



WEST OXFORDSHIRE
DISTRICT COUNCIL

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Parish Flood Report: **Shilton**

July 2008

Version 1 – This report may be revised in the future to incorporate ongoing consultation results



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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 of the Head of Street Scene 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 (EA, 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 organisation 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 powers¹ 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 riparian² land owner, and permissive powers¹ 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

No part of this report is to be reproduced, copied or used by any third party without the prior express written consent of WODC in its absolute discretion. All those reading this report acknowledge that any conditions, warranties or other terms implied by statute or common law are excluded to the fullest extent permitted by law. Without limiting the scope of the foregoing, West Oxfordshire District Council does not give any warranty, representation or undertaking as to the efficacy or usefulness of the information contained within this report, nor that any advice contained within this report will produce satisfactory results if followed. West Oxfordshire District Council hereby excludes liability to the fullest extent permitted by law for any reliance placed in this report by third parties.

2.0 THE DISTRICT COUNCIL'S ACHIEVEMENTS OVER THE PAST 12 MONTHS

Ditch Clearance

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

Flood Grants

- 1137 WODC Flood Grants totalling £284,250 given out overall
 - 17 (£4,250) for Shilton
- 112 Red Cross Flood Grants totalling £211,590 administered by WODC overall
- 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 Shilton

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 during 2008 to progress this
Progress the Strategic Flood Risk Assessment
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 Shilton and has been prepared by the Council's Engineering team. It pulls together information from external agencies and individual property owners and seeks to identify the causes of flooding in Shilton during July 2007 and potential mitigating solutions.

Shilton is a rural parish located approximately 4 miles to the west of Witney on the B4020 Shilton Road. The parish sits in the catchment of the River Thames and is located in the upstream catchment of the Shill Brook which flows through the centre of the Parish. The topography of Shilton is characterised by a valley with steep sides, largely rural in nature.

The parish falls within the River Thames flood warning area of "St Johns Lock at Lechlade to Eynsham Lock near Oxford".

Visual walkover surveys have been undertaken of the flooded areas and properties and meetings have been held with some affected residents. WODC have record of 17 applications for Flood Grant Aid in Shilton.

Flooding experienced in Shilton has been assessed as three areas (see section 4.1) comprising:

- Village of Shilton (Area 1)
- West End (Area 2)
- Hen n Chick Lane (Area 3)

Certain properties in the village of Shilton (Area1) have suffered from flooding on a regular basis throughout history due to their location in the natural floodplain of the Shill Brook. This has typically occurred once every three years where flooding to a depth of an inch or so can be expected. In July 2007, WODC have record of 15 properties flooding in this location when flooding of up to a depth of 1.5 metre (5 foot) was recorded. Flooding in the village has been attributed the Shill Brook with poor maintenance of the watercourse, bridge crossings restricting flow and engineered right angled bends in the watercourse being major factors.

The area referred to as West End, to the west of the village of Shilton (Area 2) has record of 1 property flooding during the July 2007 event. Flooding has been attributed to overland flow from surrounding farmland.

WODC has a record of 1 property flooding along the Lane towards Hen n Chick (Area 3) at the western extend of the Parish. Flooding in this location has been attributed to overland flow from the surrounding farmland.

Flooding problems and how each public and private body is affected, effectiveness of each solution, affects on adjacent land and cost, are included in Section 5 and Section 6. Conclusions and recommendations, including maintenance and flood defence improvement measures are shown in Section 7.

4.0 SURVEY

4.1 Description of Area

Shilton is a rural parish located approximately 4 miles to the west of Witney on the B4020 Shilton Road. The parish sits in the catchment of the River Thames and is located in the upstream catchment of the Shill Brook which flows through the centre of the Parish. The topography of Shilton is characterised by a valley with steep sides, largely rural in nature.

The Shill Brook is a spring fed watercourse which rises in farmland to the north west of the parish in Signet and Westwell. The watercourse is known to run dry during summer months. The watercourse flows along the northern boundary of the parish before flowing in a south easterly direction, to the west of the B4020 Shilton Road through the centre of Shilton Village. Using the Flood Estimation Handbook (FEH) the catchment of the Shill Brook has been calculated to be relatively large, at 24.23km².

On its approach to the village, the watercourse is crossed by Bridge Street via a double bridge structure (Photo 1). It appears that the original bridge crossing has been replaced by a newer, three arched road bridge. However, on the upstream side, the original older bridge wall still remains. On the downstream side of the Bridge Street crossing, the watercourse encounters a right angled bend and flows in a southerly direction to the east of the back gardens of property in the village. Prior to flowing away from the village centre, the Shill Brook encounters a second right angled bend at the village pond and ford. The brook then continues in a south easterly direction to the parish of Carterton.

The Shill Brook is classified as main river on the downstream side of the village pond and ford in Shilton.

Local accounts of flooding in the village noted that there was a long lag time between flooding in Signet and flood waters reaching Shilton. The area of Signet, (in the parish of Burford) just north of the parish of Shilton, was flooded by the Shill Brook at approximately 8pm when the Shill Brook burst its banks and a number of springs appeared due to the abundance of groundwater in the upper reaches of the catchment. The village of Shilton, approximately 3km downstream was not affected by flood waters until 3am, 7 hours later.

A second tributary to the Shill Brook rises in farm land on the southern boundary of the Shilton Parish. There were no reports of flooding in the parish attributed to this tributary.

4.2 Survey Method

A visual walkover survey of properties affected by the July 2007 flooding has been undertaken and discussions have been held with WODC and some local residents.

See Appendix 1 – Photographs.

4.3 Meetings

A summary of meetings about Shilton flooding in July 2007 are given in Table 1.

Table 1: Summary of meetings and flooding descriptions

Date	Location	Description
14.05.08	Shilton Parish Council Annual Newsletter 2007-2008	<ul style="list-style-type: none"> • Nearly 6 inches of rain fell on 20th July 2007 and the following night the village flooded. • Only a handful of properties near to the Shill Brook were spared and a year on some properties are still unfurnished. • Despite some localised flooding, an inundation on this scale is unprecedented but the indication is that if a similar rainfall event was experienced in the future, the extreme water levels would return. • Houses in the village of Shilton have reduced the natural floodplain of the Shill Brook and the old water meadows are no longer maintained. • Flood waters in the village remained for several days as the rate of flow away from the village was not sufficient. • At least one property in the parish was affected by groundwater flooding.
03.06.08	Local resident letter to EA	<ul style="list-style-type: none"> • Reference that the Brize Norton, Clanfield and Bampton flood report prepared by the EA does not mention Shilton which is in the same stream system. • Concern from local residents that any flood defence work carried out downstream may increase flood risk in Shilton • Request for consideration of a flood defence scheme for Shilton • Request for a river level gauge for Shilton • Request for consideration of a flood bypass channel and/or the removal/adjustment of bridges to increase flow.
13.06.08	Local residents house in Shilton	<ul style="list-style-type: none"> • Meeting with local residents to review the causes and extents of the July 07 floods. • Identified Areas of the village, West End and Hen n Chick Lane that have suffered from the floods. • Residents have attributed flooding in Shilton directly to the Shill Brook, which flows through the village. • In July 2007 the Shill Brook backed up behind Bridge Street crossing with water levels higher upstream than downstream. • Water flowed onto surrounding land and flowed across bridge street into properties along the road. The water continued to rise until approximately 4pm to a depth of 3-5 foot of water. • There are no records of the Shill Brook flooding at the Bridge Street prior to July 2007. • The bridges at either end of Shilton acted as dams as the water levels were so high. These bridges are believed to be listed. • Traditionally the floods rise to a few inches every few years, usually affecting a few properties. • Runoff in the area is good. The water gets away easily after it passes the bridge downstream in Shilton. This section of the brook is not obstructed and has been previously cleared by the

		<p>EA.</p> <ul style="list-style-type: none"> • Historically in the village there used to be a second stream running in closer proximity to where the main channel still lies, at the back of the properties, east of Bridge Street. The stream was filled in, planning permission was not given for the desired project and the stream was therefore never reinstated. • The area by the pond and the downstream bridge was flooded again in January. • Shilton is situated in a valley. There was a lot of runoff from fields surrounding Shilton. Water pooled at the bottom of the valley engulfing Shilton. • OCC have cleared a lot of ditches, grips, drainage/ road drains along Bridge Street, making a noticeable difference. • There is a TW pumping station in the area, this did not flood in the July 2007 floods. However it broke down and did not have an alarm. TW were then unaware of its situation and the fact it was causing sewer flooding. • Properties in the vicinity of Friesland and West End flooded due to overland flow from the surrounding fields. The surrounding fields of Westfield farm and Friesland looked like lakes due to the excess water. • There was a significant lag time from the time the area of Signet was flooded (approximately 8pm) until Shilton was flooded (approximately 3am). • The area around Signet acts as a flood plain • The area of Mount Zion lies within a valley. At the bottom of which the watercourse often looks like a small ditch, drying up in the summer. In the July 2007 floods the whole valley flooded and filled, looking like a lake.
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WODC has liaised with the Environment Agency, Oxfordshire County Council and Thames Water. OCC, and WODC have met with residents of Shilton to discuss the flooding issues.

Table 2: Summary of telephone calls/emails/correspondence made with EA,

Date	Agency	Comment
01.07.08	EA	<p>The Shill Brook sits in the Radcot Cut system which is categorised by the EA as a medium risk system, based on the number of properties within the floodplain and risk to life. Every year the EA aim to undertake work on some of the medium risk systems.</p> <p>The EA's assessment of the local main river system is that whilst increased maintenance could lead to reductions in water levels, it would not have helped greatly during the July 2007 flood event due to the scale of flooding and the volumes of water involved.</p> <p>The EA are happy to consider an extension to the main river system upstream to include the village of Shilton. This will require further consultation with the EA and WODC representatives.</p>

4.4 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 17 residential properties in Shilton have received Emergency Flood Relief Grant Aid, however it is acknowledge this is not the total number of properties affected in the Parish as some owners have been reluctant to claim.

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.

5.0 PROBLEMS AND CAUSES

5.1 Plans

Figure 1 in appendix 2 shows areas in Shilton where properties flooded in July 2007 and where owners have made claims for grant assistance. The flooding can be broadly split into three areas being:

- Area 1: Village of Shilton
- Area 2: West End
- Area 3: Hen n Chick Lane

A map detailing the following is shown in Appendix 2:

- 1% annual probability of flooding - Flood Zone 3 (previously referred to as 1 in 100 year flooding)
A plan showing the 2008 Environment Agency 1% probability Flood Zone, this is the area defined by the EA as the extent of a flood with a 1 per cent chance happening in any year. This is the high probability risk zone.
- 0.1% annual probability flooding – Flood Zone 2 (previously referred to as 1 in 1000 year flooding)
A plan showing the 2008 Environment Agency 0.1% probability Flood Zone, this is the area defined by the EA as the extent of a flood with a 0.1 per cent chance happening in any year. This is the medium probability risk zone

5.2 Area 1 – Village of Shilton

In July 2007, 15 properties located in the village of Shilton claimed Flood Grant Aid.

3 of these properties are located in the 2007 Environment Agency Flood Zone 3 with high risk of flooding, 1% or greater chance of happening each year (previously referred to as 1 in 100 year Flood Zone). The remaining properties are not located in any of the Environment Agency Flood Zones.

Flooding is attributed to the following:

5.2.1 Inadequate capacity of Bridge Street highway crossing

Flooding in Shilton in July 2007 was largely caused by the Shill Brook breaching its banks. Flooding was located predominantly around Bridge Street, in the centre of the village.

The capacity of the opening of the bridge at Bridge Street was not sufficient to take the peak runoff in the Shill Brook in July 2007. Water levels in the Shill Brook rose significantly in a short period of time. Local residents noted that the bridge became submerged and water overflowed onto the south bank adjacent to Brook Cottage where ground levels were lower and flowed across Bridge Street, in effect re-establishing the natural path of the watercourse.

The flood water flowed down Bridge Street to the village pond and inundated all but a handful of properties through the village.

The bridge crossing at Bridge Street is believed to be listed.

5.2.2 Inadequate capacity of The Old Ford footbridge

The capacity of the Old Ford footbridge was not sufficient to take the peak runoff in the Shill Brook in July 2007. As water levels rose, the footbridge restricted flow and caused water to pond upstream, flooding adjacent property and Bridge Street.

The footbridge crossing is believed to be listed.

5.2.3 Engineered river channel bends.

The Shill Brook in Shilton has to flow through two right angled bends prior to flowing away from the village.

The first is located on the downstream face of the Bridge Street crossing and prevented water from flowing downstream through the village, the second is located at the Old Forge. On inspection it can be seen that water tries to follow its natural path upstream of the Old Forge where there is scour evident at the end of the existing stone wall. Instead the flow is directed to the village pond where it collects. Water then has to flow through a right angled bend, under a foot bridge and downstream to Clanfield.

The two right angled bends restrict the natural flow of water downstream and were a major factor in the July 2007 flood event.

It should be noted that water that did pass under the foot bridge at the Old Forge was able to flow unobstructed through the main river channel maintained by the EA.

5.2.4 Flooding from Groundwater

Some of the older properties on Bridge Street were flooded from groundwater ingress. Many of the older properties were built with stone floors without foundations or damp proof courses and groundwater therefore can rise through property. This is exacerbated when poor local drainage means that surface water can not flow away but instead infiltrates to the groundwater which in turn rises to inundate property.

Groundwater flooding occurs as a result of water rising up from the underlying rocks or from water flowing from abnormal springs. This tends to occur after much longer periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas such as Shilton Village, the water table is usually at shallower depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

5.2.5 Highway Drainage

During periods of heavy rainfall, ponding occurs at low points on the highway. As the rainfall intensity increases, surface water drains and gullies become overwhelmed and water flows along the road surface increasing in depth. Where properties have door sill levels at or below the road level, water enters property. This has occurred at some properties along Bridge Street.

5.3 Area 2 – West End

In July 2007, 1 property claimed flood damage grant located to the West of the village of Shilton at West End.

This property is located in the 2007 Environment Agency Flood Zone 1, being at low risk, 0.1% probability of flooding (previously referred to as 1 in 1000 year Flood Zone).

Flooding is attributed to the following:

5.3.1 Overland Flow

Direct overland flow occurs when the ground either becomes fully saturated, preventing any percolation into the upper layers of soil, or where the rainfall intensity and rate is greater than the percolation rate of the receiving ground. Both result in sheet runoff, or water flowing directly off the surface of the land.

Flooding in West End has been attributed to overland flow. Local residents noted that water was not able to infiltrate into the ground as it was saturated, and instead flowed overland, to gather in fields adjacent to property. The fields resembled lakes and were left heavily saturated and boggy.

5.3.2 Highway Drainage

During periods of heavy rainfall, ponding occurs at low points on the highway. As the rainfall intensity increases, surface water drains and gullies become overwhelmed and water flows along the road surface increasing in depth. Where properties have door sill levels at or below the road level, water enters property.

5.4 Area 3 – Hen n Chick Lane

In July 2007, 1 property located in the area by Woodside Cottages claimed Flood Grant Aid.

This area is located in the 2007 Environment Agency Flood Zone 1, being at low risk with a 0.1% probability of flooding (previously referred to as 1 in 1000 year Flood Zone)

Flooding is attributed to the following:

5.4.1 Overland Flow

Direct overland flow occurs when the ground either becomes fully saturated, preventing any percolation into the upper layers of soil, or where the rainfall intensity and rate is greater than the percolation rate of the receiving ground. Both result in sheet runoff, or water flowing directly off the surface of the land.

Flooding in Hen n Chick Lane has been attributed to overland flow. Local residents noted that water was not able to infiltrate into the ground as it was saturated, and instead flowed overland and inundated property.

5.4.2 Highway Drainage

During periods of heavy rainfall, ponding occurs at low points on the highway. As the rainfall intensity increases, surface water drains and gullies become overwhelmed and water flows along the road surface increasing in depth. Where properties have door sill levels at or below the road level, water enters property.

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.

Parish Flood Options										
Shilton										
Version 1 – July 2008										
Option ref	Flood 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	Main switchboard: 0845 310 1111 Or e-mail: online@oxfordshire.gov.uk	Enquiries: 0845 200 800	Switchboard: 01993 861 000					
Area 1 – Village of Shilton										
	Inadequate capacity of Bridge Street highway crossing During July 2007, the Bridge Street Road Bridge surcharged and forced floodwater from the Shill Brook to flow into the village.									
A	Carry out a flood study on the Shill Brook to include a computerised hydraulic model of the watercourse to assess the capability of the Bridge Street Road Bridge in order to establish its effect on water levels upstream. Option – increase the bridge capacity either by replacing the existing bridge, providing flood relief culverts or removing the double upstream face of the bridge. Hydraulic modelling to be used to establish bridge span required or flood relief culvert size. This is a large project and funding would need to be agreed. Channel and bridge survey required,	Correspondence with the EA for data and advice. Possible partner to project to assist with modelling and partially funding project.	OCC to provide part funding as part of a feasibility study into the bridge. Two options: Remove one of the bridge faces and upgrade bridge Install additional flood relief culvert underneath Bridge Street in between Brook Cottage and Shill Brook, parallel to the bridge. N.B. all options need to look at Flood Defence impact on downstream property		WODC to provide a co-ordination role and to advise on possible planning constraints		This has the potential to greatly reduce volumes of water using Bridge Street as a flow path. The full level of protection provided can only be established following hydraulic assessment.	Flooding immediately downstream of Bridge Street Bridge may be increased. Hydraulic modelling would be required to define this.	£5k to £10k survey £5k to £10k model approx £20k to 50k – construction costs	OCC have not been approached regarding this work. They have a priority list based partly on structural integrity therefore works on this bridge will not be high priority. The bridge may be listed.
B	Install a ramp/speed bump in the Bridge Street downstream of the bridge street bridge, this will help channel out of bank flows back to the Shill Brook upstream of Willow Cottage. A raised bank on the southern side of the channel at Brook Cottage may also be required.		OCC to carry out feasibility. The raised section would act as traffic calming but feasibility is required.		WODC to provide a co-ordination role		This will prevent some flood flows from using Bridge Street as a flow path and will channel water to the downstream section of the Shill Brook.	May lead to more flooding from the Shill Brook at the rear of property on the eastern side of Bridge Street.	Up to £5k feasibility Up to £5k construction	This proposal requires further thought and consultation. Street lighting will be required for any raised section of road.
C	Flood-resilient measures on properties. Additionally the parish needs to create its own emergency flood plan.	The EA website contains reference information on flood resilient measures to properties			WODC to approve emergency flood plan	Homeowners to provide protection against flooding to their properties e.g. flood boards, flood proofing of exterior walls, sand bags.	Only effective if defences are put in place before the water level rises.	May increase flood risk to adjacent properties as flood water will be displaced	Up to £5k	On completion of the emergency flood plan, it should be sent to WODC for approval and registration.
D	Improve Flood Warnings to residents.	EA to improve flood warning dissemination / raise awareness of flood warning Shilton is high up in the catchment and flood warning needs to be based on weather radar and rainfall instead of flow monitoring			WODC to provide a co-ordination role where required		Advanced flood warning reduces damage to property and risk to life	None		EA are aware that they need to raise awareness of flood warning measures locally and nationally. Local parishes to put 'flood team' in place who are in contact with residents in Signet upstream, giving Shilton a few hours warning to get flood defences in place

Option ref	Flood Overview	Description of work required					Key Issues			Comments
		Options	Environment Agency	Oxfordshire County Council	Thames Water	WODC	Private	Effectiveness	Affects on adjacent land	
		For queries Tel 08708 506 506 Or email enquiries@environment-agency.gov.uk	Main switchboard: 0845 310 1111 Or e-mail: online@oxfordshire.gov.uk	Enquiries: 0845 200 800	Switchboard: 01993 861 000					
Area 1 – Village of Shilton										
	Inadequate capacity of The Old Ford footbridge The capacity of the Old Ford footbridge was not sufficient to take the peak runoff in the Shill Brook in July 2007. As water levels rose, the footbridge restricted flow and caused water to pond upstream, flooding adjacent property and Bridge Street.									
E	Create Flood Relief Channels to connect the Shill Brook upstream of the village pond to the Shill Brook downstream of the Old Forge, bypassing the foot bridge.	EA to be consulted for design advice. Land drainage consent may be required for temporary works. EA to provide part funding			WODC to investigate riparian ownership of land and provide a co-ordination role where required	Landowner agreement required.	Water will be redirected to the Shill Brook downstream of the footbridge constriction reducing flood risk to the village.	Will require work on private land. Maintenance issues.	Up to 5k feasibility £20k to £50k design and construction	Further consultation required
F	Re-instate the old water meadow adjacent to the village pond and allow this to provide storage during flood events.	EA to be consulted regarding works to the water meadow			WODC to investigate riparian ownership of land and provide a co-ordination role where required	Landowner agreement required.	Extra flood storage provided on existing water meadow	Water meadow may flood more frequently	Up to £5k	Further consultation required to decide responsibility / possibility of funding project.
G	EA to change status of the Shill Brook downstream of Bridge Street crossing to the Old Forge from Ordinary Watercourse to Main River.	EA to take on maintenance of Shill Brook River channel downstream of Bridge Street to the Old Forge				Riparian owners to maintain banks of the watercourse	Will ensure regular maintenance of the Shill Brook channel	Improved land drainage	Up to 5k	The EA carry out maintenance of downstream section of watercourse.
H	Changes to land management e.g. contour ploughing, to reduce direct runoff from farmland	EA to advise landowner of land management techniques to reduce runoff in upstream catchment			WODC to provide a co-ordination role	Landowner/occupier of fields to change farming technique to increase infiltration	Studies have shown that this has had mixed results	There will be a change in land use in the upstream catchment	Up to £5k	Landowners in the upstream catchment have not been approached. It may be possible for landowners. farmers to obtain environmental grants to plant hedgerows
I	Riparian owners to maintain Shill Brook upstream of the ford.				WODC to provide a coordination role and to ensure that the maintenance by riparian owners is carried out.	Riparian owners to maintain sections of watercourse on their land	Shill Brook will remain free and clear.		Up to 5k	Riparian owners have not been contacted.
Area 2 – West End										
	Direct flooding from overland flow									
A	Install new land drainage ditch to run around the edge of property, to collect runoff from surrounding fields.		OCC to be consulted			Riparian owner's responsibility as it will be on their own land. Landowner of adjacent fields to be contacted regarding possible extra drainage to the land.	Can contribute to a reduced frequency of flooding. Water will collect before reaching the property	Improved land drainage	£5k to £10k	Landowners not approached regarding option
B	Flood- resilient measures on properties. Additionally the parish needs to create its own emergency flood plan	The EA website contains reference information on flood resilient measures to properties			WODC to approve emergency flood plan	Homeowners to provide protection against flooding to their properties e.g. flood boards, flood proofing of exterior walls,	Only effective if defences are put in place before the water level rises.	May increase flood risk to adjacent properties as flood water will be displaced	Up to £5k	Measures such as providing a raised driveway may prevent floodwater ingress to property

						sand bags.				
Option ref	Flood 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	Main switchboard: 0845 310 1111 Or e-mail: online@oxfordshire.gov.uk	Enquiries: 0845 200 800	Switchboard: 01993 861 000					

Area 2 – West End – cont...

C	Changes to land management e.g. contour ploughing, to reduce direct runoff from farmland	EA to advise landowner of land management techniques to reduce runoff			WODC to provide a co-ordination role	Landowner/occupier of fields to change farming technique to increase infiltration	Studies have shown that this has had mixed results	There will be a change in land use in the upstream catchment	Up to £5k	Landowners in the upstream catchment have not been approached. It may be possible for landowners, farmers to obtain environmental grants to plant hedgerows
	Inadequate highway drainage Following periods of intense rain (such as July 2007), surface water drains and road gullies surcharge as a result of under capacity or blockage. Surface water flooding occurs to roads and low lying property									
D	Further work and maintenance - Undertake blockage and siltation inspections of road gullies and roadside ditches. Where necessary undertake jetting or other clearance measures.		OCC Highways to undertake works.		WODC to provide co-ordination role		Will improve land drainage	Reduced flooding	Up to £5k	

Area 3 – Hen n Chick Lane

	Direct runoff from surrounding land									
A	Install kerb on Hen n Chick Lane at low point in road, in the vicinity of Woodside Cottages. This will channel overland flow from surrounding land towards highway drainage.		OCC Highways department to complete works		WODC to provide co-ordination role		Will improve land drainage	Improved drainage	£5,000 to £10,000	
B	Install new land drainage ditch to run around the edge of property, to collect runoff from surrounding fields. The ditch can then connect to existing drainage.		OCC to be consulted			Riparian owner's responsibility as it will be on their own land. Landowner of adjacent fields to be contacted regarding possible extra drainage to the land.	Can contribute to a reduced frequency of flooding. Water will collect before reaching the property	Improved land drainage	Up to £5000	Riparian owners have not been contacted
C	Flood- resilient measures on properties. Additionally the parish needs to create its own emergency flood plan	The EA website contains reference information on flood resilient measures to properties			WODC to approve emergency flood plan	Homeowners to provide protection against flooding to their properties e.g. flood boards, flood proofing of exterior walls, sand bags	Only effective if defences are put in place before the water level rises.	May increase flood risk to adjacent properties as flood water will be displaced	Up to £5,000	Emergency flood plan to be sent to WODC for approval and registration.
D	Changes to land management e.g. contour ploughing, to reduce direct runoff from farmland	EA to advise landowner of land management techniques to reduce runoff			WODC to provide a co-ordination role	Landowner/occupier of fields to change farming technique to increase infiltration	Studies have shown that this has had mixed results	There will be a change in land use in the upstream catchment	Up to £5,000	
	Inadequate highway drainage Following periods of intense rain (such as July 2007), surface water drains and road gullies surcharge as a result of under capacity or blockage. Surface water flooding occurs to roads and low lying property									
E	Further work and maintenance - Undertake blockage and siltation inspections of road gullies and roadside ditches. Where necessary undertake jetting or other clearance measures.		OCC Highways to undertake works.		WODC to provide co-ordination role		Will improve land drainage	Reduced flooding	Up to £5k	

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 Area 1 – Village of Shilton

7.1.1 Maintenance

The following on-going maintenance is recommended:

- EA to maintain channel and banks of the Shill Brook downstream of The Old Forge at Shilton.

7.1.2 Flood defence improvement schemes

Immediate (under 1 year)

- Carry out a flood study on the Shill Brook to assess the capability of the bridge at Bridge Street in order to establish its effects on water level upstream (Option A)
- Flood resilient measures to be installed on property (Option C)
- EA to improve flood warning to residents. May require formation of a parish flood team to create parish emergency plan. (Option D)
- Riparian owners to maintain the Shill Brook within their land. This will keep the Shill Brook clear, maximising the channel capacity for periods of high flow.

Mid-Term (under 1 -2 years)

- Increase bridge capacity of Bridge Street crossing either by replacing existing bridge or providing flood relief culverts using flood study results discussed above (Option A)
- Install a ramp/speed bump on Bridge Street downstream of the bridge to channel flood flows back to the Shill Brook upstream of Willow Cottage (Option B)
- Create flood relief channels to connect the Shill Brook upstream of the village pond to the Shill Brook downstream of the Old Forge (Option E)
- EA to change status of the Shill Brook downstream of Bridge Street crossing to the Old Forge from Ordinary Watercourse to Main River (Option G)

Long-Term (3 years or more)

- Re-instate the old water meadow adjacent to the village pond to provide flood storage during flood events (Option F)
- Changes to land management e.g. contour ploughing, to reduce direct runoff from farmland (Option H)

7.2.1 Area 2 – West End

7.2.1 Maintenance

The following maintenance is recommended:

- OCC to maintain highway drainage system to include blockage and siltation inspection of surface water drains and road gullies (Option D)

7.2.2 Flood defence improvement schemes

Immediate (under 1 year)

- Install new land drainage ditch to run around the edge of property to collect runoff from surrounding fields (Option A)
- Flood resilient measures on property (Option B)

Long-Term (3 years or more)

- Changes to land management e.g. contour ploughing to reduce direct runoff from farmland

7.3 Area 3 – Hen n Chick Lane

7.3.1 Maintenance

The following maintenance is recommended:

- OCC to maintain highway drainage system to include blockage and siltation inspection of surface water drains and road gullies (Option E)

Immediate (Under 1 year)

- Install kerb on Hen n Chick Lane at low point in road, in the vicinity of Woodside Cottages. This will channel overland flow from surrounding land towards highway drainage (Option A)
- Flood resilient measures on property (Option C)

Mid-Term (under 1 -2 years)

- Install new land drainage ditch to run around the edge of property, to collect runoff from surrounding fields (Option B)

Long term (3 years or more)

- Changes to land management e.g. contour ploughing to reduce direct runoff from farmland (Option D)

Appendix 1: Photographs

Area 1

Photograph 1: Shilton in flood along Bridge Street



Photograph 2: Shilton in flood by the Rose and Crown pub



Photograph 3: Flooding along Bridge Street



Photograph 4: Flooding along Bridge Street adjacent village pond



Photograph 5: Top of Bridge Street where the Shill Brook broke its banks



Photograph 6: Bridge Street Bridge, looking upstream of Shill Brook



Photograph 7: Bridge Street Bridge upstream face



Photograph 8: Bridge Street Bridge showing downstream channel running parallel to road



Photograph 9: Shill Brook looking downstream to Willow Cottage



Photograph 10: Highway drainage on Bridge Street at village pond



Photograph 11: Bridge at ford in July 2007 floods



Photograph 12: Bridge at ford in Shilton in normal conditions



Photograph 13: Shill Brook looking upstream from pond



Photograph 14: Shill Brook looking upstream from pond



Photograph 15: Shill Brook trying to cut around wall, at present it is directed through a right hand bent to the next section of the watercourse.



Photograph 16: Shill Brook looking downstream towards pond



Photograph 17: Bridge at ford



Photograph 18: Looking downstream from bridge at the ford



Photograph 19: Drainage ditch downstream end of Shilton, looking towards TW pumping station



TW pumping
Station

Photograph 20: TW sewage pumping station



Area 2:

Photograph 21: Looking up road away from Shilton



Area 3:

Photograph 22: looking down the road towards Shilton, showing low point in road



Photograph 23: Looking down the road towards Shilton



Photograph 24: At dip in road by Woodside Cottages



Photograph 25: Drainage along road, looking away from Shilton

