. Evidence suggests this is what happened in April 2018. Silt in the surface water sewer system downstream of this junction was also found during post incident CCTV inspections, which is also likely to have contributed to surcharge in the surface water sewer during this event.

RECOMMENDATIONS / ACTIONS

The Council has agreed / undertaken the following actions:

- Undertaken cleansing of publicly owned highway assets (including highway gulleys).

- Provided the affected residents with sandbags as a temporary measure to aid personal resilience.
- To investigate the viability of minor realignment of highway kerbs to reduce flood risk associated with surface water runoff from the highway.
- To work with STW to investigate the viability of a scheme for delivery of Property Level Resilience for the affected properties.
- To work with the affected business owner to help them become more resilient to possible future flooding.

STW has agreed / undertaken the following actions:

- To complete routine maintenance to the surface water sewer on a biannual basis, with amendments to maintenance schedules to be evidence led following condition inspections prior to cleansing.
- Commissioned a sewer modelling study to determine the extent to which the surface water sewer contributes to flooding in Paterson Place.
- To work with the Council to investigate the viability of a scheme for delivery of Property Level Resilience for the affected properties.

DISCLAIMER

This report has been prepared pursuant to the Council's statutory responsibility, under the FWMA, to investigate flood incidents in its area. The statutory duty to investigate is not absolute or exhaustive. Under Section 19 of FWMA, the Council's statutory responsibility is limited to conducting investigations only to the extent the Council deems it necessary.

Where the Council deems it necessary to conduct an investigation, it is required to address two questions under 19(1) of the FWMA. Firstly, the Council is required to identify relevant "Risk Management Authorities"[2]. Secondly the Council is required to investigate whether the Risk Management Authorities have exercised, or are proposing to exercise, flood risk management functions set out under Section 4 of FWMA.

The relevant flood risk management authorities identified by the Council are defined in this report. The flood risk management functions which the Risk Management Authorities are proposing are also described in the body of this report.

Beyond discharging the specific statutory responsibilities under Section 19(1) of FWMA, the intended purpose of this report is solely as a resource to assist Risk Management Authorities and stakeholders to better understand the relevant flooding incident and to mitigate risks going forward.

Although the Council has commented upon contextual issues related to the flood event, it is not the purpose of this report to determine any private rights arising from the flood event.

Nor is the purpose of this report to reach conclusions as to whether any Risk Management Authority or other stakeholder (e.g. private land owners, public bodies or government agencies) has breached any duty of care (whether statutory or common law) that they may have held.

The Council has, in good faith, sought to locate and collate relevant primary and secondary evidence to prepare this report. However, the Council accepts no responsibility for assumptions or statements made on the basis of evidence which incomplete, inaccurate or both. As such, this report should not be considered as a definitive assessment of all factors that may have triggered or contributed to the flood event.

The Council expressly disclaims responsibility for any error, omission or negligent misstatement in this report to the fullest extent permissible in law. Further the Council does not accept any liability for the use of this report or its contents by any third party. Where any party wishes to assert any rights or cause of action related to the flooding event they are requested to rely on their own investigations.

[2] *As defined by Section 6(13) of FWMA*

Appendix 1 – Sewer Record (provided by Severn Trent Water)