



WEST OXFORDSHIRE
DISTRICT COUNCIL

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Parish Flood Report: **Asthall**

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

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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
 - 20 (£5,000) for Asthall
- 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

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 Asthal 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 Asthal during July 2007 and potential mitigating solutions.

Asthal is a rural parish located approximately 8km to the west of Witney and approximately 4km north of Carterton, in the heart of the Cotswolds. The parish sits in the catchment of the River Windrush, which flows in easterly direction through the parish. The main river flows in close proximity to the north of the village of Asthal, across fields which border onto the most northerly houses of Asthal. The river splits at a sluice gate on its approach to Asthal (downstream of Swinbrook), here some of the water enters and flows down the Mill Race stream, south of the main channel of the River Windrush, still North of the village. After passing Asthal the two channels reunite as the River Windrush turns and heads in a southerly direction, for a short period, towards Worsham.

The Mill Race is a smaller man made channel which once fed a mill at Asthal with water from the River Windrush. The Mill is no longer present and the sluice gates which control the Mill Race are no longer manned. To the North East of Asthal both channels pass under a road bridge which links Asthal to Fordwells. Downstream of the road bridge both watercourses continue in their separate open channels until their confluence in farmland to the east of the village.

There are no other drainage channels within close proximity of the village of Asthal.

Visual walkover surveys have been undertaken of the flooded areas and properties. Meetings have been held with affected residents and the Parish Councillor. The number of applications for Grant Aid has also been investigated.

Flooding in the Parish of Asthal has been assessed in three separate areas (see section 4.1) comprising:

- Asthal (Area 1)
- Asthal Leigh (Area 2)
- Fordwells (Area 3)

Asthal (Area 1) has 12 claims for flood relief aid following the July 2007 event. Flooding at this location was attributed to fluvial flooding from the River Windrush. Flooding was made worse through water entering the Mill Race stream and flowing towards the village.

Asthal Leigh (Area 2) has record of 2 properties claiming flood grant aid, with different mechanisms that caused flooding at each property as described below.

The first property, located in the centre of Asthal Leigh was flooded due to poorly maintained highway drainage not being able to cope with the volume of water (Photo 22). During periods of intense rainfall, water surcharges out of gully pots in the highway and inundates the house.

A drainage ditch which runs along the eastern verge of the lane to Fordwells, was, on inspection in May 2008, overgrown and not maintained. The ditch was not efficient in collecting floodwater and therefore added to the flooding which affected property at this location.

The second property which claimed flood grant aid is located on the lane between Asthall and Asthall Leigh. The property is cut into a hillside and local residents stated that the property was flooded through the action of ground water flooding and overland flow from surrounding farmland.

Fordwells (Area 3) includes five properties which suffered from flooding. Fordwells is located in a valley and during periods of intense rainfall, water flows from surrounding land onto the Langley and Leafield Roads. As the depth increases, these roads act as flow paths carrying flood water to Fordwells where drainage is unable to cope, leading to flooding of property.

A drainage ditch is located in the western verge of the lane leading from Fordwells to Asthall Leigh. This ditch is maintained by riparian owners outside property and flows well. Driveway accesses in the village cross the drainage ditch, with varying size of crossing. Further down the lane, the drainage ditch becomes overgrown.

OCC highways department have undertaken works on the Langley road to install grips to enable flow from the highway into the drainage network. This has largely been a success however, a maintenance regime must be agreed to ensure the future operation of the grips.

WODC are to contact local landowners for permission to incorporate 'weep' holes into the dry stone walls adjacent to the Langley Road to allow flood waters to flow onto the surrounding farmland and reduce the volume of water flowing down the lane to Fordwells. The reinstatement of the drainage ditch is also an option.

At the junction of the road from Asthall Leigh and the road that continues to Swinbrook there are a number of small piped drains which have become partially blocked. At the entrance to houses opposite Abrahams' Cottages, there is evidence of scour caused by the fast flowing flood waters.

Conclusions and recommendations, including maintenance and flood defence improvement measures and a programme, are provided in Section 7.

This report also includes Appendix 1 showing Photographs, Appendix 2 showing Maps and Appendix 3 provides a glossary.

4.0 SURVEY

4.1 Description of Area

Asthall is a rural parish located approximately 8km west of Witney approximately 4km north of Carterton, in the heart of the Cotswolds. The parish of Asthal consists of four main settlement areas, Asthall, Worsham, Asthall Leigh and Fordwells. The village of Asthall is the largest settlement, located close to the western margin of the parish. Approximately 2km north east of here is the small hamlet of Asthall Leigh and approximately 3km north east is the hamlet of Fordwells. These settlements were the worst affected by flooding in July 2007 and will be referred to further in this report.

The parish sits in the catchment of the River Windrush, which flows in an easterly direction through the parish. The main river flows in close proximity to the north of the village of Asthall, across fields which border onto the most northerly houses of Asthall. The river splits at a sluice gate on its approach to Asthall (downstream of Swinbrook), here some of the water enters and flows down the Mill Race, south of the main channel of the River Windrush, still north of the village. Approximately 500m to the east of the road bridge, which links Asthall to Fordwells, the channels re-converge and turn to flow in a southerly direction towards Worsham.

The Mill Race is a smaller man made channel which once fed a mill at Asthall with water from the River Windrush. The Mill is no longer present and the sluice gates which control the Mill Race are no longer manned.

There are no other drainage channels within close proximity of the village of Asthall.

Using the Flood Estimation Handbook (FEH), the catchment for the River Windrush is estimated to be approximately 300km² up to the parish boundary where it exits Asthal.

A small, un-named tributary to the River Windrush originates in farmland to the north of Fordwells. This watercourse flows through the centre of Fordwells in a southerly direction in a ditch along the western verge of the road from Asthall Leigh. The watercourse then flows in a south easterly direction, to the east of Asthall Leigh and onto its confluence with the River Windrush a short distance upstream of Minster Lovell. Using FEH, the catchment for this tributary at Fordwells is estimated to be approximately 3.65km² and 4.11km² to the east of Asthall Leigh.

4.2 Survey Method

A visual walk-over survey of properties affected by the July 2007 flooding has been undertaken including Asthall, the fields to the north of Asthall adjacent to the River Windrush and properties and drainage ditches at Asthall Leigh and Fordwells. Visual inspections of the River Windrush and the Mill Race Stream to the north of Asthall, the bridge over these watercourses and the pond at Asthall have also been made.

See Appendix I – Photographs.

4.3 Meetings

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

Table 1: Summary of Meetings and Flooding Descriptions

Date	Location	Description
06/05/08	Asthall	<ul style="list-style-type: none"> • Local residents and parish councillor commenting on properties that were affected by the 2007 floods. • Residents mentioned how flooding had occurred regularly over the years. A bad event in 2002 but none as extreme as 2007. • Gill Hill, Parish Councillor, had been in contact with EA regarding the Floods. EA said Asthall is Low Risk and there would therefore be little to no hope of works going ahead. • Asthall mainly affected by river flooding • 15 properties flooded = 50% of parish. (Astall Leigh = 2 properties, Fordwells = 5 properties). 9 flooded properties were listed buildings. These cannot withstand frequent flooding. • The 15 properties were given EA Flood Relief Forms and so the opportunity to claim. • Local Resident commented that in the 37 years she had lived there – had never seen the river valley like it. • The Mill Race stream that comes off the Windrush appears to be a problem. • Riffles for fish breeding have been laid in the Windrush channel by Asthall. Approximately 30m long 1m deep. They were put in to make fishing better, but it doesn't appear to have done so and are perceived to add to flooding problems. In parts of the channels the riffles have been filled to within 20cm of the surface, water rushes across these areas (more turbulent water is noticeable in these areas). • Water stacks up from the main Windrush channel and floods fields adjacent to Mill Race stream. This never used to be the case. Flooding appears to have worsened since 2000. Coincides when riffles were put in. • The flooding occurred rapidly. The whole valley becomes completely flooded and at speed. The valley was full within 2 hours. • Flooding appears to be coming onto the south westerly side of the Windrush, when it used to flood mainly on the north easterly side. • Since the surface water drains have been cleared (by fire brigade) there has been a noticeable difference. • Road going off to the east of Asthall has had drains jetted and cleared with root cutters. • Surface water channels used to be ditches, they are now piped restricting the capacity. • Pond at Asthall marks low point in village, sitting lower than the Windrush. The pond doesn't have an outlet as it is so low. In times of flood, water gathers here and remains as still standing water flooding the road for long periods. The fire brigade pumped the water away on the last occurrence. The EA do not want to install a pump as this will require relying on mechanical measures to deal with the problem.

Date	Location	Description
		<ul style="list-style-type: none"> • The flood arches on the bridge to the north east of the village of Asthall have been blocked. The smallest northerly arch has been completely blocked and filled in, this could be related to bridge structuring. This is restricting the River Windrush in times of flood.
06/05/08	Asthall Leigh	<ul style="list-style-type: none"> • Visit to hamlet of Asthall with Parish Councillor and Local resident. • Drainage is not efficient – this has been mentioned to the council, along with some suggested solutions. • Dip in road, water runs off onto the road and drains cannot cope. Clay topped geology. • To the north of old cottage there is a ditch to the east of the road. This is overgrown and has no proper outfall. Due to the slope of the land, the ditch fills and overflows, close to Old Cottage. • There are three drains in close proximity to Old Cottage. Only one of these is piped. The two other drains may possibly be connected as both fill up very quickly. • To the back of old cottage there is an area of lower land. The piped drain outfalls to this area. This drain is however silted up. • The other property flooded is on a hill. Water flowed down the banks of the neighbouring fields at the back of the house.. The residents of this property are still not moved back in.
18/06/08	Fordwells	<ul style="list-style-type: none"> • Flooding in Fordwells is caused by overland flow from surrounding farmland and inadequate highway drainage and maintenance. • Flood water comes from the Leaffield road, including Fir Lane and Langley. • Leaffield – it is noted that the highway drainage on leaffield road doesn't really do much and a suggestion to put in a ditch at a higher level on the bank (of Fir Lane) to catch some of the water coming down through the woods was made. This would allow some water to percolate into the ground and reduce runoff to the highway. • The problem of field entrances was made – water rushes through gateways onto the highway • Suggestion to provide some attenuation of flows in the Parish of Leaffield, just south of Lowbarrow farm. Runoff from the highway could be directed into the adjacent field where flows can be attenuated. • There may be scope for further attenuation of drainage coming from Leaffields at The Riding – again directing flood waters to adjacent fields, and not down the highway to Fordwells. • It was noted that the road from Swinbrook does not cause so many flooding issues in Fordwells as the area in which water collects and length of road water drains down is smaller than Leaffields/Langley direction. • Langley road has new grips put in place following July 2007 – a maintenance agreement is required • Requirement for kerbing in Fordwells to prevent crushing and blocking of existing drainage. • Could the camber of the road be changed in the village to take water towards Abrahams cottages which are at a higher level.

WODC has liaised with the Environment Agency, Oxfordshire County Council, Thames Water and representatives of the Parish of Asthal

4.2 Stakeholder Communications and Actions

Details of conversations and actions between October 2007 and February 2008 are included in Table 2.

Table 2: Summary of Telephone Calls made with EA, TW and OCC

Company	Comments
EA	<ul style="list-style-type: none"> • The EA confirmed that approximately 10 years ago the EA placed some riffles in the River Windrush at Asthall which significantly raised the river bed. • The EA flood defence team do not think that the riffles directly cause flooding as the village is located in a 'bowl' however, the construction of the riffles was contrary to the principles of flood defence.
TW	<ul style="list-style-type: none"> • Flooding in Asthall has not been caused by foul water, therefore Thames Water has not been contacted.
OCC	<ul style="list-style-type: none"> • OCC have stated that they intend to complete routine maintenance in the parish of Asthall. • In Fordwells, OCC carried out work to clear grips in verges this year (2008) and have suggested that concrete could be used to re-enforce existing grips. OCC are aware of ideas to create attenuation areas upstream of Fordwells and are working with WODC to carry out feasibility for this work.

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 20 residential properties in the parish of Asthall have received Emergency Flood Relief Grant Aid, however it is acknowledge this is not the total number of properties affected in the Parishes 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, which can be found in appendix 2, shows areas in Asthall where flood damage occurred during 2007. The flooding can be broadly split into three areas being:

- Asthall (Area 1)
- Asthall Leigh (Area 2)
- Fordwells (Area 3)

The map shows areas where properties were affected by flooding in July 2007, overlaid with 2008 Environment Agency Flood Zones.

- 1% probability of flooding - Flood Zone 3 (previously referred to as 1 in 100 year flooding)
 - 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% probability of flooding – Flood Zone 2 (previously referred to as 1 in 1000 year flooding)
 - 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 – Asthall

At its closest point the River Windrush is approximately 120m away from properties at Asthall. The properties lie even closer to the Mill Race, in some cases under 50m, which has been an increasing problem in recent years.

In Asthall the cause of flooding is related to the fluvial actions of the River Windrush and the associated Mill Race. The river splits at a sluice gate on its approach to Asthall, here some of the water enters and flows down the Mill Race. Flows within the Mill Race were historically limited by the sluice gate however, the sluice gate is no longer manned.

In times of flood, increasing flows are passed down the Mill Race, which in July 2007 burst its banks and flooded surrounding land. As more water is directed down the Mill Race, the risk of flooding is brought closer to the properties of Asthall.

It has been noted by local residents that since riffles have been implemented into the channel of the River Windrush, flood waters have been redirected. It is felt that the riffles are limiting the channel capacity of the Windrush (through the raised bed level) causing backing up of flows. As a consequence, heightened by the poorly maintained sluice gate, more water is pushed down the Mill Race, increasing flood risk to the village.

In 2007, 12 properties located Asthall claimed flood damage grants. Two of the properties affected reside in Flood Zone 3 – high risk of flooding, 2 are within Flood Zone 2 – medium risk of flooding and the rest within Flood Zone 1 at low risk of flooding from fluvial sources.

Flooding of farmland by the River Windrush occurs regularly however, in recent years residents stated that there has been a shift in the direction of the flood waters. The EA flood maps show in this area, the majority of the flood waters are expected to extend to the north easterly side of the

Windrush. However, water is increasingly being reported as extending towards Asthall and not the fields to the north east.

The causes of flooding in July 2007 at Asthall are the following:

5.2.1 Direct Flooding from the River Windrush

The River Windrush at its closest point to Asthall has an approximate catchment area of 290km². Following a period of intense rainfall in July 2007, where over a months rainfall fell in 24 hrs, levels in the River Windrush quickly rose and inundated Asthall.

5.2.2 Direct Flooding from the Mill Race

Flows in the Mill Race are controlled by a sluice gate. The sluice gate is no longer manned and during times of flood, more water is flowing from the River Windrush to the Mill Race than historically has occurred. In July 2007, intense rainfall led to over topping of the banks of the Mill Race and flooding of property in Asthall.

5.2.3 Riffles in the Windrush Channel

The implementation of riffles in the River Windrush involved the raising of the river bed and in turn led to a reduction in channel capacity. As a consequence the River Windrush overtops its banks more regularly.

5.2.4 Surcharging of Fordwells Road Bridge

The bridge crossing of the River Windrush, which carries the lane to Fordwells consists of multiple arches to allow the flow of water. The most northerly arch has been blocked up. This is expected to be related to the bridges structure as residents confirm it was not previously blocked up. Blocking of flood arches restricts the flow of the river whilst in flood and causes water to back up across its floodplain on the upstream side

5.3 Area 2 – Asthall Leigh

In 2007, 2 properties in the Asthall Leigh area claimed flood grant aid. All of these properties reside in the Environment Agency Flood Zone 1, being land assessed as having a less than 0.1% or less than 1 in 1000 year probability of flooding from rivers or sea in any year.

The causes of flooding at Asthall Leigh are the following:

5.3.1 Inadequate highway drainage

During periods of intense rainfall, water collects at low points in the road where there are three gullies. One of these drains is piped to a field outfall, the outfall of the remaining two gullies is unknown. The existing drainage quickly surcharges and floods onto the road, causing flooding to property. Residents have also noted that the existing gullies are often silted up due to inadequate maintenance and cannot carry and discharge water to their full potential.

5.3.2 Direct runoff from farmland

Overland flow from farmland in Asthall Leigh inundated properties during the July 2007 flood event. Direct overland flow occurs when the ground either becomes fully saturated, preventing any percolation into the upper layers of soil, or where rainfall intensity and rate is greater than the percolation rate of receiving ground. Both result in sheet runoff, or water flowing directly off the surface of the land.

Direct runoff from fields adjacent to the Fordwells and Minster Lovell lanes flowed downhill along the highway towards Asthall Leigh. This contributed to the surface water flooding in properties at a lower level in Asthall Leigh.

5.3.3 Lack of maintenance to field drainage ditch

The existing field drainage ditch to the north of Asthall Leigh is poorly maintained. The ditch has become overgrown to the extent where it is unclear that there is a ditch there which resulted in increased flooding to property in Asthall Leigh.

5.4 Area 3 – Fordwells

Five properties in this area claimed flood damage grants, one located in Flood Zone 3, all the rest located in Environment Agency Flood Zone 1.

Fordwells is located in a valley. Overland flow from surrounding farmland flows towards Fordwells, from the direction of Leaffield, Langley and Swinbrook.

As Fordwells is approached from the south, coming from Asthall Leigh, a drainage ditch is located in the left hand verge which collects all of the drainage flowing from Leaffield, Langley and Swinbrook. This is highlighted as a drain on maps of the area and is highlighted by the EA on their indicative floodplain map. The drain flows under the road in a culvert, continuing in a southerly direction, passing to the north east of Asthall Leigh to join the River Windrush to the north of Little Minster.

Highway drainage for Fordwells connects to this drainage ditch via gullies, drains and grips. A number of gullies are located at the junction of the lane from Asthall Leigh and Swinbrook.

The cause of flooding to properties in the area of Fordwells area was:

5.4.1 Direct overland flow from surrounding land

Overland flow from farmland in Fordwells inundated properties during the July 2007 flood event. In addition to this, due to the position of Fordwells in a valley, overland flow from Leaffield, Langley and Swinbrook also flow, un-attenuated towards Fordwells.

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

5.4.2 Inadequate maintenance of drainage ditches

A drainage ditch is located in the left hand verge of the lane approaching Fordwells from Asthall Leigh. Site walkovers indicated that the ditch is maintained well at driveway access points however, further downstream the ditch becomes overgrown. This channel collects water from Fordwells, Leaffield, Langley and Swinbrook, therefore, its capacity is critical to the drainage in Fordwells.

Local residents confirmed that during July 2007 waters backed up from the ditch and caused flooding to property.

5.4.3 Inadequate highway drainage

In July 2007, as rainfall intensity increased, the lanes became flow routes, flooding properties in low lying areas.

Due to inadequate drainage, high volumes of water could not easily find its way into ditches and instead flowed past gullies and into properties.

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 I. 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										
Asthal										
Version 1 – June 2008										
Option ref	Flood Overview	Description of work required					Key issues			Comments
	Options	Environment Agency For queries Tel 08708 506 506 Or email enquiries@environment-agency.gov.uk	Oxfordshire County Council Highways: 0845 310111 Or e-mail online@oxfordshire.gov.uk	Thames Water Enquiries: 08459 200 800	WODC Switchboard: 01993 861000	Private	Effectiveness	Affects on adjacent land	Cost	
Area 1 – Asthal										
	River Windrush As water levels in the River Windrush rose, banks were breached and water flowed across farmland to inundate properties in Asthal									
A	Remove riffles to restore channel back to its original capacity.	EA to remove the riffles, and return the river bed to its original level.			WODC to provide a co-ordination role		Returning the bed to its original level will increase channel capacity and reduce flood risk.	Reduced flooding	Up to £5000	The EA are aware that the riffles may have been a contributing factor to flooding in July 2007. They have not commented on the option to remove the riffles.
B	Improve operation of flood arches and movement of water on the floodplain by clearing those that are currently blocked.	EA to regrade the river bank, so that flood waters will be redirected from flood arches towards the main channel.	Bridge structure needs to be examined. The blocked flood arch needs to be unblocked. If this will cause structure issues with the bridge, the flood arch should be piped and reinforced so that the bridge will still be supported.				Will allow more of the flood waters to pass through the bridge so less will back up on the upstream side closer to Asthal.	Will allow more of the flood waters to pass downstream.	£5,000 to £20,000	OCC/EA have not been contacted regarding this option
C	Flood- resilient measures on properties.	The EA website contains reference information on flood resilient measures to properties				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	
D	Create an attenuation pond for storage of flood waters from River Windrush. Create a storage area in land to the north west of Asthall. This will contain flood flows arriving upstream of the sluice gate.	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 to allow land to flood more frequently.	Will reduce volume of water flowing downstream towards Asthall via River Windrush and the Mill Race	Will increase frequency of flooding to land upstream of road.	Up to £5,000 feasibility £20,000 to £50,000 for provision of new storage area	Further consultation required including assessment of upstream catchment to assess potential impact.
E	Improve Flood Warnings to residents.	EA to improve flood warning dissemination / raise awareness of flood warning scheme			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 could put details of floodline on the local notice board
	Flooding of Asthal as a direct impact of the Mill Race Stream. The mill race sluice is not manned and during times of flood, increased flows enter the mill race leading to flooding in Asthal.									
F	Sluice gate to be updated and maintained. Install a new gate so that in times of high flow the pressure of the water will lift the gate and force water down the main Windrush channel not the Mill Race.	EA to be consulted for design and advice. EA to implement the works on main river.			WODC to provide co-ordination role		Will reduce flood waters flowing down Mill Race instead of the Windrush. The majority of the flood waters will flow down the Windrush, further away from Asthal.	Reduced flooding adjacent to mill race	£5,000 to £20,000	EA have not been approached regarding this work
G	Create a bund in the right hand side of the Mill Race channel, to protect Asthal.	EA to be consulted for design advice/land drainage consent/flood compensation			WODC to provide co-ordination role		Will prevent flood water from Mill Race from inundating property	Flood compensation may be required	£5,000 to £20,000	

Parish Flood Options										
Asthal										
Version 1 – June 2008										
Option ref	Flood Overview	Description of work required					Key issues			Comments
	Options	Environment Agency For queries Tel 08708 506 506 Or email enquiries@environment-agency.gov.uk	Oxfordshire County Council Highways: 0845 310111 Or e-mail online@oxfordshire.gov.uk	Thames Water Enquiries: 08459 200 800	WODC Switchboard: 01993 861000	Private	Effectiveness	Affects on adjacent land	Cost	
Area 1 – Asthall (cont...)										
	Flooding of pond at Asthall									
H	Make sure that gullies are working for when the pond fills up and floods. Road drainage needs to be maintained so that it does not worsen the problems associated with the flooding of the pond. Undertake blockage and siltation inspections of road gullies, roadside ditches and road drainage in Asthall. Where necessary, undertake jetting or other clearance measures.		OCC to increase maintenance of gullies and road drainage.		WODC to provide a co-ordination role		Improved maintenance of highway drainage will enable water from the village pond to have an outfall during high water levels, reducing flooding of the highway.	Reduced flood risk	up to £5,000	The village pond does not have an outfall and flood water has in the past been pumped away by the fire brigade.
I	Increase capacity of the village pond to reduce flood risk to highway during periods of increased rainfall					Riparian owner to carry out works on the pond to increase capacity	Will reduce the volume of water flowing onto the highway during times of flood	Reduced flood risk	Up to £5,000	Riparian owner has not been approached regarding this option
Area 2 – Asthall Leigh										
	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									
A	Undertake blockage and siltation inspections of road gullies and roadside ditches. Where necessary undertake jetting or other clearance measures. The outfall of the three gullies in Asthall Leigh should be established as part of this work and ensure that they are working to their full capacity.		OCC to organise and undertake investigation and remedial works as part of their maintenance regime		WODC to provide a co-ordination role		Will allow water to drain away and not gather in low points increasing flood risk to properties.	Improved surface water drainage	Up to £5,000.	
B	Undertake inspection and maintenance of existing drainage ditches		OCC to undertake works where required.		WODC to investigate riparian ownership of land and provide a co-ordination role where required	Riparian owners to undertake work where required	Will allow water to drain away off roads and not back up affecting properties.			
	Direct flooding from overland flow Properties cut into the hillside are especially at risk from overland flow									
C	Install new land drainage ditch to run around the edge of property, to collect runoff from surrounding fields. The ditch can then connect into existing field ditch to the east (for property located on the Asthall – Fordwells lane)				WODC to consult with land owner	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.	Will allow for attenuation of flood waters and can contribute to a reduced frequency of flooding.	Improved land drainage	£5,000 to £10,000	Landowners not approached regarding option
D	Flood- resilient measures on properties.	The EA website contains reference information on flood resilient measures to properties				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	Measures such as providing a raised driveway may prevent floodwater ingress to property
E	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	Landowners in the upstream catchment have not been approached. It may be possible for landowners/farmers to

Parish Flood Options										
Asthal										
Version 1 – June 2008										
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										obtain environmental grants to plant hedgerows
Area 2 – Asthall Leigh (cont...)										
F	Maintenance of field drainage ditch on left hand verge of Asthall Leigh to Fordwells lane				WODC to provide co-ordination role and confirm riparian owner if required	Riparian owner to undertake clearance and maintenance of drainage ditch	Will help to reduce overland flow and flow of waters down lane to an already over capacity highway drainage system	Improved land drainage	Up to £5,000	
Area 3 - Fordwells										
	Direct runoff from surrounding land									
A	Install a double kerb on the right hand verge of the road from Swinbrook to Fordwells. This will prevent damage to the verge through cars riding the verges and will channel overland flow from Swinbrook towards highway drainage in fordwells. The feasibility of using kerbs throughout the rest of Fordwells should be investigated to protect existing drainage located in the verge.		OCC Highways department to complete works		WODC to provide co-ordination role		Will reduce volume of water flowing into the rear of properties on the lane from Swinbrook. The use of kerbs throughout Fordwells will protect existing drainage	Improved drainage	£5,000 to £10,000	
B	Flood- resilient measures on properties.	The EA website contains reference information on flood resilient measures to properties				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	Measures such as providing a raised driveway may prevent floodwater ingress to property
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 £5,000	Landowners in the upstream catchment have not been approached. It may be possible for land owners and farmers to obtain environmental grants to plant hedgerows
D	Install a ditch along Fir Lane (lane to Leaffield) to collect overland flow from surrounding land. This will aid infiltration and slow the rate of runoff to the highway which leads to Fordwells		Work to be completed in liaison with OCC		WODC to confirm ownership of land and arrange land drainage works.	Riparian owners to provide drainage	Increased potential for infiltration prior to discharge to highway	Reduced volume of water flowing onto Leaffield lane and into Fordwells	Up to £5,000	Feasibility of construction needs to be investigated
E	Provide attenuation in the upstream catchment of Leaffield. WODC to investigate land ownership with view to provide attenuation in farmland just south of Lowbarrow Farm and potentially on The Riding		OCC to complete works in liaison with WODC		WODC to confirm ownership of land and arrange land drainage works.	Riparian owners to be contacted by WODC	Improved attenuation in upstream catchment which will reduce runoff directed to Fordwells	Increased flooding of farmland	£5,000 to £20,000	
F	Undertake inspection and maintenance of existing drainage ditches		OCC to undertake works where required.		WODC to investigate riparian ownership of land and provide a co-ordination role where required	Riparian owners to undertake work where required	Will allow water to drain away off roads and not back up affecting properties.			
	Inadequate capacity of drainage ditch The drainage ditch which carries surface water and highway drainage from Fordwells to ultimately connect to the River Windrush is poorly maintained in places									

Parish Flood Options										
Asthal										
Version 1 – June 2008										
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G	Undertake blockage and siltation inspection of the drainage ditch located on the western side of the Fordwells – Asthall Leigh road. Carry out clearance where required		OCC to undertake works where required		WODC to investigate riparian ownership of ditch and provide a co-ordination role where required	Landowners to carry out maintenance where required.	Will allow a larger volume of water to drain away.	Will improve land drainage	Up to £5,000	
H	Increase channel capacity of the above drainage ditch				WODC to provide co-ordination role	Riparian owner to increase size and capacity of drainage ditch	Will increase flows downstream	Will reduce potential flood risk to adjacent land from culvert		
Area 3 – Fordwells (cont...)										
I	Increase size of driveway access crossing of drainage ditch located on the western side of the Fordwells – Asthall Leigh road to prevent surcharging				WODC to provide co-ordination	Individual land owners to increase size of driveway access crossings where surcharging occurs.	Will increase flows and reduce blockages	Will improve land drainage	Up to £5,000 per crossing	
	Inadequate highway drainage									
J	Increase the provision of grips to link highway runoff to the existing drainage ditch located on the western side of the Fordwells – Asthall Leigh road. OCC to provide concrete grips which will last longer		OCC to undertake works		WODC to investigate riparian ownership of land and provide a co-ordination role where required	Local residents could add this to maintenance of their ditches.	Water will be able to enter drainage ditches in more locations so that less water builds up and can drain away.			
K	Undertake blockage and siltation inspections of road gullies and surface water drains in Fordwells. Where necessary carry out jetting or other clearance measures.		OCC to undertake works where required		WODC to provide a co-ordination role where required		Will allow a larger volume of water to drain away.	Will improve land drainage	Up to £5,000	

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 Area 1 – Asthall

7.1.1 Maintenance

The following on-going maintenance is recommended:

- Maintain road drainage in Asthall around the area of the pond. Gullies need to be kept clear so that water will drain in a more efficient manner causing less flooding to the roadside. (Option H).

7.1.2 Flood Defence Improvement Schemes

The following flood defence improvement schemes are recommended:

Immediate (under 1 year)

- Take out the fishery riffles that are currently in the Windrush channel by Asthall. These have significantly raised the channel bed. Removal will return the channel back to its previous state and capacity. (Option A)
- Flood- resilient measures on properties. (Option C)
- Improve flood warning to residents (Option E)
- The sluice gate at the start of the Mill Race needs to either be updated or replaced and maintained. A new gate, in times of high flows, could force water to go down the main Windrush channel- as it is meant to, and not the Mill Race. (Option F)
- Clear and maintain drainage at the area of the pond (Option H)

Mid-Term (under 1 -2 years)

- Carry out works to the bridge over the Windrush and Mill Race. Flood arches need to be cleared. This may involve looking at the bridges structure. This can be helped by inputting pipes under the arches to help reinforce the bridge. The flood plain will need regarding to return waters efficiently back to the main channel. (Option B)
- Create storage area for flood waters in the land to the north west of Asthall. This will reduce flows towards Asthall down the Windrush and the Mill Race. (Option D)
- Create a bund in the floodplain on the right hand bank side of the Mill Race, protecting Asthall. (Option G)
- Increase the size of the pond in Asthall to reduce flood risk to the highway during periods of increased rainfall. (Option I)

7.2 Area 2 – Asthall Leigh

7.2.1 Maintenance

The following on-going maintenance is recommended:

- Drainage ditches need to be cleared and maintained. Gullies need to be cleared and maintained to ensure water can drain away and not continuously flood the low points in Asthall Leigh (Option A)
- Maintain the existing drainage ditches. This will include the clearing and creation of new grips to allow water to easily get into the ditches. (Option B)

7.2.2 Flood Defence Improvement Schemes

The following flood defence improvement schemes are recommended:

Immediate (under 1 year)

- OCC to clear and maintain gullies. The outfalls need to be checked to firstly determine where the drains go to and secondly to check drains are clear through jetting of the drains. The councils need to investigate ownership of the drainage systems to determine whether future works are private or council responsibility. (**Option A**)
- Flood- resilient measures on properties. (**Option D**)
- Create ditch to run around properties affected by runoff from surrounding fields. This will allow water to collect and drain into existing drainage ditches instead of draining towards the house. (**Option C**)

Mid-Term (under 1 -2 years)

- Maintenance of field drainage ditch on left hand verge of Asthall Leigh to Fordwells lane (**Option F**)

Long Term (3 years or more)

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

7.3 Area 3 – Fordwells

7.3.1 Maintenance

The following ongoing maintenance is recommended:

- Undertake inspection and maintenance of existing drainage ditches (**Option F**)
- Undertake blockage and siltation inspection of the drainage ditch located on the western side of the Fordwells – Asthall Leigh road, the channel capacity also needs to be increased. Carry out clearance where required (**Options G**).
- Undertake blockage and siltation inspections of road gullies and surface water drainage in Fordwells (**Option K**)

7.3.2 Flood Defence Improvement Schemes

The following flood defence improvement schemes are recommended:

Immediate (under 1 year)

- Install kerbs throughout Fordwells to protect existing drainage located in the verges and channel runoff to drainage points. (**Option A**)
- Flood resilient measures to properties. (**Option B**)
- Install a ditch along Fir Lane (leading to Leafield) to collect overland flow from surrounding land. (**Option D**)
- Increase the channel capacity of drainage ditch flowing from Fordwells to the River Windrush (**Option H**)

Mid-Term (under 1 -2 years)

- Increase the provision of grips to link highway runoff to the existing drainage ditch located on the western side of the Fordwells – Asthall Leigh road (**Option J**).
- Provide attenuation in the upstream catchment of Leaffield (**Option E**)
- Install weep holes in wall which runs parallel to Langley Road.

Long Term (3 years or more)

- Changes to land management e.g. contour ploughing, to reduce direct runoff from farmland (**Option C**)
- Increase size of driveway access crossing of drainage ditch located on the western side of the Fordwells – Asthall Leigh road to prevent surcharging (**Option I**)

Appendix I: Photographs

Area I – Asthall

Photo 1: Asthall – looking in a westerly direction with the Manor behind. Flood waters extended up this road to this point.



Photo 2: Extent of flood waters up Asthall Road



Area I – Asthall (cont...)

Photo 3: Depth of flooding on Asthall Road



Photo 4: Flooding in Asthall



Area I – Asthall (cont...)

Photo 5: Flood waters in Asthall towards Asthall Farm



Photo 6: Proximity of Mill Race to Asthall



Area I – Asthall (cont...)

Photo 7: Riffles in the Windrush Channel



Photo 8: River Windrush open channel looking downstream away from Asthall



Area I – Asthall (cont...)

Photo 9: Proximity of River Windrush and the Mill Race



Photo 10: Bridge at Asthall over the Windrush and the Mill Race



Area 1 – Asthall (cont...)

Photo 11: Blocked up Flood Arch on left bank of River Windrush



Flood arch

Photo 12: Flood Arch, to be cleared



Area I – Asthall (cont...)

Photo 13: Arch over Mill Race



Photo 14: Weir at the bridge between Mill Race and Windrush



Area I – Asthall (cont...)

Photo 15: Collapsed wall by pond in Asthall, damaged due to flood waters



Photo 16: Gully pot located at the access road to Asthall Farm



Area 2 – Asthall Leigh

Photo 17: Drain at low point in Asthall Leigh



Photo 18: Overgrown drainage ditch located on the Fordwells road, looking towards Asthall Leigh

Drainage
ditch



Area 3 - Fordwells

Photo 19: Asthall Leigh road, looking towards Fordwells

Drainage ditch
flowing
towards River
Windrush



Photo 20: Clear ditch at Fordwells (Asthall Leigh Road), maintained by residents, this joins the ditch illustrated in photo 19



Area 3 - Fordwells

Photo 21: Clear, widened ditch outside properties



Area 3 – Fordwells (cont..)

Photo 23: Leaffield Road, looking towards Fordwells

Erosion from flood water, connecting to overgrown ditch



Photo 24: Leaffield Road, looking towards Fordwells fir lane

Piped highway drainage



Area 3 – Fordwells (cont..)

Photo 25: Leaffield Road, looking towards Fordwells

Grip provision linking highway drainage to adjacent field



Photo 26: Leaffield Road, looking towards Fordwells

Small pipe to carry highway drainage to adjacent fields

