



◆ **DAVID SMITH ASSOCIATES** ◆ Consulting Structural & Civil Engineers ◆
◆ London ◆ Northampton ◆ Cirencester ◆ Birmingham ◆
www.dsagroup.co.uk

FLOOD INVESTIGATION REPORT

YELVERTOFT

23rd DECEMBER 2020

Client: Flood and Water Management
West Northamptonshire Council
One Angel Square
4 Angel Street
Northampton
NN1 1ED

Prepared By: David Smith Associates

Date: 9th March 2023

Reference: 21/43269

Revision: 04

VAT Registration No.: 670 8636 12

Eur Ing **David Smith** BSc(Hons), C.Eng, MICE, FStructE, CMAPS, MFPWS, FCABE, ACI Arb,
Hitesh Jethwa BSc Eng (Hons), I.Eng, AMIStructE **Steven Ainge** B.Eng (Hons), I.Eng, AMIStructE
Thomas Garrod B.Eng (Hons), **Ben Mason** BSc (Hons), I.Eng, MICE



London
16 Upper Woburn Place
London
WC1H 0AF
0203 741 8042
london@dsagroup.co.uk

Northampton
8 Duncan Close
Moulton Park
Northampton, NN3 6WL
01604 782620
northampton@dsagroup.co.uk

Cirencester
Waterloo House
The Waterloo
Cirencester, GL7 2PY
01285 657328
cirencester@dsagroup.co.uk

Birmingham
Central Boulevard,
Blythe Valley Business Park
Solihull, B90 8AG.
01564 711008
birmingham@dsagroup.co.uk



Our Privacy Notice can be viewed by visiting www.dsagroup.co.uk/privacy-policy

REVISION SCHEDULE

West Northamptonshire Council
Flood Investigation Report
Yelvertoft

David Smith Associates Reference: 21/43269

Rev	Date	Details	Author	Checked	Approved
01	19/07/22	Draft Report.	Bob Turrell (David Smith Associates)	Ruth Burnham (Senior Flood & Water Officer, WNC)	Simon Bowers (Assistant Director Assets & Environment, WNC)
02	26/10/22	Draft Report.	Bob Turrell (David Smith Associates)	Ruth Burnham (Senior Flood & Water Officer, WNC)	Simon Bowers (Assistant Director Assets & Environment, WNC)
03	08/03/23	Revision following additional information/consultation.	Bob Turrell (David Smith Associates)	Ruth Burnham (Senior Flood & Water Officer, WNC)	Simon Bowers (Assistant Director Assets & Environment, WNC)
04	08/03/23	Addresses redacted. Public version.	Bob Turrell (David Smith Associates)	Ruth Burnham (Senior Flood & Water Officer, WNC)	Simon Bowers (Assistant Director Assets & Environment, WNC)

FOREWORD

One of the roles of West Northamptonshire Council (WNC) as the Lead Local Flood Authority (LLFA) is to carry out investigations into flooding incidents if they meet the set thresholds.

The LLFA will:

- Identify and explain the likely cause/s of flooding;
- Identify which authorities, communities and individuals have relevant flood risk management powers and responsibilities;
- Provide recommendations for each of those authorities, communities and individuals; and
- Outline whether those authorities, communities or individuals have or will exercise their powers or responsibilities in response to the flooding incident.

The LLFA cannot:

- Resolve the flooding issues or provide designed solutions; or
- Force Authorities to undertake any of the recommended actions.

CONTENTS

- EXECUTIVE SUMMARY..... 6
- 1. INTRODUCTION 8
 - 1.1 Lead Local Flood Authority Investigation 8
 - 1.2 Method of Investigation 9
- 2. RAINFALL ANALYSIS 10
- 3. FLOODING HISTORY..... 11
 - 3.1 Previous Reports of Flooding 11
- 4. LOCATION OF FLOODING 13
 - 4.1 Location in Context..... 13
- 5. DRAINAGE SYSTEMS & WATERCOURSES 16
 - 5.1 Drainage Systems General 16
 - 5.2 Natural Watercourses 16
 - 5.3 Drainage Systems 17
 - 5.4 Flood Resilience..... 18
- 6. DESCRIPTION OF FLOOD EVENT 18
 - 6.1 Rainfall and Flood Water 18
 - 6.2 Response to Flooding 20
- 7. CONCLUSION 22
- 8. RECOMMENDATIONS..... 24
 - 8.1 General 24
 - 8.2 Communities 24
 - 8.3 West Northamptonshire Council (WNC)..... 26
 - 8.4 Environment Agency (EA)..... 27
 - 8.5 Highway Authority –Northamptonshire Highways (NH)..... 27
 - 8.6 Water Company – Severn Trent Water (STW) 28
 - 8.7 Developers..... 28
- 9. RIGHTS AND RESPONSIBILITIES 29
 - 9.1 Communities 29
 - 9.2 West Northamptonshire Council (WNC)..... 29
 - 9.3 Environment Agency (EA)..... 30
 - 9.4 Highway Authority –Northamptonshire Highways 31
 - 9.5 Water Company (Severn Trent Water) (STW)..... 31
 - 9.6 Land Owners and Developers..... 32

DISCLAIMER 33
ACRONYMS 34
USEFUL LINKS 34
USEFUL CONTACTS 35

Appendix A

 Catchment Plan

Appendix B

 Incident Plan

Appendix C

 Photographs

Appendix D

 Photographs

Appendix C

 Environment Agency Standard Notice

EXECUTIVE SUMMARY

This Flood Investigation Report (FIR) has been completed by David Smith Associates on behalf of West Northamptonshire Council (WNC) under its duties as the Lead Local Flood Authority (LLFA) in accordance with [Section 19 of the Flood and Water Management Act 2010 \(F&WMA\)](#).

Statutory Context

Section 19 of the F&WMA states that on becoming aware of a flood which meets certain pre-determined criteria, the LLFA must undertake a formal flood investigation in order to determine the relevant flood risk management authorities involved and which flood risk management functions have been, or should be taken to mitigate future flood risk. Where an authority carries out an investigation it must publish the results.

Within the Northamptonshire Local Flood Risk Management Strategy, the approved thresholds for undertaking a FIR are:

A formal flood investigation will be carried out if one or more of the following occurs:

- Flooding affecting critical infrastructure* for more than three hours from the onset of flooding;
- Internal flooding** of a building has been experienced on more than one occasion in the last five years; and/or
- Internal flooding of five buildings in close proximity*** has been experienced during a single flood incident.

* Those infrastructure assets (physical or electronic) that are vital to the continued delivery and integrity of essential national services, the loss or compromise of which would lead to severe economic or social consequences, or to loss of life.

** A situation in which a building (commercial or residential) has been flooded internally, i.e. water has crossed the threshold and entered the building. This includes;

- Basements and ground level floors of the building;
- Garages/outbuildings if they are integral to the main occupied building. Garages adjacent or separate from the main occupied building are not included;
- Occupied static caravans and park homes. Tents are not included.

*** Where it is reasonable to assume that the affected properties were flooded from the same source, or interaction of sources, of flooding.

See over for additional notes

Notes:

- The LLFA will not investigate incidents of structural dampness or where basements are affected by groundwater entering through cracks in the basement walls or floor.
- In the event that the cause of, and the responsibility for addressing the flooding is well understood, no formal investigation will be undertaken.
- The LLFA will only undertake a flood investigation if the incident is formally reported within nine months of the flood event occurring.
- In addition to internal flooding of occupied buildings, affected properties shall also include those properties (commercial or residential) where water has entered gardens or surrounding areas which restricts access, or where flooding has disrupted essential services to the property such as sewerage or electricity supply. For businesses, this includes those where the flood waters are directly preventing normal trading practices.

Flooding Incident

It was deemed necessary to complete a formal investigation into the flood incident at Yelvertoft that occurred on Wednesday 23rd December 2020. Internal flooding of more than five buildings in close proximity was experienced during a single flood incident. Some also experienced internal flooding less than five years ago. This meets the threshold for investigation as set out above.

Cause of Flooding

The flooding was caused by intense heavy rainfall over a relatively short period of time. Surface water drainage systems and watercourses were unable to collect and convey rainwater effectively. This led to excess surface water flowing over ground following localised ground levels to low points around properties.

Main Conclusion

Following this report, the local community and relevant authorities must continue to work together, sharing information and reports, and consider implementing the key recommendations set out in Section 8 of this report.

1. INTRODUCTION

1.1 Lead Local Flood Authority Investigation

1.1.1 Purpose of Investigation

1.1.1.1 Section 19 of the Flood and Water Management Act (F&WMA) 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.

Within the Northamptonshire Local Flood Risk Management Strategy the thresholds for undertaking a Formal Investigation Report in the County have been determined as:

A formal flood investigation will be carried out if one or more of the following occurs:

- Flooding affecting critical infrastructure* for more than three hours from the onset of flooding;
- Internal flooding** of a building has been experienced on more than one occasion in the last five years; and/or
- Internal flooding of five buildings in close proximity*** has been experienced during a single flood incident.

* Those infrastructure assets (physical or electronic) that are vital to the continued delivery and integrity of essential national services, the loss or compromise of which would lead to severe economic or social consequences, or to loss of life.

** A situation in which a building (commercial or residential) has been flooded internally, i.e. water has crossed the threshold and entered the building. This includes;

- Basements and ground level floors of the building;
- Garages/outbuildings if they are integral to the main occupied building. Garages adjacent or separate from the main occupied building are not included;
- Occupied static caravans and park homes. Tents are not included.

*** Where it is reasonable to assume that the affected properties were flooded from the same source, or interaction of sources, of flooding.

See over for additional notes

Notes:

- The LLFA will not investigate incidents of structural dampness or where basements are affected by groundwater entering through cracks in the basement walls or floor.
- In the event that the cause of, and the responsibility for addressing the flooding is well understood, no formal investigation will be undertaken.
- The LLFA will only undertake a flood investigation if the incident is formally reported within nine months of the flood event occurring.
- In addition to internal flooding of occupied buildings, affected properties shall also include those properties (commercial or residential) where water has entered gardens or surrounding areas which restricts access, or where flooding has disrupted essential services to the property such as sewerage or electricity supply. For businesses, this includes those where the flood waters are directly preventing normal trading practices.

1.1.2 Flood Incident

- 1.1.2.1 It was deemed necessary to complete a formal investigation into the flood incident at Yelvertoft that occurred on Wednesday 23rd December 2020. Internal flooding of more than five buildings in close proximity was experienced during a single flood incident. Some also experienced internal flooding less than five years ago. This meets the threshold for investigation as set out above.

1.2 Method of Investigation**1.2.1 Information Provided**

- 1.2.1.1 WNC provided relevant mapping and data to assist with the investigation. This included local authority asset maps, geology and groundwater flood risk maps, records of past flood events and rainfall data.
- 1.2.1.2 WNC provided specific addresses and contact details of properties that had reported flooding to the Flood Toolkit website. Some limited details were provided of other properties where flooding had been reported anecdotally, or through other local authorities.

1.2.2 Site Meetings

- 1.2.2.1 A site visit to the area of flooding was carried out by the Investigating Officer at DSA on Friday 14th May 2021. This allowed a visual inspection of the general topography and relevant features. Arrangements were made to visit affected property occupiers who had formally reported flooding to discuss this further and observe the mechanism and impact of the flooding on site.
- 1.2.2.2 Representatives of Yelvertoft Parish Council attended, who had also invited affected residents to discuss the flooding.

1.2.3 Local Authority Engagement

1.2.3.1 Local Authorities with flood risk management roles were consulted to understand their response to the flood incident.

1.2.3.2 These included

- WNC Flood and Water Management Team
- WNC Emergency Planning Team (EP)
- Environment Agency (EA)
- Northamptonshire Highways (NH)
- Severn Trent Water (STW)
- Northamptonshire Fire and Rescue (F&R)

2. RAINFALL ANALYSIS

2.1.1 General Description

2.1.1.1 Reference is made to the following:

- Hydrological Summary for the United Kingdom, November/December 2020. The National Hydrological Monitoring Programme (NHMP)
<https://nrfa.ceh.ac.uk/monthly-hydrological-summary-uk>
- Monthly Water Situation Report, England, December 2020. Environment Agency.
<https://www.gov.uk/government/collections/water-situation-reports-for-england>
- UK Climate Averages, Met Office.
<https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/>
- Local rain gauge readings provided by the EA.

2.1.1.2 In the preceding months of 2020 rainfall levels were slightly above average, although November was relatively dry.

2.1.1.3 The long term average monthly rainfall for December is 60mm. In the week prior to 23rd December 2020 approximately 18mm of rainfall was recorded which equates to 30% of the monthly average. This would have caused some saturation of catchments.

2.1.1.4 On 23rd December, approximately 36mm of rainfall was recorded between 09:15 and 22:15. This equates to 60% of the monthly average falling in a 13 hour period. There was a peak at 11:45 where 7.2mm of rain was recorded in a 60 minute period. A second peak occurred at 19:30 where 4.2mm of rain was recorded in a 60 minute period.

2.1.1.5 This quantity of rain falling on a partially saturated catchment would lead to relatively high levels of surface water runoff from the catchment.

2.1.1.6 The rainfall total in the region for December 2020 was 192% of the long term average, or nearly double.

2.1.2 Weather and Flood Warnings

- 2.1.2.1 The MET Office issued a yellow weather warning of heavy rain in Northamptonshire. This warned to expect heavy rain (20-40mm in most places with 50-70mm in a few areas) which could result in flooding.
- 2.1.2.2 The Environment Agency issued at least 24 Flood Warnings and 24 Flood Alerts through the day, covering rivers in Northamptonshire.
- 2.1.2.3 A guide to Met Office Weather Warnings can be found at:
<https://www.metoffice.gov.uk/guide/weather/warnings>
- 2.1.2.4 The Gov.uk 5 day flood risk forecasts can be found at:
<https://flood-warning-information.service.gov.uk/5-day-flood-risk>
- 2.1.2.5 A guide to Environment Agency flood warnings can be found at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/311020/flood_warnings_LIT_5215.pdf

3. FLOODING HISTORY

3.1 Previous Reports of Flooding

- 3.1.1.1 Reference has been made to the March 2016 Flood Investigation Report for Yelvertoft which can be found at <https://www.floodtoolkit.com/wp-content/uploads/2017/03/Yelvertoft-Section-19-Report-v3.2-FINAL.pdf>
- 3.1.1.2 Reference is also made to the 2015 Community Flood Risk and Mitigation Investigation & Community Drainage Maintenance Plan, which can be found at https://www.floodtoolkit.com/wp-content/uploads/2021/10/17349_YEL_Report_Rev01_211015.pdf
- 3.1.1.3 The following table lists flooding incidents that have been recorded in the area of the flood incident:

Date	Details
1968, July 1973, February 1980	Property on Swinnertons Lane flooded.
1992	Flooding at Crick Road and Swinnertons Lane
Easter 1998	Between 26 and 30 properties in the village recorded as being affected.
06/11/2000	One property internally flooded on School Lane
10/01/2007	Crick Road was reported to be almost impassable. 1 property had nearly 2ft of water in the property and required pumping by the fire service. 5 properties reported water in gardens
22/06/2007	Swinnertons Lane flooded.
2009	Clay Coton Road flooded, Surface water from pond and path
2011	Clay Coton Road flooded, Surface water from pond and path
21/11/2012	Crick Road – War Memorial. Highway flooding 1ft deep
22/11/2012	Flooding to High Street and Swinnertons Lane. At least one property on Swinnertons Lane understood to be internally flooded
25/11/2012	Flooding to Ashwells Lane
09/03/2016	Internal flooding to approximately 15 properties in village.
23/12/2020	Internal flooding to: 3 x properties on High Street 1 x property on Swinnertons Lane 1 x property on School Lane Near miss/external flooding to: 1 x property on Elkins Close 2 x properties on High Street 1 x property on Swinnertons Lane escaped flooding with use of Property Flood Resilience measures (pumps) Wards Lane generally.

4. LOCATION OF FLOODING

4.1 Location in Context

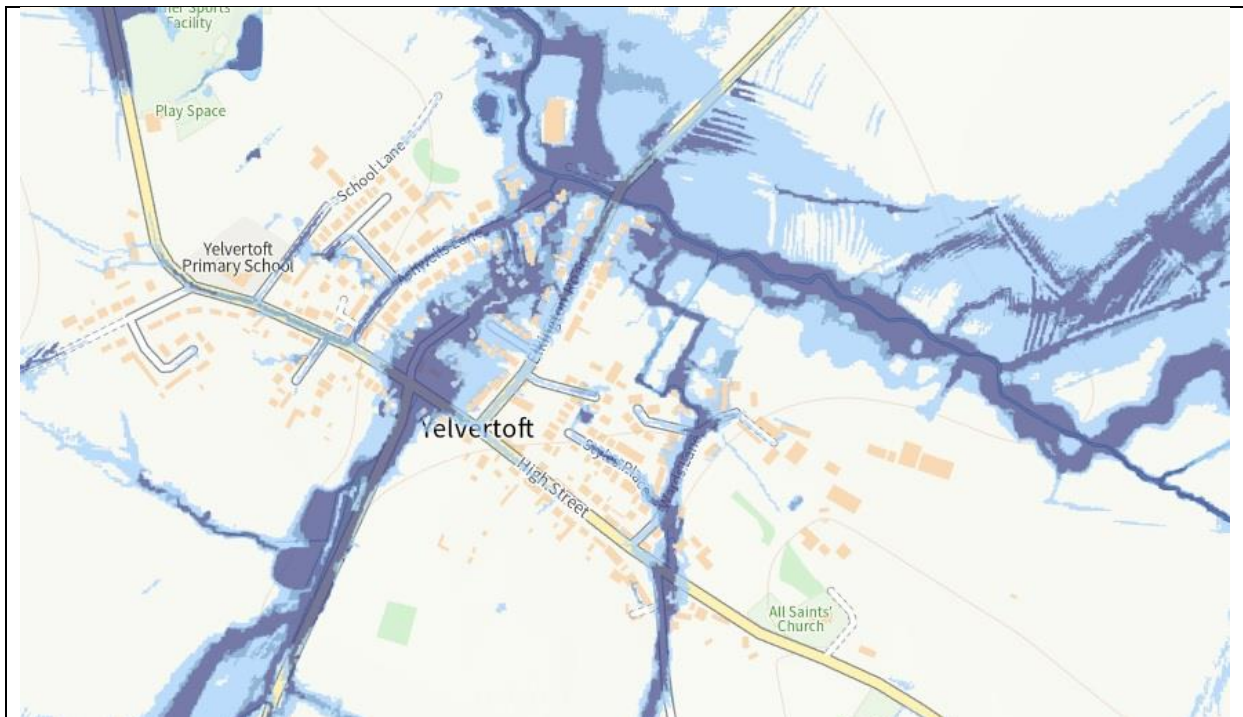
4.1.1 Catchment Area

- 4.1.1.1 Yelvertoft is located approximately 21km northwest of Northampton and 9km east of Rugby. It is in the catchment of the River Avon which flows east to west approximately 4km northwest of the village.
- 4.1.1.2 A tributary of the River Avon flows east to west around the north of the village (Clay Coton Brook). The catchment of Clay Coton Brook extends approximately 5km to the east, encompassing some of West Haddon and Cold Ashby Road.
- 4.1.1.3 Two main tributaries of Clay Coton Brook flow south to north through the village. The Crick Road tributary has a catchment area of approximately 2.4 km². It flows through a Flood Alleviation Scheme (FAS) before entering the village from the south. It flows through the village mostly through culverts before joining Clay Coton Brook at Tarrys End at the north.
- 4.1.1.4 The Wards Lane tributary has a catchment of approximately 1.3 km². It flows north through open and culverted sections before turning west then north to join Clay Coton Brook north of Kirkhams Close.
- 4.1.1.5 The Wards Lane tributary catchment is intersected by the Grand Union Canal. Culverts under the canal allow the upper catchment to link through to the tributary downstream.

4.1.2 Long Term Flood Risk Mapping

- 4.1.2.1 Long Term Flood Risk Mapping has been obtained from <https://www.floodtoolkit.com/risk/> and <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>
- 4.1.2.2 The maps are intended for guidance and cannot provide details for individual properties. The maps have been produced by the EA.

4.1.2.3 Flood Risk from Surface Water



This is in an area that has a HIGH chance of flooding from surface water. This means that each year, this area has a chance of flooding of greater than 1 in 30 (3.3%).



This is an area that has a MEDIUM chance of flooding from surface water. This means that each year, this area has a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%).



This is an area that has a LOW chance of flooding from surface water. This means that each year, this area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%).

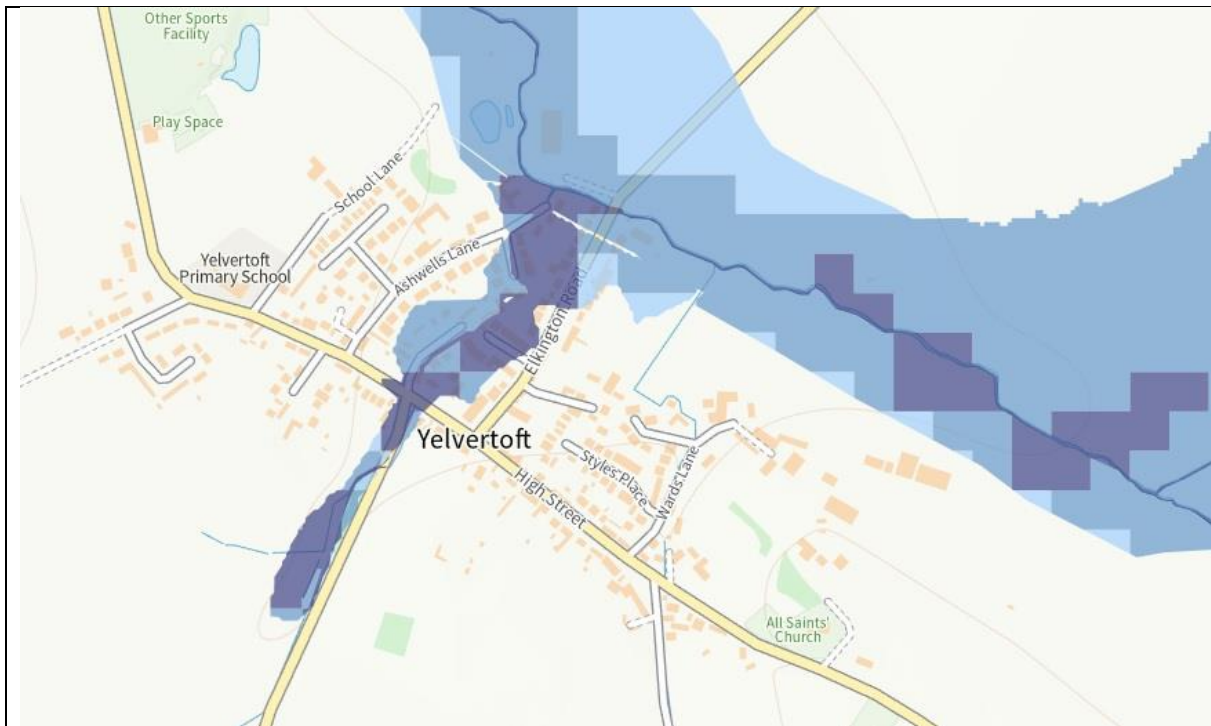


This is an area that has a VERY LOW chance of flooding from surface water. This means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).

Source: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>

© Environment Agency copyright and database rights 2022

4.1.2.4 Flood Risk from Rivers or the Sea



This is in an area that has a **HIGH** chance of flooding from rivers. This means that each year, this area has a chance of flooding of greater than 1 in 30 (3.3%).



This is an area that has a **MEDIUM** chance of flooding from rivers. This means that each year, this area has a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%).



This is an area that has a **LOW** chance of flooding from rivers. This means that each year, this area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%).



This is an area that has a **VERY LOW** chance of flooding from rivers. This means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).

Source: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>
© Environment Agency copyright and database rights 2022

5. DRAINAGE SYSTEMS & WATERCOURSES

5.1 Drainage Systems General

- 5.1.1.1 This section describes drainage systems and watercourses in direct proximity to the flood incident. The wider catchment is drained by numerous systems, all of which have some impact on the effective management of surface water flowing to and from the area of the flood incident.
- 5.1.1.2 If drainage systems are exceeded higher in the catchment, this would result in overland surface water flow which would follow the overall topography of the local catchments. This leads to an increasing cumulative quantity of surface water flowing to areas lower in the catchment, which is beyond the capacity of drainage systems in that area.

5.2 Natural Watercourses

5.2.1 Open Watercourses

- 5.2.1.1 A tributary of the River Avon flows east to west around the north of the village (Clay Coton Brook). Two tributaries of Clay Coton Brook flow south to north through Yelvertoft. These are referred to as Yelvertoft Brook and Wards Lane tributary.
- 5.2.1.2 Yelvertoft Brook is formed by the confluence of land drainage ditches and roadside ditches at the southwest of the village. These combine to become a Main River on the west side of Crick Road 440m south of High Street.
- 5.2.1.3 150m south of High Street on Yelvertoft Brook is a Flood Alleviation Scheme, described below.
- 5.2.1.4 Yelvertoft Brook flows north through Yelvertoft via Swinnertons Lane, Bridgend and Ashwells Lane before joining Clay Coton Brook at Tarrys End. It joins Clay Coton Brook at a perpendicular angle that may have some impact on the outflow when Clay Coton Brook is in spate.
- 5.2.1.5 Wards Lane tributary is formed by land drainage ditches which become formalised on each side of Crick Lane bridleway. The ditches combine as a single Ordinary Watercourse which flows north via Wards Lane and Kirkhams Close before turning west and north towards Clay Coton Brook.

5.2.2 Buried Watercourses

- 5.2.2.1 During the 19th Century Yelvertoft Brook was culverted in areas of Swinnertons Lane, with additional lengths of culvert added over time. The buried culvert now commences south of High Street and continues north for 180m to Bridgend. After a 60m section of open watercourse around Bridgend the brook sinks to a second 100m section of culvert.
- 5.2.2.2 Wards Lane has two 60m culverted sections, beneath High Street and Wards End. There are further culverted sections beneath Kirkhams Close and driveways on Wards End.

5.2.3 Structures

- 5.2.3.1 The Flood Alleviation Scheme on Yelvertoft Brook comprises of a headwall across the watercourse. This has a low level through pipe which allows the normal water flow through, but restricts heavier flows.

- 5.2.3.2 During heavier flows, the pipe restriction causes water to back up behind the headwall, and uses adjacent low level land as temporary storage. A 1200mm wide weir is notched into the top of the headwall to allow controlled overflow from the storage area once it reaches this high level. In the event that water levels in the storage area continue to increase, the entire headwall can be overtopped.

5.3 Drainage Systems

5.3.1 Public Sewers

- 5.3.1.1 STW are responsible for public sewer systems which exist throughout most of the village.
- 5.3.1.2 Foul water and combined water public sewers serve the majority of the village. Some surface water systems are indicated on STW record plans, but are identified as being privately owned or Highway Drains, and not STW public sewers.
- 5.3.1.3 New surface water public sewers, where provided, are generally required to have capacity for the 1 in 30 annual exceedance probability event without flooding. They receive surface water from private roofs and paved areas, and the public highway.
- 5.3.1.4 Historic drainage systems that have become the responsibility of STW may not have been designed to any specific standard.
- 5.3.1.5 Planned inspection and maintenance is carried out to public sewer networks. This is carried out at a frequency determined by any previous issues at the location.
- 5.3.1.6 All maintenance was reported to have been carried out within the relevant timeframe with no issues highlighted.

5.3.2 Highway Drainage

- 5.3.2.1 Throughout the village, the public highway is drained via a system of road gullies. In areas without a surface water public sewer the gullies may connect to private drainage systems (including Highway Drains), or direct to watercourses.
- 5.3.2.2 Collection systems such as road gullies are normally provided to drain surface water from the public highway close to the system only, with no allowance for additional flow from private property or cumulative exceedance flows from higher areas of the catchment.
- 5.3.2.3 Modern highway drainage systems are designed to have capacity for the 1 in 5 annual exceedance probability event. Historic highway drainage systems that have become the responsibility of the Highway Authority due to dedication, as opposed to adoption, may not have been designed to any standard.
- 5.3.2.4 Highway drainage is required to remove water in normal wet weather conditions so that the carriageway is safe for vehicular traffic, and to reduce structural damage to pavements caused by water.

5.3.3 Private Drainage

- 5.3.3.1 There are no recorded surface water public sewers in the village, and therefore drainage systems are likely to be private and outfall directly to the watercourses.
- 5.3.3.2 There is no recorded surface water drainage at School Lane, and it is assumed that a private or Highway Drain exists in this area.

- 5.3.3.3 Private residential and commercial properties generally have their own drainage systems to collect surface water and convey this to an outfall. These comprise roof gutters and downpipes, and gullies/channels for external areas.
- 5.3.3.4 The outfall is usually a soakaway, watercourse or public sewer. It is possible that some surface water runoff from private areas enters the foul/combined water public sewer systems.
- 5.3.3.5 Individual property owners are responsible for their drainage systems. Various design standards will have applied over the catchment area as development progressed in this area during the 20th Century. Drainage systems with a capacity for the 1 in 5 annual exceedance probability event might be expected.

5.4 Flood Resilience

5.4.1 Community or Property Level Resilience Measures

- 5.4.1.1 The Flood Alleviation Scheme on Yelvertoft Brook south of the village is described in section 5.2.3.
- 5.4.1.2 A property on Swinnertons Lane has installed Property Level Resilience including pumps.
- 5.4.1.3 An affected property on Swinnertons Lane deployed flood barriers to doors, which held water back for a period of time before failing.
- 5.4.1.4 The Parish Council works with Flood Risk Management Authorities and provides advice and support to residents.
- 5.4.1.5 Following flooding in 2016, the former Northamptonshire County Council arranged for a consultant specialising in Property Level Resilience to engage with affected properties to offer free surveys and quotations to take forward recommended resilience measures.

6. DESCRIPTION OF FLOOD EVENT

6.1 Rainfall and Flood Water

6.1.1 Rainfall

- 6.1.1.1 The rainfall described in Section 2 fell on the catchment from approximately 9:30am onwards, with flooding of properties starting from around 20:00.

6.1.2 Surface Water Flow

- 6.1.2.1 The Flood Alleviation Scheme on Yelvertoft Brook was exceeded, causing heavy flows to the upstream watercourse, and overland surface water flow onto Crick Road south of High Street.
- 6.1.2.2 The capacity of Yelvertoft Brook culvert through the village was exceeded, causing overtopping of the upstream watercourse on Crick Road south of High Street. Water also flowed out of the culvert via a manhole cover on Swinnertons Lane north of High Street.
- 6.1.2.3 The two separate areas of flood water on Crick Road and Swinnertons Lane deepened throughout the day, eventually meeting on High Street and becoming a single body of water covering areas of Crick Road, Swinnertons Lane and High Street.
- 6.1.2.4 The single body of water continued to deepen causing flows of water towards properties. At properties on Swinnertons Lane and High Street water came towards the property from the rear (from Swinnertons Lane) and from the front (from High Street) causing internal flooding.
- 6.1.2.5 At two properties on High Street water came towards the property from High Street but affected gardens only.
- 6.1.2.6 At a property on High Street water flowed from Crick Road and High Street to the rear of the property where it entered the lower level rear doorway. It is assumed that the adjoining neighbouring property at the same elevation also flooded although the occupier could not be spoken to.
- 6.1.2.7 On School Lane, surface water flowed west to east from Stanford Road/High Street, turning north to flow along School Lane. The water deepened at low points on School Lane and flowed towards a property causing internal flooding.

6.1.3 Standing Water

- 6.1.3.1 As described above, water from the breach of Yelvertoft Brook flooded Crick Road and Swinnertons Lane as two separate bodies of standing water which became a single body of water covering areas of Crick Road, Swinnertons Lane and High Street.
- 6.1.3.2 In the localised bowl of Swinnertons Lane, the depth of flood water was in excess of one metre. On Crick Road the depth of flood water was approximately 600mm.

6.1.4 Drainage Systems

- 6.1.4.1 The watercourse and associated culverts were exceeded by the volume and intensity of rainfall and therefore public and private drainage systems would become ineffective due to surcharged outfalls and back flow.
- 6.1.4.2 Road gullies in and around School Lane were reported to be blocked, rendering them inoperable.

6.1.5 Specific Features That May Have Affected Water Flow

- 6.1.5.1 The storage area associated with the Flood Alleviation Scheme did not have capacity for the volume of water held back by the flow restrictions. Whilst a significant volume of water was stored, ultimately the headwall was overtopped allowing the natural water flow to spill over to Crick Road.

- 6.1.5.2 The Yelevertoft Brook culverts had their capacity exceeded causing these to surcharge and flood. This is due to a combination of the cross sectional area and gradient of the culvert being insufficient, and the effect of the outfall flow restriction caused by the angle of entry where it joins Clay Coton Brook.
- 6.1.5.3 The culverts on Wards Lane had their capacity exceeded causing these to surcharge and flood. This resulted in overland surface water flow on Wards Lane with no internal flooding to properties.

6.2 Response to Flooding

6.2.1 Immediate Response

- 6.2.1.1 Property owners took their own action to attempt to protect their homes, and clear up afterwards.
- 6.2.1.2 Fire and Rescue received a number of emergency calls at the time of the flood incident from across the county. This included the normal level of calls relating to fires and other emergencies. F&R attended properties and external area on a priority basis, particularly where there was a risk to peoples safety or where relatively deep flood water was held and had no effective means to drain away. F&R are reported to have pumped flood water out of the affected property on School Lane.
- 6.2.1.3 NH received 211 requests for service due to flooding county wide, which were dealt with by the out of hours crews. Many were capacity issues with drainage systems rather than specific issues that could be immediately rectified.
- 6.2.1.4 NH cleansed the Highway Drainage in and around School Lane soon after the flood incident.
- 6.2.1.5 The EA issued a Flood Alert on 23/12/20 at 16:14.
- 6.2.1.6 The Duty Emergency Planning Officer of the WNC Emergency Planning Team liaised with the Duty Officer at F&R, and the wider Emergency Planning Team. Information on the extent of flooding and individual affected properties was collated. Emergency accommodation arrangements were determined.

6.2.2 Follow Up Response

- 6.2.2.1 The Parish Council have undertaken numerous follow up actions including:
- Working with the EA, WNC and Warwickshire Wildlife Trust to determine actions that can be taken to address the flood risk.
 - Providing advice to landowners in respect of agricultural run-off and Natural Flood Management.
 - Working with Vision Link, the EA and other local authorities to provide a camera and level sensors at the Flood Alleviation Scheme.
 - Providing advice and resources to residents in relation to emergency planning and flood resilience.
 - Attempting to recruit Flood Wardens.

6.2.2.2 The LLFA Flood and Water Management Team liaised with Risk Management Authorities including relevant sections of North and West Northamptonshire Councils, EA, NH, F&R and water companies to determine the extent of flooding across the county.

Almost 300 separate formal and anecdotal reports of flooding across the county were received over the following weeks. These were mapped and recorded on the central database.

The team responded to Councillor and MP correspondence.

Section 19 Flood Incident Investigations were instructed where investigation thresholds were met. This will determine any longer term response.

6.2.2.3 The WNC Emergency Planning Team shared details of the immediate response and details of properties known to be affected with the LLFA.

6.2.2.4 Following the 2016 flooding, the EA organised a community drop-in event to aid with data collection. They undertook the Section 19 Flood Investigation which can be found at <https://www.floodtoolkit.com/wp-content/uploads/2017/03/Yelvertoft-Section-19-Report-v3.2-FINAL.pdf>

6.2.2.5 Since 2016 the EA have undertaken the following in relation to Yelvertoft Brook:

- Carried out an internal inspection of the culverts. No debris or other issues were identified.
- Reviewed the hydraulic model to assess how the Flood Storage Area operates to further investigate potential opportunities, including the confluence with Clay Coton Brook.
- Provided the CCTV camera at the Flood Alleviation Scheme.
- Expanded the Flood Warning Service to include Yelvertoft.
- Provided mapping to the Parish Council relevant to the 2016 flooding.
- Working with the Parish Council to explore Natural Flood Management across the catchment.

7. CONCLUSION

- 7.1.1.1 The flooding in Yelvertoft was caused by intense heavy rainfall over a relatively short period of time.
- 7.1.1.2 Surface water drainage systems and watercourses were unable to collect and convey rainwater effectively. This led to excess surface water flowing over ground following localised ground levels to low points around properties.
- 7.1.1.3 The quantity of rainfall exceeded the capacity of the Flood Alleviation Scheme on Yelvertoft Brook, and the capacity of open channel and culverted watercourses through the village.
- 7.1.1.4 Affected areas are shown to be at high risk of surface water flooding on published Long Term Flood Risk Mapping, with the exception of School Lane which is shown at low risk of surface water flooding.
- 7.1.1.5 Other than the Flood Alleviation Scheme on Yelvertoft Brook, and limited measures at some individual properties, there are no formal community or property level resilience measures in place that could have been deployed.
- 7.1.1.6 The following are the Key Recommendations resulting from the flood incident:
- Owners and/or occupiers of affected properties should consider preparing an Emergency Plan or Business Continuity Plan, and implementing Property Level Resilience.
 - With support from Flood Risk Management Authorities, the community should make efforts to:
 - Appoint Community Flood Wardens,
 - Prepare a Community Emergency Plan,
 - Explore options for funding and contributions for schemes to manage surface water and flood risk.
 - The LLFA should coordinate with other Flood Risk Management Authorities to extend publicity of the existing information available in relation to flood risk at <https://www.floodtoolkit.com/> and consider further means to pinpoint the dissemination of this information to specific communities at risk of flooding.

- The LLFA should continue to work with the community and Flood Risk Management Authorities. The work should:
 - Aim to manage surface water to provide a better standard of protection to Highway infrastructure, and the community.
 - Identify further surveys, investigations and studies required to locate and record existing drainage systems in the area of the flood incident and the wider catchment.
 - Identify all legal responsibilities for drainage and watercourse maintenance in the area of the flood incident and the wider catchment, reminding relevant parties of these responsibilities and the benefits of doing it.
 - Identify further surveys, investigations and studies required to fully understand how the flooding occurred and the likelihood of it occurring again.
 - Assess the requirement and viability of engineering schemes to ensure the existing infrastructure operates as intended, and to provide a better standard of protection if required. This might include community level flood resilience measures, improving drainage and watercourse structures to accommodate extreme rainfall events, providing attenuation storage areas and creating formal overland flood flow routes.
- Local Authorities, Emergency Services and other relevant response groups should continue to work together, and review their immediate and follow up response to the emergency.

8. RECOMMENDATIONS

8.1 General

- 8.1.1.1 Listed below are the recommended course of actions emanating from this formal Flood Investigation Report.
- 8.1.1.2 It is important to note that it is for the relevant responsible body or persons to assess each recommendation in terms of the legal obligation, resource implications, priority and cost/benefit analysis of undertaking such action.
- 8.1.1.3 The recommendations may be included within the Action Plan linked to the Local Flood Risk Management Strategy or in the relevant risk management authority's future work programmes, as appropriate.

8.2 Communities

(e.g. Town/Parish Council, Flood Forum, Community Groups, Resident and Business Associations, land owners and affected residents)

- 8.2.1.1 Review the library of flood guides on the Flood Toolkit. The LLFA has produced a number of flood guides covering various subjects, some of which relate to this flood incident. The relevant guides have been identified and are available at:

<http://www.floodtoolkit.com/pdf-library/>

No.	Flood Guide Title	Read	No.	Flood Guide Title	Read
1	Agricultural Run-Off	X	15	Riparian Ownership and Flood Risk	X
2	Ditch Clearance	X	16	Flood Defence Consenting	X
3	Flood Investigations	X	17	Using Agricultural Land for Attenuation	X
4	Watercourse Management	X	18	Enforcing Flood Risk Management	X
5	Flood Related Benefits of the Water Framework Directive		19	Flood Related Roles of Parish Councils and Communities	X
6	Reservoirs and Flooding		20	Buying a House: Is there a Flood Risk?	
7	Funding for Flood Alleviation	X	21	Flood Warnings	X
8	Roles and Responsibilities for Sewers	X	22	Neighbourhood Planning and Flood Risk	X
9	Roles and Responsibilities for Highways	X	23	New Development and Emergency Flood Plans	
10	Groundwater Flooding		24	Fisheries and Flooding	
11	What to do in a Flood Emergency	X	25	Flood Advice for Businesses	X
12	How to Protect your Home	X	26	Impacts of Flooding	X
13	Insurance and Flood Risk	X	27	Together we can Reduce Flood Risk	X
14	Using Experts for Flood Risk Assessment	X			

- 8.2.1.2 Recruit Community Flood Wardens to help coordinate the production of a Community Emergency and Flood Plan, the template for which can be found on the Flood Toolkit here:

<https://www.floodtoolkit.com/wp-content/uploads/2017/06/Community-Emergency-and-Flood-Plan-Guidance-June-2017.pdf>

This can include:

- a plan of the community showing areas at risk of flooding, especially vulnerable properties and particularly vulnerable people (e.g. elderly, medical conditions, young families);
- a plan of the community outlining the ownership and maintenance regimes of drainage systems, with contact details to report any issues;
- a list of any improvements to existing drainage systems that are required.

This information should be used to inform the basis of preparing Household Emergency Plans for vulnerable properties in this area, a template for which can be found on the Flood Toolkit here:

<https://www.floodtoolkit.com/wp-content/uploads/2017/06/Household-Emergency-Plan-June-2017.pdf>

8.2.1.3 Regularly inspecting drainage systems in the area. Report blockages or other issues to the responsible owner and the LLFA.

8.2.1.4 Explore options for Property Level Resilience. Information on Flood Prevention measures for Home Owners, Communities and Businesses can be found on the Flood Toolkit here:

<http://www.floodtoolkit.com/risk/prevention/>

These measures can apply to single properties or larger systems that can be applied to protect multiple properties and communities.

8.2.1.5 Explore catchment wide solutions such as attenuation areas (balancing ponds), rain gardens, overflow routes and tree planting. <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>

8.2.1.6 Use the Flood Toolkit Funding Tool to find sponsors who may be willing to help fund improvement projects: <http://www.floodtoolkit.com/risk/funding/>

8.2.1.7 Continue to report flood incidents to the LLFA at: <https://www.floodtoolkit.com/emergency/report-flood/>. Endeavour to obtain as much evidence of flood events as possible, such as photographic and video evidence.

8.2.1.8 Continue to refer to the Community Flood Risk and Mitigation Investigation carried out in 2015.

https://www.floodtoolkit.com/wp-content/uploads/2021/10/17349_YEL_Report_Rev01_211015.pdf

8.2.1.9 Northamptonshire Fire and Rescue Service provides emergency prevention tools and advice for home owners and businesses. They can provide support, advice and training to organisations across the county to help develop their business continuity processes.

Further information can be found at:

<https://www3.northamptonshire.gov.uk/councilservices/fire-safety-and-emergencies/emergencies/emergency-prevention-and-advice/Pages/protecting-your-business.aspx>

8.2.1.10 Property owners should undertake regular inspection and maintenance of their drainage systems in accordance with a defined maintenance regime. Property owners should assess the capacity of their drainage systems and identify any areas with insufficient capacity. Where this could lead to runoff to the public highway or nuisance to third party private property, improvement works should be considered.

8.3 West Northamptonshire Council (WNC)

8.3.1 Lead Local Flood Authority (LLFA)

8.3.1.1 Work with Flood Risk Management Authorities, riparian/property owners, the community and those affected by flooding. The work should:

- Aim to manage surface water to provide a better standard of protection to Highway infrastructure, and the community.
- Identify further surveys, investigations and studies required to locate and record existing drainage systems in the area of the flood incident and the wider catchment.
- Identify all legal responsibilities for drainage and watercourse maintenance in the area of the flood incident and the wider catchment, reminding relevant parties of these responsibilities and the benefits of doing it.
- Identify further surveys, investigations and studies required to fully understand how the flooding occurred and the likelihood of it occurring again.
- Assess the requirement and viability of engineering schemes to ensure the existing infrastructure operates as intended, and to provide a better standard of protection if required. This might include community level flood resilience measures, improving drainage and watercourse structures to accommodate extreme rainfall events, providing attenuation storage areas and creating formal overland flood flow routes.

8.3.1.2 Work with the Council's Emergency Planning Team and the EA to support community based Flood Wardens, should they be recruited.

8.3.1.3 Work with the Council's Emergency Planning Team, the EA and other flood management authorities to support the community in the production of a Community/Household Emergency and Flood Plan and provide advice to residents and occupiers on how to explore options for property level resilience.

8.3.1.4 Continue to provide information and resources relating to flood risk, preparedness and response via the Flood Toolkit website. Consider increased, ongoing publicity of this information source.

8.3.2 Other Council Sections

8.3.2.1 The Asset Team to identify and develop a detailed plan of their assets to share with the LLFA and the community. Undertake regular maintenance of their assets and consider improvement works where beneficial.

8.3.2.2 The Planning Teams to continue to consult with the EA and LLFA (Surface Water Drainage Team) as required in respect of planning applications for new developments to reduce flood risk. Aim to ensure that all works are carried out in accordance with the approved plans and documents.

- 8.3.2.3 The Planning Team to review the planning policies relating to developments in the catchment of the flooding incident, together with any flood risk assessments and drainage designs. Consider contacting the developers to take action in the event that any items relating to surface water drainage and flood risk are not evident or ineffective in the final developments or in the construction period.
- 8.3.2.4 Utilise their powers under Section 20 of the Land Drainage Act 1991 to carry out drainage works.
- 8.3.2.5 Endeavour to assist other flood risk management authorities and land owners in the preparation of a detailed plan of assets relating to drainage and flood risk, to share with the LLFA and the community.
- 8.3.2.6 Carry out cleansing to streets and public open space to remove litter and detritus which could affect drainage systems.
- 8.3.2.7 Work with the LLFA and other parties with the work detailed in 8.3.1.1.
- 8.3.2.8 Assist the LLFA in publicising the Flood Toolkit information resource.

8.4 Environment Agency (EA)

- 8.4.1.1 Continue to investigate flood risk management options including natural flood management in Yelvertoft to reduce the risk of river flooding in the Avon Warwickshire management catchment.
- 8.4.1.2 Work with the WNC Emergency Planning Team and the LLFA to support the community and, should one be recruited, a community based Flood Warden.
- 8.4.1.3 Work with the LLFA and other parties with the work detailed in 8.3.1.1.
- 8.4.1.4 Assist the LLFA in publicising the Flood Toolkit information resource.

8.5 Highway Authority –Northamptonshire Highways (NH)

- 8.5.1.1 Undertake regular highway drainage cleansing throughout the catchment. Identify and develop a detailed plan of their assets to share with the LLFA and the community.
- 8.5.1.2 Consider more regular inspection and maintenance of highway drainage systems in areas identified as being at risk on the Surface Water Flood Risk Mapping, and where flooding has occurred.
- 8.5.1.3 Assess the capacity of their assets and identify any areas with insufficient capacity for draining normal runoff from the highway. Where this leads to flood risk to properties improvement works should be considered.
- 8.5.1.4 Assess the suitability of third-party drainage systems accepting discharge from Highway Drainage systems and report any unsatisfactory areas to the LLFA.
- 8.5.1.5 Assess the viability of works to provide overland flood flow routes from the highway to safe areas, to reduce reliance on drainage systems in extreme rainfall events.
- 8.5.1.6 Work with the LLFA and other parties with the work detailed in 8.3.1.1.
- 8.5.1.7 Assist the LLFA in publicising the Flood Toolkit information resource.

8.6 Water Company – Severn Trent Water (STW)

- 8.6.1.1 Assess the sources of water entering the public sewerage system.
- 8.6.1.2 Assess the capacity of their assets and identify any areas of insufficient capacity. Where this leads to flood risk to properties improvement work should be considered.
- 8.6.1.3 Continue to update the detailed plan of their assets to share with the LLFA and the Community. Work with property owners to identify drainage that may be transferred to STW under the Private Sewer Transfer.
- 8.6.1.4 Work with the LLFA and other parties with the work detailed in 8.3.1.1.
- 8.6.1.5 Assist the LLFA in publicising the Flood Toolkit information resource.

8.7 Developers

- 8.7.1.1 Developers should work with local authorities to ensure all development does not increase flood risk (from any source) to the site or adjacent land and is completed in accordance with approved plans, documents, and planning policy.
- 8.7.1.2 For more information on planning policy, standards and associated guidance, see the Flood Toolkit - <https://www.floodtoolkit.com/planning/developers/>

9. RIGHTS AND RESPONSIBILITIES

9.1 Communities

- 9.1.1.1 Communities may consist of the Town or Parish Council, a Flood Forum, Community Action Group, Resident and Business Associations, affected residents and land owners, amongst others.
- 9.1.1.2 Property owners who are aware that they are at risk of flooding should take action to ensure that they and their properties are protected.
- 9.1.1.3 Communities and residents, as property owners, have responsibility for their private drainage systems. They may have riparian responsibilities if their land boundary is next to a watercourse, a watercourse runs alongside their garden wall or hedge, and / or a watercourse runs through or underneath their land.
- 9.1.1.4 Community resilience is important in providing information and support to each other if flooding is anticipated. Actions taken can include subscribing to MET Office email alerts for weather warnings, signing up to the Flood Warning Direct service for river flood warnings, supporting a Community Flood Warden, producing a Community Emergency and Flood Plan, implementing property level resilience and moving valuable items to higher ground.
- 9.1.1.5 Anyone affected by flooding should try to document as much information about the incident as possible using the Flood Incident Report Form, which can be found at:
<https://www.floodtoolkit.com/emergency/report-flood/>

9.2 West Northamptonshire Council (WNC)

9.2.1 Lead Local Flood Authority (LLFA)

- 9.2.1.1 As stated within the introduction section, the LLFA has a responsibility to investigate flood incidents under Section 19 of the F&WMA. While the LLFA can suggest possible causes of flooding, and make recommendations to ensure flood risk is mitigated as far as possible, the F&WMA does not provide WNC with the mandate or funding to act on identified causes of flooding or force risk management authorities to undertake any recommended actions.
- 9.2.1.2 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 (non-Main River) as detailed within Section 21 of the F&WMA.
- 9.2.1.3 The register must contain a record about each structure or feature, including the ownership and state of repair. The LLFA is also required to keep a record of flooding hotspots across the county.

9.2.1.4 As the responsible LLFA for the affected properties in West Northamptonshire, WNC will be looking for support from other risk management authorities, communities and individual home owners to ensure flood incidents are reported, and any assets which have a significant effect on flood risk are recorded on the asset register.

9.2.2 Other Council Sections

9.2.2.1 The Council has powers under Section 14 of the Land Drainage Act 1991 (LDA) to undertake flood risk management works on ordinary watercourses (non-Main River) where deemed necessary.

9.2.2.2 Under Section 20 of the LDA, the Council has powers to (by agreement of any person and at that person's expense) carry out any drainage work which that person is entitled to carry out. Agreement may not be required in certain emergency or legally upheld situations.

9.2.2.3 As Local Planning Authority, the Council has a responsibility to ensure that developments do not increase the risk of flooding on the site and elsewhere, and wherever possible secure betterment. They have a role in Building Control and the Building Regulations.

9.2.2.4 The Emergency Planning Team prepares, maintains, and reviews arrangements for dealing with major incidents across the Councils area under the Civil Contingencies Act 2004. They work closely with the Emergency Services (Northamptonshire Police, Northamptonshire Fire & Rescue, and East Midlands Ambulance Service) and provide extra support to them, and those affected by an incident.

9.2.2.5 The Council is responsible for street cleansing and waste removal, and manages property and housing in the borough.

9.3 Environment Agency (EA)

9.3.1.1 The EA has a strategic overview responsibility of all sources of flooding and coastal erosion under the F&WMA.

9.3.1.2 The responsibility for maintenance and repair of Main Rivers lies with the riparian owner, but the EA have permissive powers to carry out maintenance work on Main Rivers under Section 165 of the Water Resources Act 1991 (WRA).

9.3.1.3 Main River means all watercourses shown as such on the statutory Main River maps held by the EA and the Department of Environment, Food and Rural Affairs, and can include any structure or appliance for controlling or regulating the flow of water into, in or out of the channel.

9.3.1.4 The EA will encourage third party asset owners to maintain their property in appropriate 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.

9.3.1.5 Other work carried out by the EA includes:

- Working in partnership with the Met Office to provide flood forecasts and warnings.
- Developing long-term approaches to Flood and Coastal Erosion Risk Management (FCERM). This includes working with others to prepare and carry out sustainable Flood Risk Management Plans (FRMPs). FRMPs address flood risk in each river catchment. The EA also collates and reviews assessments, maps and plans for local flood risk management (normally undertaken by LLFAs).

- Providing evidence and advice to support others. This includes national flood and coastal erosion risk information, data and tools to help other risk management authorities and inform Government policy, and advice on planning and development issues. The EA are statutory consultees of the Local Planning Authority.
- Working with others to share knowledge and the best ways of working. This includes work to develop FCERM skills and resources.
- Monitoring and reporting on FCERM. This includes reporting on how the national FCERM strategy is having an impact across the country.

9.4 Highway Authority –Northamptonshire Highways

- 9.4.1.1 Highway Authorities have a duty to maintain the highway under Section 41 of the Highway Act 1980 but subject to the special defence in Section 58.
- 9.4.1.2 New highway drainage systems are designed to Highways England’s Design Manual for Roads and Bridges (Volume 4, Section 2). They are only required to be constructed to drain surface water run-off from within the highway catchment rather than from the wider catchment.
- 9.4.1.3 There are historic drainage systems in historic highways which can become the responsibility of the Highway Authority due to dedication, as opposed to adoption. These drainage systems may not have been designed to any standard.

9.5 Water Company (Severn Trent Water) (STW)

- 9.5.1.1 Water and sewerage companies are responsible for managing the risks of flooding from surface water, foul water or combined sewer systems. Public sewers are designed to protect properties from the risk of flooding in normal wet weather conditions. However, in extreme weather conditions there is a risk that sewer systems can become overwhelmed and result in sewer flooding.
- 9.5.1.2 Since October 2011, under the ‘Private Sewer Transfer’, STW adopted piped systems on private land that serve more than one curtilage and were connected to a public sewer on 1st July 2011. Sewerage Undertakers have a duty, under Section 94 of the Water Industry Act 1991, to provide sewers for the drainage of buildings and associated paved areas within property boundaries.
- 9.5.1.3 Sewerage Undertakers are responsible for public sewers and lateral drains. A public sewer is a conduit, normally a pipe that is vested in a Water and Sewerage Company or predecessor, that drains two or more properties and conveys foul, surface water or combined sewage from one point to another, and discharges via a positive outfall.
- 9.5.1.4 There is no automatic right of connection for other sources of drainage to the public sewer network. Connection is therefore discretionary following an application to connect.

9.6 Land Owners and Developers

9.6.1.1 Land owners must let water flow through their land without any obstruction, pollution or diversion which affects the rights of others. Others also have the right to receive water in its natural quantity and quality. All riparian owners have the same rights and responsibilities.

9.6.1.2 Land owners must accept flood flows through their land, even if these are caused by inadequate capacity downstream. Legally, owners of lower-level ground have to accept natural land drainage from adjacent land at a higher level. The exception to this is where the owner of the higher level land has carried out “improvements” such that the run-off from the land cannot be considered “natural”.

9.6.1.3 Land owners must keep any structures, such as culverts, trash screens, weirs, dams and mill gates, clear of debris.

These rights and responsibilities are summarised in the Government guidance – Owning a Watercourse:

<https://www.gov.uk/guidance/owning-a-watercourse>

Advice for developers is available on the Flood Toolkit.

<http://www.floodtoolkit.com/planning/developers/>

The flood guides detailed in 8.2.1.1 above should also be referred to.

9.6.1.4 Land owners and developers are responsible for working with the Local Planning Authority to ensure that their development is completed in accordance with the planning permission and all conditions that have been imposed.

DISCLAIMER

This report has been prepared as part of the Lead Local Flood Authorities responsibilities under the Flood and Water Management Act 2010. It is intended to provide context and information to support the delivery of the Local Flood Risk Management Strategy and should not be used for any other purpose.

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

Any recommended actions outlined in this FIR will be for the relevant responsible body or persons to assess in terms of resource implications, priority and cost/benefit analysis of the proposal. Moving forward, these may be included in the Action Plan linked to the Local Flood Risk Management Strategy or in the relevant risk management authority's future work programme as appropriate.

The opinions, conclusions and any recommendations in this report are based on assumptions made by David Smith Associates and the Lead Local Flood Authority when preparing this report, including, but not limited to those key assumptions noted in the report, including reliance on information provided by others.

David Smith Associates and the Lead Local Flood Authority expressly disclaim responsibility for any error in, or omission from, this report arising from or in connection with any of the assumptions being incorrect.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the time of preparation and David Smith Associates and the Lead Local Flood Authority expressly disclaim responsibility for any error in, or omission from, this report arising from or in connection with those opinions, conclusions and any recommendations.

The implications for producing Flood Investigation Reports and any consequences of blight have been considered. The process of gaining insurance for a property and/or purchasing/selling a property and any flooding issues identified are considered a separate and legally binding process placed upon property owners and this is independent of and does not relate to the County Council highlighting flooding to properties at a street level.

David Smith Associates and the Lead Local Flood Authority do not accept any liability for the use of this report or its contents by any third party.

ACRONYMS

LLFA	Lead Local Flood Authority
EA	Environment Agency
WNC	West Northamptonshire Council
NH	Northamptonshire Highways
STW	Severn Trent Water
FIR	Flood Investigation Report
F&WMA	Flood and Water Management Act 2010
LDA	Land Drainage Act 1991
WRA	Water Resources Act 1991

USEFUL LINKS

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>

Gov.UK Guidance – Owning a Watercourse:

Your responsibilities and rules to follow for watercourses on or near your property, and permissions you need to do work around them.

<https://www.gov.uk/guidance/owning-a-watercourse>

EA - Prepare your Property for Flooding:

How to reduce flood damage Flood protection products and services

<https://www.gov.uk/government/publications/prepare-your-property-for-flooding>

Lead Local Flood Authority Web Pages:

<http://www.floodtoolkit.com/>

Northamptonshire Local Flood Risk Management Strategy:

<https://www.floodtoolkit.com/wp-content/uploads/2017/11/Northamptonshire-LFRMS-Report-November-2017-Final-1.pdf>

Flood and Water Management Act 2010

<http://www.legislation.gov.uk/ukpga/2010/29/contents>

USEFUL CONTACTS

West Northamptonshire Council

Highways:

Tel: Street Doctor (Highways) 0300 126 1000

Website: <https://fixmystreet.northamptonshire.gov.uk/>

Email: highways.ncc@westnorthants.gov.uk

Emergency Planning:

Tel: 0300 1261012 (office hours)

Website: <http://www.northamptonshire.gov.uk/emergencies>

Email: emergencyplanning1.ncc@northnorthants.gov.uk

Flood and Water Management Team:

Email: floodandwater.NCC@westnorthants.gov.uk

Environment Agency

General Tel: 08708 506 506 (Mon-Fri 8-6) Call charges apply.

Incident Hotline: 0800 807060 (24 hrs)

Floodline: 0345 988 1188

Website: <https://www.gov.uk/government/organisations/environment-agency>

Email: enquiries@environment-agency.gov.uk

Severn Trent Water

24 hour customer service team: 0800 783 4444

Website: <https://www.stwater.co.uk/in-my-area/flooding/>

Yelvertoft Parish Council

Tel: 07305 801095

Email: clerk@yelvertoft-pc.gov.uk

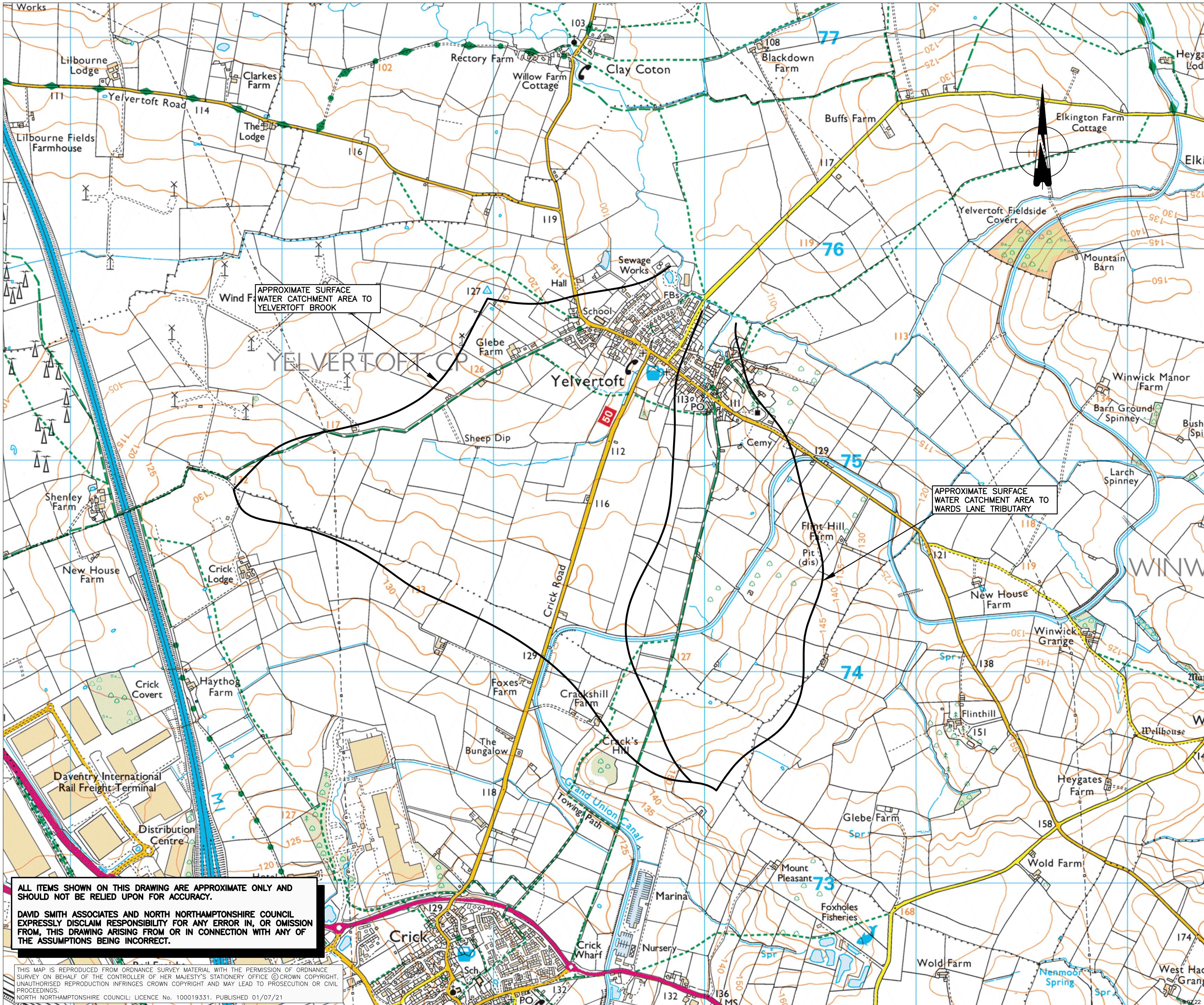
Website: <https://www.yelvertoft-pc.gov.uk/>

The Flood Toolkit “Who is responsible” page:

<http://www.floodtoolkit.com/contacts/>

APPENDIX A

Catchment Plan



APPROXIMATE SURFACE WATER CATCHMENT AREA TO YELVERTOFT BROOK

APPROXIMATE SURFACE WATER CATCHMENT AREA TO WARDS LANE TRIBUTARY

ALL ITEMS SHOWN ON THIS DRAWING ARE APPROXIMATE ONLY AND SHOULD NOT BE RELIED UPON FOR ACCURACY.

DAVID SMITH ASSOCIATES AND NORTH NORTHAMPTONSHIRE COUNCIL EXPRESSLY DISCLAIM RESPONSIBILITY FOR ANY ERROR IN, OR OMISSION FROM, THIS DRAWING ARISING FROM OR IN CONNECTION WITH ANY OF THE ASSUMPTIONS BEING INCORRECT.

THIS MAP IS REPRODUCED FROM ORDNANCE SURVEY MATERIAL WITH THE PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE © CROWN COPYRIGHT. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS.

NORTH NORTHAMPTONSHIRE COUNCIL: LICENCE No. 100019331. PUBLISHED 01/07/21

P1	FIRST ISSUE	MAB	19.07.22
ISSUE	REVISION	BY	DATE

THIS DRAWING IS THE PROPERTY OF DAVID SMITH ASSOCIATES. IT MUST NOT BE REPRODUCED, COPIED NOR ITS CONTENTS DIVULGED WITHOUT THEIR PERMISSION.

© DAVID SMITH ASSOCIATES

ISSUE

PRELIMINARY

CLIENT

WEST NORTHAMPTONSHIRE COUNCIL

CONTRACT

SECTION 19

FLOOD INCIDENT INVESTIGATION

TITLE

YELVERTOFT

CATCHMENT PLAN

FLOOD INCIDENT DATE

23rd DECEMBER 2020

DRAWN	CHECKED	DATE	SCALE
MAB	BT	JUL '22	1:12,500 @ A2

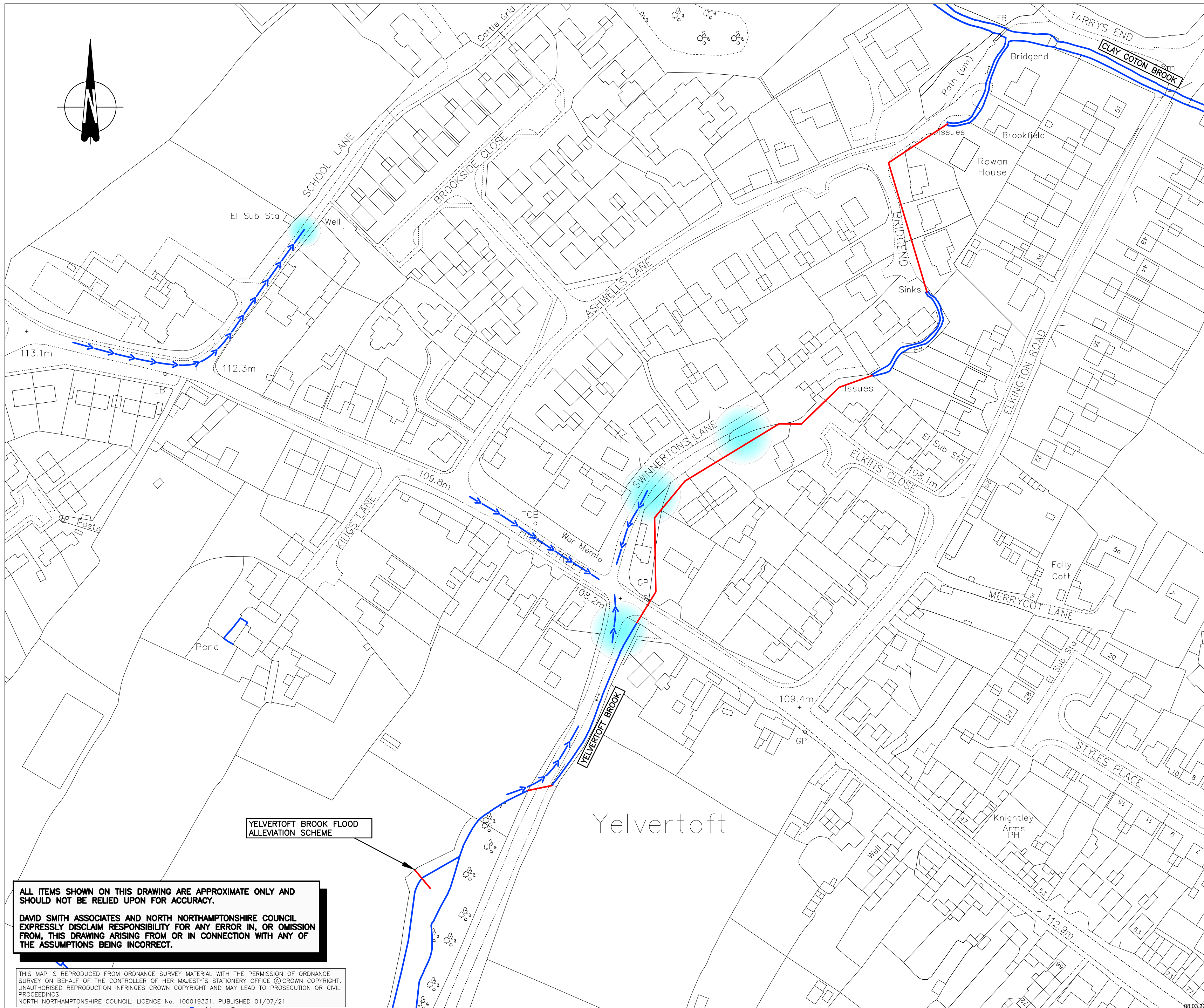
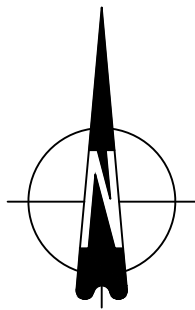


Tel: (01604)782620 8 Duncan Close
 Email: northampton@dsagroup.co.uk Moulton Park
 Website: www.dsagroup.co.uk Northampton NN3 6WL

DRAWING NUMBER	21	43269/50	REVISION
			P1

APPENDIX B

Incident Plan



KEY:

- MAIN ROUTES OF OVERLAND FLOW DURING FLOOD INCIDENT
- SCHEMATIC AREA OF FLOODING
- APPROXIMATE ROUTE OF PIPE/CULVERT

P2	BUILDING NUMBERS REMOVED.	MAB	08.03.23
P1	FIRST ISSUE	MAB	15.07.22
ISSUE	REVISION	BY	DATE

THIS DRAWING IS THE PROPERTY OF DAVID SMITH ASSOCIATES. IT MUST NOT BE REPRODUCED, COPIED NOR ITS CONTENTS DIVULGED WITHOUT THEIR PERMISSION.
©DAVID SMITH ASSOCIATES

ISSUE
PRELIMINARY

CLIENT
WEST NORTHAMPTONSHIRE COUNCIL

CONTRACT
**SECTION 19
FLOOD INCIDENT INVESTIGATION**

TITLE
YELVERTOFT

INCIDENT PLAN

FLOOD INCIDENT DATE
23rd DECEMBER 2020

DRAWN	CHECKED	DATE	SCALE
MAB	BT	JUL '22	1:12,500 @ A2

David Smith Associates
Consulting Structural & Civil Engineers

Tel: (01604)782620 8 Duncan Close
Email: northampton@dsagroup.co.uk Moulton Park
Website: www.dsagroup.co.uk Northampton NN3 6WL

DRAWING NUMBER	21	43269/51	REVISION P2
----------------	----	----------	----------------

YELVERTOFT BROOK FLOOD ALLEVIATION SCHEME

ALL ITEMS SHOWN ON THIS DRAWING ARE APPROXIMATE ONLY AND SHOULD NOT BE RELIED UPON FOR ACCURACY.

DAVID SMITH ASSOCIATES AND NORTH NORTHAMPTONSHIRE COUNCIL EXPRESSLY DISCLAIM RESPONSIBILITY FOR ANY ERROR IN, OR OMISSION FROM, THIS DRAWING ARISING FROM OR IN CONNECTION WITH ANY OF THE ASSUMPTIONS BEING INCORRECT.

THIS MAP IS REPRODUCED FROM ORDNANCE SURVEY MATERIAL WITH THE PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE © CROWN COPYRIGHT. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS.
NORTH NORTHAMPTONSHIRE COUNCIL: LICENCE No. 100019331. PUBLISHED 01/07/21

APPENDIX C

Photographs

Photographs of the flood incident area taken by the community



View south of High Street and Crick Road



Property on High Street

APPENDIX D

Photographs

Various photographs of the flood incident area taken by the Investigating Officer



Flood Alleviation Scheme on Yelvertoft Brook, south of High Street.



Entrance to Yelvertoft Brook culvert, south of High Street



Access to Yelvertoft Brook culvert, Swinnertons Lane



School Lane

APPENDIX C

Environment Agency Standard Notice

Open Government Licence for public sector information

You are encouraged to use and re-use the Information that is available under this licence freely and flexibly, with only a few conditions.

Using Information under this licence

Use of copyright and database right material expressly made available under this licence (the 'Information') indicates your acceptance of the terms and conditions below.

The Licensor grants you a worldwide, royalty-free, perpetual, non-exclusive licence to use the Information subject to the conditions below.

This licence does not affect your freedom under fair dealing or fair use or any other copyright or database right exceptions and limitations.

You are free to:

- copy, publish, distribute and transmit the Information;
- adapt the Information;
- exploit the Information commercially and non-commercially for example, by combining it with other Information, or by including it in your own product or application.

You must (where you do any of the above):

- acknowledge the source of the Information in your product or application by including or linking to any attribution statement specified by the Information Provider(s) and, where possible, provide a link to this licence;

If the Information Provider does not provide a specific attribution statement, you must use the following:

Contains public sector information licensed under the Open Government Licence v3.0.

If you are using Information from several Information Providers and listing multiple attributions is not practical in your product or application, you may include a URL or hyperlink to a resource that contains the required attribution statements.

These are important conditions of this licence and if you fail to comply with them the rights granted to you under this licence, or any similar licence granted by the Licensor, will end automatically.

Exemptions

This licence does not cover:

- personal data in the Information;
- Information that has not been accessed by way of publication or disclosure under information access legislation (including the Freedom of Information Acts for the UK and Scotland) by or with the consent of the Information Provider;
- departmental or public sector organisation logos, crests and the Royal Arms except where they form an integral part of a document or dataset;
- military insignia;
- third party rights the Information Provider is not authorised to license;
- other intellectual property rights, including patents, trade marks, and design rights; and identity documents such as the British Passport

Non-endorsement

This licence does not grant you any right to use the Information in a way that suggests any official status or that the Information Provider and/or Licensor endorse you or your use of the Information.

No warranty

The Information is licensed 'as is' and the Information Provider and/or Licensor excludes all representations, warranties, obligations and liabilities in relation to the Information to the maximum extent permitted by law.

The Information Provider and/or Licensor are not liable for any errors or omissions in the Information and shall not be liable for any loss, injury or damage of any kind caused by its use. The Information Provider does not guarantee the continued supply of the Information.

Governing Law

This licence is governed by the laws of the jurisdiction in which the Information Provider has its principal place of business, unless otherwise specified by the Information Provider.

Definitions

In this licence, the terms below have the following meanings:

'Information' means information protected by copyright or by database right (for example, literary and artistic works, content, data and source code) offered for use under the terms of this licence.

'Information Provider' means the person or organisation providing the Information under this licence.

'Licensor' means any Information Provider which has the authority to offer Information under the terms of this licence or the Controller of Her Majesty's Stationery Office, who has the authority to offer Information subject to Crown copyright and Crown database rights and Information subject to copyright and database right that has been assigned to or acquired by the Crown, under the terms of this licence.

'Use' means doing any act which is restricted by copyright or database right, whether in the original medium or in any other medium, and includes without limitation distributing, copying, adapting, modifying as may be technically necessary to use it in a different mode or format.

'You', 'you' and 'your' means the natural or legal person, or body of persons corporate or incorporate, acquiring rights in the Information (whether the Information is obtained directly from the Licensor or otherwise) under this licence.

About the Open Government Licence

The Controller of Her Majesty's Stationery Office (HMSO) has developed this licence as a tool to enable Information Providers in the public sector to license the use and re-use of their Information under a common open licence. The Controller invites public sector bodies owning their own copyright and database rights to permit the use of their Information under this licence.

The Controller of HMSO has authority to license Information subject to copyright and database right owned by the Crown. The extent of the Controller's offer to license this Information under the terms of this licence is set out in the [UK Government Licensing Framework](#).

This is version 3.0 of the Open Government Licence. The Controller of HMSO may, from time to time, issue new versions of the Open Government Licence. If you are already using Information under a previous version of the Open Government Licence, the terms of that licence will continue to apply.

These terms are compatible with the Creative Commons Attribution License 4.0 and the Open Data Commons Attribution License, both of which license copyright and database rights. This means that when the Information is adapted and licensed under either of those licences, you automatically satisfy the conditions of the OGL when you comply with the other licence. The OGLv3.0 is Open Definition compliant.

Further context, best practice and guidance can be found in the [UK Government Licensing Framework](#) section on The National Archives website.