



Halton Borough Council
S19 Flood Investigation Report

A557 Watkinson Way
Flood at Cranshaw Hall Bridge
25th- 26th September 2017

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1 Introduction

1.1 Purpose

This document has been prepared by Halton Borough Council (BC), as the Lead Local Flood Authority (LLFA), for the specific purpose of meeting the requirements of Section 19 (1) and (2) of the Flood and Water Management Act (2010) which 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 have relevant flood risk management functions, and

(b) 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 subsection (1) it must—

(a) publish the results of its investigation, and

(b) notify any relevant risk management authorities.

The supporting data has been collated from a variety of sources. Whilst every effort has been made to identify the cause, and consequence, to flooding at the identified Section 19 locations this document does not include every flooding occurrence, only where flooding has been reported and is indicative only.

Table 1.1: Incident Summary

Incident Reference	2017-001
Location	A557 Watkinson Way – Cranshaw Hall Bridge
Date(s) of Incident(s)	25 th -26 th September 2017
Reason for Investigation	Major Road Closure
Identified Cause	Debris in Highway Ditch

This report aims to meet the requirements of Section 19 of the FWMA (2010) as well as provide a reference for the effective future management flooding in in the administrative area of Halton through:

- Providing details of the flooding incident,
- Undertaking analysis of the flood history of the area,
- Identifying the responsibilities of Risk Management Authorities (RMAs) and the actions which were carried out,
- Identifying successful response measures and lessons learned, and
- Recommending the next steps.

1.2 Glossary

The table below defines some of the frequently used terminology within the flood risk management industry and this document.

Table 1.2: Definition of Terms

Term	Definition
Annual Probability	Flood events are defined according to their likelihood of a particular flood occurrence in any one year. For example, a flood with an annual probability of 1 in 100 can also be referred to as a flood with a 1% annual probability. This means that every year there is a 1% chance that this magnitude flood could occur.
EA	Environmental Agency
Flooding Asset Register	The register is a record of all structures or features designated by the EA, the LLFA, the district and borough councils or the IDB which have an effect on flood risk as part of Section 21 for the Flood and Water Management Act (2010).
Flood Risk Management Function	A function listed in the Act (or related Acts) which may be exercised by a risk management authority for a purpose connected with flood risk management.
FWMA (2010)	Flood and Water Management Act 2010
Very Low Flood Risk	Area with a very low probability of flooding from rivers (< 1 in 1,000 annual chance of flooding or <0.1%).
Low Flood Risk	Area with a low probability of flooding from rivers (between a 1 in 1000 and 1 in 100 annual chance of flooding or between 0.1% and 1%)
Medium Flood Risk	Area with a medium probability of flooding from rivers (between a 1 in 100 and 1 in 30 annual chance of flooding or between 1% and 3.33%).
High Flood Risk	Area with a high probability of flooding from rivers (> 1 in 30 annual chance of flooding or greater than 3.3%).
IDB	Internal Drainage Board
Instances of property flooding	This is a count of the reported incidents of internal property flooding that occurred across the event. Properties which were flooded twice are accounted for twice and therefore not a count of the number of properties.
LLFA	Lead Local Flood Authority – Halton Borough Council
Main River	Main rivers are usually larger streams and rivers, but some of them are smaller watercourses of local significance. Main Rivers indicate those watercourses for which the Environment Agency is the relevant risk management authority.
Ordinary Watercourse	An ordinary watercourse includes every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than public sewer) and passage through which water flows which does not form part of a Main River. The Lead Local Flood Authority, District/Borough Council or Internal Drainage Board is the relevant risk management authority.
Riparian Owner	Owner of land adjoining, above or with a watercourse running through it who has certain rights and responsibilities, i.e. maintenance of the watercourse to prevent restrictions thus leading to fluvial flooding.
RMA	Risk Management Authority
UU	United Utilities

1.3 Sources of Flooding

The table below identifies the different sources of flooding. The flood event may only experience one source or a combination.

Table 1.3 – Sources of Flooding

Source	Description
Fluvial flooding	Exceeding of the flow capacity of river channels (whether this is a Main River or an Ordinary Watercourse), leading to overtopping of the river banks and inundation of the surrounding land.
Tidal flooding	Propagation of high tides and storm surges up tidal river channels, leading to overtopping of the river banks and inundation of the surrounding land.
Surface water flooding (aka pluvial flooding)	Intense rainfall exceeds the available infiltration capacity and/or the drainage capacity leading to overland flows and surface water flooding.
Groundwater flooding	Emergence of groundwater at the surface (and subsequent overland flows) or into subsurface voids as a result of abnormally high groundwater flows, the introduction of an obstruction to groundwater flow and/or the rebound of previously depressed groundwater levels.
Sewer flooding	Flooding from sewers is caused by the exceeding of sewer capacity and/or a blockage in the sewer network. In areas with a combined sewer network system there is a risk that land and infrastructure could be flooded with contaminated water. In cases where a separate sewer network is in place, sites are not sensitive to flooding from the foul sewer system.
Other sources of flood risk	Flooding from canals, reservoirs (breach or overtopping) and failure of flood defences.

1.4 Flood Risk Data Sources

The following sources of data have been used in preparing this report:

- Flood Risk Mapping (Risk of Flooding from Rivers and Sea; EA)
- Flood Warning and Alert areas (EA)
- Risk of Flooding from Surface Water (RoFSW: EA)
- Groundwater map (EA)
- Susceptibility to Groundwater Flooding (British Geological Survey)
- Historic Flood Evidence
- Historic Flood Map (EA)
- Property Flooding Database
- Historic Flooding Incidents Database

1.5 Other Data Sources

The following sources of data have been used in preparing this report:

- Geological information
- Superficial geology (Geology of Britain Viewer; British Geological Survey)
- Bedrock geology (Geology of Britain Viewer; British Geological Survey)
- Local residents

2 Executive Summary

The purpose of this report is to investigate which Risk Management Authorities (RMAs) had relevant flood risk management functions during the flooding that took place within the boundary of Halton Borough Council. The report also considers whether the relevant RMAs have exercised, or proposed to exercise, their risk management functions as per Section 19 (1) of the Flood and Water Management Act (2010) (FWMA (2010)), as well as adhering to the Flood Risk Regulations (2009).

The FWMA (2010) dictates that LLFAs should investigate a flood event to the extent that it 'considers it necessary or appropriate'. The flood in event on 25th-26th September 2017 has met the criteria defined by Halton Borough Council (BC) prompting an investigation due to flooding of a major road, requiring its closure.

- The reported flooding was due to pluvial and fluvial source(s).
- In the 36 hours prior to the incident 10.6mm rainfall was recorded (at Richard Fairclough House Warrington between 5pm 24/9/2017 and 11am 25/9/2017). This is not considered to be an unusual event.
- No properties were affected by the flooding.
- A major road (Watkinson Way A557) was affected by the flooding on the evening of the 25th September 2017, and although warning signs had been erected, there was an incident later that evening where a vehicle skidded and collided with the barrier. This resulted in the decision to close the road. The road remained closed after the flood had subsided whilst works were undertaken on the 26th September to address the cause of the flooding.
- The cause of the flooding was found to be debris which had collected in a culvert inlet carrying a highway interceptor drainage ditch across the carriageway. This caused a back up allowing water to flow onto the carriageway.
- During the closure works were also undertaken to remove excess vegetation from the ditch, and remove silt from the ditch immediately prior to the culvert. These works were undertaken by Halton BC as riparian owner and Highway Authority.

The review of the flood incident has been used to identify areas for future improvement in relation to proactive / reactive response and impact to local residential and business communities. The following areas for improvement have been identified.

AREAS FOR IMPROVEMENT	
1	Be proactive and maintain ditches better
2	Improve Comms to the public
3	Initial and ongoing communication to the press/web team/social media team – better use could be made of digital media as communications during the flood did not reflect this. There are opportunities to be more proactive and inform colleagues in the Contact Centre rather than be reactive, taking the opportunity to communicate to thousands of people instantly. The only way the Web Team/Social Media/Press team found out was via the contact centre as they were getting lots of calls

4	Lack of drainage plans/database.
5	There was a lack of information regarding the source of the flood as it was only on further investigation and consultation of road infrastructure drawings that the source could be fully found and resolved.
6	Unable to determine that some vehicles would not slow down despite the slow signs.
7	Knowledge of the ditches in Borough and who deals with these locations i.e. Open Spaces/Highway Development teams.
8	Deployment of the right contactors to the right area whilst the road closure was in place (e.g. further south clearing debris).
9	Difficulty arranging team to clear litter over entire ditch/difficult to reach areas.
10	No details of vehicle, condition or details of collision appear to have been collected to inform future insurance claims.
11	Communication with the public – it was perceived that as a complaint had been received relating to field flooding nearby, this was the cause of the flooding on the carriageway which it wasn't. (This field flooding was due to be investigated /cleared later that week) However, the field flooding cause was also investigated and fixed on the visit due to the emergency.

A number of actions have been identified following the review of the flood incident on 25th-26th September at Watkinson Way. The actions outlined below should be used as a tool to assist with current and future flood management plans amongst Halton BC, EA, UU and all other interested parties and the site-specific and strategic levels.

KEY RECOMMENDATIONS	
1	Identify assets that require maintenance to prevent flooding
2	To make sure the following email addresses are updated constantly throughout so Halton BC can be reactive – even if it's a non-emergency incident the first person in on a morning can put something on the website/answer social media queries <ul style="list-style-type: none"> • info@halton.gov.uk • publicrelations@halton.gov.uk • SocialServicesReferrals@halton.gov.uk (Contact Centre tend to monitor this more than the other email addresses)

	<ul style="list-style-type: none"> • Emergencyplanning@halton.gov.uk
3	Produce a drainage asset database with as many stakeholders' assets as possible that is readily available.
4	Inspection regime need to be put in place to inspect ditches.
5	Funding needs to be made available.
6	Better awareness of land drainage assets and the development of a specific maintenance regime. This would build on existing information for high risk areas, such as culverts, and be developed jointly with Open Spaces. There may then be a need for additional resource on the ground to carry out the maintenance.
7	There would be opportunities for this to be put together with the maintenance of wider new development Sustainable Urban Drainage Schemes with commuted sums/management co payments to help support

3 Section 19 – Investigation Requirement

Under the FWMA (2010) the LLFA must undertake an investigation upon becoming aware of a flood incident within its area. Halton Borough Council will undertake a Post Incident Review to determine the consequences of the flooding incident. The Post Incident Review will determine the likely cause of the flooding and consequence. If a flood event is deemed to have had a significant consequence, then a Formal Investigation of the flooding incident will be undertaken. A flood event with significant consequences is one that has had, or could have had if action had not been taken, one or more of the following impacts.

Table 3.1 – Flood Investigation Protocol Threshold Exceedance for Watkinson Way 25th-26th September 2017

Key Threshold	Threshold Exceeded?
Resulted in major disruption to the flow of traffic.	Yes
Posed, or could have posed, a risk to human health.	No
Adversely affected the functioning of critical infrastructure.	No
Caused harmful impacts to environmentally and socially important assets.	No
Caused internal flooding to a property used for residential or commercial purposes.	No
It is unclear which Risk Management Authority (RMA) is responsible or whether the appropriate duties have been carried out.	No
The weight of public interest justifies the need for investigation (to be decided internally after review).	No

Note: Timescales for investigations are subject to the scale and complexity of incidents being investigated.

Section 19 (1) of the FWMA (2010) requires that the investigation determines the RMAs that have relevant flood risk management functions and whether each of those authorities have exercised or propose to exercise those functions. Section 19 (2) requires that the LLFA publishes the results of its investigation and notify the relevant RMAs accordingly.

The flooding incident that occurred on 25-26th September 2017 at Watkinson Way is considered to have been significant for Formal Investigation as part of Section 19 of the FWMA (2010).

In addition to the FWMA (2010) the Flood Risk Regulations was introduced by Government in 2009 due to transposing the European Community Floods Directive (Directive 2007/60/EC) into domestic UK law under the European Communities Act 1972. Halton Borough Council as a LLFA is required to implement its provisions.

As a result of the Flood Risk Regulations (2009), the LLFA has a duty to prepare a number of documents, including:

- Preliminary Flood Risk Assessment (PFRA);
- Flood hazard and risk maps;
- Flood Risk Management Plans.

This Section 19 report contributes to the continual development of flood hazard / risk maps and Flood Risk Management Plans.

4 Identification of Relevant Risk Management Authorities

The legal framework for managing flooding lies with a number of different agencies; the key responsibilities for each agency are summarised below.

4.1 Halton Borough Council - Lead Local Flood Authority (LLFA)

Halton Borough Council is the LLFA for the area of Section 19 investigation. The LLFA is responsible for developing, maintaining and applying a strategy for local flood risk management from the following sources:

- Surface Water.
- Groundwater
- Ordinary watercourses (fluvial)
- Highways Drainage.
- Canals (where not owned by Canals and Rivers Trust)

The FWMA (2010) outlines the LLFA has a consenting and enforcement responsibility for ordinary watercourse regulation within the administrative area. The FWMA (2010) outlines the LLFA has powers to designate structures and features that affect flooding in order provide protection to assets that are relied upon for flood risk management from the aforementioned flooding sources. Once a feature is designated, the owner must seek consent from the authority to alter, remove or replace it (FWMA (2010) Schedule 1, Section 1).

The LLFA liaises regularly with the EA, as well as the other RMAs, to ensure that all sources of flooding in their administrative area are managed appropriately.

District and Borough Councils can carry out flood risk management works on minor watercourses, working with the LLFA. Through the planning processes, they control development in their area, ensuring that flood risks are effectively managed. If they cover part of the coast, then District and Unitary Councils also act as coastal erosion risk management authorities.

Halton Borough Council is the Highway Authority within the administrative area of the reported flooding location. Under Section 41 of the Highways Act 1980 the Council is responsible for providing and maintaining adopted highway drainage and roadside ditches, and must ensure that road projects do not increase flood risk. Highway maintenance includes that of the road drainage networks (drains and gullies).

Under the Civil Contingencies Act (2004), Halton Borough Council is a Category 1 Responder and therefore have the statutory duty to put into action emergency plans and assess local risks to inform the emergency planning services. The Council is also required to make information publically available regarding civil protection matters, and to maintain arrangements to warn and advise the public in the event of an emergency.

4.2 The Environmental Agency (EA)

The EA is responsible for providing a strategic overview, and investigation, to flooding from the following sources:

- Main rivers (fluvial)
- Reservoirs (over 10,000m³ storage)

- River Estuaries.
- The Sea.

The EA have prepared strategic plans which set out how to manage risk, provide evidence (e.g. online flood mapping), and advice to local and national Government. They provide support to the other RMAs through the development of risk management skills and a framework to support local delivery. In coastal regions the EA are classified as a coastal erosion risk management authority.

Section 165 of the Water Resources Act (1991) states the EA have permissive powers to undertake maintenance or emergency works on the aforementioned flooding sources. The FWMA (2010) outlines that the EA has powers to designate structures and features that affect flooding in order to protect assets that are relied upon for flood risk management for Main River and tidal sources. Once a feature is designated, the owner must seek consent from the authority to modify, remove or replace (FWMA (2010) Schedule 1, Section 1).

The EA also have permissive powers to issue flood warnings to communities at risk. It should be noted, at present, this is not a statutory duty.

Under the Civil Contingencies Act (2004), The EA are a Category 1 Responder and therefore have the statutory duty to put into action emergency plans and assess local risks to inform the emergency planning services.

4.3 United Utilities (UU)

UU (as the Water and Sewerage undertaker) have a statutory duty, under the Water Industry Act (1991), to provide and maintain efficient performance of the public sewer network within their respective administrative boundary. Relevant actions include: the inspection, maintenance, repair and any works to their drainage assets which may include watercourses, conduits, ditches or other infrastructure such as pumping stations.

Under the FWMA (2010), UU are responsible for managing the risks of flooding from their respective surface water, foul and/or combined sewer systems where the sewer flooding is wholly or partly caused by an increase in the volume of rainwater (including snow and other precipitations) entering or otherwise affecting the system.

UU are required to deliver a significant reduction in sewer flooding incidents by 2020. Their performance commitment includes flooding caused by hydraulic inadequacy of sewers, and other causes of flooding such as blockages, collapses and equipment failures.

Since the late 1970s, and with the first publication of Sewers for Adoption in 1980, sewer systems have typically been designed and constructed to accommodate a rainfall event with a 1 in 30 return period. However the majority of the sewer network is not designed to accommodate flows from severe weather events. A severe event is classified by UU as a rainfall event which exceeds a 1 in 20 return period. An event with a larger return period would expect to result in significant system surcharge or flooding.

Since October 2011 UU are now responsible for certain private sewers and lateral drains of properties. Transfer of private pumping stations to UU ownership was completed in October 2016. This has removed confusion for responsibility and aid in flood management from the LLFA perspective.

UU are a Category 2 responder under the Civil Contingencies Act (2004) and therefore has the responsibility to co-operate and share information with Category 1 responders to inform multi-agency planning frameworks

4.4 Riparian Owners

Riparian owners are those who own land or property adjacent to a watercourse. Riparian owners have a responsibility to maintain the bed and banks of the watercourse; this includes maintenance of any owned structures, such as trash screens, sluices and culverts.

Section 25 of the Land Drainage Act (1991) outlines that where the flow of a watercourse is obstructed; the riparian owner is responsible to resolve the condition. Section 28 of the Land Drainage Act (1991) outlines the responsibility of the riparian owner to undertake maintenance of their watercourse if it is impeding the flow of water.

Riparian owners must let water flow through their land without obstruction and must accept flood flows through their land. Riparian owners have no duty in common law to improve the drainage capacity of a watercourse. Further information is contained within the EA document *Owning a Watercourse* <https://www.gov.uk/guidance/owning-a-watercourse>

4.5 Local Residents

Residents who are aware that they are at risk of flooding should take action to ensure that they and their properties are protected.

Residents should report flooding incidents or potential problems (such as blockages or sewer collapse) to the water authority or LLFA.

4.6 Police, Fire and Rescue Service

The Police, Fire and Rescue Services are a Category 1 Responder under the Civil Contingencies Act (2004) and therefore have a responsibility, along with other organisations for developing emergency plans, contingency plans and business continuity plans to help reduce, control or ease the effects of an emergency.

4.7 Identified RMAs for the Reported Flood Incident

The following RMAs were identified as playing an integral role to the reported flooding incident:

- Halton Borough Council
- Cheshire Police (attendance of Road Traffic Collision (RTC) only)

Section 8.9 of this report provides a summary to RMA response to the reported incident.

5 Catchment Characteristics

Halton Borough Council has taken a “whole catchment” view of flood risk management. By doing so it ensures the council appreciate its actions over the whole area rather than simply within political boundaries. Halton Borough Council’s administrative area is situated within both the Mersey catchment and Weaver Gowy catchment area. The Council has established a strong liaison link with Warrington Borough Council due to the general topography and drainage characteristics and the interplay between Halton and Warrington. Other influences are from watercourses in Knowsley BC, St Helens BC and Warrington BC administrative areas of the catchment.

Halton Borough Council is part of the wider Cheshire and Mid-Mersey sub-regional LLFA working group, where best practice and lessons learned are shared in relation to the management of flood risk. There is liaison with the Merseyside Group of Drainage Authorities as a result of established transportation and economic partnership working, and ultimately to the whole Mersey Estuary Catchment through contacts at regional level with Manchester Authorities (AGMA).

The area subject to this report lies to the north of Widnes on the North side of the Mersey Estuary. Here the land slopes gently upwards from the River Mersey to a maximum elevation of around 50m AOD. This area is drained predominantly by Ditton Brook to the west and Bowers Brook (contributed to by the land drainage/ditches which are the subject of this report) to the East of Widnes. Both of these main rivers flow into the tidal Mersey Estuary. The southern section of Bowers Brook is culverted.

5.1 Catchment Overview

5.1.1 Land use

The A557 passes through agricultural land at Cranshaw Farm Bridge. Historical land use appears to have always been agricultural.

5.1.2 Topography

Prior to the construction of the A557 the agricultural land sloped gently south-eastwards with surface water runoff/ land drainage contributing to the catchment of Bowers Brook. Upon construction of the A557 land drainage was intercepted by a series of ditches within the highway boundary on the north side of the highway, with regularly spaced culvert crossings allowing surface water to cross the highway to continue flow to Bowers Brook.

Figure 5.1 Area topography and flood location



5.1.3 Geology and Soils

The reported flooding location contains Soil Type 2. The Cranfield Soil and Agrifood website classifies the soil type as slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage.

Table 5.1: Soil Type Characteristic

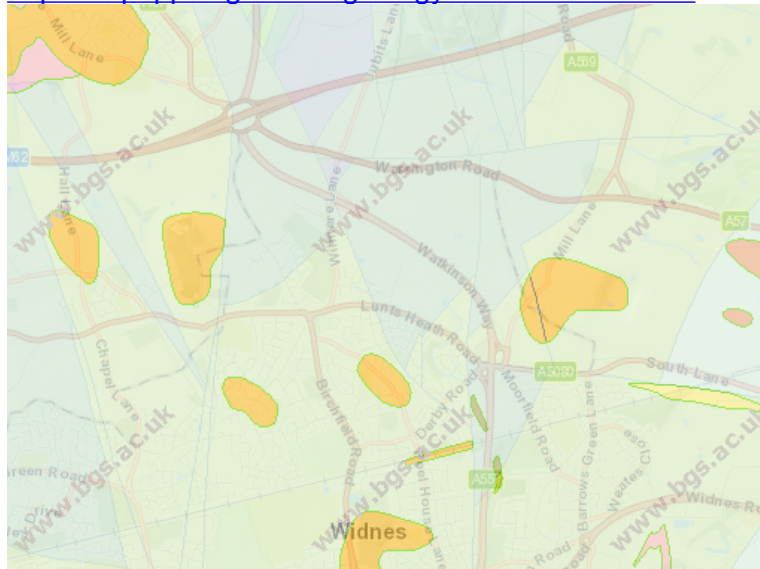
Soil Type	Definition
1	<ul style="list-style-type: none"> • Hard, very dense and only able to be penetrated with difficulty by a small sharp object. • Low natural moisture content and a high degree of internal strength. • No obvious signs of water seepage. • Can be excavated only by mechanical equipment.
2	<ul style="list-style-type: none"> • Very stiff, dense and can be penetrated with moderate difficulty by a small sharp object. • A low to medium natural moisture content and a medium degree of internal strength. • A damp appearance after it is excavated.
3	<ul style="list-style-type: none"> • Stiff to firm and compact to loose in consistency or is previously-excavated soil. • Exhibits signs of surface cracking. • Exhibits signs of water seepage. • If dry, may run easily into a well-defined conical pile. • Has a low degree of internal strength.
4	<ul style="list-style-type: none"> • Soft to very soft and very loose in consistency, very sensitive and upon disturbance is significantly reduced in natural strength; • Runs easily or flows, unless it is completely supported before excavating procedures. • Has almost no internal strength. • Wet or muddy appearance. • Exerts substantial fluid pressure on its supporting system.

Geology is shown on the British Geological Survey maps as follows:

- Bedrock – Kinnerton Sandstone formation and Etruria formation (Mudstone, Sandstone and Conglomerate)
- Superficial – Till, Devensian Diamicton

Figure 5.2 British Geological Survey interactive map extract

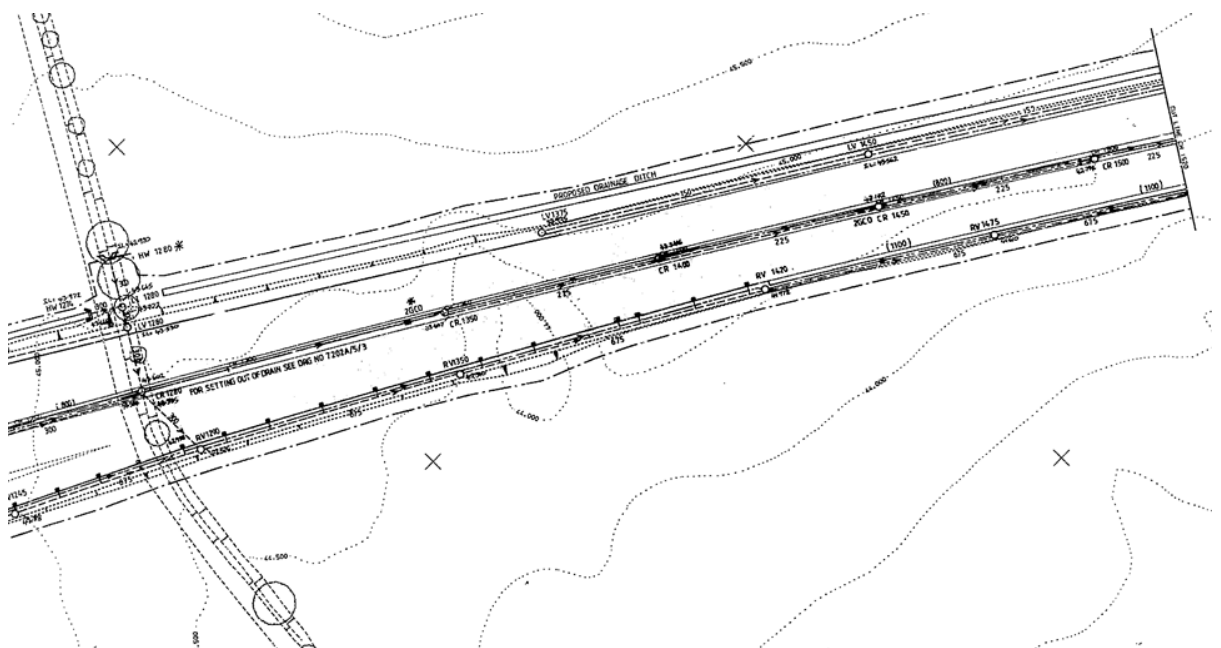
<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

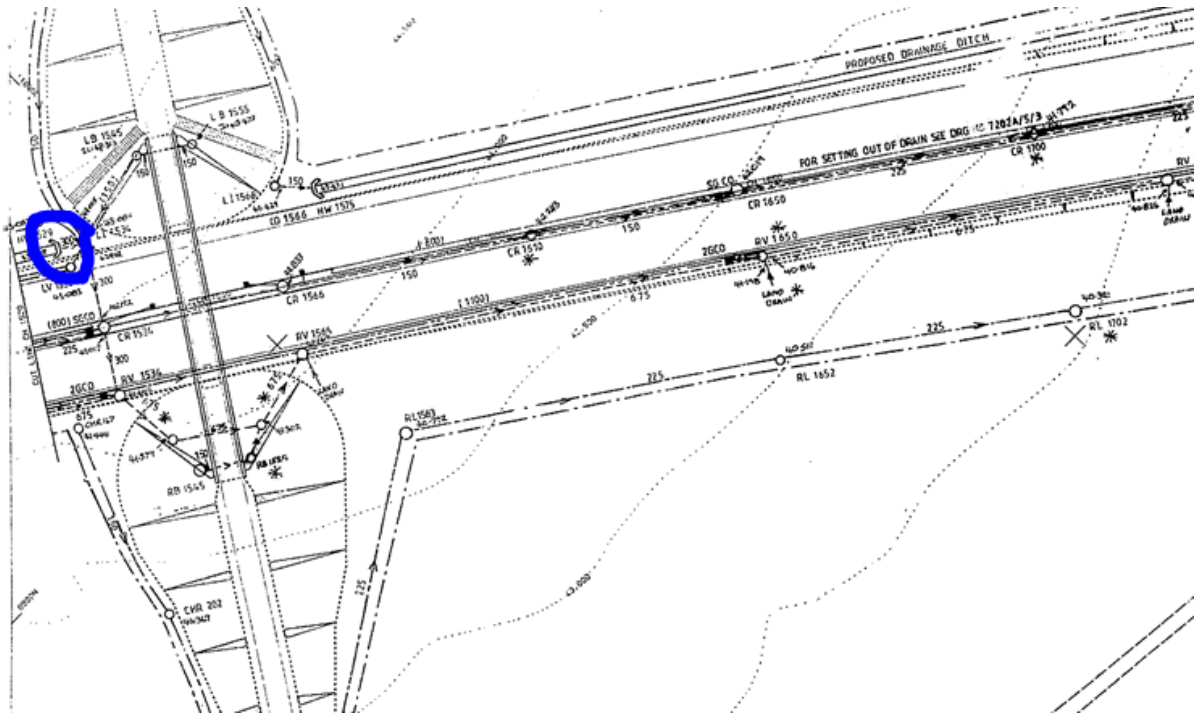


5.1.4 Watercourse Network

Land drainage from the fields to the north of the site is intercepted by a series of ditches within the highway boundary on the north side of the dual carriageway, with regularly spaced culvert crossings allowing surface water to cross the highway to continue flow to Bowers Brook. Details are shown on the plans below with location of culvert blockage which caused the flood shown circled in blue:

Figure 5.3 Highway Drainage Drawings





5.1.5 Sewer Network

There are no UU sewers in the vicinity.

5.1.6 Flooding History

There are no records of historic flooding in this area, although the Council were made aware of flooding to the fields at Model Farm adjacent to the watercourse system approx. 200m north west of (and a separate system from) the flood location approx. 1 week prior to the incident (week commencing 18th September 2017), and contractors were scheduled to address this issue later that week (end of week commencing 25th September 2017) .

6 Flood Incident Details

This section of the report details the meteorological conditions, rainfall and weather warnings during the flood event on 25th/26th September 2017. This review has used data supplied by the EA, the Met Office and other sources.

6.1 Antecedent Conditions

Met Office rainfall summaries do not indicate any particularly unusual weather events around the time of this incident, apart from slightly higher than usual rainfall in during September. UK rainfall summary for 2017 states the following:

The UK rainfall total for 2017 was 1124 mm, which is 97% of the 1981-2010 average. No individual regions were as much as 10% above or below their long-term average rainfall totals for the year. January and April were notably drier than average, but June to September were all rather wet, most especially June.

Met Office report for England 20th-30th September 2017 states the following:

Bright or sunny start in the east on the 20th, but with isolated showers in the south and patchy rain and drizzle in the west, the latter becoming heavier and more persistent and spreading north-eastwards. Bands of rain from Northumberland to the West Country on the 21st moved steadily eastwards, clearing the east coast after dark. Fog in the north and east early on the 22nd cleared, leaving sunshine over the south-east, but rain over the west slowly spread eastwards during the day. Fog in the south-west on the 23rd cleared, rain and drizzle elsewhere but it turned brighter and warmer from the south-west from late morning. Sunny across the east on the 24th, cloudy elsewhere with some early fog in some places, and rain in the west moved slowly and erratically eastwards through the day. Bright over the south-west on the 25th after patchy fog cleared, but generally wet with patchy fog elsewhere, the rain tending to become drizzly by evening. Extensive fog around the Midlands and south-west on the 26th cleared by lunchtime, leaving a generally cloudy day with isolated afternoon showers along the east coast. After a dry and bright start on the 27th, rain spread from the south-west during the morning, becoming more showery in the south-west later while eastern areas remained mostly dry. Mostly bright and sunny for the 28th, but some eastern parts were cloudier with showers or patchy rain dying out to leave a brighter afternoon, then rain reached the south-west later. Rain in the west on the 29th moved north-eastwards during the morning, followed by some isolated showers, with patchy rain in the south-east eventually dying out towards dusk. Rain over the west on the 30th moved erratically eastwards during the day.

6.2 Rainfall Data

In the 36 hours prior to the incident 10.6mm rainfall was recorded (at Richard Fairclough House Warrington between 5pm 24/9 and 11am 25/9). This is not considered to be an unusual event.

6.3 Watercourse Data

There are no watercourses that are covered by EA monitors in this section of the borough.

6.4 Weather / Flood Warning

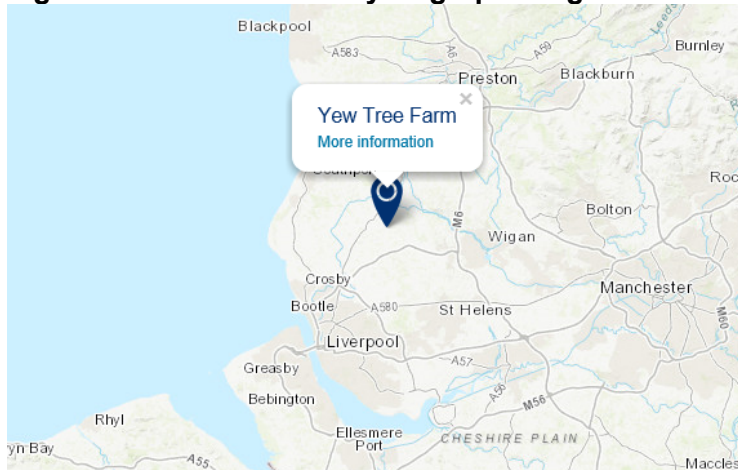
Under the Land Drainage Act (1991) and the FWMA (2010) the EA has permissive powers, but is not a statutory duty, to issue flood warnings communities at risk of flooding. The Met Office however has a statutory duty to provide forecast information for the public, relevant Government agencies (e.g. the EA), and the water authorities. Legislation supporting the Civil Contingencies Act (2004) states that Category 1 responders must have regard to the Met Office's duty to warn the public, and provide information and advice, if an emergency is likely to occur or has taken place.

The area around Watkinson Way which is subject of this report is not covered by the EA's Flood Warning service.

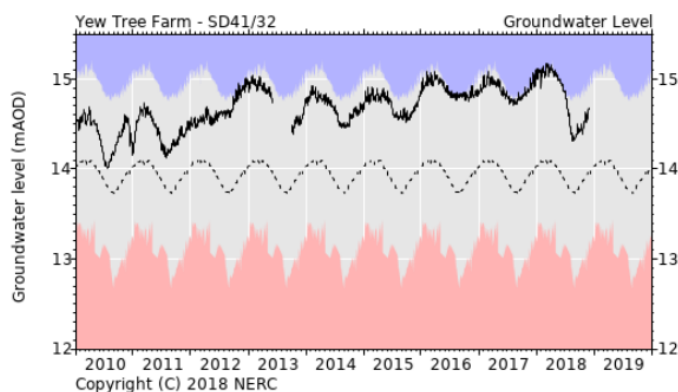
6.5 Groundwater Conditions

No groundwater data is available for this immediate area, but the British Geological Survey site at Yew Tree Farm, Lancashire recorded notably high levels for September 2017.

Figure 6.1 Location and Hydrograph for groundwater levels



Hydrograph



7 Data Collection

Once the flood event had subsided the LLFA began the process of data collection and consultations amongst the RMAs. The following sections provide an outline to the process.

7.1 Consultation

Information related to the reported incident has been obtained from Cheshire Police, and a incident debrief session was held with the Halton Borough Council staff involved in the incident. Table 7.1 provides a summary of the information collated

Table 7.1: Data Register

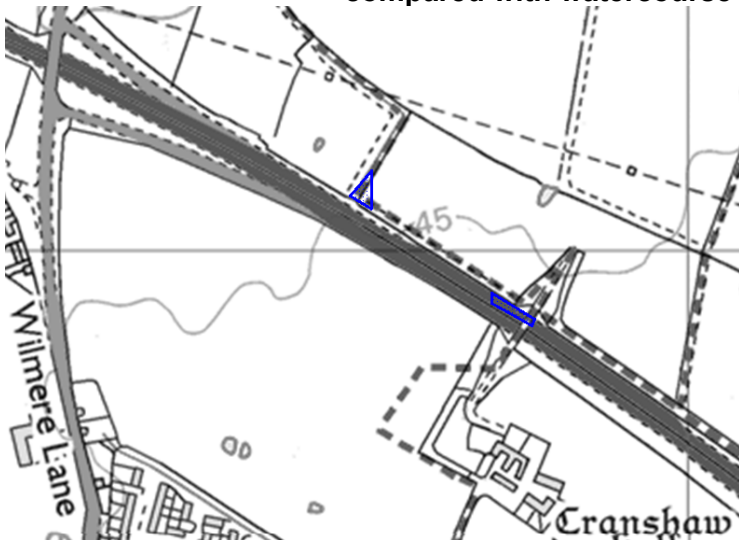
Consultee	Information
Halton Borough Council	<ul style="list-style-type: none">• Timeline/call out log for the incident date• Flood De-brief Meeting Notes
Environmental Agency	<ul style="list-style-type: none">• Modelled and historic flood outlines (flood maps).• Rain gauge data.
Met Office	<ul style="list-style-type: none">• Report on the weather situation surrounding the incident date.
Police	<ul style="list-style-type: none">• Incident form for the incident date.

7.2 Data Review

The data collected as part of the consultation process was used to confirm the extend of flooding at the reported location, as well as an assessment to the implementation of pre- and re-active measures at the reported location and elsewhere within the Halton Borough Council administrative boundary.

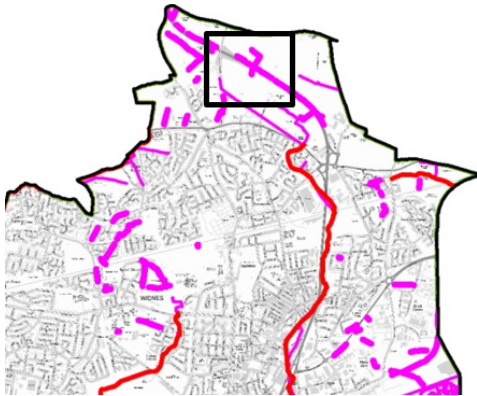
Spatial data was plotted using Geographic Information System (GIS), and the reported incidents of flooding were reviewed to identify geographical flooding 'hotspots' where multiple reports of flooding were identified in close proximity of each other. The flooding hotspots that have been identified for the 25th/26th September 2017 event are shown in Figure 7.1. This data has been utilised to update the Halton Borough Council flood register.

Figure 7.1: Overview of Flooding Locations for incident on 25th/26th September 2017 compared with watercourse locations



(in blue)

Watercourses shown pink, inset area showing flood extent



7.3 Summary of Consequence to Flooding

Flooding occurred on the A557 near to Cranshaw Hall Bridge on 25th September 2017. Reports of cascading water across the southbound carriageway caused the Council to place flood warning road signs during that day. At that time the Council was unaware of the cause of flooding. Later that evening there was a RTC involving a single vehicle aquaplaning into a barrier. Police attended the scene and closed one lane. The decision was later taken to close the road, and this remained in place until the next morning when LLFA staff located the cause of the blockage and contractors were deployed to fix the problem which was found to be siltation/blockage at the head of the Cranshaw Bridge Culvert. The road was reopened on the afternoon of the 26th. Although a diversion route was put in place, the closure of the A557 southbound caused significant disruption to traffic during the AM peak of the 26th, which also affected Junction 7 of the M62, with many complaints and calls to the Council.

7.4 Site Investigations

Site investigations were undertaken between 26th and 27th by Halton Borough Council to increase confidence in the information obtained in determining the flooding mechanism(s).

The objective of the site work was to:

- Identify and appraise historic flooding mechanisms
- Engage with stakeholders to capture local knowledge of the flood event

8 Flooding Locations

8.1 Affected Areas

For this flood event the affected areas were the same as the flood outlines shown in Figure 7.1

Table 8.1 provides detail of the flooding timeline and actions taken.

Table 8.1: Watkinson Way Flooding Timeline

Date	Officer	Actions / Information	Response / Outcome
Spring 2017	RW	Received reports from farmer at Model Farm regarding problems with drainage to LLFA team leader/officer (JF/RW).	Litter removal requested.
Spring to Sept 2017	All	Open Spaces made aware of problem. Awaiting litter pick.	Email requests
Spring to Sept 2017		No further contact from the farmer.	
18/09/2017	RW	A week before the incident there were still problems with ditches affecting Model Farm field. Problem had become worse and farmer unable to plough his fields.	Work programmed for two weeks later - 28 th September 2017.
		Problem appeared to be the field drains/watercourse. Field ditches are lower than the road. Lyons were booked via Tarmac to attend to address the problem under programmed TM for 28 th /29 th Sept.	

25/09/10 Morning	GD	Highways On-Call Officer/Engineer (GD) noted water cascading across the carriageway from the field. Unaware this was from the ditch (next system along from farmers complaint).	
25/09/2017 Approx 13:00hrs	GD	Arranged for 'Flood Warning' and 'SLOW' signs to be erected, to warn drivers of water travelling across the carriageway. Arranged for Contractor to attend to clean gullies opposite flood area, to ensure they can manage excess surface water.	
25/09/2017 Approx 19:00	GD	Highways On-Call Officer/Engineer (GD) received a call from Cheshire Police via Contact Centre (Out of Hours Service) regarding a vehicle had aquaplaned on the road.	
25/09/2017 20:00hrs	GD	Call received from Cheshire Police advising a car had aquaplaned on the flooded road. Cheshire Police had advised they had closed a lane to slow the traffic down.	
25/09/2017 21:00hrs	GD	On-Call Highways Engineer contacted Traffic Manager for advice. Risk identified and Contractor was contacted to arrange for road to be closed, including setting up a diversion route whilst the flood was being investigated during daylight (following day). Checked diversion route for potential hazards. Road left closed overnight.	
25/09/2017 23:30hrs	GD	Called Highways England to advise of closure of A557 Southbound and also informed Out of Hours.	

Date	Officer	Actions / Information	Response / Outcome

26/09/2017		Highways Divisional Manager was out of office but kept updated via phone.	
26/09/2017 Pre 9.30hrs		Radio announcements advising the road was closed. HBC Communications unaware of incident.	
26/09/2017 9.30hrs– 9.45hrs	MO	HBC Contact Centre contacted Communications & Marketing officer (MO).	Information received via GD was posted on social media, providing updates to the public.
26/09/2017 10:00hrs	GD	Briefed JF / RW in office and arranged to meet on site.	
26/09/2017 10:00hrs	JF / GD	<p>On site to investigate flooding causes and organise deployment of works to mitigate the problem. Flooding had now subsided from carriageway but still high levels in adjoining ditch. This involved liaison with both the Highways Term Maintenance Contractor (Tarmac) who arranged for drain contractors (Lyons) to attend on site. Used HBC Highway and Land Drainage Plan to jet clear the blockages at culvert crossings under the road at Cranshaw Bridge. This was the cause of the road to flood. The contractor also cleared the blockage causing flooding to the farmers field further North towards Wilmere Lane Southbound slip at main field drain outlet.</p> <p>Worked with Open Spaces Managers to mobilise StreetScene and Landscape operatives. These operatives cleared the debris and the two affected ditches of the vegetation and also removed the self-seeded trees which had become established over the years.</p> <p>Tarmac instructed to remove barriers and cleared 10-15 metres of ditch on approach to each of the two culverts, the following day</p>	
Date	Officer	Actions / Information	Response / Outcome
26/09/2017 10:00hrs	RW / GD	Contractor Lyons at site clearing manholes and the head of the ditch was investigated.	

26/09/2017 10:00hrs		Litter / debris in the ditch was the cause of the problem. The flood had subsided.	
26/09/2017 10:00hrs	RW	Advised Open Spaces and assistance requested.	
26/09/2017 11:00hrs	RW	Open Spaces officers attended site.	
26/09/2017 Midday	JF	Fully aware of issues and causes. Manhole investigations now complete. The ditch/culvert system which caused the flood across the road and that which caused the flood in the farmers field were two separate drainage run systems	
26/09/2017		Tarmac requested to clear the ditches as HBC Open Spaces did not have the necessary equipment. (10-15 m on approach to each culvert)	
26/09/2017 14:00hrs		Flood subsiding.	
26/09/2017 14:00hrs		Decision made to reopen the road, keeping one lane closed, in liaison with Traffic Manager (SR)	
26/09/2017 15:00hrs		Road reopened with one lane. One slip road remaining closed, to allow works to continue.	
26/09/2017 15:00hrs	GD/JF	Returned to office once the road had reopened.	
26/09/2017	SR	Regular discussions with HBC Highways regarding road closure despite other commitments.	
26/09/2017	MO	Communications officer remained in contact with HBC Highways throughout the afternoon, keeping social media updated, which was supported by Communications officer.	
26/09/2017		RW communicated with farmer whilst on site.	

8.2 Flooding Mechanism

Review of the available data has indicated the flooding that was experienced on 25th/26th September 2017 at A557 Watkinson Way was due to the following factors summarised in Table 8.2

Table 8.2: Summary of Contributing Factors to Flooding

Source of Flooding	Description	Role in Flooding Incident
Groundwater	Groundwater flooding occurs as a result of water rising up from the underlying aquifer or from water flowing from springs. This tends to occur after much longer periods of sustained high rainfall and can be sporadic in both location and time often lasting longer than a fluvial or surface water flood.	Field drainage had become saturated due to issues with ditch/culvert. Evidence suggest groundwater levels may have been high despite this.
Surface Water	Intense rainfall exceeds the available infiltration capacity and/or the drainage capacity leading to overland flows and surface water flooding.	Combination of rainfall event and blockage issues with ditch culvert had led to excess levels in ditch.
Fluvial	Flooding resulting from water levels exceeding the bank level of a main river or ordinary watercourse, because flow exceeds the capacity of the channel	Blockage issues with ditch culvert had led to excess levels in ditch/watercourse system within highway verge which led to exceedance of the bank level and flooding of the carriageway
Sewer	Flooding from the sewer system may occur if: (a) a heavy rainfall event exceeds the capacity of the sewer system / drainage system, (b) interaction with groundwater within the sewer system / drainage system, (c) the system becomes blocked by debris or sediment and/or, (d) the system surcharges due to high water levels in receiving watercourses.	N/A
Tidal	Propagation of high tides and storm surges up tidal river channels, leading to overtopping of the river banks and inundation of the surrounding land.	N/A
Other sources of flood risk	Flooding from canals, reservoirs (breach or overtopping) and failure of flood defences.	Flood due to blockage of ditch/culvert

8.3 Groundwater Flooding

Whilst groundwater levels may have been high in the region at this time of year, and the land drains likely to have been surcharged due to blockage, this is not considered to be the primary source of the flooding.

8.4 Surface Water

Whilst the management of surface water falls under the remit of Halton Borough Council as the LLFA, the Environment Agency has also produced the national Risk of Flooding from Surface Water (RoFSW) mapping in its Strategic Overview role in flood risk management. This mapping has been designed to indicate areas that may be at risk of surface water flooding

for 30 year (high risk), 100 year (medium risk) and 1000 year (low risk) storms and is shown below.

As would be expected there is a high risk of the ditch flooding, but only a low-medium risk of any overtopping and flow path across the carriageway.

However, it is important to note that this is national mapping product and does not represent reflect local detailed sewer drainage networks and is not designed to represent the risk of fluvial flooding from watercourses.

Figure 8.1 Risk of Flooding from Surface Water (RoFSW) mapping extract



8.5 Fluvial

Upon investigation immediately following the event, during the day on 26th September, and upon consulting the drainage drawings for the highway, it was apparent that there were two separate systems with blockages, one at the manhole receiving the watercourse from the farmers field (northernmost flood location), and one at the culvert head at the end of the ditch carrying land drainage parallel to the road near Cranshaw Bridge (southernmost flood location) and the cause of the road closure. Once these blockages were cleared, water levels subsided and further works were undertaken to remove silt, litter and vegetation.

8.6 Sewer

No sewer flooding was noted relating to this event.

8.7 Tidal

No tidal flooding was noted relating to this event.

8.8 Other Sources of Flood Risk

No other sources of flooding were noted relating to this event.

8.9 RMA Response to Flood Incident

The source of flooding was mainly pluvial / fluvial. Halton Borough Council was the lead RMA for the reported incident. Cheshire Police also performed other functions during the event. The actions of the authorities during the incident are summarised below:

Table 8.3: RMA Pre- and Re-active Response to Flooding

Consultee	Information
Halton Borough Council	<ul style="list-style-type: none">Enforced road closures for public safety during the flood event.During/immediately after event highways and their drainage assets were inspected and repairs carried out.
Police	<ul style="list-style-type: none">Incident form for the incident date contained within Appendix 1

A full report of actions on the run up to and during the event is contained in section 8.1

8.10 Other Affected Areas

There were no other affected areas within the borough.

8.11 Flooding Incident Summary

- 10.6mm of rainfall fell in 36 hours over the reported flooding location prior to the event
- Ditch/watercourse and field drainage levels were high due to system blockages and likely high groundwater.
- Signs were erected to warn of flooding and later decision taken to close the road due to RTC.
- Halton Borough Council had scheduled works to address problems in this area however the flood event preceded the date of the works, and works were then carried out under emergency closure post flood event to resolve the problem.

9 RMA Response – Strategic Overview

Given the cause and consequence to the flooding mechanism of the incident on 25th/26th September 2017 it is clear that Halton Borough Council as RMA, Highway Authority and LLFA, together with emergency services had a role to play in the response. This section of the report provides an overview to their respective participation at the strategic level in terms positive actions and lessons learnt which contribute to future amendment of flood risk management within the Halton administrative boundary. Assessment criteria have been based on consultations with the RMAs, partners and stakeholders.

9.1 Flood Incident Response – Core Themes

The following core themes characterise the flooding and flood incident response that occurred on the 25th/26th September 2017:

- Lack of maintenance of the highway ditch/watercourse system was the main cause of the flood
- Understanding of asset data relating to watercourses and where they interact with highways, and the development of a subsequent programme of landscape and drainage asset maintenance requires improvement.
- During the event, cooperation between responders and various Council teams was good.
- Further lessons were learned for coordination both to help prevent, and assist response during future events.

The following sub-headings elaborate on the core themes outlined above.

9.2 Understanding of Asset Data

The A557 was constructed by the Highways Agency and later de-trunked and handed to Halton Borough Council as Highway Authority to maintain. The handover included drawings, but did not include a detailed list of highway drainage assets and/or programme of maintenance. This level of information is typical across the highway network. It is has therefore been identified that further work is required for the Authority to collate and process asset information to enable the production of a prioritised inspection and maintenance plan. This will need to take account of available resources as at present maintenance is only carried out on a reactive basis. Work is ongoing to collate this information and develop a programme.

9.3 Cooperation & resources

Cooperation during the incident between the Highways and Open Spaces teams and making the required resources available to carry out traffic management, landscaping, drainage and litter picking works, ensured that a speedy and effective response was made post event. However in line with the above paragraph, better understanding of assets, which department has maintenance responsibility and analysis of additional resource is required.

It was noted that better communication is required with the Councils Communications and Marketing team during the event, so they are able to field calls and enquiries more effectively.

9.4 Positive Observations

The following items have been identified as positive observations that should be noted:

Good Practice	
1.	Contractor and Street Scene provided resources quickly.
2.	Following the posting of information via HBC Communications & Marketing, information was reached by a large audience very quickly.
3.	Good response from HBC On-Call Highways Engineer, Highways Term Maintenance Contractor and Open Spaces Contractor.
4.	Once the problem was identified, there was good co-ordination and inter-departmental working.
5.	A full closure was required due to a RTC. After discussion with Traffic Manager, a lane closure was put in place. This took around 3hrs to complete.
6.	Contractor on site the next day and located problem to remove blockage.
7.	Making teams available (at expense of future regular programmes) to deal with an emergency issue.
8.	Making the most of the emergency closure. Completing works simultaneously over a large area.
9.	Once aware of the hazard, warning signs were erected quickly.

9.5 Lessons Learnt and Moving Forwards

A review of the information obtained during the post incident review exercise has identified the following which could potentially improve current measures:

Areas for Improvement / Gaps	
1.	HBC Highways to be proactive and maintain ditches better.
2.	There is a requirement to ensure HBC Communications & Marketing are informed and kept informed of incidents such as this. The Web Team / Press Team where advised about incident was via the Contact Centre, due to the amount of calls they received.
3.	A requirement for drainage plans / database held by HBC Highways.
4.	There was a lack of information regarding the source of the flood.
5.	Knowledge of the ditches in Borough and who deals with these locations i.e. Open Spaces / HBC Highways.
6.	Deployment of the right contactors to the right area, whilst the road closure was in place (e.g. further south clearing debris).
7.	Difficulty arranging team to clear litter over entire ditch / difficult to reach areas.
8.	No details of vehicle, condition or details of collision appear to have been collected to inform future insurance claims.
9.	Communication with the public. It was perceived there was a complaint received into HBC, relating the flooding of a field nearby, was the cause of the flooding on the carriageway, which it wasn't. Due the emergency, this was also repaired on the visit. This was due to be investigated / cleared later in the week.
10.	Funding needed to address this issue.

Key Learning Points	
1.	In the future, there must be better communications structure put in place, when there is a similar flooding incident.
2.	A database needs to be produced and maintained, which covers the following areas: <ul style="list-style-type: none"> • drainage plan information • asset register information and

	<ul style="list-style-type: none"> • watercourse brook information, which will incorporate the cleansing arrangements. <p>HBC Highways Team need to be able to access this information in and out of office hours.</p> <p>The team need to be more familiar with highway assets and their required maintenance regimes.</p>
3.	A physical barrier should have been considered to have been installed on Watkinson Way to slow the traffic down (chicane).
4.	Need to liaise regularly over both response plans and asset management, with other departments (Open Spaces).
Key Recommendations	
1.	<p>The following email addresses to be informed of incidents, such as flooding or any other incident which has an impact on the borough and cause public concern. By using these email addresses, any incidents can be managed corporately with Emergency Planning and Communications & Marketing:</p> <ul style="list-style-type: none"> • info@halton.gov.uk • publicrelations@halton.gov.uk • SocialServicesReferrals@halton.gov.uk (Contact Centre monitor this email adresse). • Emergencyplanning@halton.gov.uk
2.	Identify assets that require maintenance to prevent flooding.
3.	Database to be produced, as in Key Learning - Point 2
4.	Inspection regime need to be put in place to inspect ditches.
5.	Funding needs to be made available.
6.	Better awareness of land drainage assets and the development of a specific maintenance regime. This will build on existing information for high risk areas, such as culverts. This may be developed jointly with HBC Open Spaces.
7.	Work required in this area may be considered under the maintenance of a wider new Sustainable Urban Drainage Scheme.

10 Flood Investigation Outcomes

This section of the flood investigation report aims to outline a summary of the responses from each of the RMAs involved with the flooding incident on 25th/26th September at Watkinson Way, and provide suggested actions to improve the current flood risk management strategy with the Halton administrative area.

10.1 Halton Borough Council

10.1.1 Halton Borough Council as the LLFA

As the LLFA, Halton Borough Council has produced this flood investigation report in response to the incident on 25th/26th September at Watkinson Way. This report has been compiled through collaborative working with relevant RMAs and stakeholders. This flood investigation report will be made available to the public with all interested parties notified. In addition, Halton Borough Council will coordinate with the RMAs for future work and investigations and will collaborate with local communities to address flooding issues.

10.1.2 Halton Borough Council as the Highways Authority

Halton Borough Council is the Highway Authority within the administrative area of the reported flooding location. Actions resulting from the event are summarised as follows:

- Arranged warning signs and subsequent road closure
- Cleared two no. blockages in watercourse/ditch systems during/immediately after the incident, and working with Open Spaces team clearance of ditches.
- Review of assets and responsibilities for maintenance programmes working with Council's Open Spaces team being undertaken

10.1.3 Halton Borough Council as a Category 1 Responder

Halton Borough Council, as the Category 1 Responder, have utilised the event to assess its current stance of the Multi-Agency Emergency Response plan for flooding and severe weather.

10.2 Environment Agency

Environment Agency were not involved in the response to this incident.

10.3 United Utilities

United Utilities were not involved in the response to this incident

11 Recommended Actions

11.1 Strategic Overview

LLFA role is to coordinate the management of flood risk within their administrative area. It is suggested that the recommendations made within this report are taken on board by the relevant RMAs and reviewed on a regular basis.

With the exception of the actions identified above regarding Communications and Asset Management, there is not considered any need to investigate further capital schemes to reduce risk by providing flood alleviation in these areas.

11.2 Action Plan

Action No.	Details	Responsible
1.	<p>Implement procedure to improve internal communications and in-turn improve external communications with the community.</p> <p>The following email addresses to be informed of incidents, such as flooding or any other incident which has an impact on the borough and cause public concern. By using these email addresses, any incidents can be managed corporately with Emergency Planning and Communications & Marketing:</p> <p>info@halton.gov.uk</p> <p>publicrelations@halton.gov.uk</p> <p>SocialServicesReferrals@halton.gov.uk (Contact Centre monitor this email address).</p> <p>Emergencyplanning@halton.gov.uk</p>	HBC Highways HBC C&M Emergency Planning

2.	Identify all watercourses within the borough of Halton.	HBC Highways
3.	Identify assets requiring maintenance.	HBC Highways / HBC Open Spaces
4.	Produce an inspection programme for asset maintenance.	HBC Highways / Open Spaces
5.	<p>Database to be produced and maintained, which covers the following areas:</p> <ul style="list-style-type: none"> • drainage plan information • asset register information and • watercourse brook information, which will incorporate the cleansing arrangements. <p>HBC Highways Team need to have access to this information in and out of office hours.</p>	HBC Highways
6.	The team needs to be familiar with highway assets and their required maintenance regimes.	HBC Highways
7.	<p>Knowledge of the ditches in Borough and who deals with these locations i.e. Open Spaces / HBC Highways.</p> <p>This information to be added into the above database.</p>	HBC Highways
8.	Schedule regular meetings between Highways and Open Spaces	HBC Highways / HBC Open Spaces
9.	Investigate funding options.	HBC Highways
10.	Produce action cards to cover other various options for consideration during incidents e.g. Installing a physical barrier/chicane.	HBC Highways
11.	The above action cards to be included in the HBC Flood Response Plan.	Emergency Planning
12.	Investigate how information regarding vehicles which have been involved in a collision or damaged due to a Highways incident / accident are collected.	HBC Highways / Insurance
13.	Other options regarding resilience planning and response for similar incidents, for example	HBC Highways /

	physical barriers to be considered / installed to slow the traffic down (chicane), to be included in the HBC Flood Response Plan.	Emergency Planning
14.	Liaise regularly regarding response plans and asset management, with other departments.	HBC Highways
15.	Better awareness of land drainage assets and the development of a specific maintenance regime.	HBC Highways / HBC Open Spaces
16.	Flood work required in this area may be considered under the maintenance of wider new Sustainable Urban	HBC Highways
17.	A report to be produced regarding the incident to be submitted to Defra / The Environment Agency.	HBC Highways
18.	HBC Flood Response Plan to be updated.	Emergency Planning

12 Contacts and useful websites

Table 12.1: Key Flooding Contact Details

<p>The following gives guidance on whom to contact about various types of flooding.</p> <p>Always contact the emergency services first (999) if you or a family member is in immediate danger.</p>	
Flooding from a Public Sewer	
United Utilities	<p>Report sewer flooding 0345 6723 723</p> <p>www.unitedutilities.com</p>
Flooding from a Burst Water Mains	
United Utilities	<p>Report a leak 0800 330033</p> <p>www.unitedutilities.com</p>
Flooding from the Public Highway, Drains or Ordinary Watercourses (Non-Main River)	
Halton Borough Council	0303 333 4300
Flooding from a Main River	
Environment Agency	<p>General enquiries 03708 506 506 (Mon-Fri, 8am – 6pm)</p> <p>Incident hotline 0800 80 70 60 (24 hour service)</p> <p>Floodline 0345 988 1188 (24 hour service)</p> <p>General enquiries email enquiries@environment-agency.gov.uk</p>

Table 12.2: Useful Web Resources

<p>The following web links contain useful information about being prepared, understanding flood risk and reporting drainage issues to Halton Borough Council</p>	
Being Prepared	
Prepare for a flood and get help during and after:	https://www.gov.uk/after-flood
Ready for flooding – Before, during and after:	https://nationalfloodforum.org.uk/wp-content/uploads/2016/12/Ready-For-Flooding-26-11-14.pdf

Flood Hub	https://thefloodhub.co.uk/
Make a personal flood plan:	www.gov.uk/government/publications/personal-flood-plan
Prepare your property for flooding:	www.gov.uk/government/uploads/system/uploads/attachment_data/file/451622/LIT_4284.pdf
Understanding Flood Risk and Flood Warnings	
Check current flood warnings and river levels:	https://www.gov.uk/check-flood-risk
Sign up for flood warnings:	www.gov.uk/sign-up-for-flood-warnings
Reporting a Flood	
Report flooding from a public highway to Halton Borough Council:	Halton Borough Council 0303 333 4300
Report a problem with a drain or a grid (also known as a gully):	Halton Borough Council 0303 333 4300

Appendix 1 – Police Incident Form

Incident 627 25/09/17 come in at 1626hrs as one vehicle RTC driver lost control due to flooded road.

(Vehicle make, model, reg, owner/driver, and address details redacted)