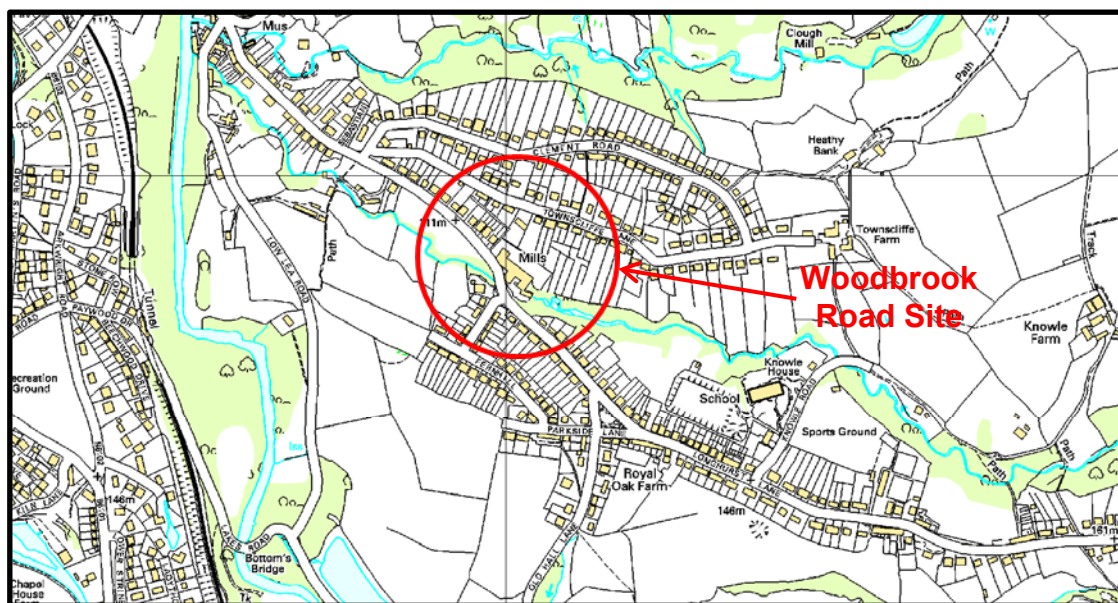


STOCKPORT

METROPOLITAN BOROUGH COUNCIL



Draft Flood Investigation Report Woodbrook Road, Mellor, Stockport

**Services to Place
Highways & Transportation
Flood Risk Management Team**

September 2017 (amended March 2018)

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EXECUTIVE SUMMARY

This Flood Investigation Report has been completed by Stockport Council, as Lead Local Flood Authority (LLFA) for the borough of Stockport, under Section 19 of the Flood and Water Management Act 2010 (FWMA).

Section 19 of the FWMA states that on becoming aware of a flood in its area a LLFA must, to the extent that it considers necessary, investigate:

1. Which risk management authorities have relevant flood risk management functions and
2. Whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to a flood.

The aim of the investigation is to identify the community affected, to determine why they flooded, review responses during and post event and to recommend further action for each risk management authority to consider going forward.

Flood alerts and warnings were issued by the Met Office and the Environment Agency (EA) on 21st November 2016. In the event flooding in Stockport was centred mainly in Marple Bridge.

The November flood event caused internal flooding to 5 properties on the residential development of Woodbrook Road, 12 properties on Longhurst Lane and 1 property on Town Street. A flood flow path has been provided by PH Property (DCI) LLP which is approximately 55 metres long and located at the rear of Woodbrook Road and adjacent to Longhurst Lane. This is to allow flood water in excess of the 100 year plus climate change levels to discharge off the site and onto Longhurst Lane before it returns to the watercourse.

This report recommends 26 general and community specific actions to help reduce or mitigate the impact of future flooding within the area for each authority to consider. The delivery of these actions will be dependent on the authorities securing funding and other internal priorities. In addition, the authorities will continue to work together with the community affected to identify all potential options to reduce flood risk.

Several site visits have been made by the LLFA to determine the cause of flooding. The conclusion from the investigation is that the flooding was due to a blockage at the trash screen at the inlet to the culvert and impediments along the overland flood flow route.

1.0 INTRODUCTION

1.1 Lead Local Flood Authority Investigation

Stockport Metropolitan Borough Council as the Lead Local Flood Authority (LLFA) has a responsibility to record and report flood incidents as detailed within Section 19 of the Flood and Water Management Act 2010 (FWMA):

Section 19 Requirements

- 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.

This report provides a concise review of the rights and responsibilities of all risk management authorities involved, and an outline of their past or proposed actions, if any. It also makes recommendations for a possible way forward.

1.2 Site Location

The developed site (residential properties) which was the former Cataract Bridge Mill is located on Longhurst Lane, Mellor, Stockport (NGR: SJ 970789 888428). It was the site of a textiles mill which was derelict in the year 2010 and is located on the main arterial road between Mellor and Marple Bridge, as shown in Figure 1.

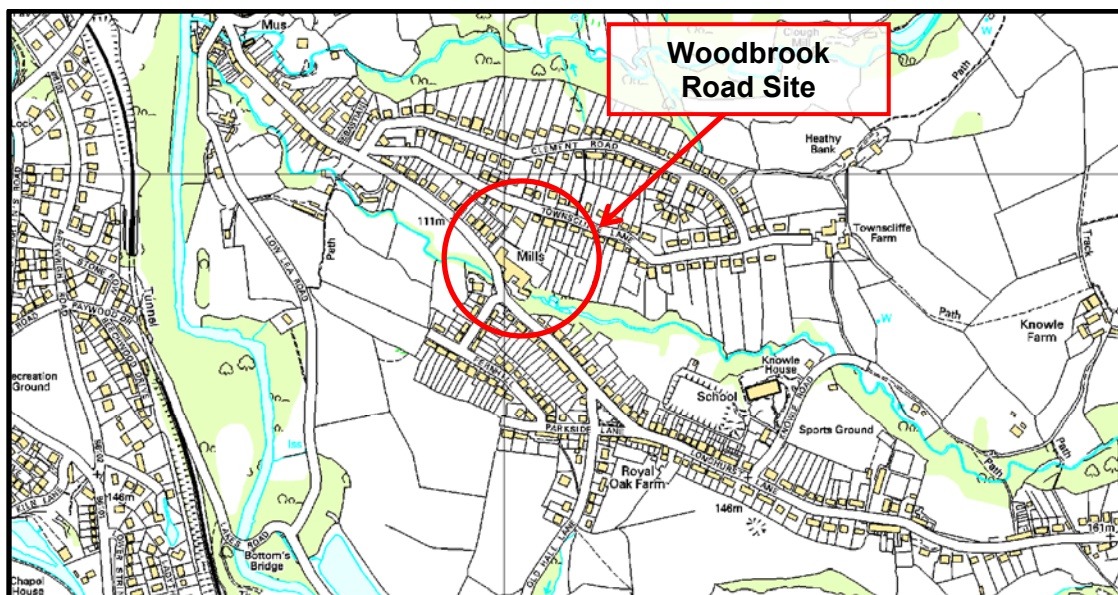


Figure 1: Site Location, Mellor, Stockport

(Reproduced from the 2011 Ordnance Survey 1250 mapping with the permission of the Controller of Her Majesty's Stationery Office. © Crown Copyright. Stockport MBC LA100019571)

1.3 Cataract Brook and Culverted Watercourse

A watercourse (Cataract Brook) flows through the site entering a culvert to the eastern side of the site and outfalling to the west of Longhurst Lane. There is, at least, one intermediary manhole located on the culvert within residential site and the culvert is protected from blockage and unauthorised entry by the use of a trash screen fitted to the inlet headwall. The layout of the brook and culvert can be seen in Figure 2. The layout of the culvert is taken from the latest design drawing that was submitted by PH Property (DCI) LLP and consented for construction by The Environment Agency (EA) as the 'as constructed' alignment has not been verified to date. The developer (PH Property (DCI) LLP) has confirmed that they do not have the as built drawings for the culvert diversion.

Cataract Brook is classified as a 'Main River'. The EA's formal consent is required for any works which affect a main river and the EA has permissive powers to carry out works of maintenance and improvement on these rivers.

The responsibility for the culvert falls under riparian ownership and, as such, Stockport Council as the Highway Authority is responsible for the culvert under the Adopted Highway of Longhurst Lane and an adjoining strip of land adjacent to Longhurst Lane. The responsibility for the culvert under the private land of the development rests with the riparian landowner. At the time of the flooding incident and, until such time as the ownership is transferred to another party, the responsibility for the trash screen remains with the developer, PH Property (DCI) LLP.

In 2009 the culvert under Stockport Council's riparian ownership was relined with a GRP liner between the outfall and the existing manhole within the ground of the development. The GRP lining to the culvert varied in section over 2 lengths to suit the existing dimensions of the original masonry culvert. The upstream section of culvert was rehabilitated using an 800 x 910mm oval GRP liner for 20m approx. and the second downstream section was rehabilitated using a 1745 x 930mm oval GRP liner for 7 m approx. The culvert at the outlet remained as originally constructed as a masonry arch, 1100 – 1250mm wide / 2200 – 2960mm high for a distance of 3.4m.

As part of the residential development, constructed in 2013, the existing culvert was diverted and extended in a 1050mm diameter concrete pipe from the existing manhole within the development site to a new inlet headwall structure to the east. The culvert works were constructed in accordance with the design drawing that received E.A. consent, the existing intermediary manhole within the development will have been renewed as a pre-cast concrete chamber built to adoptable standards.

In accordance with the consented drawing the culvert is 41 metres long from the inlet headwall to the renewed manhole within the housing development.

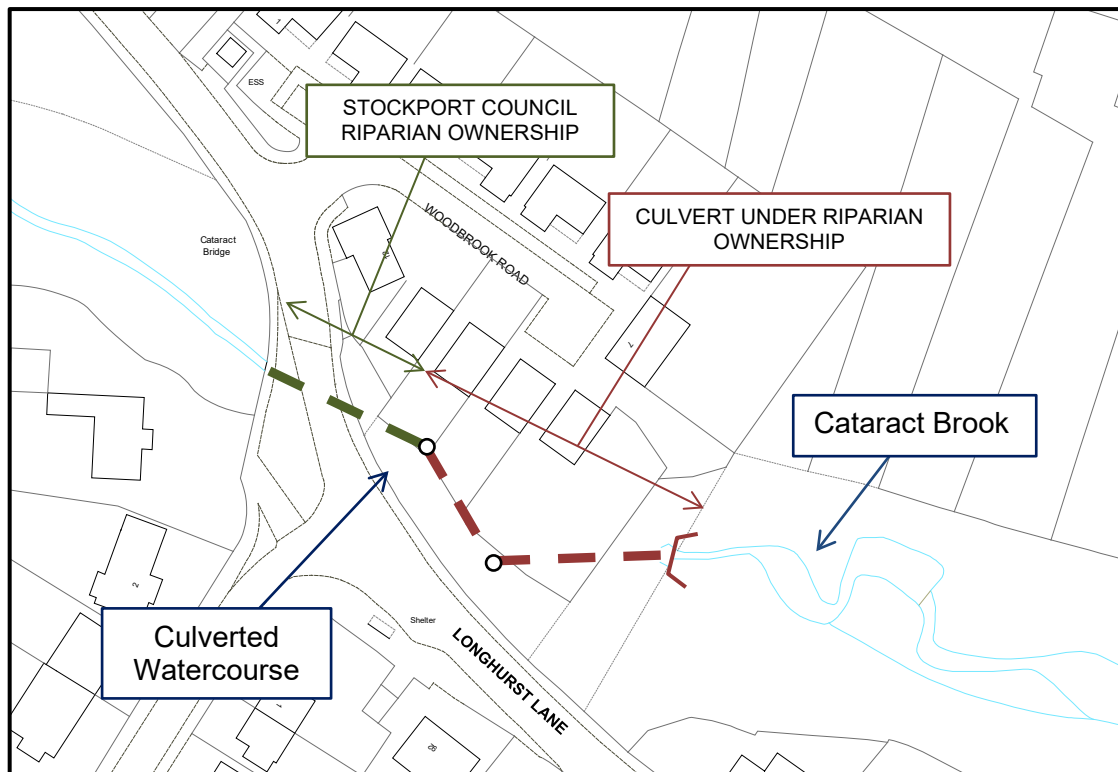


Figure2: Cataract Brook at Woodbrook Road development

2.0 FLOODING

2.1 Flooding History

In May 2012 the derelict building site of Cataract Mill flooded as a consequence of a blockage within the culvert. The flooding was investigated by Stockport Council and the flood investigation report can be viewed at:

[https://assets.contentful.com/ii3xdrqc6nfw/15YOYMzpSuW6UWgycoeYM8/b35dddad32e71b9a9608b4824048c213/Cataract Bridge Mill Flood investigation Report.pdf](https://assets.contentful.com/ii3xdrqc6nfw/15YOYMzpSuW6UWgycoeYM8/b35dddad32e71b9a9608b4824048c213/Cataract_Bridge_Mill_Flood_investigation_Report.pdf)

2.2 Flood Incident – 21 November 2016

In the evening of 21st November 2016 a flooding incident was reported to Stockport Council. Solutions SK attended on Longhurst Lane with sandbags and the Council's Forward Incident Officer attended between 7.30 pm and 10.50 pm.

The flood event caused internal flooding to all 5 properties on Woodbrook Road. 12 properties on Longhurst Lane suffered flooding with 1 internally flooded and 1 property on Town Street also flooded internally. Flooding disrupted traffic on Longhurst Lane travelling between Marple Bridge and Mellor.

The flooding incident was passed to the Flood Risk Management Team at Stockport Council LLFA on the 22nd November 2016. A member of public supplied photographs of the flooding incident (Photos 1 and 2). Other photographs were taken during site visits following the flood event (Photos 3, 4, 5, 6, 7 and 8).

The site was inspected by Stockport Council LLFA and although flood waters had receded, photographs were taken and a blocked trash screen was found at the culvert inlet (Figures 3 and 4).

The watercourse is designated 'Main River' and so the EA was contacted and informed of the flooding event. Stockport Council was informed that the responsibility to clear the trash screen rests with the developer (PH Property (DCI) LLP).



Photo 1: Flooding on to Longhurst Lane (Source: member of public)



Photo 2: Flooding on to Longhurst Lane (Source: member of public)



Photo 3: Blocked trash screen at culvert inlet (Source: Stockport Council)



Photo 4: Cleared trash screen following flooding (Source: Stockport Council)



Photo 5: Overland flood flow channel with obstruction (Source: Stockport Council)



Photo 6: Overland flood flow channel following tree removal (Source: Stockport Council)



Photo 7: Overland flood flow channel with obstruction (Source: Stockport Council)



Photo 8: Overland flood flow channel to be reprofiled (Source: Stockport Council)

3.0 POSSIBLE CAUSES

The following observations were made during the investigation into the flooding incident that affected residential properties of Woodbrook Road, Longhurst Lane and Town Street, each of which may have contributed towards the flood event.

3.1 Inlet Trash Screen

There are two existing trash screens, one is installed with a head wall at the entrance into the culverted Cataract Brook and the other approximately 15 metres upstream of the headwall, both trash screens are currently being maintained by PH Property (DCI) LLP.

The trash screen on the culvert inlet was found to be totally blocked on the 21st November 2016. A blockage at the inlet will cause water to pond and flood the adjacent land. The trash screen design resulted in bar spacings at 100mm which could lead to increased risk of blockages and consequential flooding in the immediate area. The 'as constructed' trash screen bars had 50mm spacings.

3.2 Overland Flood Flow Channel

The residential properties in Woodbrook Road were constructed by PH Property (DCI) LLP between 2013 and 2015. Prior to the construction of the properties, Scott Hughes Design (SHD) were appointed by PH Property (DCI) LLP to prepare a Flood Risk Assessment (FRA) to support a planning submission for the new development known as 'Cataract Bridge Mill' off Longhurst Lane in Mellor, Stockport.

The assessment had been undertaken in line with the 'Planning Policy Statement 25 (PPS 25): Development and Flood Risk' criteria. The FRA had been commissioned to identify any flood related issues and any likely constraints that could be imposed and was prepared and issued on 24th January 2012. A recommendation to provide an overland flood flow path was made in section 7.0 of the FRA report regarding the necessity to demonstrate containment within the site of flooded areas for the critical 1% Annual Exceedance Probability (AEP) storm plus climate change and also to assess consequential flooding and flow paths of excess water when the 1% AEP plus climate change rainfall event is exceeded. An overland flood flow channel was provided by PH Property (DCI) LLP at the rear of proposed properties to allow flood water in excess of the 1% AEP plus climate change to discharge off the site and onto Longhurst Lane with proposed levels of the channel being 870mm below the level of threshold of each property.

A recent level survey of the channel and the threshold of the properties carried out by Stockport Council has indicated that the threshold level of each property only has a clearance of 0.489 to 0.494 metres from the highest point taken within the flood relief route. Level survey and visual site inspection of channel indicated that the channel has 15 metres of negative gradient acting as a resistance to the flow through the flood relief channel increasing flood risk to the rear of properties in Woodbrook Road.

Additionally, there were a number of obstructions along the overland flood flow channel that would have impeded the flow during the event which would have also been a factor in the flooding to the Woodbrook Road properties.

The most prominent obstruction along the overland flow route revealed to be five fences running perpendicular to the flow of water. These fences sat on top of the overland flow route have subsequently been removed by PH Property (DCI) LLP prior to the Section 19 investigation. A 'high-level' water mark which stained the first

fence/obstruction along the overland flow route shows the water level rose to 116.476 AOD. The as built high point at which water overflows onto Longhurst lane is 115.372 AOD, suggesting that the fences restricted the flow of water along the overland flow route resulting in the water level rising by 1.104m above the low point at which it is intended to overflow onto Longhurst Lane.

The other prominent obstruction is the presence of approximately ten trees along the overland flow route. The Highway Authority has subsequently removed one tree and Section 6 of the report recommends that the other work is carried out.

3.3 Culvert Condition

The EA have confirmed that a man entry survey of the culvert was undertaken following the flood event on 21st November 2016 and no structural or operational defects were found within the culvert that could have been a factor in the flood event.

4.0 RIGHTS AND RESPONSIBILITIES

4.1 Lead Local Flood Authority

As stated within the Introduction, Stockport Council as the LLFA has a responsibility to investigate flood incidents under Section 19 of the FWMA.

The LLFA also has a responsibility to maintain a register of assets which have a significant effect on flooding from surface runoff, groundwater or ordinary watercourses as detailed within Section 21 of the FWMA. The register must contain a record about each structure or feature, including the ownership and state of repair.

We will therefore be looking for support from other authorities to ensure flood incidents are reported, and any assets which are having a significant effect on flood risk are recorded on our register.

While we suggest possible causes of flooding of the residential properties at Woodbrook Road, we make recommendations to ensure flood risk is mitigated as far as possible, the FWMA does not provide Stockport Council with the mandate or funding to tackle all identified causes of flooding.

Stockport Council also have powers under Section 25 of the Land Drainage Act 1991 (LDA) to serve notice on any persons impeding the flow of a watercourse and causing an increase in flood risk.

4.2 Environment Agency

The EA has permissive powers to carry out maintenance work on Main Rivers under Section 165 of the Water Resources Act 1991 (WRA).

Cataract Brook is classified a Main River, however the frequency of EA maintenance activities is primarily risk based, and for this watercourse these activities comprise annual vegetation management and clearance of blockages as and when required.

Any third party assets on Cataract Brook, such as the access structures and culverts, are neither owned nor maintained by the EA. The EA's policy on third party assets is to notify third party owners of their asset forming part of a flood risk system, and assist by inspecting the assets and advising third party owners on their condition.

The EA will also encourage third party asset owners to maintain their property in satisfactory condition and take enforcement action where it is appropriate. They may consider undertaking maintenance or repair of third party assets only where it can be justified in order to safeguard the public interest and where other options are not appropriate.

Under the Environmental Permitting Regulations, a flood risk activity permit from the EA is required for any proposed works or structures, in, under, over or within 8 metres of the top of the bank of Cataract Brook which, is designated a 'main river'. Please check online at:

<https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>

4.3 United Utilities

United Utilities have confirmed that they do not have any records of properties on Longhurst Lane or Woodbrook Road (new development) to have suffered from sewer flooding.

4.4 Highways Authority

Stockport Council has a duty to maintain the highway under Section 41 of the Highway Act 1980. The western end of the culvert carries Longhurst Lane and is known as Cataract Bridge. This section of culvert under the highway is inspected and maintained by Stockport Council Highway Structures section and was relined in 2009.

4.5 Riparian Landowners

Riparian landowners are those who own land adjoining a watercourse. As detailed within the EA document 'Living on the Edge', riparian landowners have certain rights and responsibilities, including the following:

- they must maintain the bed and banks of the watercourse, and also the trees and shrubs growing on the banks;
- They must clear any debris, even if it did not originate from their land. This debris may be natural or man-made;
- They must keep any structures that they own clear of debris. These structures include culverts, trash screens, weirs and mill gates;
- If they do not carry out their responsibilities, they could face legal action.

Riparian landowners must understand and act upon these responsibilities. Stockport Council has proposed to write to some landowners in the borough highlighting the importance of this.

Under the Environmental Permitting Regulations, a flood risk activity permit from the EA may be required for any proposed works or structures, in, under, over or within 8 metres of the top of the bank of Cataract Brook which, is designated a 'main river'. Please check online at:

<https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>

4.6 Residents

Stockport residents who are aware that they are at risk of flooding should take action to ensure that they and their properties are protected. Community resilience is important in providing information and support to each other if flooding is anticipated.

Actions taken can include laying sandbags and moving valuable items to higher ground, to more permanent measures such as installing floodgates, raising electrical sockets and fitting non-return valves on pipes.

Anyone affected by flooding should try to document as much information about the incident as possible. Stockport Council should be contacted and will make a record of the details provided.

As Cataract Brook is classed a main river, residents are advised to report incidents (e.g. pollution, blockages and etc.) to the EA and contact floodline on 03459881188.

5.0 RECOMMENDATIONS

The method for prioritising works on watercourses varies for each risk management authority involved, and is dependent on factors such as resources available, operational area, and interpretation of flood risk. It is therefore important that all Risk Management Authorities are open and honest with the community about what actions will or won't be taken, and why.

A suitable solution to mitigate the flooding at the residential properties at Woodbrook Road would be:

- Consider designing a new two-stage trash screen at the headwall with increased bar spacing; the design of the new trash screen should be in accordance with the latest design versions on the EA.
- The overland flood flow channel is to be re-profiled with the level of the channel to be 870mm below the level of threshold of each property. In order to achieve this, the level of the footpath and the kerb adjacent to Longhurst Lane need to be lowered by 100mm and approximately 15 to 20 metres of the channel is to be re-profiled.
- An additional gully to be installed on Longhurst Lane to take excess flows from the channel, this should provide a solution to the flooding problem along Longhurst Lane.
- To excavate adjacent gully connection pipework into culvert and increase diameter from 150mm to 225mm.
- Any obstruction in the channel (e.g. trees and debris) needs to be removed and cleared. This includes the removal of trees within Highway verge.
- Consider the installation of an overflow drainage system to redirect flood flows from the overland flow channel back in to the culverted watercourse before it discharges on to Longhurst Lane. This could be achieved by the construction of a standard highway drainage system to catch flood water within the open land in a positive drainage system with direct connections on to the culvert and/or via. The existing manholes.

This section of the report contains general actions and community specific recommendations to mitigate the future flood risk as summarised within Table 1 below:

Authority/ Stakeholder	Recommended Actions
LLFA	<ul style="list-style-type: none">• Review feasibility of installation of overflow drainage system along flood flow route to redirect flood waters back to the culvert. Assess scheme for EA Grant-in-Aid funding for flooding mitigation works.• Facilitate sharing of information between Risk Management Authorities, and the community.• Keep a record of all flood incidents and significant flood risk assets within the area.• Support Stockport Council in serving notice on landowners where there is evidence flows are being impeded and increasing flood risk.• Stockport Council to ensure the owners of culverts and watercourses within the area are aware of their responsibilities.• Where the condition of a watercourse is such that ordinary flows are being impeded and the risk of flooding increased, Stockport Council should ensure the owner of that watercourse remedies the condition.

Highways Authority	<ul style="list-style-type: none"> • Consider reconstruction of the footpath and the kerb adjacent to Longhurst Lane to lower the level of the footpath along the flood flow route by 100mm • Consider re-profiling the verge/green area to allow run off to leave the site efficiently • Consider installing additional gully on Longhurst Lane to take excess flows from the channel as a mitigation measure in the event of a flood. • Consider excavating adjacent gully connection pipework into culvert and increase diameter from 150mm to 225mm. • Maintain efficient operation of the highway drainage network. • Ensure necessary maintenance is carried out to the local highway drains following flood events. • Consider ways to raise awareness of damage caused by driving through floods.
EA	<ul style="list-style-type: none"> • Review proposals from riparian owners for the trash screen modifications along with proposed inspection and maintenance schedules to mitigate the flood risk. • Consider taking ownership of the inspection and maintenance management for the trash screen. • Review borough wide flood management • Ensure watercourses are suitably maintained. • Review triggers levels for Flood Alerts in this area. • Ensure effective communication with the LLFA regarding flood events and potential flood issues.
Residents	<ul style="list-style-type: none"> • Take measures to protect themselves and their property when flooding is imminent. • Consider installation of Property Level Protection • Review home insurance • Document and photograph the incident, report flooding to the EA, Stockport Council and Highways.
Riparian Owner	<ul style="list-style-type: none"> • Investigate the feasibility of installing a new two stage trash screen at the headwall with increased spacing bars. The design of the new trash screen should be in accordance with the EA's trash screen design guidelines. • The overland flood flow channel is to be profiled with level of the channel to be 870mm below the level of the threshold of each property, as agreed at planning stage and approximately 15 metres of the channel to be re-profiled. • All remaining obstruction in the flood flow channel (e.g. trees and debris) need to be cleared and removed off site. • Investigate the feasibility of installing an overflow drainage system along flood flow route to redirect flood waters back to the culvert to mitigate flooding downstream through blockage at the trash screen. • Must maintain any culvert, or the bed and banks of any adjacent watercourse. • Clear away any debris from the watercourse or culvert, even if it did not originate from their land.

Table 1: Recommendations

Stockport Council may wish to highlight the potential for flood risk management solutions to be considered within the planning process, particularly as part of planning applications for larger developments in the area.

6.0 CONCLUSION

All flood risk authorities must continue working together, sharing information on any actions taken.

Recommended actions outlined in Section 5.0 of this report are to be investigated and assessed for progression to construction on site. Once these works are completed, flood risk from Cataract Brook at this site should be mitigated.

A full record of flooding incidents at the site must be kept in order for future planning applications to be assessed accurately.

USEFUL CONTACTS AND LINKS

Environment Agency

General Enquiries 08708 506 506 (Mon-Fri, 8am - 6pm)
Incident Hotline 0800 80 70 60 (24hrs)
EA Floodline 0345 988 1188 (24hrs)

Stockport Metropolitan Borough Council

Stockport Direct 0161 217 6111 (24hrs)

All calls may be charged

Highways Act 1980:

<http://www.legislation.gov.uk/ukpga/1980/66/contents>

Water Resources Act 1991:

<http://www.legislation.gov.uk/ukpga/1991/57/contents>

Land Drainage Act 1991:

<http://www.legislation.gov.uk/ukpga/1991/59/contents>

EA - 'Living on the Edge' a guide to the rights and responsibilities of riverside occupation. Direct link to gov.uk websites:

<http://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities>

EA - River and Coastal Maintenance Programmes:

<http://www.gov.uk/government/publications/river-and-coastal-maintenance-programme>

EA - Prepare your Property for Flooding:

How to reduce flood damage
Flood protection products and services
<http://www.gov.uk/prepare-for-flooding>

Stockport Council – Flooding in Stockport

<http://www.stockport.gov.uk/services/transport/highwayandstreetlightmaintenance/seweragedrainage/flooding>