Economic Regeneration, Growth & Environment

S19. (1) Flood Investigation Report

Engineering & Flood Risk Management Team

Warrington Borough Council – Lead Local Flood Authority

Date: May 2016

Location: Stone Pit Lane, Croft

Flood Investigation Reference Number: 2016/008/001

Version: Final 02

Revision Schedule: 2016/008/001 Flood Investigation

	Originator:	Checked by:	Reviewed by:	Approved by:
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Date February 2016 Final01	**Signature** 	**Signature** 	**Signature** 	**Signature**
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Document Status: Final01				

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Date May 2016 Final02	**Signature** 	**Signature** 	**Signature** 	**Signature** 
	Position Asset & Flood Risk Engineer	**Position** Engineering & Flood Risk Manager	**Position** Engineering & Flood Risk Manager	**Position** Engineering & Flood Risk Manager
Document Status: Final02 – Additional information added following drainage survey.				

Supporting Documents:

- **Drawing Number: LD2016/008/001revB General Arrangement Drawing and Levels.**

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1.0 Introduction

Following this flood event an investigation under Section 19 (1) of the Flood and Water Management Act was undertaken to determine which risk management authorities had relevant flood risk management functions and whether each of those risk management authorities had exercised or was proposing to exercise those functions in response to the flood. In accordance with Section 19 (2) of the Flood and Water Management Act this report details the results of the investigation.

2.0 Details of the Flood Events

Reference:	2016/008/001		
Location:	Stone Pit Lane, Croft		
Date of Flood Events:	26/12/2015	**Duration:**	unknown
Reason for investigation:	Internal Property Flooding of Business		
Identified Source:	Multiple blockages of culverted watercourse.		

3.0 Flood History

The Council is aware that flooding occurred to the carriageway on Stone Pit lane on 12 December 2014 which affected the entrance to Turret Hall and the Stables (See figure 1 below). The flood event was attended by Mr Jonathan Dawson-Parry (Asset & Flood Risk Engineer - Warrington Borough Council).

The cause of flooding was identified as a blockage of the inlet to a culvert due to vegetation growth. Removal of the vegetation was undertaken by the Highway Maintenance Team.

A further inspection was undertaken by Mr Jonathan Dawson-Parry on 15 December 2014 where it was observed that the flood water had receded (See figure 2 below).

Figure 1: Image of flooded ditch on 12 December 2014.

Figure 2: Image of ditch on 15 December 2014.

4.0 Flood Event: 26 December 2015.

4.1 Flooded Properties

According to the Department for Communities and Local Government:

The definition of a “flooded property” is a property (includes both homes and businesses), where flood water has internally entered the fabric of a building, this definition includes:

- Basements and below ground level floors;
- Garages, if they form part of the fabric of a building. However, garages adjacent to, or separate from the main building are not included;

- Occupied caravans and park homes, but not tents.

Warrington Borough Council is aware that 1 business was flooded.

Figure 3: Image of flooding on 26 December 2015 to stable yard provided by resident.

Figure 4: Image of flooding on 26 December 2015 to stable block provided by resident.

4.2 Affected Properties

According to the Department for Communities and Local Government:

The definition of an “affected property” is one where:

- Water has entered gardens or surrounding areas restricting access to a property; and/or
- Flooding has disrupted essential services to the property, such as utility services e.g. sewage, drinking water, gas, electricity etc;
- And for businesses, this includes those businesses where flood waters are preventing an enterprise from trading as usual.

Warrington Borough Council is aware that 2 residential properties and 1 business were affected.

It should be noted that Stone Pit Lane was severely affected by flooding (See figure 5 below).

Figure 5: Image of flooding on 26 December 2015 to Stone Pit Lane provided by resident.

4.3 Response

According to the Highways response log, the following actions were undertaken during the flood event on 26 December 2015:

- Flood signs deployed.
- Sandbags deployed.

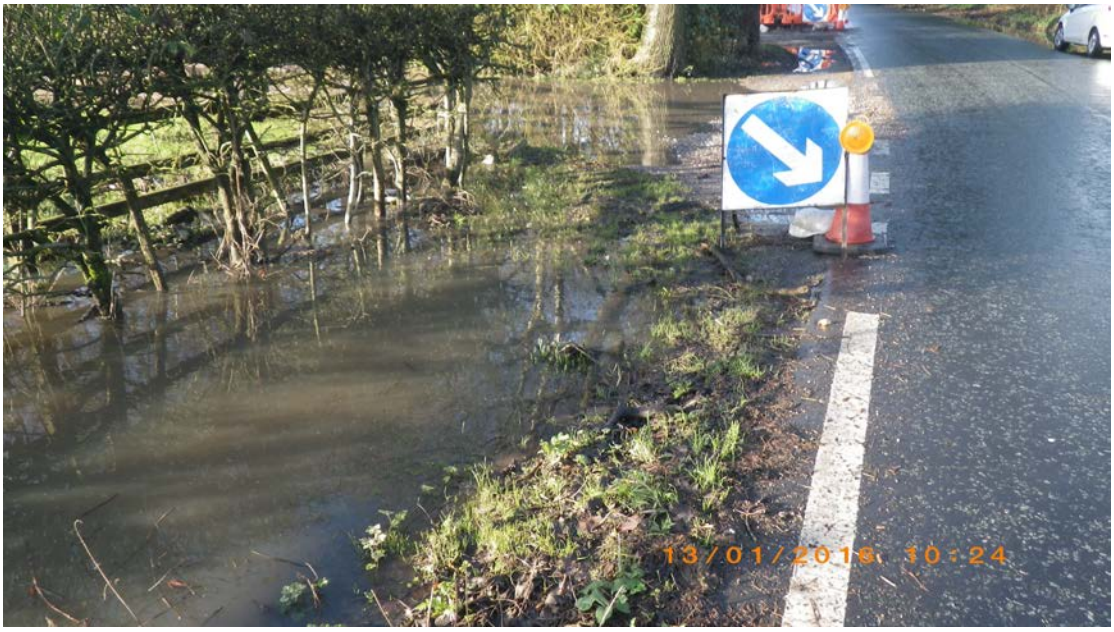
4.4 Site Visit (13 January 2016)

The following Officers from Warrington Borough Council attended the affected area on 13 January 2016 in order to discuss the flooding with affected customers and to gather information:

- Mr Jonathan Dawson-Parry (JDP)
  (Asset & Flood Risk Engineer: Warrington Borough Council)
- Mrs Laura Andrews (LA)
  (Highway Maintenance Engineer: Warrington Borough Council)

The above Officers witnessed that the water level in the ditch was still high and the entrance to The Stables and Turret Hall were still flooded.

Figure 6: Image of flooding observed on 13 January 2016 to Stone Pit Lane.



Prior to this, the issue was dealt with by the Highway Maintenance Team whom had dug down on the culvert adjacent to the entrance to Turret Hall in order to gain access to try and clear the blockage.

4.4.1 Customer Testimony

The Council Officers listed in section 4.4 discussed the flood event at length with Mr Anthony Sutcliffe of The Stables, Stone Pit Lane.

Mr Sutcliffe showed the Council Officers photographs taken during the flood event on 26 December 2015 and JDP agreed to look into the issue for Mr

Sutcliffe. Mr Sutcliffe kindly provided the photographs via e-mail to the Engineering & Flood Risk Team.

4.4.2 Engineering & Flood Risk Team Actions

Following the discussion with Mr Sutcliffe as detailed in section 4.4.1, JDP and LA returned to site approximately 30 minutes later with a drainage crew and high pressure vacuum tanker with root cutter in order to try and resolve the issue.

The crew was successful in removing four blockages from the pipe between the excavation and the outfall under the bridge near to the entrance to Kenyon Hall. It was the opinion of the crew that the blockages were as a result of tree roots.

Following the jetting and root cutting, the water began to drain quickly and the outfall for the culvert was observed under the bridge to be running full bore.

JDP attended site again on 15 January 2015 and observed that the water level had dropped significantly and that there was no flooding.

The following week, an access chamber was constructed on the culvert adjacent to the entrance to Turret Hall which will assist any future maintenance.

A headwall was constructed at the inlet to the culvert week commencing 09 May 2016 which should reduce the risk of future blockages.

As the culvert carries a watercourse, the ongoing maintenance is the responsibility of the riparian owner (the owner of property adjoining a watercourse). The riparian owner has a duty to maintain an open watercourse/culvert to ensure that the water passes through their land unobstructed. The limits of adopted highway are shown on drawing number LD2016/008/001revB and were taken from WiSDOM (Councils internal mapping system).

Figure 7: Extract from WiSDOM showing limits of highway adoption.

In order to confirm responsibility for the ongoing maintenance of the culvert, the Engineering and Flood Risk Team undertook a Land Registry Search.

As the exact alignment of the culverted watercourse was unknown, the Engineering & Flood Risk Team arranged that when the water levels had dropped, for specialist drainage contractors to attend the culvert in order to prove its exact alignment and as such define who is responsible for maintaining the culvert going forward. This work was undertaken on 15 April 2016, the survey showed that the system runs in highway before discharging via an outfall located within the abutment of Kenylo Bridge into Cockshot Brook (see section 5.3).

4.5 Widespread Flood Event Information

Widespread flooding affecting internal property, external property, carriageway and farmland was observed across Warrington on the 26th December 2015. Approximately 2500 sandbags were deployed by the Highway Maintenance Team.

4.6 Rainfall Information

4.6.1 Warrington Borough Council Rain Gauge

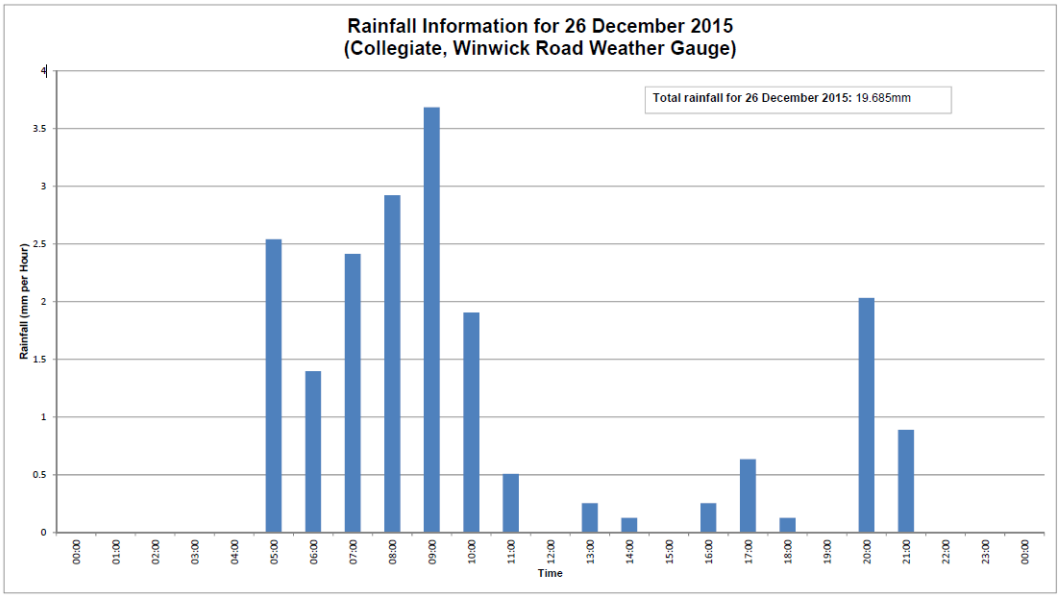
The Warrington Borough Council rain gauge is positioned at the Collegiate (Long Lane, Longford). It is a distance of approx. 3.2miles (5.1km) south west from Stone Pit Lane, Croft.

9.271mm of rain fell on the Warrington Borough Council rain gauge at the Collegiate on 25 December 2015.

19.685mm of rain fell on the Warrington Borough Council rain gauge at the Collegiate from 05:00 to 21:00 on 26 December 2015. (See figure 8)

The rainfall data shows that no rain fell on 27 December 2015.

Figure 8: Rainfall information.



4.6.2 Environment Agency Rain Gauge

The Environment Agency rain gauge is positioned at Richard Fairclough House (Wash Lane, Latchford). It is a distance of approx. 4.7miles (7.5km) south from Stone Pit Lane, Croft.

According to the Environment Agency rain gauge at Richard Fairclough House, the following rainfall was observed:

- 25 December 2015: 18.17mm
- 26 December 2015: 6.32mm
- 27 December 2015: 0.00mm

4.6.3 Rainfall Conclusion

Due to the stochastic nature of rainfall, the above rainfall data may only be used indicatively.

Although the rainfall experienced at the Collegiate and Richard Fairclough House appears to be moderate, this is only in relation to these locations and the rainfall experienced at Stone Pit Lane may have been much heavier.

Rainfall information obtained from the Environment Agency on 23 February 2016 for the Sweetloves Wastewater Treatment Works which is located off Whitehill Lane, Bolton (approximately 12miles north east of Stone Pit Lane, Croft) shows the following rainfall observations:

- 25 December 2015: 26.4mm
- 26 December 2015: 58.4mm

- Total Rainfall over two days: 84.8mm

Information provided by the Environment Agency shows that during the flood event on 26 December 2015, the gauging station at Atherton Lake Brook which is a tributary of Glaze Brook recorded flows which were in excess of the flows for an estimated return period of 1 in 1000 year, this would indicate that there was significant rainfall in the area. The gauging station at Atherton Park Brook is approximatly 4.7miles north east from the affected area on Stone Pit Lane, Croft.

The return period is an estimate of how often a flood of a given size can be expected to occur and, since less frequent floods are more extreme, the 1000 year event would be bigger than the 100 year flood.

The probability that a flood with a particular return period will occur is the same every year and does not depend how long it was since a flood of this size last occurred.

The fact that extreme flows were recorded on a nearby watercourse may also indicate that flow levels were high on Cockshot Brook which would prevent the water from discharging from the drainage system. It should be noted that

there appears to be no non-return mechanism on the outfall from the culverted section of watercourse into Cockshot Brook. This may result in water backing up the culvert during times of high flow on Cockshot Brook.

Significant amounts of overland flow were observed on Heath Lane as can be seen in figure 9 & 10 (approx. 450m east from the affected area on Stone Pit Lane) on 26 December 2015 (Video provided by resident of Heath Lane).

It may be that the weather front which resulted in the rainfall at Sweetloves Wastewater Treatment Works and caused extreme flows on Atherton Lake Brook passed over Stone Pit Lane. It is noted from December 2015 weather summary on the Met Office website that "*Storm Eva brought further strong winds and heavy rain on Christmas Eve, followed by a further depression on 25th to 26th which brought heavy rain across north Wales and northern England*."

Figure 9: Image showing overland flow at Heath Lane on 26 December 2015 (taken from video footage provided by resident).

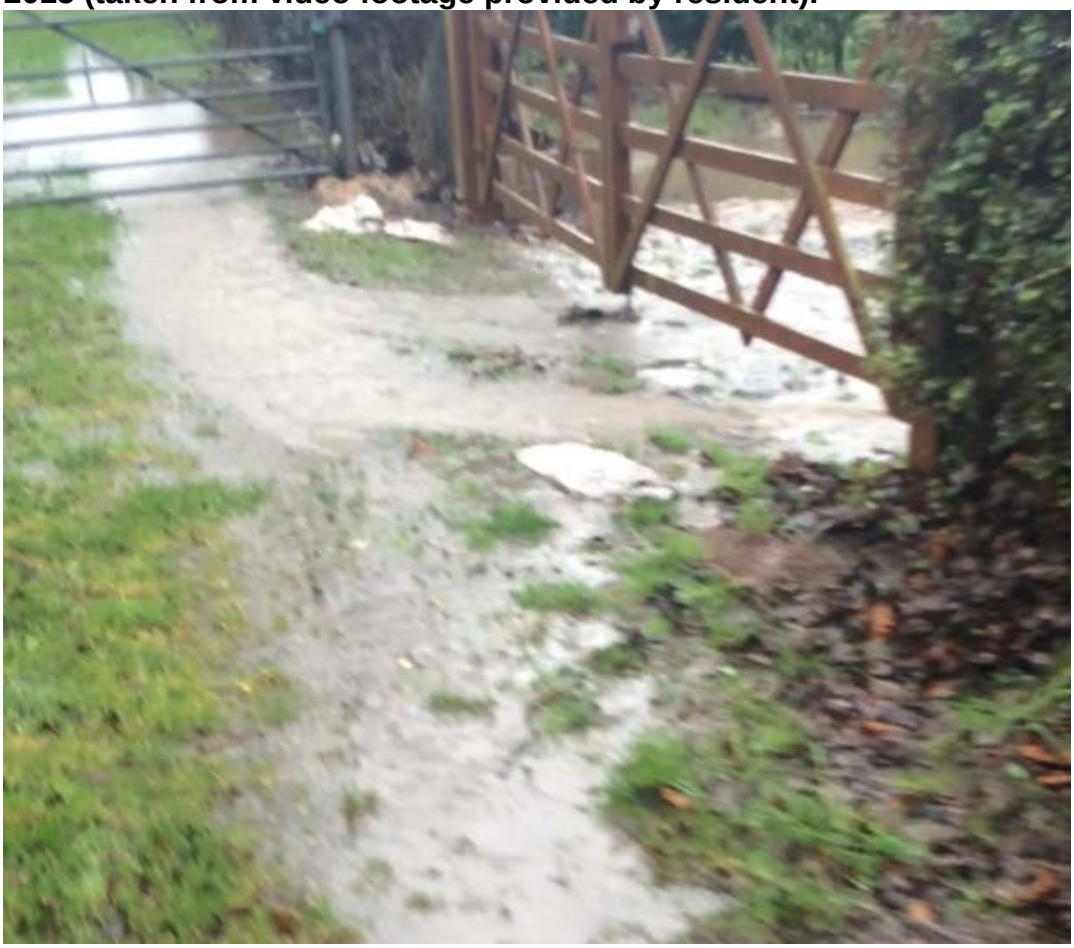


Figure 10: Image showing overland flow at Heath Lane on 26 December 2015 (taken from video footage provided by resident).

5.0 Catchment Characteristics

5.1 Catchment Land Use

The area surrounding Stone Pit Lane, Croft is predominantly greenfield land consisting of agricultural land.

5.2 Topography

LiDAR (Light Detection And Ranging) topographical data coverage for the area surrounding Stone Pit Lane is excellent quality with 1m resolution data available. Spot levels are provided on drawing number LD2016/008/001revB.

It appears that the surrounding land slopes generally in an east to west direction towards Cockshot Brook.

It should be noted that the entrance to Turret Hall/The Stables is approximately 3.5metres lower than the stables where internal business

flooding occurred and is a localised low spot. It is shown as being at high risk on the Environment Agency Risk of Flooding from Surface Water Mapping.

In respect of the flooding to The Stables, micro topography [which is not visible on the LiDAR data] such as the level of the buildings compared to the surrounding land/kerbing may have played a significant role in channelling the water.

Figure 11: Lidar Data shown as coloured height map.

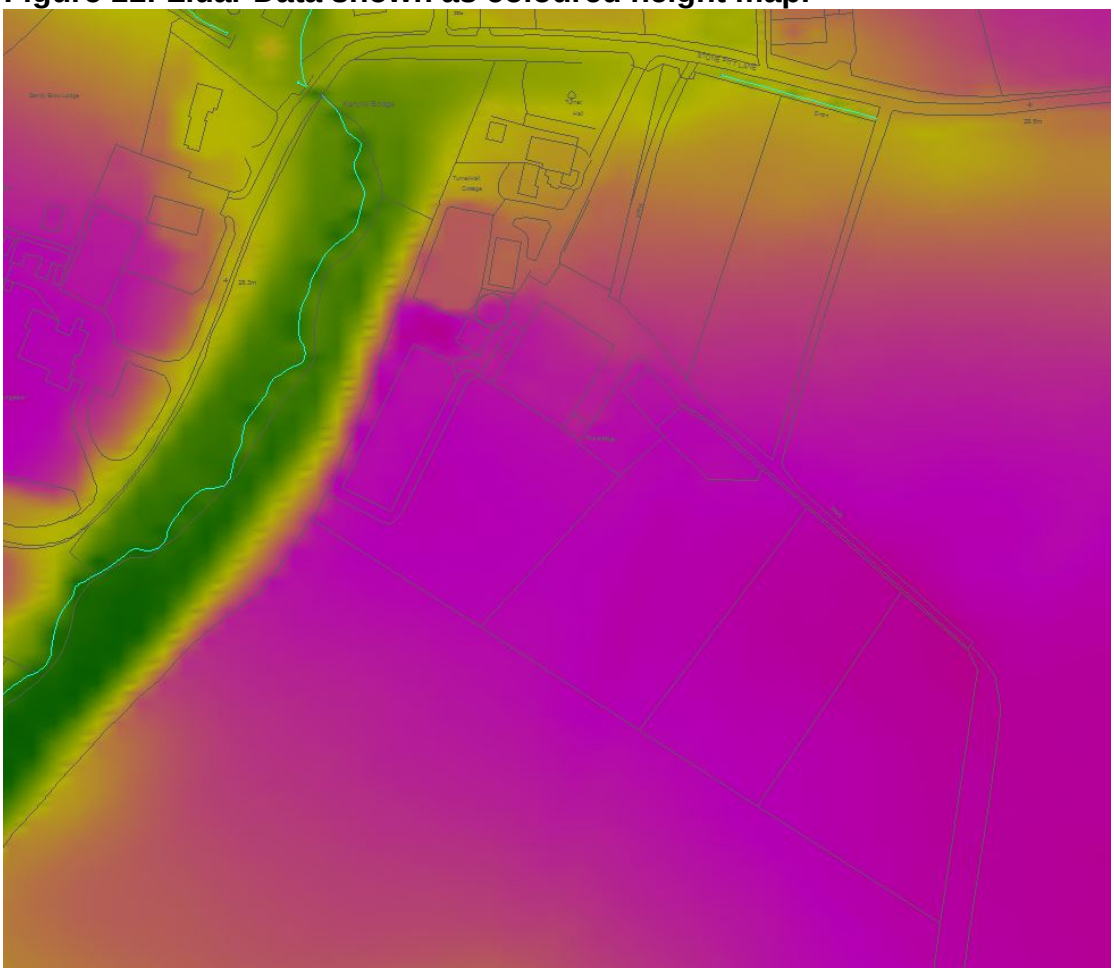
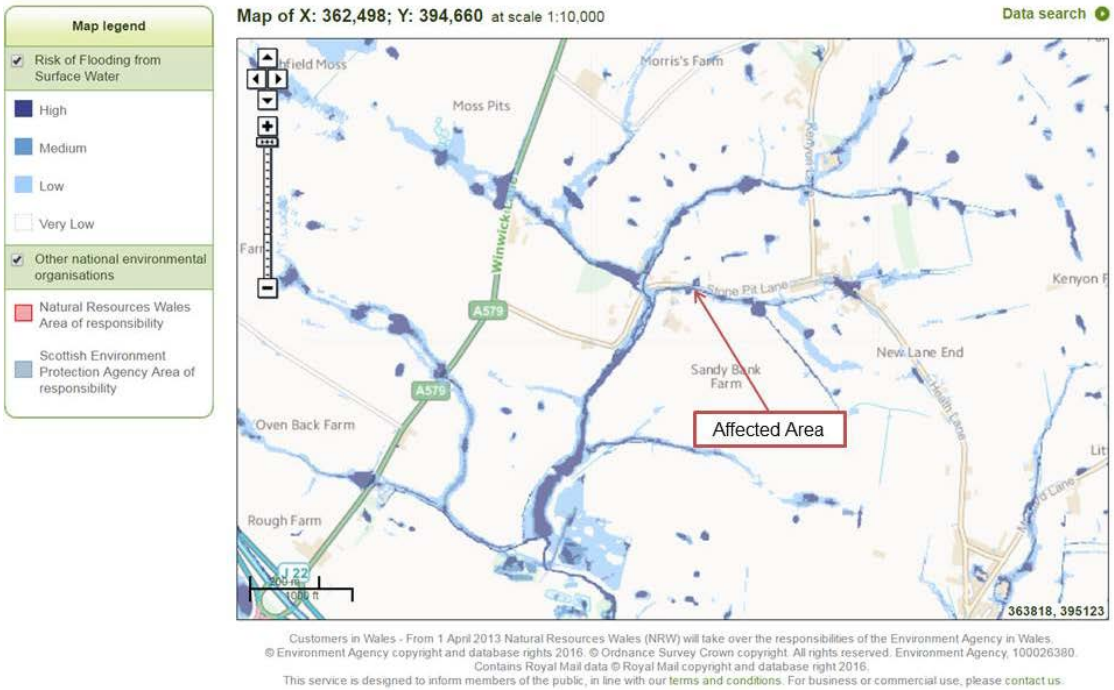


Figure 12: Extract of Environment Agency Risk of Flooding from Surface Water Mapping.

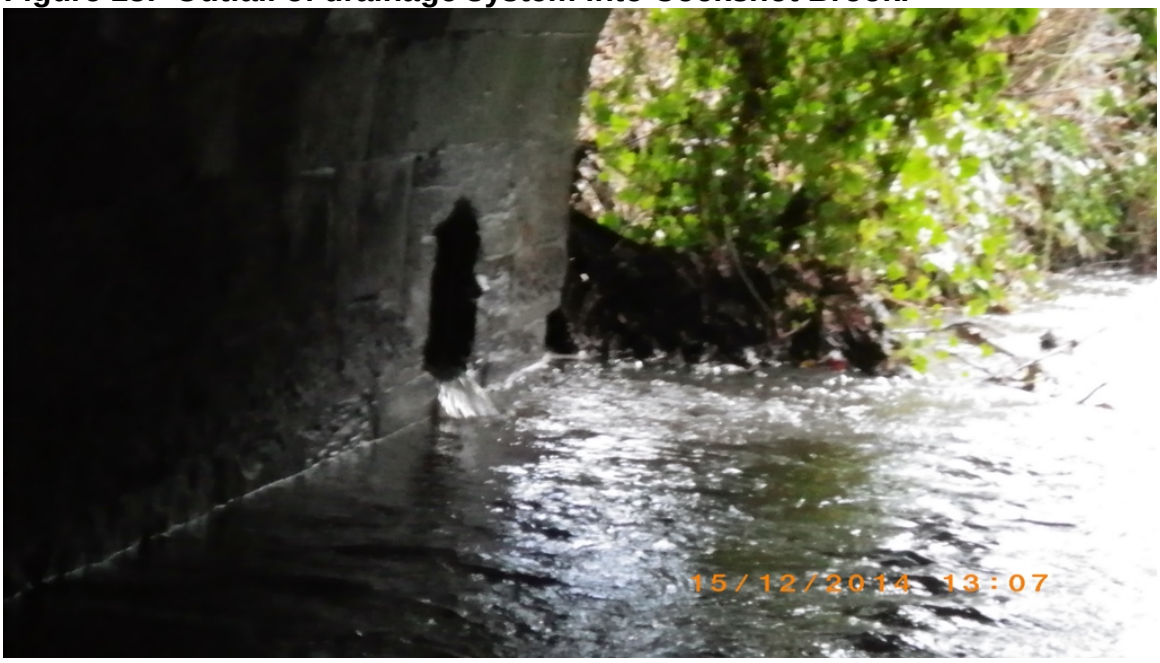


5.3 Watercourse Network

The nearest open watercourse to the flooded area is a section of open ditch approximately 60 metres in length adjacent to Stone Pit Lane (north of The Stables).

Downstream the ditch is culverted through to an outfall located within the abutment of Kenylo Bridge into Cockshot Brook approximately 120m to the west of the flooding area.

Figure 13: Outfall of drainage system into Cockshot Brook.



Upstream of the ditch the watercourse is culverted for approximately 115m where it receives flow from a pond.

The pond receives flow from an open ditch to the west (approximate 115m in length) which becomes culverted to the rear of 117, 119, 123 and 125 Stone Pit Lane for 43m by a UPVC pipe with an internal diameter of 600mm and then becomes open again for 12.5m to the rear of 115 Stone Pit Lane.

The watercourse then becomes culverted by a 450mm internal diameter pipe and runs through the grounds of 103 and 105 Heath Lane across the highway to a manhole adjacent to a farm track and 116 Heath Lane.

The manhole receives flow from a 150mm egg shaped land drain and a 225mm pipe from the direction of the farm track. The origin of these systems is not known.

6.0 Conclusions

It is the conclusion of Warrington Borough Council that the flooding which occurred on 26 December 2015 to “The Stables” would appear to have been due to surface water runoff from the surrounding fields.

It is the conclusion of Warrington Borough Council that the flooding which occurred on 26 December 2015 to Stone Pit Lane and the accesses to “The Stables” and “Turret Hall” would appear to have been due to blockage of the culvert from the drainage ditch to the outfall into Cockshot Brook causing the ditch to overflow. It may also be that the water level was high in Cockshot Brook further reducing the efficiency of the drainage system as well as excessive overland flow entering the system.

7.0 Actions

The following are recommended but not binding actions.

7.1 Warrington Borough Council

7.1.1 Actions Completed

- Jet culvert to remove blockages.
- Root cut culvert.
- Install manhole to improve access.
- Install headwall at inlet to culvert.
- Confirm alignment of watercourse and confirm appropriate riparian owner.

7.1.2 Outstanding Actions

- Non to note.

7.1.3 Ongoing Actions

- Warrington Borough Council to continue to liaise with the relevant riparian owners as necessary.

- Warrington Borough Council to continue to monitor condition of ditch and culverted watercourse on Stone Pit Lane and undertake action as appropriate.

- Warrington Borough Council to continue to undertake gully cleansing on Stone Pit Lane.

8.0 Disclaimer

Although every effort has been taken to ensure the accuracy of the information contained within the pages of this report, we can't guarantee that the contents will always be current, accurate or complete.

This report has been prepared as part of Council's responsibilities under the Flood and Water Management Act 2010 as Lead Local Flood Authority (LLFA).

The findings of this report are based on a subjective assessment of the information available to those undertaking the investigation and therefore may not include all relevant information. Therefore it shouldn't be considered as a definitive assessment of all factors that may have triggered or contributed to the flood event.

The opinions, conclusions and any recommendations in this report are based on our assumptions when preparing this report, including, but not limited to those key assumptions noted in the reports, including reliance on information provided by third parties.

The Council expressly disclaims responsibility for any error in, or omission from, this report arising from or in connection with any of the assumptions made being incorrect. The opinions, conclusions and any recommendations in these reports are based on conditions encountered and information reviewed at the time of preparation and the Council expressly disclaims responsibility for any error in, or omission from, this report arising from or in connection with those opinions, conclusions and any recommendations.

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All users are asked to advise the Engineering & Flood Risk Team of any changes in circumstances or information that may materially affect this investigation.

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This document will be reviewed following any new information being received in relation to the flood event and its causes/effects.

Line of Culverted Watercourse proven 15 April 2016 (Section of culverted watercourse with 4 blockages)

Access Chamber constructed week commencing 18 January 2016.

Line of Culverted Watercourse

Outfall into Cockshot Brook located within the abutment of Kenylo Bridge.

Headwall installed week commencing 09 May 2016.

Poultry Farm

Tanks

220

220a

Green Bank

Track

MH1

IN1

OF1

Kenylo Bridge

STONE PITT LANE

Drain

27.700

27.740

29.6m

Sandy Brow Lodge

Turret Hall

Turret Hall Cottage

Sandy Bank Farm

28.3m

30.340

30.560

30.400

31.390

The stables

31.750

32.100

32.120

31.840

31.920

32.030

32.740

32.420

The Bungalow

NOTES

Site Location
Stone Pit Lane,
Croft, Warrington

OS X (Eastings) : 362487
OS Y (Northings): 394793
Nearest Post Code: WA3 7DZ

Key

Line of culverted watercourse

Limt of highway adoption (according to Wisdom)

Revn.	Revision Details	Rev by	Chk by	Date:
B	Alignment of culvert updated	JSP	JWT	29/07

WARRINGTON Borough Council

Economic Regeneration, Growth and Environment Directorate

Transport and Environment
New Town House, Buttermarket Street, Warrington WA1 2NH

Project
LD2016/008
Flood Investigation Report
Stone Pit Lane, Croft

Drawing Title
General Arrangement Drawing and Levels

Drawn by J S Dawson-Parry e-mail jparry@warrington.gov.uk
Approved by J W Turton Telephone 01925 442534
Date 23 March 2016 Fax 01925 443255

Sheet 1 of 1

Scales: Not to Scale

Drawing No.: LD2016/008/001

Phase / Revision: B

AutoCAD File Ref: LD2016-008-001.dwg