WEST OXFORDSHIRE
DISTRICT COUNCIL

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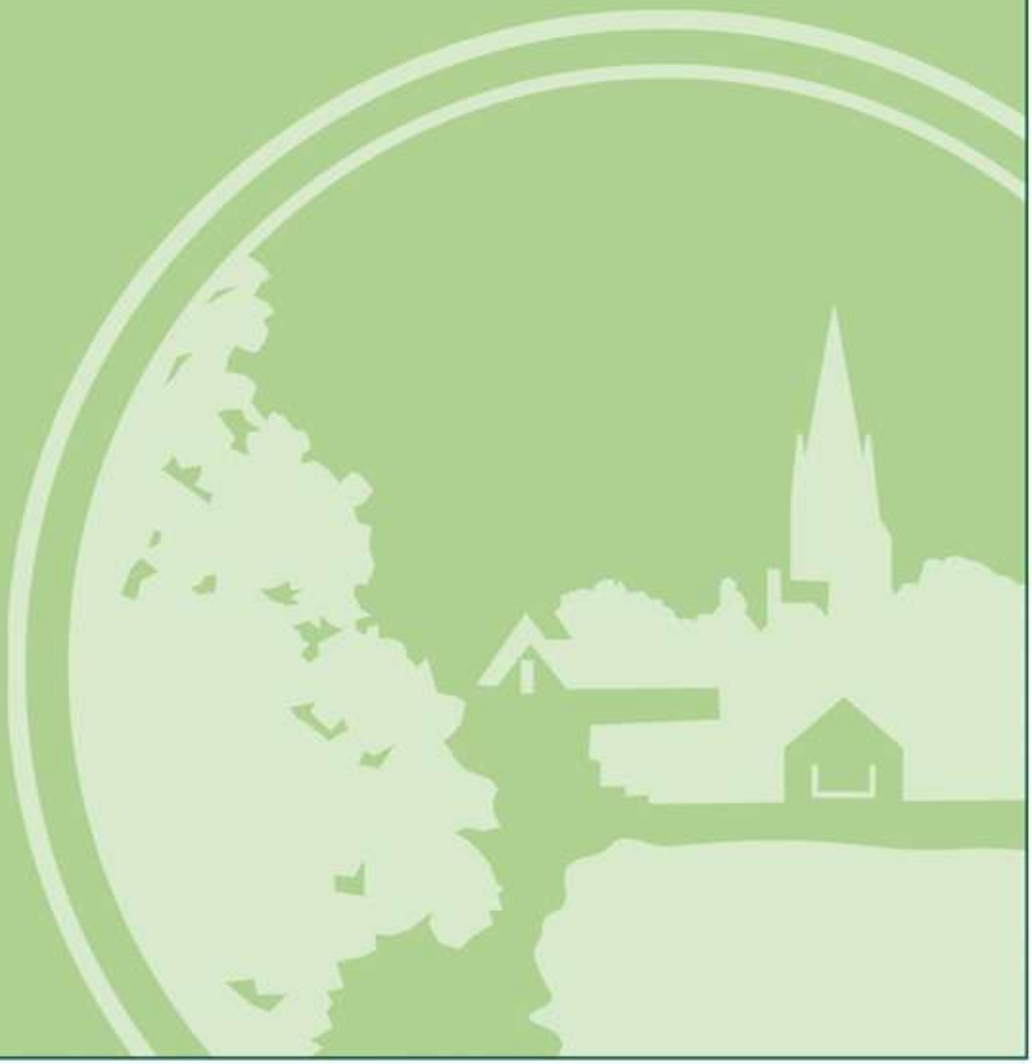
Parish Flood Report:
Witney

May 2008



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1.0 INTRODUCTION

On the 20th July 2007 large parts of the South of England were subjected to intensive storms. The scale and speed of the rainfall was unprecedented and took most communities by surprise causing widespread flooding of highways and property. On this occasion, unlike previous storms / flooding experienced, this impacted on many properties that had never been affected before, due to much of the flooding coming in the form of rain water run off from land.

A swathe of the district was particularly badly affected by the massive storms, which commenced in the morning and subsided in the evening. During the following days further disruption occurred due to rising river levels. At RAF Brize Norton, the records show that over 125 mm (5 inches) of rain fell in 12 hours, and this is a record going back over 100 years. Not only that, but the period from May to July had been the wettest on record since 1903 and meant that the ground was saturated and unable to absorb any more water.

On the 10th October 2007, the District Council's Cabinet considered a report and approved additional resources in order that a review of the affected areas could be carried out and further reports be prepared for the Council's considerations.

1.1 Purpose of the report

In response to requests from both the Parish and Town Councils and the general public West Oxfordshire District Council has produced a number of reports that identify each individual cause of flooding within the Parish / Town, what work is being carried out by external agencies (Environment Agency, Thames Water etc); what the potential options are for future mitigation - and who might be best placed to fund such schemes. The reports themselves reflect the series of water systems that all played a part in the flooding experienced in July 2007 and will help all the organisations involved understand the need to sequence their activities.

This report has been prepared by a qualified Engineer in consultation with the key external agencies and seeks to explore the main reason behind why the floods happened in July 2007 and give an overview of the event itself. It will also provide an understanding of the different roles and levels of responsibility for the agencies involved.

This report should be used to make sure that all the agencies involved with flood prevention – like the Environment Agency, Thames Water, Oxfordshire County Council, Town / Parish Councils and private land owners – work in true partnership for the good of everyone in the local community.

A key outcome of the reports is that residents are given a broad overview of the complex linkages between the different organisations involved and also the range of options available.

1.2 Roles and responsibilities

One of West Oxfordshire District Councils key ongoing roles is to continue to lobby National agencies / Government on behalf of the residents and businesses of the district to secure funding and/or additional resources to assist with flood prevention and other relevant activities. The Council will also work closely with other agencies and organisations in order to highlight the local issues and actions identified in the report.

The legal responsibility for dealing with flooding lies with different agencies and is complex, so below is a simplified summary.

Environment Agency (EA) – Permissive powers[1] for main rivers

Oxfordshire County Council (OCC) – Responsible for adopted highways and highway drainage.

Thames Water (TW) – Responsible for adopted foul and surface water sewers.

West Oxfordshire District Council (WODC) – Duties as a riparian[2] land owner, and permissive powers[1] under Land Drainage Act 1991, Public Health Act 1936, Highways Act 1980 and Environmental Protection Act 1990.

Private land owners - Duties as a riparian land owner.

1.3 Consultation and consent

The key organisations mentioned above are currently carrying out their own investigations, but operate independently of each other, have different methods of prioritisation and different funding criteria. The District Council has consulted with these agencies together with Parish Councils, Town Councils and individual property owners in order to prepare this report.

It is recognised that the majority of the options proposed in this report require further investigations / feasibility studies and / or consultation before they are carried out. Therefore these options may not be appropriate in every case when full costings, environmental, landscaping, biodiversity, built environment and historic factors are fully considered.

When considering protection against future flooding, it must be emphasised that the risk and impact of flooding can be mitigated against but in some cases not fully removed.

1.4 Response to this report

The options section of this report highlights the potential areas of work / activities under the responsible agency, for example the Environment Agency, West Oxfordshire District Council etc. If you have any specific questions relating to these activities please contact the relevant agency using the contact details provided at the top of the chart.

If you have any general questions please contact your Parish / Town Council who have been a key contributor to the production of the report and have agreed to act as the first point of contact.

The Council is also planning to hold a series of 'road shows' in the Parish areas where representatives from all the relevant areas will be available to answer any questions local residents have as well as provide more information on ways residents may help themselves.

[1] Permissive powers are when an organisation may choose whether or not to exercise their powers. I.e. they are NOT under a duty. In making this choice account must be taken of any factors required by the legislation, plus for example how urgent, how necessary they are, cost, likely result, etc

[2] Riparian owners are responsible for the maintenance of any watercourse within or adjacent to the boundaries of their property.

1.5 Legal

2.0 DISTRICT COUNCIL'S ACHIEVEMENTS OVER THE PAST 12 MONTHS

Ditch Clearance

- 1731 Linear metres WODC owned ditches cleared overall
  - 428 Linear metres WODC owned ditches cleared in Witney
- 1923 Linear metres Privately owned ditches cleared overall
  - 713 Linear metres Privately owned ditches cleared in Witney
- Overall 2.27 miles of ditches have been cleared

Flood Grants

- 1137 WODC Flood Grants totalling £284,250 given out overall
  - 233 (£58,250) for Witney
- 40 Red Cross Flood Grants totalling £80,929 administered by WODC overall
  - 9 (£17,830) for Witney
- 301 Hardship Grants totalling £155,050 given out overall

Reports

- Interim Flooding Report published October 2007
- 12 Parish Flood Reports completed by June 2008, 1 report for Witney

Actions from the Council's Interim Report published in January 2008

The table below provides a summary of some of the completed actions identified in the report

Bronze command procedure to be updated to recognise the need for ensuring shift rotas are in place in the early stages of an emergency
Consider producing a revised warning system that identifies a higher category of risk that is only issued in exceptional circumstances
The emergency plan specifically addresses the need to keep in regular contact with elected members
That in future emergency situations District Councils ensure that they have a representative present at Silver Command from the start of the emergency to act as a conduit for information between Silver Command and the District Councils
The council should encourage all residents residing in the flood plain and in areas at risk of flooding to sign up to the EA Flood Alert system.
Provide clear information to residents and businesses about what type of waste we can collect and how it will be collected
Explanations to residents of our need for bulky waste to be placed on the roadside for collection
Commence a review of the mapping of the many thousands of privately owned ditches and culverts, and ensure they are kept clear and well maintained in accordance with the new policy (2 TOR 3)
Lobby central government for a single agency to take control of all land drainage issues
WODC continues to act in a coordination capacity with key external agencies
Continue to liaise with EA to ensure that procedures relating to planning consultations are robust. Seminar being arranged to take place early in 2008 to progress this
Progress the Strategic Flood Risk Assessment
Consider producing a revised warning system that identifies a higher category of risk that is only issued in exceptional circumstances
Approaches to be made to the EA and Metrological Office with regard to improving their predictive capability
During emergency events, have an external media person (BBC) in Bronze Command
Purchase digital TVs to assist with reviewing weather, local and national news to assist emergency management

3.0 EXECUTIVE SUMMARY

Following the flooding events of July 2007, West Oxfordshire District Council (WODC) has responded to requests from both Town and Parish Councils to aid the coordination of all the agencies and bodies that were undertaking their own investigations into the floods through the production of Parish Flood Reports.

This document is the Parish Flood Report for the market town of Witney and has been prepared by the Council's Engineering team. It pulls together information from external agencies and individual property owners. It identifies the causes of flooding in Witney during July 2007 and potential mitigating solutions.

The report itself is broken down into a number of sections and will include;

- An overview of flooding history in Witney and flood related issues raised by residents
- A presentation of the problems and causes of flooding in Witney during July 2007, with the town divided into fifteen areas for clarity
- A summary of all the flooding issues and potential mitigation options in each area
- A breakdown of the recommendations for immediate, mid-term and long term actions for each area including the responsible agency based on the options identified

The table below provides a summary of some of the main causes of the flooding in Witney and the mitigation options that could be applied to alleviate the different flooding problems. More detail is provided regarding the specific locations of the causes of flooding in section 4 of the report

Source of flooding	Potential mitigation measures
Blockage in culverts/road gullies	Clear and maintain culverts/road gullies
Inadequate maintenance of open channel, culverts, ditches and gullies	Ensure that channel/culverts/ ditches/gullies maintained regularly – identify body responsible if not clear
Surcharging of surface water & foul drainage systems	Fit anti-lift manhole covers to the surface water manholes
Inadequate land drainage of low areas	Install flood protection for properties Build/repair bunds Install cut-off drains Install additional road gullies
Inadequate culvert/road gulley capacity	Increase culvert/road gulley capacity – or install additional culvert/road gulley
Inadequate capacity of opening under Bridge Street	Right bank opening of the bridge to be de-silted Replace solid bridge walls with open balustrade
Insufficient storage in upstream catchment	Storage areas to be investigated and developed in the upstream catchment
Run off from agricultural land.	Attenuation within field boundaries using ditches Installing drainage on farm tracks which lead directly to public highways

Thames Water has carried out a growth study for Witney in 2007 and recommendations were put forward to OFWAT for funding during 2010 - 2015. In addition, the construction of a new inlet at the Witney sewerage treatment works is in progress which will deal with the predicted housing growth in the catchment.

4.0 SURVEY

4.1 Description of area

Witney is a thriving market town on the edge of the Cotswolds, 12 miles west of Oxford and just north of the A40 road. Witney has over 25,000 residents in over 10,000 households, according to recent figures from Oxfordshire County Council, making it the largest town in West Oxfordshire. The current MP for Witney is the Rt Hon David Cameron.

Witney has developed along the banks of the River Windrush. The river is braided upstream and downstream of Witney but in Witney, it passes under one bridge along Bridge Street. In recent years, the town has expanded rapidly, e.g. housing development at Madley Park, Millers Mews, Grangers Place, Woodford Mill.

The catchment of the River Windrush at Witney is approximately 30km^2. A map of the catchment area is shown in Figure 8 in Appendix 2.

Two brooks enter the River Windrush in Witney; Hailey Road Drain upstream of Bridge Street and Madley Brook downstream. The upstream catchment area for Hailey Road Drain is the area south of Poffley End. Hailey Road Drain is culverted under Eastfield Road and Hailey Road. The upstream catchment of Madley Brook is the area to the west of Cogges Wood and south of New Yatt. Madley Brook is mainly open channel in Witney except when it passes under Newland Road, TF Smith buildings and Meadow View.

4.2 Survey approach

Visual walk-over surveys have been undertaken. Photographs of some of the flood affected areas are in Appendix 1.

A review of all correspondence, received by the Council about the July 2007 flooding in Witney, has been carried out and incorporated within the findings of the report.

4.3 Meetings

Details of key meetings attended by District Council representatives about the Witney flooding in July 2007 are given in Table below;

Date	Main participants and Venue	Description
22/11/07	Witney Flood Action Group (WFAG), West End Flood Action Group, 1B Hailey Road	To discuss and put forward concerns, issues and solutions directly relating to the Hailey Road, Eastfield Road, West End Area
04/12/07	WFAG, Witney Flood Action Group, House of Windsor	Inaugural meeting of WFAG. Objectives are to: • Prevent/reduce future flooding and damage to properties • Be assured that progress is being made • Arrange future progress meetings.
05/12/07	Town Council, Town Hall, Witney	Concerns: • Development in the flood plain • Funding • Flood warning.
14/12/07	Meeting between David Cameron MP Witney and WFAG, Woodgreen Witney	• Presentation by WFAG • Overview by Environment Agency • Question and answer session with panel from EA, OCC and WODC.
4/04/08	Meeting between David Cameron MP Witney and WFAG, Woodgreen Witney	• Follow on meeting from 14/12/07 • Attended by EA, TW, OCC & WODC

The District Council has liaised with the Environment Agency, Oxfordshire County Council and Thames Water. The Environment Agency has carried out visual surveys of the flooded areas affected by the main river.

The District Council has contacted some of the owners of properties that flooded in July 2007.

4.3.1 Application for Grant Aid

The District Council has distributed a range of financial support to the residents of district in the form of;

- Emergency Flood Relief Grant Aid of £250
- 'Hardship' Grants
- Red Cross Grants

To date the owners of 233 residential properties in Witney have received Emergency Flood Relief Grant Aid, however it is acknowledged this is not the total number of properties affected in Witney as some owners have been reluctant to claim. A further £17,830 of Hardship and Red Cross Grants were also distributed to residents in Witney.

Whilst the Emergency Flood Relief Grant Aid was not paid to industrial and commercial properties, the Council did provide advice and support to local business affected by the flooding on funding available from Business Link and other organisations.

4.3.2 Flooding History

There are records of flooding from the Hailey Road Drain along Eastfield Road, Hailey Road and Cannon Pool. It has been reported that roads and low lying properties flood every 1 to 2 years.

Houses near the Madley Brook culvert under Newland Road are reported to have flooded four times in the 1970s. After the culvert was replaced, there were no further reports of flooding until the July 2007 floods.

There have been reports of flooding in the last 20 years around Queen Emmas Dyke, Thorney Leys, Burwell Leys, but the precise details have not yet been ascertained.

5.0 PROBLEMS AND CAUSES

5.1 Plans

Figure 1 (in appendix 2) shows areas in Witney where flooding occurred in July 2007.

Appendix 2 also contains the following maps:

- A single map which shows:
  - **Witney parish boundary**
  - **Environment Agency** - main rivers and enmained water courses in the area.
  - **Flood Zone 2, January 2008** - 0.1% annual probability of flooding occurring or low to medium risk. Previously referred to as 1:1,000 year flooding.
  - **Flood Zone 3, January 2008** - 1% annual probability of flooding occurring or high risk. Previously referred to as 1:100 year flooding

<u>Note</u> – this EA map has been updated to reflect the events of July 2007. All references to flood zones in this report refer to the previous EA flood zone map i.e. pre July 2007.

- **Ditches** – a plan showing the ditches identified from the OS maps and ditches which are the responsibility of WODC.

- **Culverts** – a plan showing the culverts identified from the OS maps and site visits.

- **Bridge Street** – map of approach of river Windrush to Bridge Street bridge.

5.2 Area 1 - Eastfield Road and Hailey Road

In July 2007, a number of properties were flooded, which included one property along Hailey Road near the junction with Eastfield Road, eight properties on the south-east side of Eastfield Road and six properties near the Hailey Road Drain culvert inlet.

A number of properties were in the 2007 Environment Agency 1 in 100 year flood zone and there were also properties near the culvert inlet, which are outside the flood zone areas.

The Hailey Road Drain collects runoff from the rural upstream catchment around Poffley End and then the urbanised area along Eastfield and Hailey Road and discharges into the River Windrush, on the left bank, approximately 350m upstream of Bridge Street.

It is reported that the gardens and low lying properties in this area flood every 1 to 2 years.

It is believed that the landowners for area 1 are:

- Cottsway Housing Association owns the properties in Eastfield Road
- Oxfordshire County Council, OCC, are responsible for the roads but the property owners may also have riparian ownership responsibilities.
- West Oxfordshire District Council, WODC, owns the land between house 72 and 74.
- Private owners of agricultural land

The cause of flooding is the following:

5.2.1 Hailey Road Drain Culvert Capacity

The Hailey Road drain culvert does not have the capacity to convey the runoff from the upstream catchment (both rural and urbanised). Water backs up at the culvert inlet eventually flowing overland along the natural topographical drainage path, which is along Eastfield Road and Hailey Road.

The cause of inadequate flow capacity could be because of:

a. A blockage in the culverted watercourse, which has now been cleared
b. Inadequate culvert capacity during severe storm events
c. And/or an increase in the peak flow due to a change in land management in the catchment.
d. Inadequate maintenance of main river channels

5.3 Area 2 – Area south west of The Kings School

Four houses claimed for the flood damage grant. Three houses are directly opposite The Kings School and one adjacent to the New Yatt Road.

This area is known to flood but it is not clear if the houses have flooded before. It is estimated that the houses flood once every 20 years.

During a site visit it was observed that there appears to be a poorly maintained cut-off ditch north west of the properties near The Kings School and a small bund and ditch along the perimeter of the house near New Yatt Road.

The cause of flooding is assumed to be the following:

5.3.1 Run-off from the Upstream Catchment

This area is on the edge of the upstream rural catchment of Hailey Road Drain and the ground slopes towards new Yatt Road. There appears to be inadequate land drainage to protect the properties.

5.4 Area 3 - T-junction of Hailey Road, Crawley Road and West End, Commonly Known as Cannon Pool

Nine properties claimed flood damage grants, four properties at the bottom west side of Hailey Road and five properties on the left bank of the open section of Hailey Road Drain downstream of West End Road. The four properties along Hailey Road were in the 2007 Environment Agency 1 in 100 flood zone and the properties downstream of West End Road are outside the flood zones.

The area at Cannon Pool is known to flood regularly and it is a natural low point.

Hailey Road Drain is culverted under Hailey Road and then passes under Cannon Pool. The drain then becomes an open channel section for approximately 40m before entering another culvert (C11) for approximately 45m at the confluence of ditch D03 and ditch D04. Culvert C11 is approximately 45m long. After culvert C11, the Hailey Road Drain is an open channel for approximately 100m before entering the River Windrush.

The cause of flooding is assumed to be the following:

5.4.1 Natural Low Point and Blocked Downstream Overland Flow Path

The road levels on the OS maps show Cannon Pool to be a natural low point. The runoff from West End Road and Crawley Road would collect in the low point in addition to the overland flow down Hailey Road. A house on the southern side of Cannon Pool has been purchased by the OCC in anticipation of the new Link Road. This house is a partial obstacle to overland flow.

5.4.2 Inadequate Capacity of Downstream Open Section and Culvert

The cause of inadequate flow capacity could be:

a. Poor maintenance of the open channel, which is an Environment Agency main river
b. A blockage in culvert C11
c. Inadequate size of culvert C11
d. And/or an increase in the peak flow due to a change in land use.

5.5 Area 4 – Farmers Close

One house claimed for the flood damage grant in July 2007.

There have previously been reports of flooding due to damage/collapsed drainage pipes. These drains have been replaced.

The house which claimed flood damage, and its neighbours, appear to be in the lowest area in Farmers Close, hence all surface runoff would flow along the road to the end of the cul-de-sac. The houses are terraced. The drainage available at the end of the cul-de-sac is in the form of road gulleys. Some houses are below the road kerb level hence if the water level rises above the road kerb level there is a possibility that flood water could enter the house. There are two road gulleys at the end of the cul-de-sac; one gully is visibly higher than the other.

The cause of flooding is assumed to be either or both of the following:

5.5.1 Thames Water and OCC Drainage

The road gullies and surface water sewers in Farmers Close are not sufficiently adequate to remove surface water from the lowest area in the cul-de-sac during severe storm events.

5.5.2 Surface Runoff

The house is in the flow path of overland runoff.

5.6 Area 5 – Madley Brook

Fourteen properties claimed for the flood damage grant in July 2007.

There have not been any other flooding reports since the 1970s.

Seven of the most downstream properties were in the 2007 Environment Agency 1 in 100 year flood zone. Five properties are in the 2007 Environment Agency 1 in 1000 year flood zone and two properties are outside the flood zones.

Madley Brook drains the upstream rural catchment south of New Yatt and to the west of Cogges Wood. Madley Brook then passes under Woodstock Road, C1, and Jubilee Way, C2 and C3, and is open channel through an urbanised area in Witney to culvert C9 under Newland Road.

The Environment Agency has advised that ditch D01 is main river and not as shown in Figure 6.

A resident has stated that during the July floods the road to the north of the junction of Woodstock road, the B4059, and the new Jubilee Way became impassable as Jubilee Way effectively became a control dam which regulated the discharge into Madley Brook from the culverts under Jubilee Way. The resident stated that there was backing up from the new culvert under Madley Way (C4), the footbridge, C5, and from the culvert under Harvest Way (C8).

Just upstream of culvert C4, there is a low concrete bridge that does not appear to have a function.

The cause of flooding is assumed to be a combination of the following:

5.6.1 Inadequate Capacity of Madley Brook

The cause of inadequate flow capacity could be because of:

a. Inadequate maintenance of sections of the open channel, which is an Environment Agency main river
b. Inadequate maintenance of open watercourse and culverts
c. Blockages in culverts
d. Inadequate culvert size (culverts C4, C5, C8 and C9).
e. And/or increase in the peak flow due to a change in land use and due to balancing ponds not functioning correctly.

5.7 Area 6a – Upstream of Bridge Street

A number of properties claimed for the flood damage grant in July 2007.

Based on the 2007 flood map, sixteen properties were not in the Environment Agency 1 in 1000 year flood zone, i.e. five properties along Mill Street, six along West End Road, four along Bridge Street and one in Millers Mews. Thirty-two lie in the flood zone 1 in 100 year and 1 in 1000 year flood zones. The EA have updated their map since July 2007, therefore the number of properties that lie within the current flood zone has changed.

There has been a lot of new development upstream of Bridge Street, e.g. Millers Mews, Woodford Mill, Riverside House, Riverside Cottage, Riverside Gardens and Grangers Place. Riverside House was extended in 1986 and the extension protrudes into the River Windrush's flow path leading to Bridge Street, see Figure 7. This has probably caused the left bank bridge opening to become silted.
It is reported that at the peak of the flood event the water level rose 1m in 15 minutes.

The cause of flooding is assumed to be a combination of the following:

5.7.1 Inadequate Capacity of the Opening under Bridge Street

The capacity of the opening under Bridge Street was not sufficiently adequate to take the peak runoff flow in the River Windrush in July 2007. The upstream water level rose as the water was not able to flow freely downstream due to barriers, e.g. properties along Bridge Street and blockages in the opening under Bridge Street. The water pressure behind the properties increased until the water was able to pass through the properties onto Bridge Street. The flow passed along Bridge Street, where it flowed through low points to the downstream side of Bridge Street.

The rise in water level upstream of Bridge Street caused properties to be flooded including some properties along the south east end of West End.

5.7.2 Runoff from Roads

One house on the southern side of Mill Street has a door sill level at pavement level hence any wash from traffic in the road could enter under the door.

The flats at the entrance to the Woodford Mill development are adjacent to the pavement on the northern side of Mill Street and have a floor level below road level. These properties were probably flooded by runoff from Mill Street as well as from rising water level in the River Windrush.

Wash from traffic on West End Road caused some flooding of properties along this road.

5.7.3 Increase in Peak Runoff Rate

A change in land management techniques in the River Windrush catchment could have caused an increase in peak runoff and hence river flow for the same rainfall event.

The inappropriate operation of mill weirs could cause an increase in flow rate although it is considered to be a minor influence at high flows.

5.7.4 Woodford Way highway drainage ditch

In periods of heavy rain, water off the highway fills the ditch. It is perceived that in severe storm events this ditch could surcharge causing flooding to the hospital grounds. This could be exacerbated by the soffit level of the pedestrian bridge.

5.8 Area 6b – Downstream of Bridge Street

Twenty-one properties claimed for the flood damage grant in July 2007.

No reports of previous flooding have been obtained.

One property which claimed for the flood damage grant was in the 2007 Environment Agency 1% probability / 1 in 100 year flood zone; the others were in the 2007 Environment Agency 0.1% probability / 1 in 1000 year flood zone.

A new development is presently being constructed downstream of Bridge Street called Aquarius. Some of the development was inhabited during the 2007 floods. Ten of the properties that claimed for the flood damage grant were in the new development. The ground level in the new estate has been raised to allow the drainage from the development to drain towards the river. The foundations for the properties in this estate were piled and further investigations are needed to check how this was designed in relation to the existing surface water drainage. The raising of Aquarius appears to have created a low point behind the houses along Bridge Street where there is not an effective surface water drainage system. There is a road gulley in this low area but it was badly silted in December 2007. The residents state that when it rains, water always ponds over the gulley. The developers of Aquarius do not own the land where the gulley is. It is reported that there is a verbal agreement between the landowner of the gulley area and the developers of Aquarius to join the road gulley to a ditch, D10, which runs behind the properties along Newland and then flows through the middle of the Aquarius development.

A new bridge has been built across the River Windrush. This bridge did not seem to cause a major restriction to the flow in the 2007 floods.

The cause of flooding is a combination of the following:

5.8.1 Inadequate capacity of the River Windrush

See section 5.7.1.

5.8.2 Restriction in the downstream Flood zone

Aquarius has changed the over land pathway of surface water.

5.8.3 Inadequate Land Drainage of Low Areas

The area behind Bridge Street and Aquarius is a low area with no effective land drainage.

5.8.4 Increase in Peak Runoff Rate

See section 5.7.3.

5.9 Area 7 – High Street/Witan Way

One house claimed for the flood damage grant in July 2007.

One elderly local resident can remember flooding along the High Street occurring in their lifetime.

The entrance door to the house which was flooded is in an alley leading off the High Street towards the river. The door sill level is at the same level as the alley road level and there is a manhole outside the door.

The cause of flooding is assumed to be either or both of the following:

5.9.1 Thames Water Drainage

The manhole may have surcharged and the water entered the property under the door.

5.9.2 Surface Runoff

Surface water 'splashed' / 'washed' from the traffic on the High Street may have flowed into the alley and hence under the door into the property.

5.10 Area 8 – Wadards Meadow

One property claimed for the flood damage grant in July 2007. The property, a bungalow, is in a relatively new development and appears to have the lowest threshold level in the surrounding area. It was in the 2007 Environment Agency 1 in 100 year flood zone area.

The cause of flooding is assumed to be either or both of the following:

5.10.1 Land Drainage

The bungalow is in a natural low area where surface runoff would collect.

5.10.2 Rising River Water Levels

The bungalow would be the first property in the area to flood from rising water levels.

5.11 Area 9 – Oxford Hill (South)

Two properties claimed for the flood damage grant in July 2007. Neither property is in the 2007 Environment Agency flood zone areas.

Both properties are older properties and have their door sill level at or below road level. The properties are on the southern side of Oxford Hill.

On 11 December 2007 it was observed that a road gulley along Newland Road was silted.

The cause of flooding is assumed to be the following:

5.11.1 Surface Runoff

Any wash from the traffic on Oxford Hill would be able to enter the properties under their front doors.

5.12 rea 10 – Oxford Hill (North)

One property claimed for the flood damage grant in July 2007 and is not in the 2007 Environment Agency flood zone areas.

The cause of flooding is assumed to be the following:

5.12.1 Land Drainage

The flooding was caused from surface runoff being directed towards the property. Since the July floods, ditch WODC-04 has been cleared and ditch WODC-03 re-aligned to take the flow away from the property.

5.13 Area 11 – Queen Emma's Estate

Four properties claimed for the flood damage grant in July 2007.

Queen Emma's Estate is a low-lying area with minimal ground level slope. The development is owned by Pye Homes and has suffered from localised flooding for many years. The area is not in the 2007 Environment Agency flood zone areas.

It is not believed that the surface water from Queen Emma's Estate drains into the culverted length of the Queen Emma's Dyke.

The cause of flooding is assumed to be the following:

5.13.1 Inadequate Surface Water Drainage System

It appears that the private surface water system had blocked outfalls due to the inadequate maintenance of the ditches into which the surface drainage system discharges. Since the floods, the culvert along Ducklington Lane, D11, has been cleared by the OCC and Henry Box ditch, D12, has been cleared by Pye Homes, the developers. The Henry Box ditch does not have a significant slope hence it could be prone to siltation. At the Environment Agency's request, a length of the Henry Box near the Queen Emma's Dyke was left uncleared to act as a silt trap. Pipes were found discharging into the Henry Box drain as well as into the culvert along Ducklington Lane.

5.14 Area 12 – Old Ducklington Lane

One property claimed for the flood damage grant in July 2007. The property is not in the 2007 Environment Agency flood zone areas.

The cause of flooding is assumed to be the following:

5.14.1 Surface Runoff

The land to the rear of the property is higher. The opposite side of Ducklington Lane is slightly lower. The property is probably in an overland flow path.

5.15 Area 13 – Burwell Estate

Fifty-one properties claimed for the flood damage grant in July 2007. This estate is not in the 2007 Environment Agency flood zone areas.

Residents advised that flooding in Burwell Estate commenced from the water surcharging from surface water drainage manholes. It is reported that the balancing pond between the A40 and Thorney Leys road overflowed and discharged onto Thorney Leys Road. The other balancing pond was overgrown. The runoff from the adjacent Burwell Fields (recreational ground) was also a flood threat. The runoff from the area flows to culvert C15, then under Thorney Leys road and then into ditch D21, which discharges into culvert C17 under the A40 and into Colwell Brook on the downstream side of the A40.

Colwell Brook flows along the south western side of Witney. It flows under the A40 in culvert C16, which is adjacent to culvert C17 that takes the runoff from Burwell Estate. At a place called Coral Springs, south of the Deer Park Road roundabout, ditch D20 leaves Colwell Brook and passes under the A40 in culvert C14 and rejoins Colwell Brook at the downstream side of culverts C16 and C17.

The cause of flooding is assumed to be the following:

5.15.1 Surcharging of the surface water drainage system in the estate.

Surcharging could have been created by:

a. High water levels in Colwell Brook. It is reported that the OCC cleared the trash screens of C16 and C17 during the July 2007 floods and this helped to relieve the flooding.
b. Poorly maintained culverts. It is reported that culvert C17 is presently silted up to 50%. Siltation of culvert C15 could cause surcharging in the surface water system in the Burwell Estate.

5.15.1 Surface runoff

The sources of runoff into the Estate during the floods were:

a. The recreational ground, which naturally drains towards the Burwell Estate
b. Overflow from the balancing pond onto Thorney Leys road and hence into the Estate
c. Adjacent higher ground.

5.16 Area 14 – Lower End of Cogges Hill Road adjacent to Ditches D14 and D15

Two properties claimed for the flood damage in July 2007. One property is in the 2007 Environment Agency 1 in 100 year flood zone and one is in the 1 in 100year to 1 in 1000year flood zone.

There had been no previous record of flooding since the estate was built 25 to 30 years ago.

The houses are on the edge of the flood plain.

The cause of flooding is assumed to be the following:

5.16.1 Rising River Water Levels

The properties that had flooded inside have threshold levels below the flood level. All the roads and gardens in this part of the estate were also flooded.

6.0 OPTIONS

The following table shows the possible options available for flood alleviation schemes throughout the Parish, and their potential effectiveness, as assessed by the District Council Engineers. The areas affected by flooding within the Parish have been given unique area numbers, i.e. Area 1. Several options for flood alleviation projects are identified for each area as "Actions" or "Options".

Many of these options will require further detailed investigation along with the agreement of the responsible landowner, identification of budget and a cost benefit analysis to be carried out before they could be implemented.

Some of the options shown are also mutually exclusive, that is if one option is carried out then another will not be necessary, to find if this is the case for an option, please look at the detailed description in the Conclusions and Recommendations Section (7.0).

If you require further information regarding a particular option, please contact the agency that would be responsible for implementation of the proposal, where this has been shown, using the contact information at the top of the column. If no contact details are shown, there may be a private landowner responsible. If this is the case the District Council will ensure that private landowners are made aware of their responsibilities.

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		For queries Tel 08708 506 506 or email enquiries@environment-agency.gov.uk	For queries Tel: 0845 310 1111 or e-mail northernarea@oxfordshire.gov.uk	For queries Tel: 08459 200800	For queries Tel: 01993 861000 Or email enquiries@westoxon.gov.uk	For queries relating to Witney Town Council Tel:01993 704379 or e-mail townclerk@witney-tc.gov.uk				
Area 1- Eastfield Road and Hailey Road										
	15 properties were flooded – estimated frequency once every 8 to 10 years									
	Primary cause - Inadequate culvert capacity									
Action 1	Computer hydraulic model of the Hailey Road Drain.	EA to carry out flood risk mapping of the Main River					The model will help to determine the mechanism of flooding and the most effective solution	None	Up to £5k	Cost excludes survey costs
Action 2	Watercourse to be surveyed to identify culvert sizes and the position of any blockages. Manholes should also be surveyed.		OCC have carried out a CCTV survey of the culvert and manholes. OCC have advised that they will secure the manhole covers and will remove debris which is causing obstruction in the culvert during 2008.				Information collection	None	Up to £5k	Since the July 2007 floods, OCC have carried out a partial CCTV survey. This showed that one side of the highway drainage is connected to the culvert and the other side is connected to a separate drain, which discharges at Cannon Pool.
Action 3	Detailed survey of upstream catchment to identify potential upstream storage areas and land use and management.	EA to carry out topographical survey of 2.8km² to show all changes of slope and low areas. EA have confirmed this will be carried out 2009-2010					Information collection	None	Up to £5k	
A	Increase culvert capacity, by either replacing existing culvert with a larger one or laying a parallel pipe. This is a large project and funding needs to be agreed.	Consent needed	OCC to consider two options: 1) Install an additional larger culvert under Hailey Road running the full length 2) Replace the existing culvert with new large culvert (WODC to design)		WODC to assist in a coordination role		Protection of all the houses down Hailey Road in a 1:25 year storm and the prevention of road flooding	Flooding at Cannon Pool could still occur if the culvert downstream of Hailey is not increased as well (see Area 3)	More than £500k	

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B	Approximately 15 storage areas in upstream rural catchment area.	EA to consider designing and building upstream storage areas to reduce peak runoff into culvert					Effective in Areas 1, 2 and 3 and up to 1 in 100 year storm	There will be a change of land use in the upstream catchment	£200k to £500k	The landowners in the upstream catchment have not been approached. Land negotiations and compensation could greatly increase cost. The small storage areas would be outside the Reservoirs Act.
C	One on-line storage reservoir upstream of the inlet.	Upstream on-line storage areas to be designed and built to reduce peak runoff into culvert					Effective in Area 1, 2 and 3 up to 1 in 100 year storm	There will be a change of land use in the upstream catchment	£200k to £500k	The landowners in the upstream catchment have not been approached. Land negotiations and compensation could greatly increase cost. The single storage areas would come under the Reservoirs Act.
D	Remove wall between 72 and 74 Eastfield Road. Raise wall behind gardens. Build wall along the side of 72 and 74 along the culvert corridor, which is now being used for overland flow.					Cottsway to fund the wall raising as it is protecting their houses.	The houses near the inlet would be protected but flooding along Eastfield Road and Hailey Road would still occur. It would not stop flooding at Cannon Pool. The water head over the culvert will be reduced and hence may reduce the flow through the culvert.	Road flooding would commence earlier along Eastfield Road and Hailey Road. Flooding of other houses along Eastfield Road and Hailey Road would still occur.	Up to £5k	Cottsway have not been approached.
E	Clear road gullies.		Clear road gullies along Hailey Road and Eastfield Road and maintain.				Reduce road flooding. Slight reduction in flood risk to the properties along Eastfield Road and Hailey Road but no reduction in flood risk to properties near the culvert inlet.	Reduced ponding at Cannon Pool for low return period events but more discharge to downstream open channel. Hence slight increase in flood risk to properties against the open channel.	Up to £5k	Since the July 2007 floods, OCC have cleared road gullies.

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F	Raise kerbs to highway.		Raise approx 70m of kerb on the junction of Eastfield Road and 10m along Hailey Road				Would stop flood water entering approx 10 houses during a 1:10 year storm	Slightly more flooding to the lower part of Hailey Road	£5k to £20k	
G	Change in land management.	Advise landowner of upstream catchment on land management techniques to reduce runoff				Landowners to change farming techniques so as to improve infiltration. More hedgerows to be planted across the slope to reduce overland flow rate.	Runoff from the upstream catchment would be reduced hence reducing the risk of house flooding to 1 in 15 to 20 year event.	There will be a change in land use in the upstream catchment.		The landowners in the upstream catchment have not been approached. It may be possible for landowner/farmer to obtain environmental grant to plant hedgerows.
Area 2 – South of junction between lane to Middlefield Farm House and New Yatt Road										
	Four properties were flooded, frequency of flooding unknown – assume frequency of flooding every 10 years									
	Primary cause – Runoff from upstream catchment									
A	Individual flood protection - 1	Consent needed				Build bund (0.5m high) and cutoff drain, 120m long, for houses opposite Kings School.	Cut off drain will divert runoff to the Hailey Road catchment.	Slight increase in runoff to Hailey Road Drain catchment area.	Up to £5k	Property owners not contacted.
B	Individual flood protection – 2					Build bund (0.5m high) and cutoff drain 70m for house near New Yatt Road.	Effective to height of bund. If overtopped the owner will have to pump out. Bund could affect drainage of property.	Would remove small area in flood plain but unlikely to have a major effect on flood levels.	Up to £5k	Property owners not contacted.
C	Individual flood protection – 3					Flood protection to house only, e.g flood boards, flood proofing of exterior walls of house to flood level, sand/water bags.	Only effective if the flood boards are put into place before the water levels rises. There is no flood warning on the Hailey Road Drain.	No effect on adjacent land.	£750 per property	Property owners not contacted.
D	Clear and repair highway gullies at the junction with New Yatt Road.		Clear highway gullies							
E	Ensure the ditch on New Yatt Road conveys water past the access road entrance.		Maintain culvert			Ditch clearance work.	Reduce effects of flash flooding to lower lying properties.	Minimal increase in water flowing onto the highway in the Early Road area.	Up to £5k	

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F	Stop or reduce the run off, from the school field.					School to investigate methods of reducing or stopping run off from the school field.	Significant reduction in the effects of flash flooding on low lying properties.	May affect school buildings but careful design would alleviate this risk.	£5k to £50k	Cost totally dependant on the final design.
Area 3 – T-Junction of Hailey Road, Crawley Road and West End, commonly known as Cannon Pool										
	Nine properties flooded, similar frequency to the properties along Eastfield Road and Hailey Road.									
	Primary cause – Natural low spot and downstream overflow path blocked. Secondary cause – Inadequate capacity of downstream open channel sections and culvert.									
Action 1	The lower section of Hailey Road Drain would be part of the model in Area 1 above.	Flood risk mapping of the Main River to be carried out.					The model will help to determine the mechanism of flooding and the most effective solution.	None	See Area 1 above	
Action 2	Watercourse to be surveyed to identify culvert size and the position of any blockages.		CCTV to be carried out along 45m of culvert.				Information collection	None	Up to £5k	This scheme will cause major traffic disruption.
Action 3	Detailed survey of open channel sections involving channel cross sections and culvert inlet and outlet arrangements.	7 no. topographical cross sections of open channel.					Information collection	None	Up to £5k	
A	Increase culvert capacity by laying a parallel culvert for 45m.		Install additional pipe parallel to existing. WODC to design.				Works to be carried out if the model shows that the existing culvert is undersized. Increasing the culvert capacity will reduce upstream water levels of culvert. It will reduce flooding to 5 properties.	Flood water level may be reduced.	£5k to £20k	There is a very small cover, hence a pipe will have to be laid in parallel.
B	Demolish the OCC house, which is a barrier in the overland flow path.		OCC to consider options as the OCC house is a partial obstacle to the overland flow of water.				Will remove barrier to flow path and hence reduce water levels upstream of the culvert. Reduce flooding to the road and 4 properties.	There may be more flooding downstream.	Up to £5k	The computer hydraulic model should be used to identify the effect of removing a barrier to flow on the downstream reaches.
Area 4 – Farmers Close										
	1 property flooded, no previous flooding reported –assume that this was the first time the property flooded.									

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	Primary cause – Surface water runoff, Thames Water drainage and OCC road drainage									
A	Thames Water to ensure drains are free from blockages and have a free outfall.			Carry out investigation of surface water sewers in area and the outfalls to ensure they are free flowing.			If any blockages are removed then the level of ponding will be reduced and flooding reduced.	Reduce risk of runoff from road taking overland flow route through houses.	Up to £5k	
B	Clear road gullies.		Clear out all gullies in Farmers Close.				If any blockages are removed then the level of ponding will be reduced and flooding reduced.	Reduce risk of runoff from road taking overland flow route through houses.	Up to £5k	
C	Install additional road gulley.		At the downstream end of the lowest cul-de-sac, there are 3 gullies. One is approx 300mm higher than the other. Install another road gulley at the level of the lowest.				Reduce ponding and hence the risk of flooding.	None	Up to £5k	
D	Raising road kerb.		Raise low points so flow does not enter property. Approximately 10m.				Reduce risk of runoff from road flooding house.	Little effect on adjacent land.	Up to £5k	
E	Individual property flood defences.					Flood protection to house only, e.g flood boards, flood proofing of exterior walls of house to flood level, sand/water bags.	Only effective if the flood boards are put into place before the water level rises. There is no flood warning in area. Flood water pond against house with no outlet; it is better to prevent water flowing to house.	None	Up to £5	
Area 5 – Madley Brook										
	Fourteen properties were flooded – no reports of flooding since 1970's – assume frequency of flooding is in 75 years.									
	Primary cause – Inadequate capacity of Madley Brook, incorrect operation of balancing ponds.									

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Action 1	Computer hydraulic model of Madley Brook.	Flood risk mapping of the Main River to be carried out.					The model will help to determine the mechanism of flooding and the most effective solution.	None	Up to £5k	Cost excludes survey costs.
Action 2	CCTV survey of all culverts.		CCTV surverys to be carried out for Jubilee Way culverts C2, C3, C7 and culvert C1 under Woodstock Road and culvert C4 under Medlay Road and C 8 under Harvest Way.			Developers to survey culvert C5 and C6.	Information collection	None	Up to £5k	
Action 3	Topographical survey of Madley Brook including cross sections that extend across flood plain surveys.	Cross-sections (approx. 30 no.) to be taken along Madley Brook					Information collection	None	Up to £5k	
A	Investigate how the balancing lakes in the new development functioned during the July 2007 floods and correct operation and write operational and maintenance guidelines.					The balancing ponds have not been adopted by the WODC as they appear not to function efficiently.	No effect on the runoff from the upstream rural catchment. Would only affect the runoff from the new development and may help to alleviate localised flooding.		Up to £5k	
B	Put controls on the inlets of culverts under Woodstock Road and Jubilee Way so as to control the amount of water entering Madley Brook in Witney.	Install flow controls on the upstream ends of culverts C7, C1, C2 and C3.					The peak run off into Madley Brook in Witney will be reduced and hence flooding reduced to give 1 in 100 year protection.	The land upstream of the culverts will be flooded. The road to the north of Witney was flooded in July 2007. The situation could be made worse.	£5k to £20k	Difficult to quantify until computer model is run to establish the required design flows and the capacity of the existing culverts. There have been no negotiations with the landowners about increased flooding of land.
C	Option B plus bund to prevent road from flooding.	Install flow controls on the upstream ends of culverts C7, C1, C2 and C3. Design height of bunds required to prevent road flooding at a 1 in 100 year event.					The peak run off into Madley Brook in Witney will be reduced and hence flooding reduced to give 1 in 100 year protection.	Road protected but upstream land will be flooded.	£50k to £100k	Difficult to quantify until computer model is run to establish the required design flows and the capacity of the existing culverts. There has been no survey of the upstream catchment or negotiations with

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										landowners.
D	Option B plus raising road to the north of Witney.	Install flow controls on the upstream ends of culverts C7, C1, C2 and C3 and determine flood water levels upstream.	Raise road to prevent flooding.				The peak runoff into Madley Brook in Witney will be reduced and hence flooding reduced to give 1 in 100 year protection.	Road is protected but upstream land will be flooded.	More than £500k	Difficult to quantify until computer model is run to establish the required design flows and the capacity of the existing culverts. There has been no survey of the upstream catchment or negotiations with landowners.
E	Storage areas in upstream rural catchment.	Design upstream storage required to prevent 1 in 100 year flooding.			WODC to coordinate construction		Protection to 1 in 100 year.	Land use change in upstream rural catchment.	£100k to £500k	Difficult to quantify until computer model is run to establish the required design flows and the capacity of the existing culverts. There has been no survey of the upstream catchment or negotiations with landowners.
F	Increase culvert capacities along Madley Brook. The computer model will identify the capacity of the culverts required by either increasing the size of the existing or installing additional flood relief culverts.	Design culvert sizes.	Replace culverts.				Protection to 1 in 100 year event. May not be possible to increase capacity of culvert under Newland Road, C09.	Major traffic disruption to replace culverts.	£100k to £500k	Difficult to quantify until computer model is run to establish the required design flows and the capacity of the existing culverts. From site visit it will be difficult to increase capacity of culvert C09 under Newland Road.
G	Desilt culverts and regularly maintain Madley Brook channel.	Maintenance programme to be set up.					Will improve capacity of brook and will reduce flood risk.	None		
H	Change land management.	Advise landowner of upstream catchment on land management techniques to reduce runoff.				Landowners to change farming techniques so as to improve infiltration. More hedgerows to be planted across the slope to reduce overland flow rate.	Runoff from the upstream catchment would be reduced hence reducing the risk of house flooding to 1 in 15 to 20 year event.	There will be a change of land use in the upstream catchment.		The landowners in the upstream catchment have not been approached. It may be possible for the landowner/farmer to obtain environmental grant to plant hedgerows.

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Area 6a – Upstream of Bridge Street										
	Ninety-eight properties were flooded, assume frequency of flooding is > 1 in 75 year.									
	Primary cause – Inadequate capacity of the opening under Bridge Street. Secondary cause – Runoff from roads and increase in peak runoff rate.									
Action 1	Computer hydraulic model of the River Windrush and flood plain upstream and downstream of Bridge Street.	Flood risk mapping of the Main River to be carried out.					The model will help to determine the mechanism of flooding and the most effective solution.	None	£5k to £20k	Cost excludes survey costs.
Action 2	Detailed survey of upstream and downstream catchments and barriers to flow near Bridge Street including survey of bridge along Bridge Street.	Survey required for the Flood Risk Mapping.					Information collection.	None		
Action 3	Detailed topographical survey of the upstream catchment to ensure all possible storage areas are utilised in an extreme flood event and to identify all operational flood gates either Environment Agency responsibility or private.	Survey required for the Flood Risk Mapping.					Information collection.	None		
A	Coordination of the operation of all floodgates in the upstream catchment. This may help to ensure all the flood plain storage areas are utilised.	The Environment Agency are the experts in water level control procedures.					This will help reduce the impact on lower return period floods but unlikely to have any effect on the flood that was experienced in July 2007.	None		
B	Desilt the right bank opening of the bridge under Bridge Street.	This is not a difficult operation provided only the silt under the bridge is removed. EA & OCC have confirmed that this will be carried out in 2008.	This is not a difficult operation provided only the silt under the bridge is removed. EA & OCC have confirmed that this will be carried out in 2008.				This will increase the flow area of the bridge opening. The modelling will show how effective it is taking into account other protrusions into the upstream flow path.	Flood water may flow more easily to the downstream side. It is unlikely if this will cause an increased flood risk.	£5k to £20k	
C	Clear out ditches in the River Windrush floodplain upstream of Bridge Street.				Ditches to be cleared.	Ditches to be cleared (All Souls College).	Reduced flood risk at low return periods. Would have no effect on a large-scale flood as in July 2007.	None	Up to £5k	

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D	Increased maintenance, and weed cutting along the River Windrush, and the pollarding/removal of large trees that could affect river flows and investigate more extensive desilting of the river.	Maintenance regime of river to be established and actioned.					Improves flow capacity of river but would have little effect on a large scale flood.	None		
E	Utilise fully the storage in the upstream catchment.	From topographical survey determine if all upstream catchment is being utilised fully and install control measures to utilise fully.					The computer model will demonstrate the effectiveness of any upstream storage.			Difficult to cost without knowledge of the required size and shape.
F	Upstream storage area.	Upstream storage to be constructed to reduce peak runoff. To be designed from results of topographical survey.					Flood protection to 1 in 100 year event. The computer model will demonstrate the effectiveness of any upstream storage.	Land use in upstream storage area will change.		
G	Change in Land Management.	Advise landowner of upstream catchment on land management techniques to reduce runoff.				Landowners to change farming techniques so as to improve infiltration. More hedgerows to be planted across the slope to reduce overland flow rate.	Runoff from the upstream catchment would be reduced hence reducing the risk of house flooding to 1 in 15 to 20 year event.	There will be a change of land use in the upstream catchment.		The landowners in the upstream catchment have not been approached. It may be possible for the landowner/farmer to obtain environmental grant to plant hedgerows.
H	Individual flood protection to the houses and flats flooded by traffic wash along West End Road and Mill Street.					The properties are close to the road hence flood boards will be required as a flood defence.	If flood boards are used, then the individual flood defences are only effective if in place before the flood.	None	£750/ property	
I	Stop road traffic when the roads become flooded.		Joint co-ordination between the OCC and WODC		Joint co-ordination between the OCC and WODC		The flood risk to the individual properties, which flooded because of traffic wash in July 2007, will be reduced.	Witney would be isolated if there was a traffic ban. Emergency services would not be banned hence there may still be a wash.		

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J	Replace the solid bridge walls with open balustrade to allow flow to pass through the bridge.		This work would have to be approved by OCC.				This will increase the flow capacity of the bridge hence there will be a decrease in the water level upstream. BUT there is a chance that flow will pass down Bridge Street and then enter the area downstream between the houses on Bridge Street and the Aquarius development. There appears to be only one road gulley in this area hence there is a possibility of increasing the flood risk downstream. There may also be a chance that the flood risk to the properties adjacent to the River Windrush on the downstream side will be increased.		Up to £5k	
K	Ensure maintenance of highway drainage ditch parallel to Woodford Way adjacent to hospital is carried out.		The highway drainage system has been designed and constructed in accordance with EA requirements. OCC to carry out essential maintenance.					Lack of maintenance may cause flooding to hospital grounds.	Up to £5k	
L	EA to install river level gauges with telemetry to improve advanced warning system.	EA to investigate						None	£5k to £20k	
Area 6b – Downstream of Bridge Street										
	Twenty-one properties were flooded, assume frequency of flooding is > 1 in 75 year									
	Primary cause – Inadequate capacity of the opening under Bridge Street. Secondary cause – Runoff from roads and increase in peak runoff rate.									
Action 1	See Actions 1 and 2 in Area 6a	It is the Environment Agency's responsibility to carry out flood risk mapping of the Main River.					The model will help to determine the mechanism of flooding and the most effective solution.	None	See Action 1 Area 6a	Cost excludes survey costs.
A	Connect road gulley in low area to ditch D10 and ensure there is a clear flow path along ditch D10 to the River Windrush.					This work is currently being carried out by Barratts.	Will reduce flood risk to the houses along Bridge Street.	None	£20k to £50k	
B	Make walls along the boundary of the properties along Bridge Street and the low area near Aquarius into flood walls.					Barratts should be approached to do this work as mitigation measure for removing the downstream flow	Will reduce flood risk to the houses along Bridge Street.	None	£50k to £100k	

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Witney Parish

May 2008

Option ref	Problem Overview	Description of work required					Key issues			Comments
	Options	Environment Agency	Oxfordshire County Council	Thames Water	WODC	Private	Effectiveness	Affects on adjacent land	Cost	
		For queries Tel 08708 506 506 or email enquiries@environment-agency.gov.uk	For queries Tel: 0845 310 1111 or e-mail northernarea@oxfordshire.gov.uk	For queries Tel: 08459 200800	For queries Tel: 01993 861000 Or email enquiries@westoxon.gov.uk	For queries relating to Witney Town Council Tel:01993 704379 or e-mail townclerk@witney-tc.gov.uk				
						path by building Aquarius.				
C	Barratts perimeter ditch to be desilted to junction with the river Windursh.	EA to investigate.								
Area 7 – High Street / Witan Way										
	One property was flooded – no previous records of flooding have been obtained.									
	Primary cause – Surcharging manhole and/or traffic wash.									
A	Individual property flood defences e.g. flood boards					These flood defences will be the responsibility of the owner.	Will protect properties depending on height but only required for 1:100 year storm.	None	£750/ property	
Area 8 – Wadards Meadow										
	One property was flooded – No previous records of flooding have been obtained – assume frequency of flooding is 1 in 100 year.									
	Primary cause – surface runoff and/or rising river water levels.									
Action 1	See Action 1, 2 and 3 in Area 5	It is the Environment Agency's responsibility to carry out flood risk mapping on the Main River.					Information collection.	None	Up to £5k	Cost excludes survey costs.
A	Individual flood defences, e.g. flood boards					Property owners would need to provide flood defences for their own properties and install in flood event e.g. flood boards, sacks, roller shutter. This would only be required for 1:100 year storm. Storage and erection procedure	Will protect properties depending on height but only required for 1:100 year storm.	None	£750/ property	
Area 9 – Oxford Hill (South)										
	Two properties were flooded – no previous records of flooding have been obtained.									
	Primary cause – Surface runoff/wash from traffic.									

West Oxfordshire District Council

Parish Flood Report – Options summary

Witney Parish

May 2008

Option ref	Problem Overview	Description of work required					Key issues			Comments
	Options	**Environment Agency**	**Oxfordshire County Council**	**Thames Water**	**WODC**	**Private**	**Effectiveness**	**Affects on adjacent land**	**Cost**	
		For queries Tel 08708 506 506 or email enquiries@environment-agency.gov.uk	For queries Tel: 0845 310 1111 or e-mail northernarea@oxfordshire.gov.uk	For queries Tel: 08459 200800	For queries Tel: 01993 861000 Or email enquiries@westoxon.gov.uk	For queries relating to Witney Town Council Tel:01993 704379 or e-mail townclerk@witney-tc.gov.uk				
A	Individual flood protection to the houses.					Property owners would need to provide flood defences for their own properties and install in flood event e.g. flood boards, sacks, roller shutter. This would only be required for 1:100 year storm. Storage and erection procedure	Will protect properties depending on height but only required for 1:100 year storm.	None	£750/ property	
B	Stop road traffic when the roads become flooded.		Joint co-ordination between the OCC and WODC	Joint co-ordination between the OCC and WODC			The flood risk to the individual properties, which flooded because of traffic wash in July 2007, will be reduced.	Witney would be isolated if there is a traffic ban. Emergency services would not be banned hence there may still be wash.		
Area 10 – Oxford Hill (North)										
	One property was flooded – assume frequency of flooding was 1 in 50 years but risk reduced due to ditch realignment and maintenance.									
	Primary cause – Land drainage.									
A	Realignment of ditch WODC-03 and clearing of WODC-04 was carried out in November 2007.				WODC together with other riparian owners are responsible for future maintenance of ditches.	WODC together with other riparian owners are responsible for future maintenance of ditches.	The realignment and ditch clearing has reduced the flood risk but maintenance is required to keep effectiveness.	None		
Area 11 – Queen Emma's Dyke Estate										
	Four properties were flooded – assume flood risk was 1 in 10 years, reduced since remedial works carried out.									
	Primary cause – Inadequate surface water drainage system. jo.arbon@mouchelparkman.com									

West Oxfordshire District Council

Parish Flood Report – Options summary

Witney Parish

May 2008

Option ref	Problem Overview	Description of work required					Key issues			Comments
	Options	Environment Agency	Oxfordshire County Council	Thames Water	WODC	Private	Effectiveness	Affects on adjacent land	Cost	
		For queries Tel 08708 506 506 or email enquiries@environment-agency.gov.uk	For queries Tel: 0845 310 1111 or e-mail northernarea@oxfordshire.gov.uk	For queries Tel: 08459 200800	For queries Tel: 01993 861000 Or email enquiries@westoxon.gov.uk	For queries relating to Witney Town Council Tel:01993 704379 or e-mail townclerk@witney-tc.gov.uk				
A	Ditch along Ducklington Lane, D11, and Henry Box Drain, D12, were cleared by OCC and the developers Pye Homes, in November 2007.		OCC are responsible for the future maintenance of ditch D11.		WODC could adopt drain and maintain.	Pye Homes cleared out Henry Box ditch D12 in November 2007 but it is unlikely that they will take on a long-term maintenance responsibility.	Clearing of ditches D11 and D12 has reduced the flood risk.	None		The long-term, maintenance responsbilities and funding sources for Ditch D12 need to be clarified. Clarification of ownership of the surface waster system in the Estate is needed.
Area 12 – Old Ducklington Lane										
	One property was flooded – no previous records of flooding have been obtained – assume frequency of flooding is 1 in 100 year.									
	Primary cause – Surface runoff.									
A	Individual flood defences, e.g. flood boards, water proofing exterior walls and redirecting runoff away from the house.					It may be possible to raise ground levels around the house to redirect the runoff away from it.	If flood boards are used then the individual flood defences are only effective if in place before the flood.	None	£750/ property	
Area 13 – Burwell Estate										
	Fifty-one properties were flooded – assumed standard protection 1:50 year.									
	Primary cause – Surcharging of the surface water drainage system in the Estate. Secondary cause – Surface runoff from recreational ground.									
Action 1	Numerical hydraulic model of Colwell Brook.	Flood risk mapping of the Main River to be carried out.					The model will help to determine the mechanism of flooding and the most effective solution.	None	Up to £5k	Cost excludes survey costs.
Action 2	Survey of culverts C14, C16 and C17 under the A40 and C15 under Thorney Leys.		CCTV surveys required						Up to £5k	
Action 3	Topographical survey of Colwell Brook, upstream and downstream of the A40 and D20	Cross-sections (50 no.) are required along Colwell Brook and along ditch D20 until it rejoins Colwell Brook downstream of culverts C16 and C17.								

West Oxfordshire District Council

Parish Flood Report – Options summary

Witney Parish

May 2008

Option ref	Problem Overview	Description of work required					Key issues			Comments
	Options	**Environment Agency**	**Oxfordshire County Council**	**Thames Water**	**WODC**	**Private**	**Effectiveness**	**Affects on adjacent land**	**Cost**	
		For queries Tel 08708 506 506 or email enquiries@environment-agency.gov.uk	For queries Tel: 0845 310 1111 or e-mail northernarea@oxfordshire.gov.uk	For queries Tel: 08459 200800	For queries Tel: 01993 861000 Or email enquiries@westoxon.gov.uk	For queries relating to Witney Town Council Tel:01993 704379 or e-mail townclerk@witney-tc.gov.uk				
A	Clear culvert, C17		Desilt existing culvert as it is currently 50% full.				Most properties in the lower half of Burwell Close would not flood as culvert will not surcharge.	None	Up to £5k	
B	Clear ditch D21			Thames Water have cleared ditch D21 and have set up ongoing maintenance programme.						
C	Investigate how the balancing ponds functioned during the July 2007 floods and optimise operation.	A joint survey of balancing ponds has been carried out between Thames Water, EA and WODC.		Thames Water to carry our works as agreed including monthly inspections.	WODC together with Thames Water to carry out a joint survey of balancing ponds to establish works which Thames Water are instructed to do.		This will reduce the runoff onto Thorney Leys and the water entering the Burwell Estate, which will enter the surface water system.	None		
D	Clear ditch from Colwell Brook to A40 (D20) and clear culvert C14 so as to reduce the amount of water in Colwell Brook upstream of A40 in a flood event.	EA to model to prove effect.	Clear culvert C14 and ditch 20 so as to reduce the amount of water in Colwell Brook upstream of A40 in a flood event.		WODC to establish ownership of ditch D20.		Assist protection of a few properties in Burwell Close.	None but surveys needed.	Up to £5k	
E	Build flood bund in the recreational field on the western side of Burwell Estate to protect Burwell Estate from surface runoff.				It is understood that Witney Town Council are responsible for this area. Approximately 70m of flood bunding is needed. Area to be surveyed to quantify flood bund height and extent.	It is understood that Witney Town Council are responsible for this area. Approximately 70m of flood bunding is needed. Area to be surveyed to quantify flood bund height and extent.	Will prevent surface water from entering the Estate. Will effectively create a storage area in the recreational area.	Part of the recreational ground will be waterlogged in a wet period.	Up to £5k	The future maintenance of the flood bund should be determined.
F	Fit anti-lift manhole covers to the surface water manholes.			Thames Water to fit anti-lift manhole covers on the manholes which surcharge first.			Will prevent flooding from manholes at the lowest ground level but would push the surcharge effect further upstream in the surface water system.	None		

West Oxfordshire District Council

Parish Flood Report – Options summary

Witney Parish

May 2008

Option ref	Problem Overview	Description of work required					Key issues			Comments
	Options	Environment Agency	Oxfordshire County Council	Thames Water	WODC	Private	Effectiveness	Affects on adjacent land	Cost	
		For queries Tel 08708 506 506 or email enquiries@environment-agency.gov.uk	For queries Tel: 0845 310 1111 or e-mail northernarea@oxfordshire.gov.uk	For queries Tel: 08459 200800	For queries Tel: 01993 861000 Or email enquiries@westoxon.gov.uk	For queries relating to Witney Town Council Tel:01993 704379 or e-mail townclerk@witney-tc.gov.uk				
G	Continuing maintenance of all culverts under the A40 and Thorney Leys (C14, C15, C16 and C17).		Some culverts already cleared by OCC				Will reduce the surcharging in the Burwell Estate in a flood event.	None	Up to £5k/ annum	
Area 14 – Cogges Road Hill Road										
	Two properties were flooded – no previous records of flooding have been obtained (relatively new estate) – assume frequency of flooding is 1 in 75 year.									
	Primary cause – River water levels.									
A	Individual flood protection to the houses.					Property owners would need to provide flood defences for their own properties and install them in a flood event, e.g. flood boards, sacks.	Will protect properties depending on height. May only be required for 1:100 year storm. Could be problems with storage and installation procedures.	None	£750/ property	
B	Clear ditch D14 and D15				WODC to establish ownership	Owners to clear ditches and maintain.	Will slightly reduce flood risk.	None	Up to £5k	

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 Area 1 – Eastfield Road and Hailey Road

7.1.1 Maintenance

The following ongoing maintenance item is recommended:

- OCC to clear and maintain road gullies along Hailey Road and Eastfield Road (Option E). OCC have confirmed that the gullies will be cleaned twice a year.

7.1.2 Flood Defence Improvement Schemes

The following flood defence improvement schemes are recommended:

Immediate (under 1 Year)

- Option D – Wall to be removed between 72 and 74 Eastfield Road; wall to be raised behind gardens; wall to be built along the side of 72 and 74 along the culvert corridor; Cottsway to be approached to fund the wall raising.

Mid-Term (under 1-2 Years)

- Option A – OCC / EA to investigate cost of increasing the culvert capacity by either:
  - Installing an additional large culvert under Hailey Road (running its full length)
  - Replacing the existing culvert with a new large culvert which OCC / EA will design.

  Consent is required from the Environment Agency and OCC for this option.
- Option F – OCC to investigate feasibility of raising approximately 70m of kerb on the junction of Eastfield Road and 10m of kerb along Hailey Road.

Long-Term (3 years or more)

- Option B – Environment Agency to investigate the creation of (approximately) a number of storage areas (balancing ponds) in upstream rural catchment areas.

7.2 Area 2 – Area South West of The Kings School

7.2.1 Maintenance

There are no recommendations for ongoing maintenance in Area 2.

7.2.2 Flood Defence Improvement Schemes

The following flood defence improvement schemes are recommended:

Immediate (under 1 Year)

- Option C – Property owners to provide and install flood protection for their own properties, e.g. flood boards, flood proofing of exterior walls of house to flood level, and sand/water bags (property owners to be contacted).
- Option D – clear and repair the highway gullies at junction with New Yatt Road.
- Option E – ensure ditch on New Yatt Rd conveys water past access road entrance.

Mid-Term (under 1-2 Years)

- Option A – Bund (0.5m high) and 120m cut off drain to be installed for houses opposite Kings School (property owners to be contacted; consent needed from the Environment Agency)
- Option B – Bund (0.5m high) and 70m cut off drain to be installed for house near New Yatt Road (property owners to be contacted).

Long- Term (3 years or more)

- Option F - stop or reduce the run off from the school field.

7.3 Area 3 – T-junction of Hailey Road, Crawley Road and West End, Commonly Known as Cannon Pool

7.3.1 Maintenance

There are no recommendations for ongoing maintenance in Area 3.

7.3.2 Flood Defence Improvement Schemes

The following flood defence improvement scheme is recommended:

Immediate (under 1 Year)

Investigate the removal of the front boundary wall (possibly prior to construction of the proposed cycleway) of land purchased by OCC which would allow water to flow down Hailey Road rather than acting as a dam.

There are no other options for immediate flood defence improvement schemes.

Mid-Term (under 1-2 Years)

- Option A – OCC to investigate an increase in culvert capacity by designing and installing a 45m culvert parallel to the existing one. Works to be carried out only if the model shows that the existing culvert is undersized. Consent is required from both the Environment Agency and OCC.

7.4 Area 4 – Farmers Close

7.4.1 Maintenance

The following ongoing maintenance items are recommended:

- Thames Water to carry out investigation of surface water sewers and outfalls in the area to ensure that they are free flowing (Option A)
- OCC to clear out all gulleys in Farmers Close (Option B).

7.4.2 Flood Defence Improvement Schemes

The following flood defence improvement schemes are recommended:

Immediate (under 1 Year)

- Option C – OCC to investigate the feasibility of installing an additional road gulley at the downstream end of the lowest cul-de-sac
- Option D – OCC to investigate the feasibility of raising approximately 10m of road kerb
- Option E – Property owners to provide and install flood protection for their properties, e.g. flood boards, flood proofing of exterior walls of house to flood level, and sand/water bags (property owners to be contacted).

Mid-Term (under 1-2 Years)

There are no options for mid-term flood defence improvement schemes.

7.5 Area 5 – Madley Brook

7.5.1 Maintenance

The following ongoing maintenance items are recommended:

- Operational and maintenance guidelines to be written regarding the functioning of the balancing lakes during the July 2007 floods (Option A).
- Culverts to be desilted and Madley Brook channel to be maintained regularly by the Environment Agency who will also establish a ongoing maintenance programme (Option G).

7.5.2 Flood Defence Improvement Schemes

The following flood defence improvement schemes are recommended:

Immediate (under 1 Year)

- Option B – Environment Agency to put controls on the inlets of culverts under Woodstock Road and Jubilee Way (culverts C1, C2, C3 and C7)
- Option C – Option B plus bund to be built to prevent road from flooding; Environment Agency to design height of bund required to prevent road flooding for a 1 in 100 year event.

Mid-Term (under 1-2 Years)

- Option A – Operation of the balancing lakes to be corrected
- Option F – Some culvert capacities to be increased along Madley Brook (Environment Agency to design the culvert sizes and OCC to replace culverts) to accommodate sever storm events.

7.6 Area 6a – Upstream of Bridge Street

7.6.1 Maintenance

The following ongoing maintenance items are recommended:

- The right bank opening of the bridge under Bridge Street to be desilted by OCC / EA (Option B)
- Ditches to be cleared out in the River Windrush floodplain, upstream of Bridge Street. WODC to clear all ditches for which they are responsible. It is the land owners responsibility (assumed to be All Souls College) to adequately maintain the ditches on their land in accordance with the Management Agreement (Option C).
- Environment Agency to improve the level of maintenance along the River Windrush, including weed cutting and the pollarding/removal of large trees which could affect river flows (Option D) and investigate more extensive desilting
- Ensure regular maintenance of the ditch on Woodford way adjacent to the hospital is carried out by OCC to ensure maximum attenuation of storm water is achieved.

7.6.2 Flood Defence Improvement Schemes

The following flood defence improvement schemes are recommended:

Immediate (under 1 Year)

- Option A – The Environment Agency to alert those responsible regarding the operation of all mill weirs in the upstream catchment.
- Option F – Environment Agency to determine from topographical survey if all storage areas in the upstream catchment are being utilised fully and to start installing control measures to ensure that they are being used fully.
- Option I – Flood protection (e.g. flood boards) for individual houses and flats along West End Road and Mill Street flooded by traffic wash.
- Option J – Joint coordination between the OCC and WODC to stop road traffic (apart from emergency services) when the roads become flooded.

Mid-Term (under 1-2 Years)

- Option L – EA to install river telemetry upstream of Bridge Street.

7.7 Area 6 b – Downstream of Bridge Street

7.7.1 Maintenance

There are no recommendations for ongoing maintenance in Area 6b.

7.7.2 Flood Defence Improvement Schemes

The following flood defence improvement schemes are recommended:

Immediate (under 1 Year)

Option A – Road gulley in the low area to be connected to ditch D10 and flow path along ditch D10 to the River Windrush to be checked and made sure it is clear (it is understood that this work is being carried out by Barratts and the owner of the land between Aquarius and Bridge Street)

Option B – Barratts perimeter ditch to be desilted to junction with the river Windrush

Mid-Term (under 1-2 Years)
There are no options for mid-term flood defence improvement schemes.

7.8 Area 7 – High Street/Witan Way

7.8.1 Maintenance

There are no recommendations for ongoing maintenance in Area 7.

7.8.2 Flood Defence Improvement Schemes

The following flood defence improvement scheme is recommended:
Immediate (under 1 Year)

- Option A – Property owners to provide and install flood protection for their own houses, e.g. flood boards, flood proofing of exterior walls of house to flood level, and sand/water bags (property owners to be contacted).

Mid-Term (under 1-2 Years)
There are no options for mid-term flood defence improvement schemes.

7.9 Area 8 – Wadards Meadow

7.9.1 Maintenance

There are no recommendations for ongoing maintenance in Area 8.

7.9.2 Flood Defence Improvement Schemes

The following flood defence improvement scheme is recommended:
Immediate (under 1 Year)

- Option A – Property owners to provide and install flood protection for their own properties, e.g. flood boards, sacks, and roller shutters (property owners to be contacted).

Mid-Term (under 1-2 Years)
There are no options for mid-term flood defence improvement schemes.

7.10 Area 9 – Oxford Hill (South)

7.10.1 Maintenance

There are no recommendations for ongoing maintenance in Area 9.

7.10.2 Flood Defence Improvement Schemes

The following flood defence improvement schemes are recommended:

Immediate (under 1 Year)

- Option A – Property owners to provide and install flood protection for their own properties, e.g. flood boards, sacks, and roller shutters (property owners to be contacted)
- Option B – Joint coordination between the OCC and WODC to stop road traffic (apart from emergency services) when the roads become flooded.

Mid-Term (under 1-2 Years)

There are no options for mid-term flood defence improvement schemes.

7.11 Area 10 – Oxford Hill (North)

7.11.1 Maintenance

The following ongoing maintenance item is recommended:

- WODC and other riparian owners to clear and maintain ditches (Option A).

7.11.2 Flood Defence Improvement Schemes

There are no options for flood defence improvement schemes (either immediate or mid-term).

7.12 Area 11 – Queen Emma's Estate

7.12.1 Maintenance

The following ongoing maintenance item is recommended:
OCC to maintain culvert D11 (along Ducklington Lane);

7.12.2 Flood Defence Improvement Schemes

Mid term (under 1 – 2 years)

WODC to adopt and maintain ditch 12 (Henry Box Drain) (Option A).

There are no other options for flood defence improvement schemes (either immediate, mid-term or long term).

7.13 Area 12 – Old Ducklington Lane

7.13.1 Maintenance

There are no recommendations for ongoing maintenance in Area 12.

7.13.2 Flood Defence Improvement Schemes

The following flood defence improvement schemes are recommended:

Immediate (under 1 Year)

- Option A – Property owners to provide and install flood protection for their own properties, e.g. flood boards, water proofing exterior walls and redirecting runoff away from house (property owners to be contacted).

Mid-Term (under 1-2 Years)

There are no options for mid-term flood defence improvement schemes.

7.14 Area 13 – Burwell Estate

7.14.1 Maintenance

The following ongoing maintenance items are recommended:

- OCC to clear culvert C17 (Option A)
- Thames Water to clear ditch D21 (Option B)
- OCC to clear culvert C14 and ditch from Colwell Brook to A40 (D20); WODC to establish ownership of ditch D20 (Option D)
- OCC to maintain all culverts under the A40 and Thorney Leys (C14, C15, C16 and C17) (Option G).

7.14.2 Flood Defence Improvement Schemes

The following flood defence improvement schemes are recommended:

Immediate (under 1 Year)

- Option C –Thames Water and WODC to carry out joint survey of the balancing ponds in order to establish the works which Thames Water needs to carry out.
- Option F – Thames Water to fit anti-lift manhole covers on the manholes which surcharge first.

Mid-Term (under 1-2 Years)

- Option E – Witney Town Council (assumed owner) to build approximately 70m of flood bund in the recreational field on the western side of Burwell Estate.

7.15 Area 14 – Lower End of Cogges Hill Road adjacent to Ditches D14 and D15

7.15.1 Maintenance

The following ongoing maintenance item is recommended:

- Private owners of ditches D14 and D15 to clear and maintain them (WODC to establish ownership of ditches) (Option B).

7.15 Flood Defence Improvement Schemes

The following flood defence improvement scheme is recommended:

Immediate (under 1 Year)
Option A – Property owners to provide flood defences for their own properties, e.g. flood boards, sacks, and roller shutters (property owners to be contacted).
Mid-Term (under 1-2 Years)
There are no options for mid-term flood defence improvement schemes.

Appendix 1: Photographs

Area 1 – Eastfield Road and Hailey Road
Inlet grille to Hailey Road Drain

Area 1 – Eastfield Road and Hailey Road
View of culvert corridor between houses on Eastfield Road. Wall on the boundary of the fields has already had a gap cut into it by the WODC.

Area 2 – South west of Kings School
View of lane between Kings School and affected area towards New Yatt Road. Ditch in forefront of photograph

Area 4 – Farmers Close
Road gully in low area of cul-de-sac.

Area 5 – Madley Brook
View looking downstream of culvert C09

Area 5 – Madley Brook
View looking upstream from culvert C09

Area 5 – Madley Brook
View looking across culvert C09 from upstream to downstream

Area 5 – Madley Brook
View of upstream balancing lake near Harvest Way and Culvert C04

Area 5 – Madley Brook
View of Madley Brook adjacent to upstream balancing pond upstream of C04

Area 5 – Madley Brook
View of downstream balancing pond upstream of C04 on Madley Brook

Area 5 – Madley Brook
Downstream view of culvert C05

Area 5 – Madley Brook
Upstream view of culvert C05

Area 5 – Madley Brook
Downstream view of culvert C04 under Madley Way

Area 5 – Madley Brook
Upstream view of culvert C04 under Madley Way from top of low concrete bridge

Area 5 – Madley Brook
View of low concrete bridge upstream of culvert C04

Area 6a
View of downstream side of the bridge under Bridge Street

Area 6a
View looking upstream along the River Windrush taken from Bridge on Bridge Street (roof repairs being carried out)

Area 6a
View looking downstream along the River Windrush, taken from bridge on Bridge Street

Area 6a
View of River one branch of River Windrush, looking upstream in Woodford Mill.

Area 6b
View looking along Mill Street towards Bridge Street. Woodford Mill development on left.

Area 6b
Construction of Aquarius behind the houses along Bridge Street.(05-12-08)

Area 6b
Road gulley, in low area behind houses along Bridge Street, with no apparent outfall except to seep into the ground below. Barrier caused by raising of Aquarius (14-12-08).

Area 8
View across open grass field towards low area in Wadard meadows

Area 9
Blocked road gulley on southern side of Oxford Hill on 11-01-08

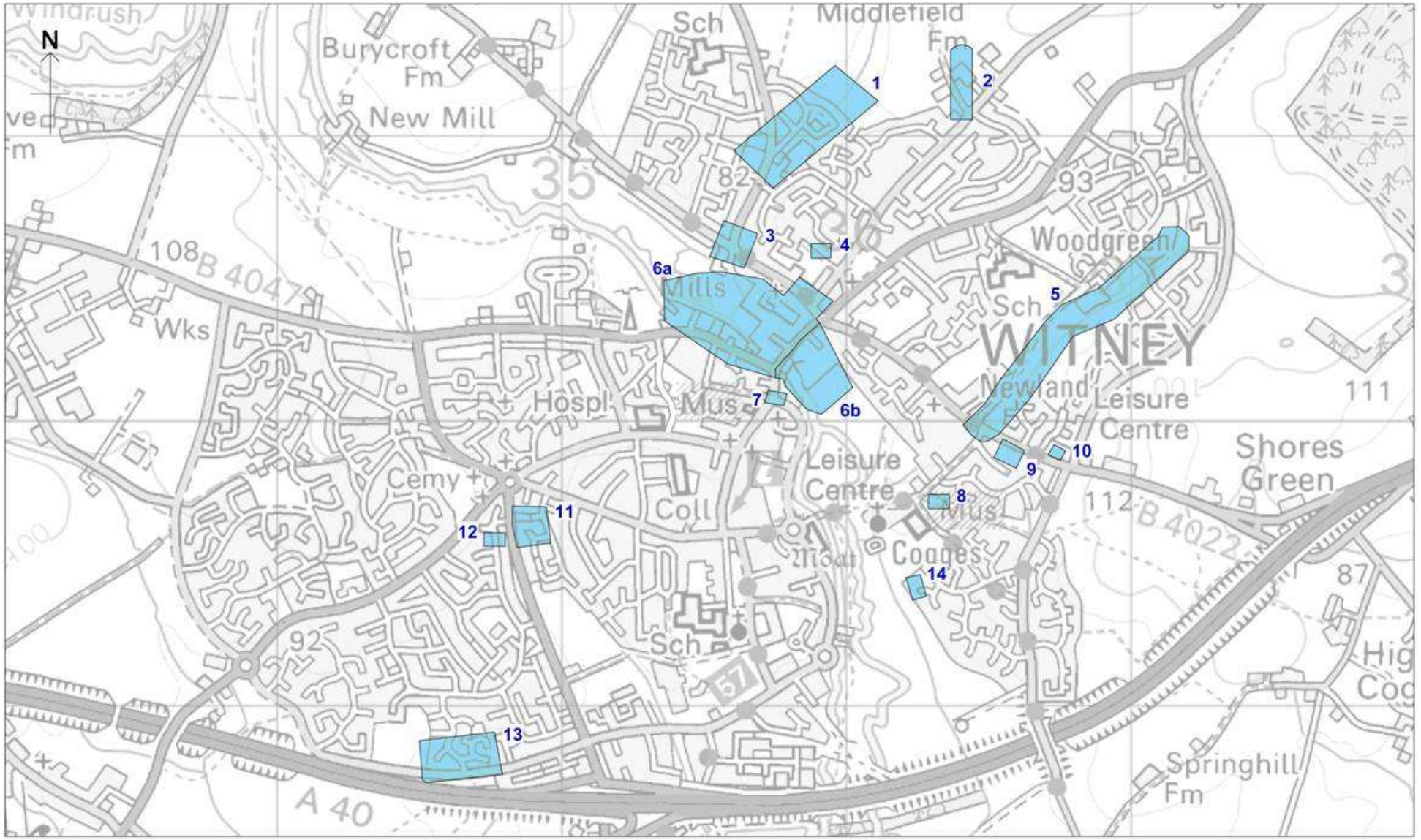
Area 13
View of Culvert 14 under A40

Area 13
View along D20 towards A40

Area 14
View along ditch D14 looking downstream

Area 14
View across car park to the Area of Cogges Road Estate, which flooded in July 2007

Appendix 2: Maps



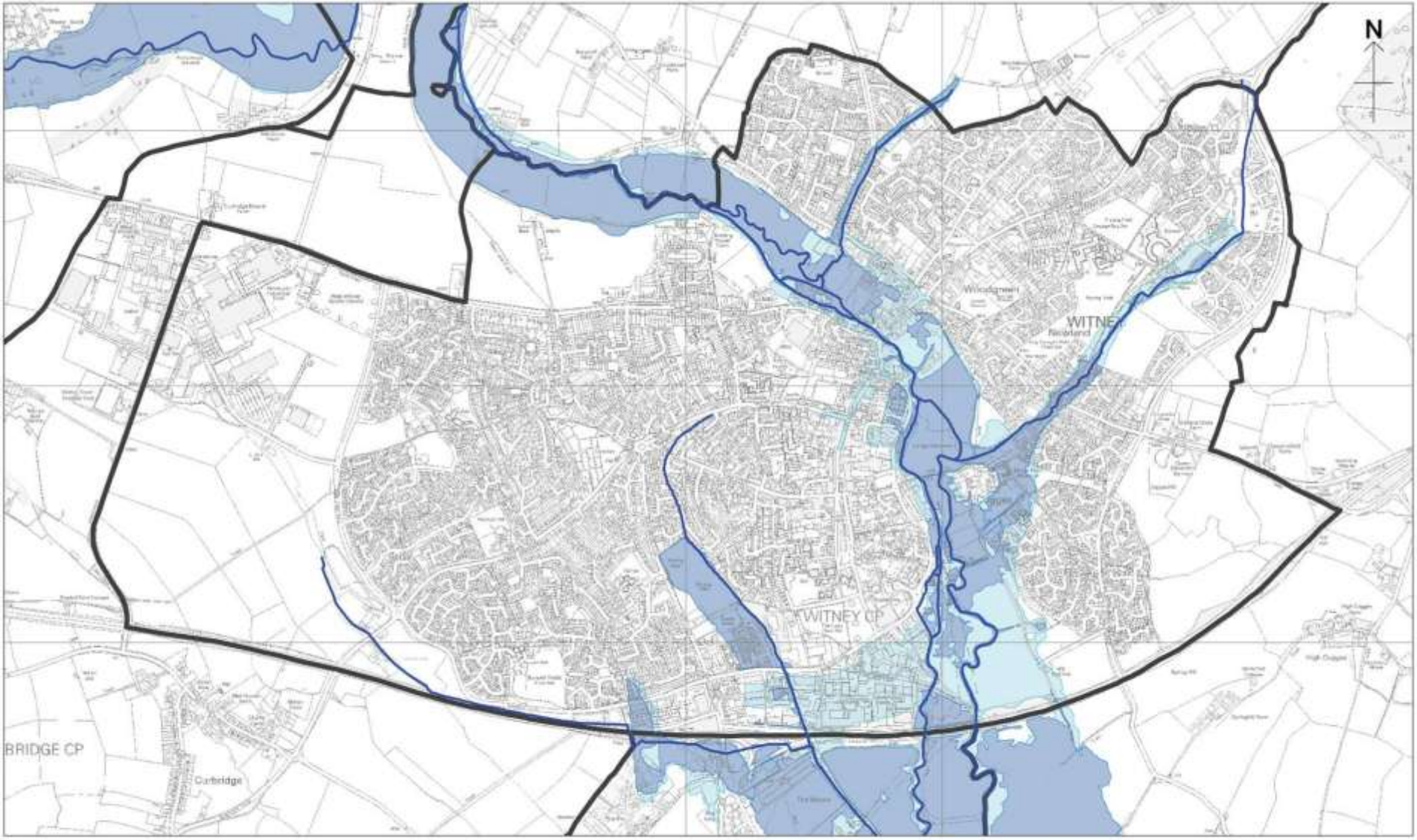
West Oxfordshire District Council
Woodgreen
Witney
Oxfordshire
OX28 1NB

Tel: 01993 861000
Fax: 01993 861050
www.westoxon.gov.uk

Key:

1 Locations where some properties have flooded

Map Title:	Witney - Location of House Flooding
Department:	
Map No:	Figure 1
Date: 10:06:08	Scale: 1:18000



West Oxfordshire District Council
Elmfield
New Yatt Road
Witney
Oxfordshire
OX28 1PB

Tel: 01993 861000
www.westoxon.gov.uk

Map Title:	Environment Agency Flood Zones January 2008	
	Flood Zone 2 - 0.1% probability of flooding occurring or low to medium risk. Previously referred to as 1:1,000 year flooding	Parish Boundary
	Flood Zone 3 - 1% probability of flooding occurring or high risk. Previously referred to as 1:100 year flooding	Environment Agency Main Rivers
	Scale: 1:20000	

Approach of River Windrush to the Bridge Street bridge

Appendix 3: Glossary

Glossary of Terms

Bund
A barrier, often an earth embankment used to prevent or slow flood water flow.

CBA (Cost Benefit Assessment)
Cost-Benefit Analysis estimates and totals up the equivalent money value of the benefits and costs to the community of projects to establish whether they are worthwhile.

Critical Ordinary Watercourse
These are watercourses such as ditches, streams or rivers that are important for the drainage of an area. They have the potential to put large numbers of people or property at risk from flooding and have been identified as watercourses that will be enmained (see below).

Culvert
A closed channel for the passage of water e.g. a pipe underneath a road.

Enmained
When the classification of a watercourse, which is not a Main River (see below), changes to allow the Environment Agency to legally carry out maintenance if required to prevent flooding.

Flood Plain
An area of land where water is expected to flow or be stored during times of flood. The flood plain can extend beyond the edges of a watercourse.

Flood Zones
Flood Zones are the Environment Agency's method for showing the extent of flood risk.
They are split into Flood Zone 1, 2 & 3 outlining the probability of flooding from rivers occurring.

Flood Zone 1 – little to no risk of flooding, less than 0.1% risk of flooding in any one year.

Flood Zone 2 - low to medium risk, 0.1% risk of flooding in any one year.

Flood Zone 3 - high risk, 1% risk of flooding in any one year.

Flood Storage Area
A flood storage area is a part of the flood plain that allows flood waters to be temporarily stored. The purpose of a flood storage area is to slow flood water down, delaying its arrival at a main watercourse.

Fluvial Flooding
Flooding from river water.

Highway Drainage
Ditches and drainage channels within land owned by the Highway Authority which carry water draining from the highway. In Oxfordshire the County Council is the Highway Authority.

Land Drainage Scheme
A network of ditches created to drain water from farmland to improve the quality of land available for agriculture.

Main Rivers
A main river is a watercourse shown on the Government's main river map. The Environment Agency only has powers to enforce flood defence works on main rivers.

Ordinary Watercourse
An ordinary watercourse is every watercourse, apart from a public sewer, which is not classified as a main river. Local Authorities only have powers to enforce flood defence works on ordinary watercourses.

Pluvial Flooding
Flooding from rain water

Public Surface Water Sewers
Surface water sewers that are maintained by the appointed sewerage company for an area. In West Oxfordshire Thames Water is the appointed sewage company.

Roadside Ditches
Ditches and drainage channels alongside roads which are the responsibility of the adjoining landowner and not the Highway Authority.

Riparian Owner
The riparian owner is responsible for the maintenance of any watercourse within or adjacent to the boundaries of their property. Where a watercourse is sited between two or more property boundaries each owner may be equally responsible.

Sewer
A drain or pipe, usually underground, used to carry away surface water or sewage.

SUDS (Sustainable Drainage Systems)
Sustainable drainage systems (known as SUDS) offer an alternative approach to traditional drainage. SUDS employ a whole range of techniques to effectively manage drainage including dry ditches (swales) and detention/ attenuation ponds, which aim to detain water run-off and release it slowly into watercourses or into the ground.

Trash Screen
A grill or grate that is installed on the opening to a culvert to collect debris and prevent blockages.