We are managing the flood risk now and in the future

The River Churn Flood Risk Management Strategy

Strategy Plan Summary Document

Winter 2009/10

River Churn Floods in South Cerney, Winter 2000/01

1. Introduction: The River Churn Flood Risk Management Strategy

The River Churn has flooded several times in the past. In response to known flooding problems, we (the Environment Agency) have produced the River Churn Flood Risk Management Strategy Plan, referred to as 'the Strategy Plan', to manage this flood risk in a cost effective and sustainable way. This document is a summary of the Strategy Plan and provides information for planning purposes and to inform the local community.

In developing the Strategy Plan we consulted widely and sought advice and agreement from local authorities, environmental bodies, statutory and non-statutory organisations, and our specialists in development control, archaeology and the environment.

River Churn, Cirencester: Low-lying recreational area serves an important function as floodplain to reduce the flood risk to downstream

Public consultation

We presented the flood risk and strategy proposals at a public exhibition in September 2006, which was attended by nearly 100 people. The vast majority indicated that they were concerned about flood risk, would like to see something done about it and were broadly supportive of the proposals for reducing the risk.

The Strategy Plan

- Identifies the flood risk problems and related issues.
- Recommends a short term plan for priority work.
- Provides a longer term approach for future management of flood risk.
- Takes into account predicted climate change.

Working with our partners, we will plan, co-ordinate and implement the proposals for flood risk management recommended in the Strategy Plan. We will update this Plan in the future, to ensure we continue to invest wisely in flood risk management and to take into account any new information, for example, following a major flood incident.

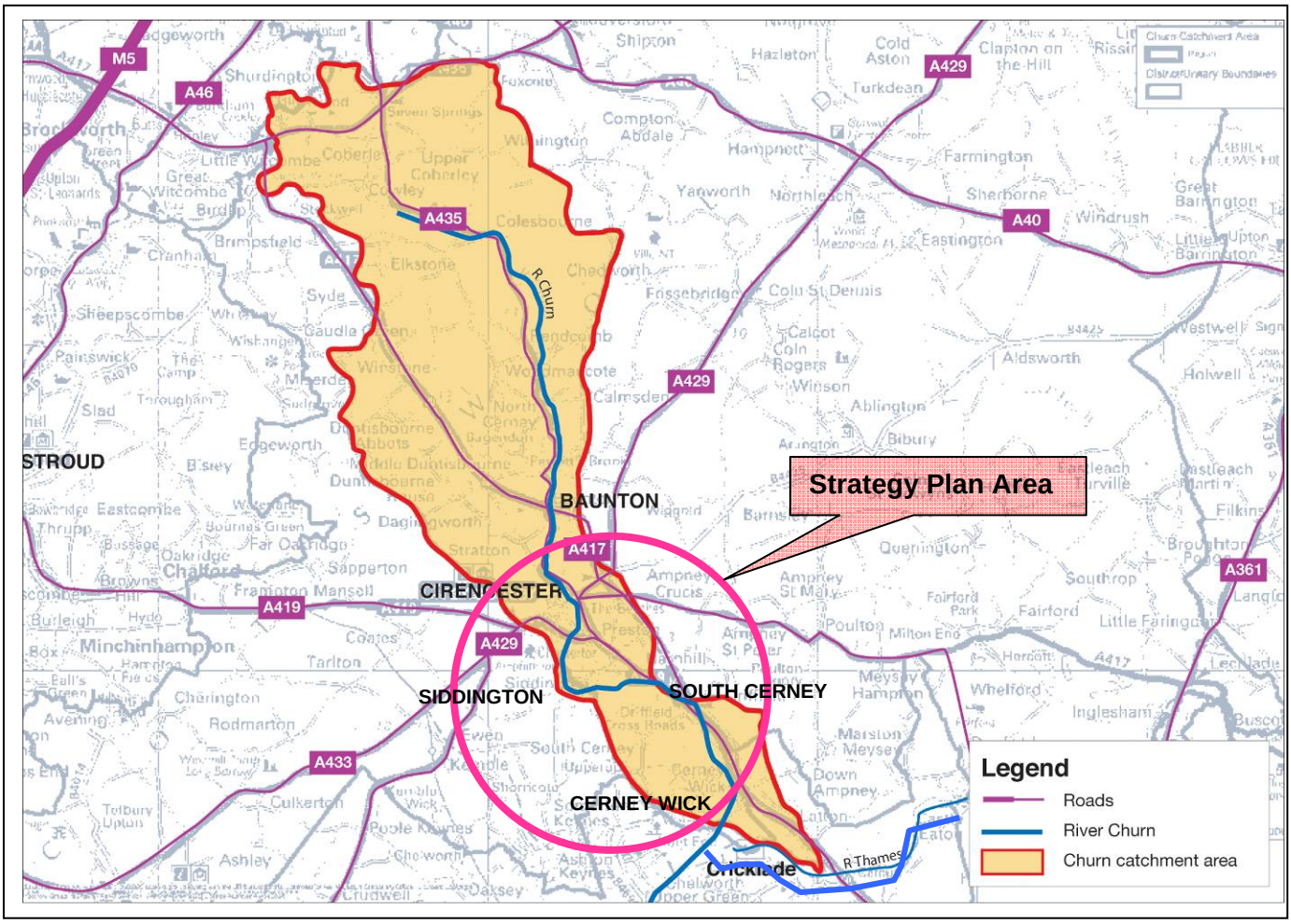
This Strategy Plan Summary Document can be accessed on our website www.environment.agency.gov.uk/yourenv and is available for viewing at the following addresses:

- Environment Agency, Red Kite House, West Area Office, Howbery Park, Crowmarsh Gifford, Wallingford, Oxford OX10 8BD
- Gloucestershire County Council, Shire Hall, Westgate Street, Gloucester GL1 2TG
- Wiltshire County Council, County Hall, Bythesea Road, Trowbridge, Wiltshire BA14 8JN
- Cotswold District Council, Trinity Road, Cirencester, Gloucestershire GL7 1PX
- North Wiltshire District Council, Monkton Park, Chippenham, Wiltshire SN15 1ER
- Bourton-on-the-Water Library, Bourton-on-the-Water, Gloucestershire GL54 2AP
- Chipping Campden Library, High Street, Chipping Campden, Gloucestershire GL55 6AT
- Cirencester Bingham Library, The Waterloo, Cirencester, Gloucestershire GL7 2PZ
- Cricklade Library, 113 High Street, Cricklade, Swindon, Wiltshire SN6 6AE
- Fairford Library, London Road, Fairford Gloucestershire GL7 4AQ
- Cirencester Town Council, Dyer House, 3 Dyer Street, Cirencester, Gloucestershire GL7 2PP

2. The Strategy Plan Area

The Strategy Plan has examined the flood risk on the River Churn and its tributaries from Baunton, just north of Cirencester, to its confluence with the River Thames near Cerney Wick. The Strategy Plan Area shown in Figure 1 below includes Cirencester, Siddington, South Cerney and Cerney Wick.

Figure 1 Strategy Plan Area for River Churn Flood Risk Management



Churn Valley Characteristics

The Churn Valley covers an area of 133km^2 with the River Churn being the main watercourse. The area has been subjected to significant land use change and development over the last 45 years. Most notably these include many large housing developments in and around Cirencester, the construction of the A419 dual carriageway and extensive mineral extraction leading to the creation of the Cotswold Water Park.

In formulating the Strategy Plan, we have considered the following factors:

- Continuing pressure for building and infrastructure development.
- Environmental features connected with flood and water level management include international, national and local sites of nature conservation interest.
- To preserve and protect areas that lie within the Cotswold Area of Outstanding Natural Beauty (AONB).
- Important archaeological features and scheduled monuments, such as Roman towns and roads, barrow groups and ancient trackways.

3. Flooding

The Strategy Plan sets out an approach to manage the flood risk that occurs directly from the River Churn and its tributaries, in particular within Cirencester, Siddington, South Cerney and Cerney Wick.

Other flood risk problems associated with sewer, ground water and surface water flooding are not addressed by the Strategy Plan. However, its recommendations are compatible with improvements proposed by others such as the local authority.

What do we mean by 'flood risk'?

Flood risk is not just the likelihood of flooding, but the possible damage a flood could do as well.

When we talk about flood risk we mean two things:

- The likelihood of a particular flood happening, best expressed as a chance or probability over a period of one year. For example, 'There is a 1 in 100 chance of flooding in any given year in this location'.

- The impacts or consequences that will result if the flood occurs.

We need to know both how high the probability is of a flood occurring and the severity of any impact (which may change depending on how extreme the flood is). Only by determining both the probability and the severity for a range of floods of different sizes can we assess what the flood risk is to a particular area.

Historic Flooding

In developing the Strategy Plan, we have analysed the history of flooding in the area. These include the following incidents of significant flooding:

- The 1947 flooding was largely caused by rain falling on frozen ground and melting snow.

- The December 2000 flood was a result of exceptional winter rainfall. This event was close to a 1 in 30 year chance of flooding in any year and affected 27 properties.

- In July 2007 flooding from the river affected properties of Mill Place and Beeches Road in Cirencester and six properties were reported to have flooded in South Cerney.

Analysis of Flood Risk

We have used the historic flooding information, alongside rainfall data, river flow data and flooding characteristics, to create computer models of the River Churn. We used models to identify the areas of high and low flood risk, and the impacts or consequences that will result if the flood occurs. From this we have identified the following:

- A number of communities within Cirencester, South Cerney, Siddington and Cerney Wick are at high flood risk.

- Baunton, Latton and Ashton Keynes are at a very minor flood risk.

There has not been any major flooding affecting properties experienced on the River Churn upstream of Baunton or its tributaries. These tributaries include Perrott's Brook, Duntisbourne Brook, Elkstone Brook, Hilcot Brook, Ullenwood Stream, Cerney Wick Stream, Creamery Ditch and Rendcomb Stream.

4. Flood Risk Management

How is flood risk managed today?

We currently manage flood risk in the Strategy Plan area through a programme of routine river maintenance. However, with the ageing of current river control structures, increasing urbanisation and climate change, there has been a gradual increase in the level of flood risk.

The Strategy Plan sets out the Environment Agency's approach to the renewal of the river control structures and the review of their future operational and maintenance requirements.

The Strategy Plan specifically addresses the flood risk from the River Churn and its tributaries. We have discussed the interaction from other sources of flooding with our partners responsible for dealing with sewer, ground water and surface water flooding.

Who is responsible for managing flood risk?

The management of flood risk is everyone's responsibility.

During a flood the local authority provides the emergency response to householders.

We (the Environment Agency) have a duty to oversee all matters relating to floods, and aim through flood risk management to reduce the likelihood of flooding. We also seek to reduce the risk of flooding by influencing land use planning and through improved flood warning and emergency responses.

Others with flood risk management responsibilities include Cotswold District Council, Cirencester Town Council, North Wiltshire District Council, Gloucestershire County Council and Thames Water, as well as private individuals.

Anyone owning land next to a watercourse has responsibilities as a 'riparian owner'.

Land owners have the right to protect their property from flooding, but in most cases we must agree plans before any work commences. Land owners must also accept flood flows through their land even if flooding is caused by inadequate capacity down stream.

Any work on a watercourse might require planning permission from a local authority.

Our document 'Living on the Edge' (see our website) explains everyone's responsibilities in more detail.

5. Standard of Flood Protection

'Standard of Protection' is a term which the Environment Agency uses to define the probability of flooding to a property, business or area. Over time, the Standard of Protection may reduce due to normal deterioration of structures and assets or the changes in flows due to the effects of climate change and other factors.

Source: Environment Agency website

Current Standard of Protection

We estimate that:

- the current river system and its operation provides a Standard of Protection from flood events with a 1 in 20 chance of occurring in any one year; and
- there are currently about 700 properties at risk from a 1 in 100 chance of flooding, and this number will increase to 830 properties with the effects of climate change.

The River Churn comprises more than 25km of natural channel and 1.2km of culverted or covered channels through the northern part of Cirencester. There are 19 structures with a flood risk management function, most in good condition and some in fair to poor condition that require maintenance.

Proposed Improvement to Standard of Protection

We have considered many options to manage the flood risk in the Strategy Plan area.

The Strategy Plan recommends an increase in the Standard of Protection from a 1 in 20 chance to at least a 1 in 30 chance of flooding in that location in any given year.

For Watermoor, an area of Cirencester which was affected by flooding in 2000, a higher increase in Standard of Protection to a 1 in 50 chance may be justified. It has not proved to be cost effective to provide this higher Standard of Protection in all locations.

6. How we developed the Strategy Plan

The overall aim of the strategy is to promote ways of reducing flood risk in the Churn Valley.

To manage the flood risk better, we propose 'structural' work to the river system such as refurbishing weirs and sluices, and building new flood defence walls. We will also adopt 'non structural' approaches such as policies, land use management and flood warning.

River Churn near Siddington:
Extensive flooding of road intersecting the floodplain, with sand bags placed to help block the flows into the village.

Strategic Appraisal

We developed the Strategy Plan in the following way:

1. We set strategic environmental and social objectives in order to:
   - avoid where possible, effects on human health and population;
   - protect and improve inland waters;
   - protect and enhance biodiversity;
   - mitigate climate change impacts;
   - protect and enhance cultural heritage features;
   - protect and enhance landscape, character and visual amenity.
2. We studied the flood risk problem by developing computer models of the river to identify areas at risk of flooding. We tested options for flood risk management using these models.
3. To receive national funding approval the Strategy Plan had to show it is:
   - economically justified;
   - technically feasible;
   - environmentally acceptable;
   - of sufficient priority;
   - supported locally.
4. Consultation was important to ensure we produced a Strategy Plan that is acceptable to as many people as possible. We therefore consulted:
   - national government organisations;
   - local authorities;
   - nature conservation and heritage groups;
   - recreation, fisheries and navigation groups;
   - the general public and businesses in the Strategy Plan area.

We have also ensured that our Strategy Plan takes into consideration other high level plans, strategies and polices in the area.

7. Assessing Flood Risk Management Options

We have undertaken technical, economic and environmental assessment to identify the preferred flood risk management options. The types of questions we have considered in the assessment include:

Technical assessment:

- How will it be built and how sustainable is it?
- When will it be built?
- How effective will it be in the longer term to protect against climate change impacts?

Economic assessment:

- How cost-effective is the option over the 100 year life cycle?

Environmental assessment:

- How will it affect nature conservation and the existing landscape?
- How will it affect water quality?

We also identified opportunities to carry out environmental work alongside our structural proposals. Any work will minimise and avoid adverse impacts on the environment, and seek environmental enhancements such as:

- improving the landscape character by sensitive design;
- improving recreation access along the river and floodplain e.g. linking existing footpaths and providing hand railing on the top of flood defences, where necessary;
- the opportunities for enhancing the ecological interest of the river banks and disused canal e.g. pollarding trees to reduce shading, clearing some of the scrub, and provision of bat boxes;
- restoration of the natural river bed and other in-stream habitat enhancements, e.g. planting native marginal vegetation, creating riffles, creating shallow margins;
- formalising/creating open ditches with shallow profiles to enhance ditch habitat and allow shallow flooding and creation of floodplain grazing marsh;
- improving fish migration routes.

8. What our Strategy Plan recommends

We recommend a programme of structural and non-structural measures to reduce the risk of flooding in the Churn Valley.

Our Recommendations

The Strategy Plan sets out our recommendations as a programme of:

- 'structural' works for example refurbishing weirs and sluices, and building new flood defence walls;
- 'non-structural' measures for example policies, land use management, and flood warning.

These measures will reduce flood risk to those properties that have flooded in the past, continue to protect defended properties and go some way towards offsetting the predicted climate change effects.

The Strategy Plan is detailed on the following pages, and Figures 2 to 9 illustrate the areas where we are considering potential 'structural' work.

We will continue to review flood risk to the properties now and in the future. We will also review the possibility for flood storage upstream of Cirencester as a longer term measure.

Implementing this Strategy Plan will contribute to achieving our aim to maintain and improve flood defences as set out in our document 'Creating a better Thames - our five year Plan 2006-2011' (see our website).

Where opportunities exist we will enhance the environment as part of the proposed flood defence work.

Strategy Plan: Structural Measures

Short Term Measures: 0 to 5 years

Location	Number	Proposed Action	Current Progress
Cirencester	1	Modify sluices at Gloucester Street Bridge to improve flow management and operation.	Planned 2009/10
	2	Review and improve the flow passage through Gooseacre Lane Bridge: Likely outcome to lower services in channel bed	Planned 2010
	3	Provide local flood protection measures in vicinity of Spitalgate Lane Bridge	Planned 2010
	4	Implement Barton Mill Channel improvement work	Completed
	5	Implement Barton Mill Sluice improvements	Completed
	6	Provide an improved sluice control on Gumstool Brook	Planned 2009/10
	7	Provide minor rising of channel walls in the Hereward Road area.	Planned 2010
	8	Clearance of debris from the Spitalgate flood arch	Completed
	9	Provide local bank raising in the Abbey grounds	Planned 2010
	10	Refurbish of culvert C1	Planned 2010
	11	Refurbish of culvert C2	Planned 2010/11
	12	Review and implement improvements to low spots in vicinity of Beeches Road	Planned 2010/11
	13	Review of the operation and integrity of the sluice gates at New Mill	On-going with landowner's co-operation
	14	Review of the requirements for the Watermoor flood defence work	Analysis to commence 2010
Siddington	15	Review of the existing sluice structure downstream of the South Cerney Road - monitor and maintain existing integrity, including liaison with Gloucestershire County Council	Negotiations ongoing with Gloucestershire County Council
South Cerney	16	Relocate the services which cross the channel near Silver Street Bridge	Ongoing negotiations with service owners
	17	Improve the lower channel downstream of the Fanshawe Weir (over 550m)	Completed
	18	Review and implement changes to operation of the sluice downstream of Bow-Wow bridge and clear channel of silt/gravel.	Planned 2010
Cerney Wick	19	Review of Control structures through Cerney Wick	Ongoing
Third party structures	NA	Continue to operate and maintain third party flood defence assets as required, and enforce where necessary.	

Strategy Plan: Structural Measures

Medium Term Measures: 5 – 20 Years

Location	Proposed Action
Cirencester	Reconstruct the Barton Mill Sluices Ongoing refurbishment of culvert C1 Ongoing refurbishment of culvert C2 Replace the flapped outlet at Spitalgate Lane Review the control structure within culvert in Hereward Road
Siddington	None planned
South Cerney	Replace the side weir at Upper Mill House Replace the fixed crest weir at Clarks Hay Road Replace the small stone weir at Lower Mill
Cerney Wick	Replace the side weir at Cerney Wick Farm
Storage	Review the options for flood storage in response to adverse climate change effects
Third party structures	Continued operation and maintenance of third party flood defence assets. Replacement of minor weirs

Long Term Measures: 20 – 99 Years

Location	Proposed Action
Cirencester	Review of the operation and performance of the gauging station Replace the Gloucester St Sluice Ongoing refurbishment of culvert C1 Ongoing refurbishment of culvert C2
Siddington	Replace the stop-log weir upstream of South Cerney Road Review the old sluice structure downstream of South Cerney Road Review the need for a gauging station at this location
South Cerney	Replace the weirs at the upstream bifurcation point Replace of Chapter Manor paddle sluice weir Install new gauging weirs where appropriate
Cerney Wick	Reconstruct the gauging station
Storage	Continue to investigate the flood storage options upstream of Cirencester in response to adverse climate change effects Design and construct storage area subject to feasibility.
Third party structures	Continue the operation and maintenance activities

Strategy Plan: Non-Structural Measures

Key Issues Identified	Proposed Action
Operation and maintenance improvements	Investigate whether changes to existing operating procedures would have a positive effect on flood risk in Cirencester (Gloucester Street sluices). Support the Environment Agency's promotion of Performance based Asset Management Systems (PAMS). Formalise the operating regime for third party assets.
Flood warning improvements	Support the Environment Agency's continued improvement of its flood warning network and flood forecasting capabilities. Improve gauging to cover the high flow range more reliably.
Planning and development control	Introduce flood neutral policy with better control to prevent inappropriate development Use PPS25 and planning liaison to strengthen influence over Local Authority and Regional Spatial Planning Support the Environment Agency's continued promotion of sustainable drainage through PPS25. Continue to review future land requirements
Land use management	Promote Environmental Stewardship schemes. Support the creation/extension of floodplain meadows and reed beds Monitor rural land-use research to identify future opportunities to reduce flood risk.
Tactical local measures	Draft a Flood Action Plan that defines structure operation rules, responsibilities. Other initiatives such as self-help programmes, local protection and flood proofing.

Figure 2 Cirencester Local Improvements

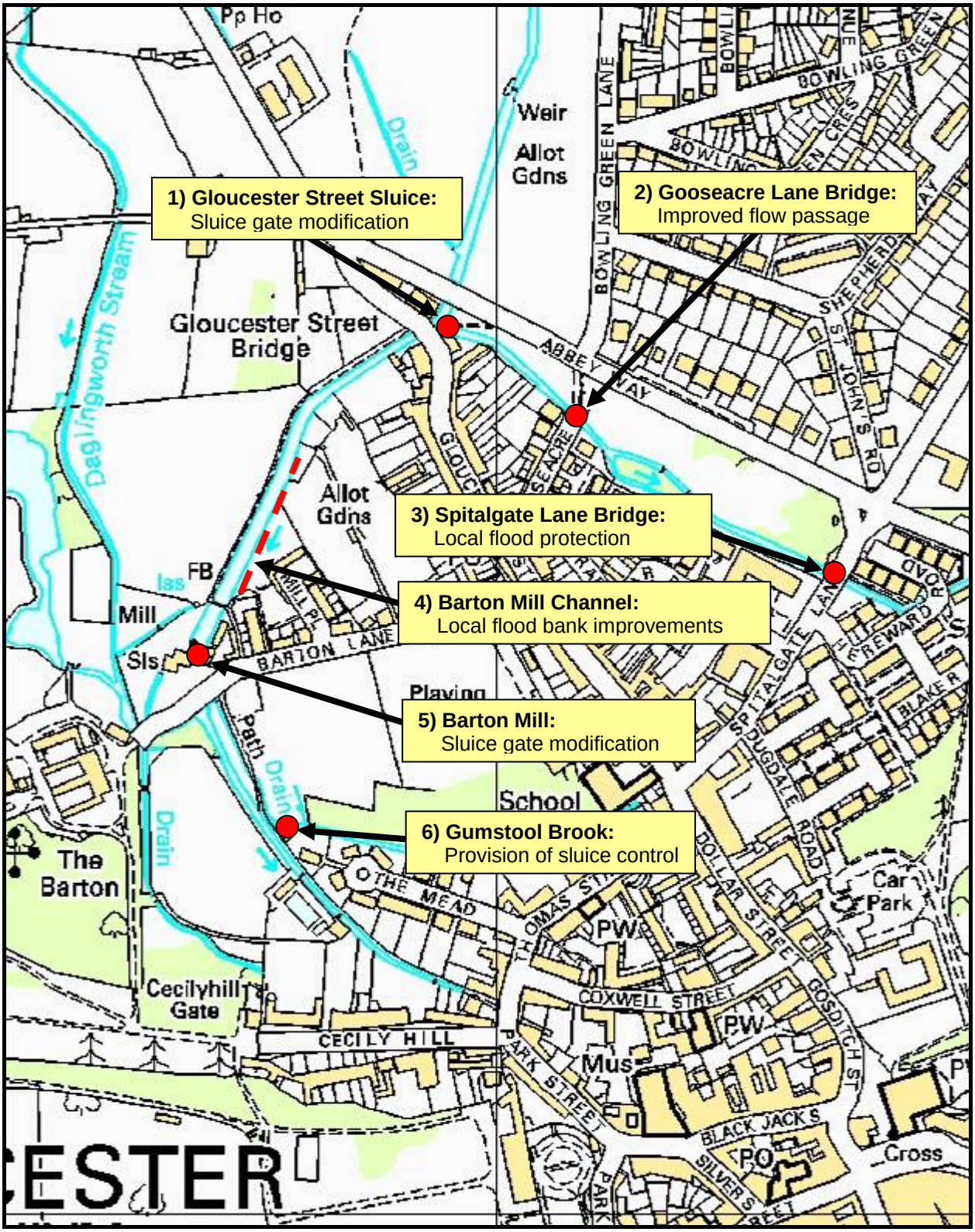


Figure 3 Cirencester Local Improvements

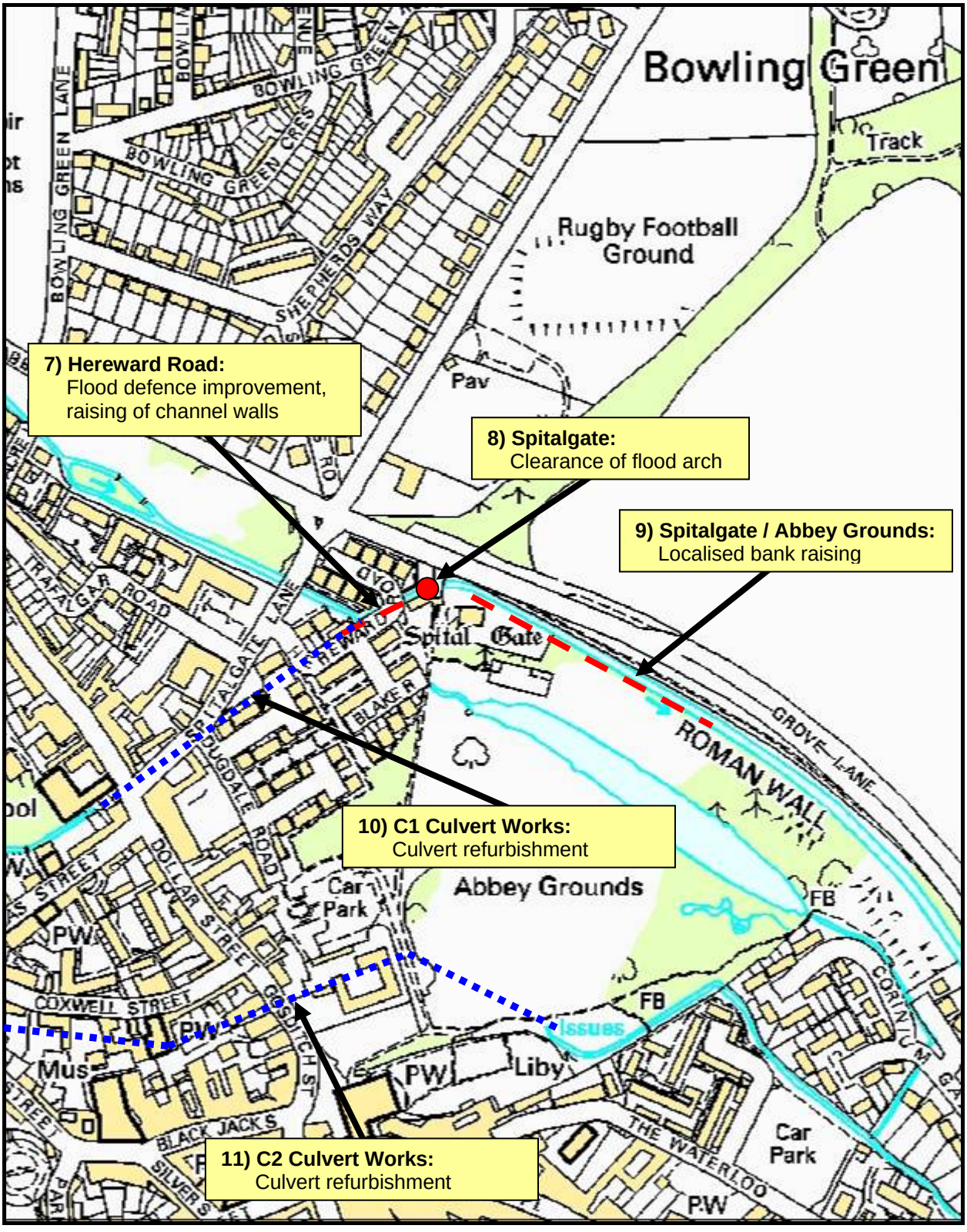


Figure 4 Cirencester Local Improvements

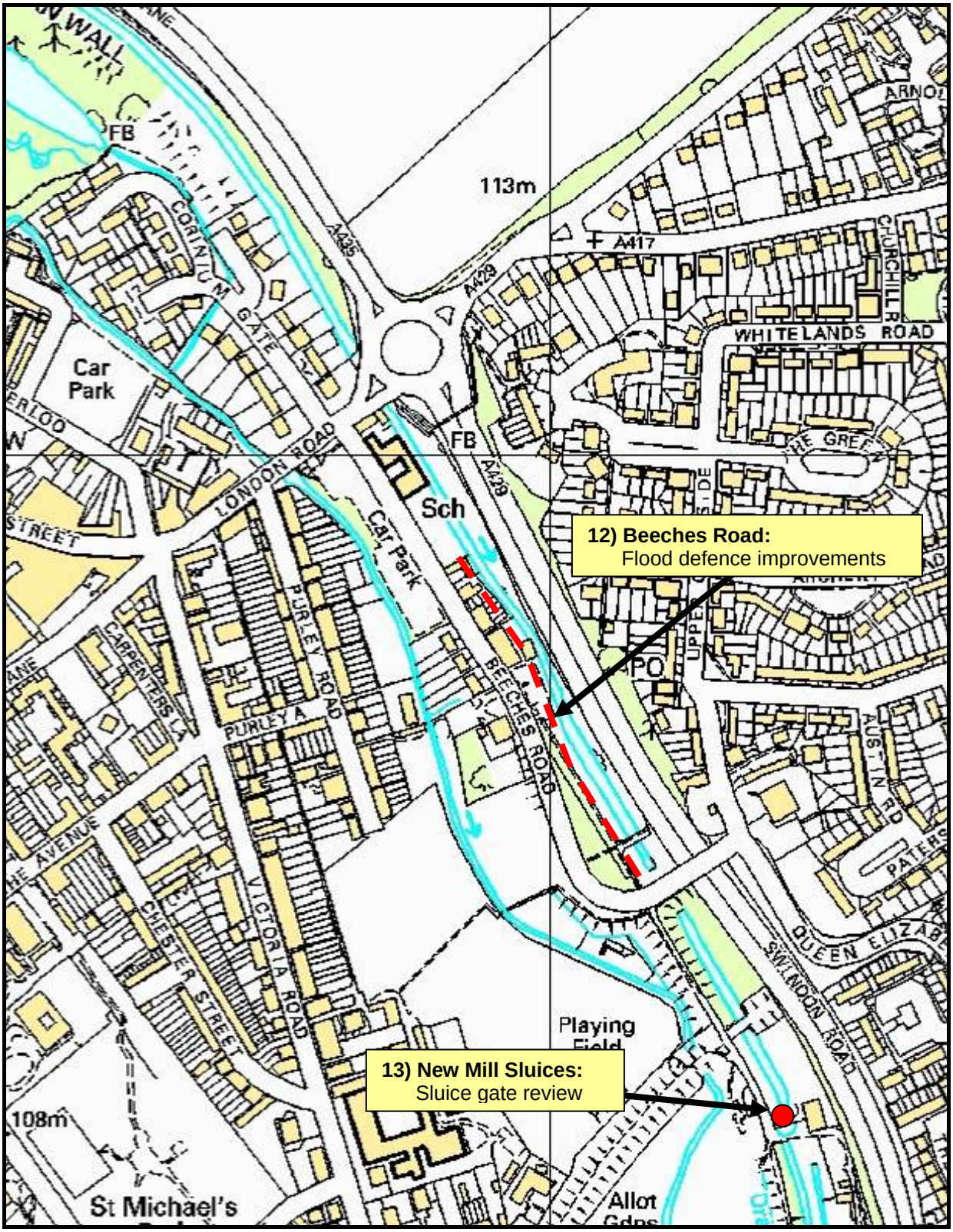


Figure 5 Cirencester Local Improvements

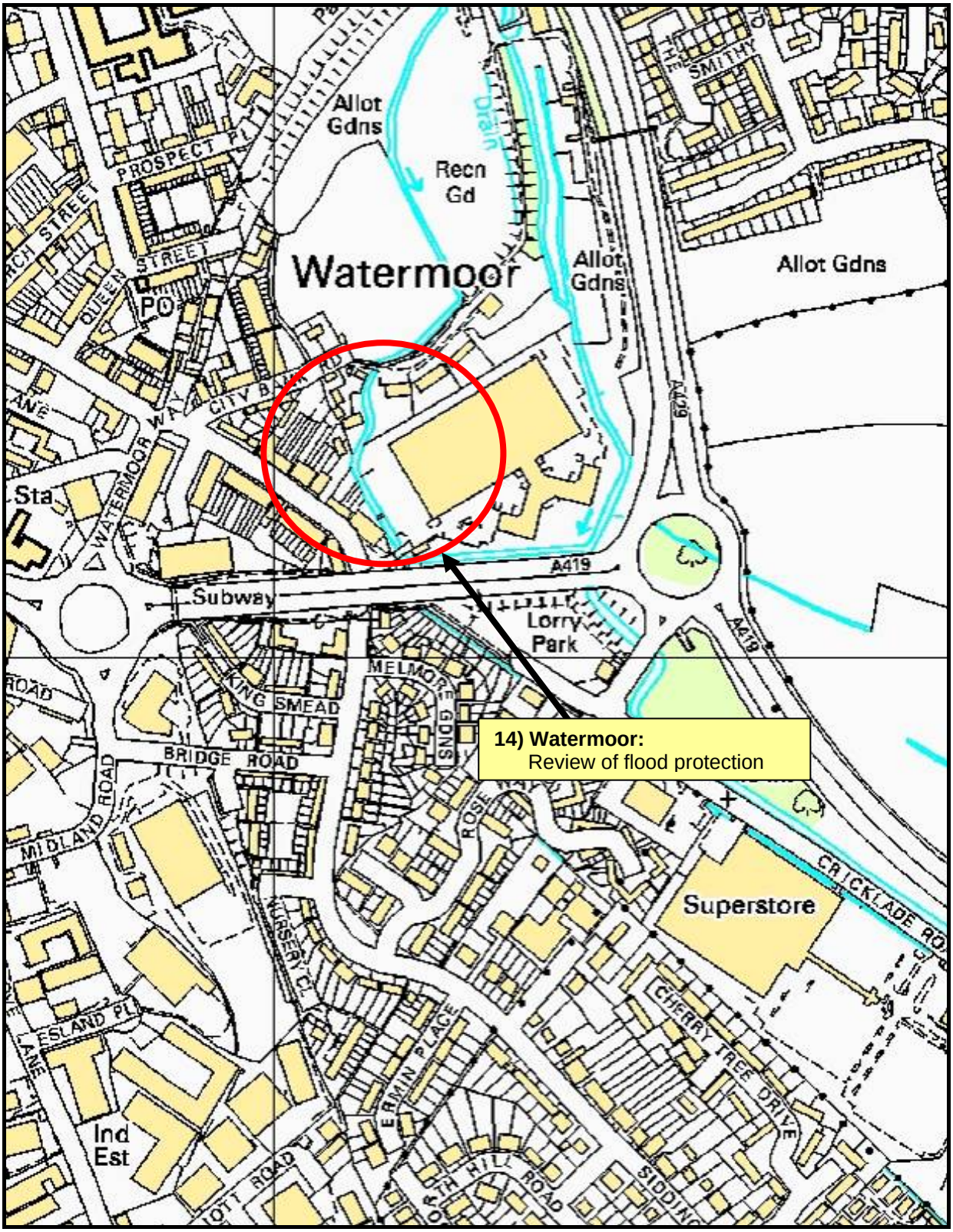
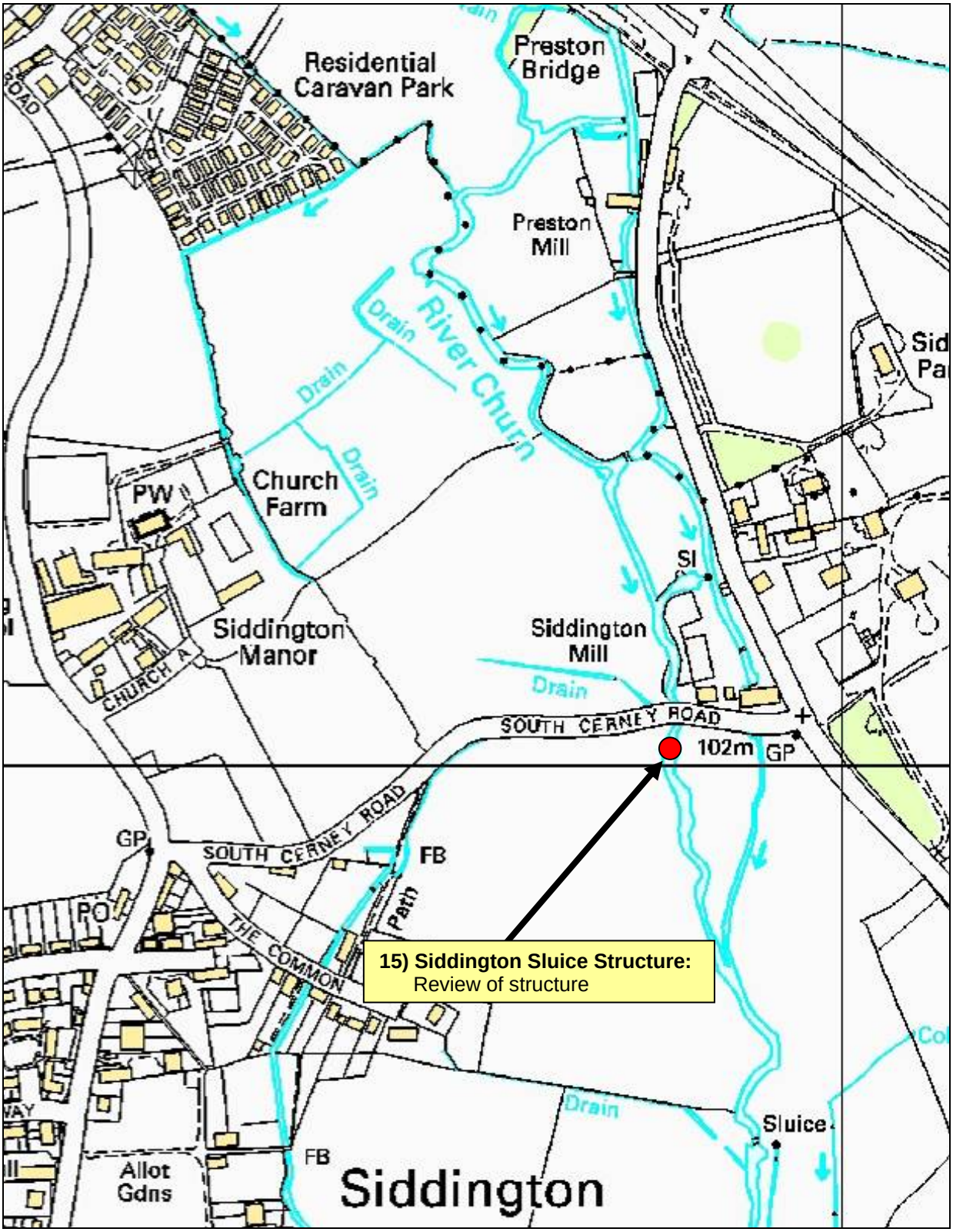


Figure 6 Siddington Local Improvements



Local flood defence improvements

Potential channel/structure improvement

Figure 7 South Cerney: Local Improvements

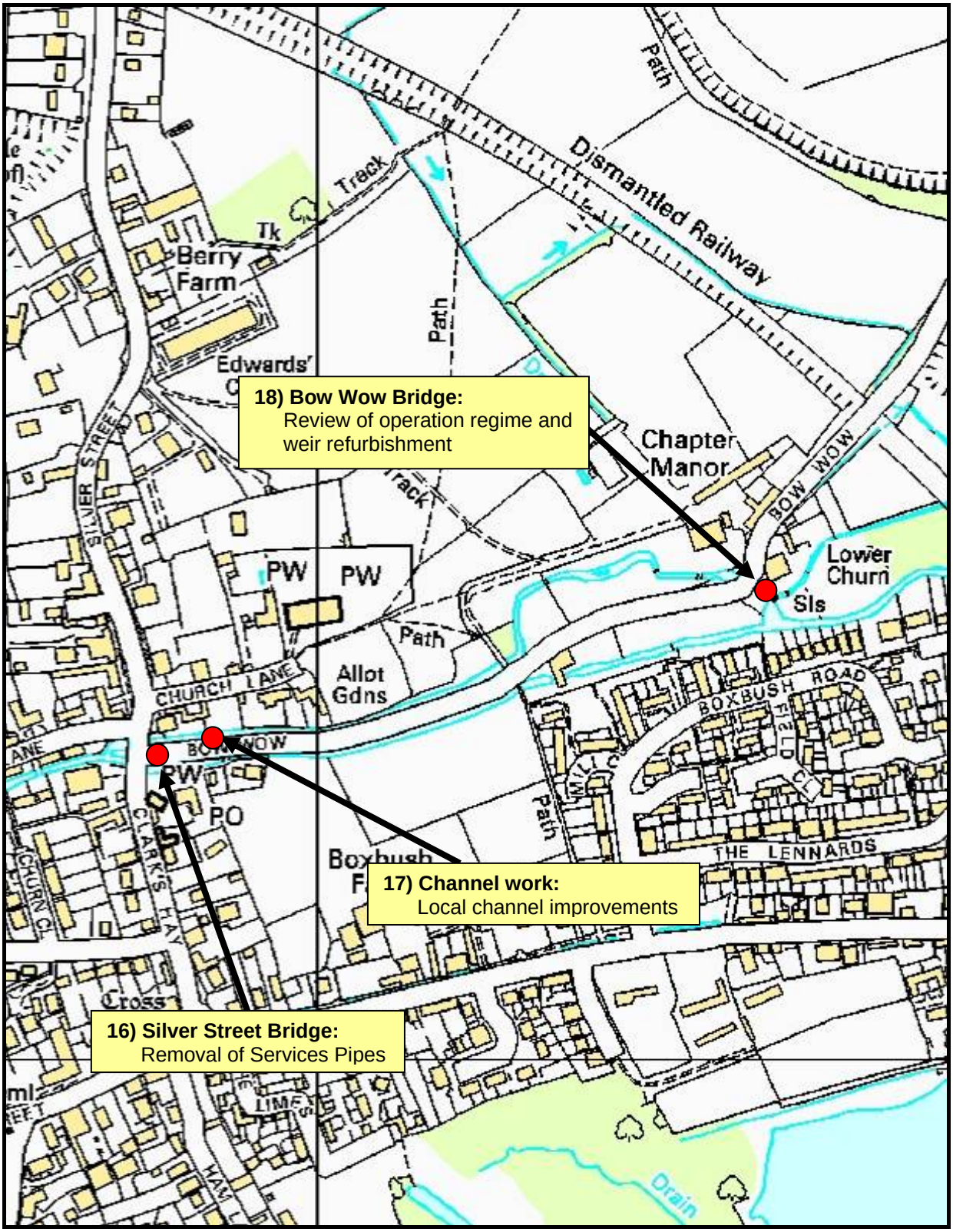


Figure 8 Cerney Wick: Local Improvements

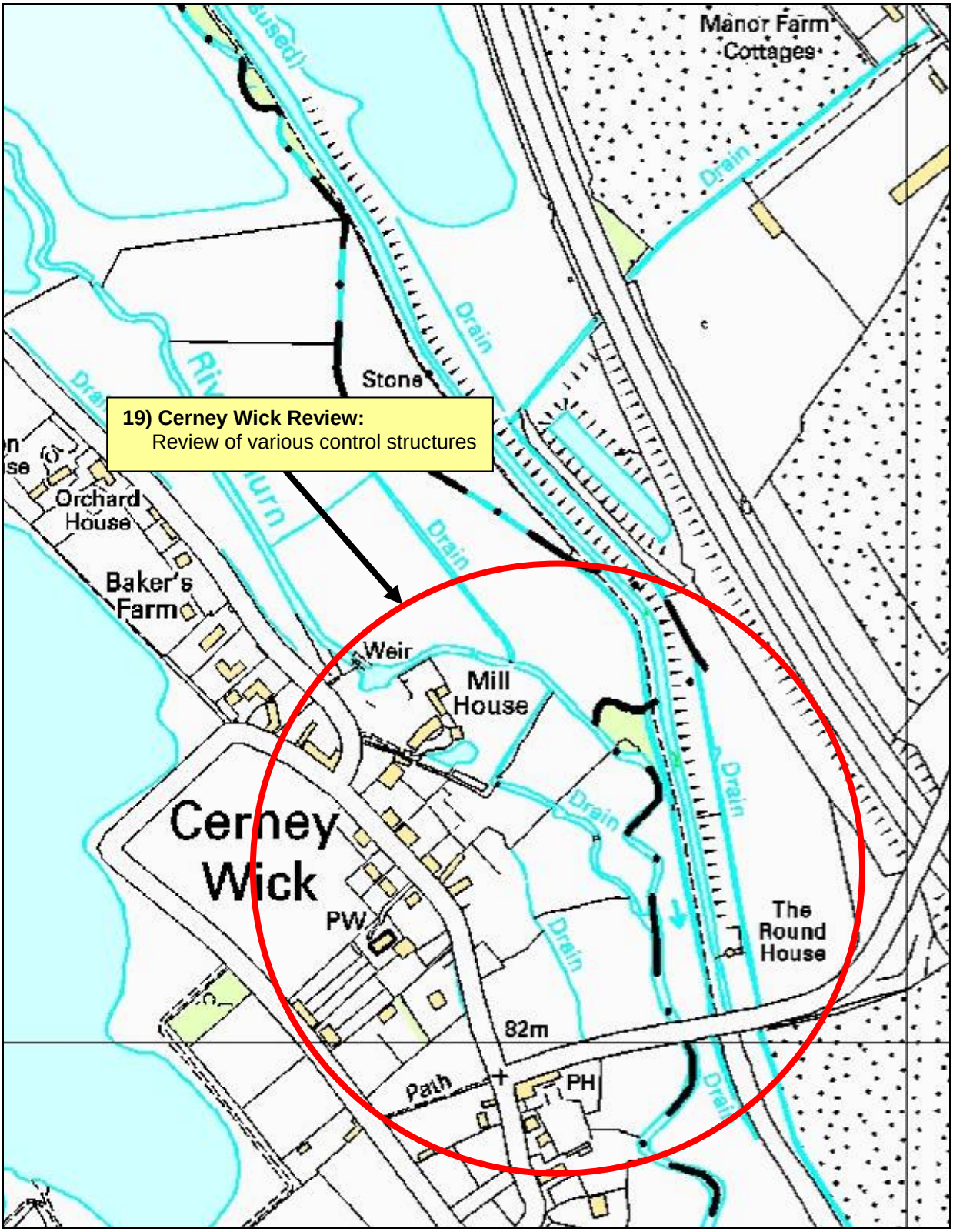
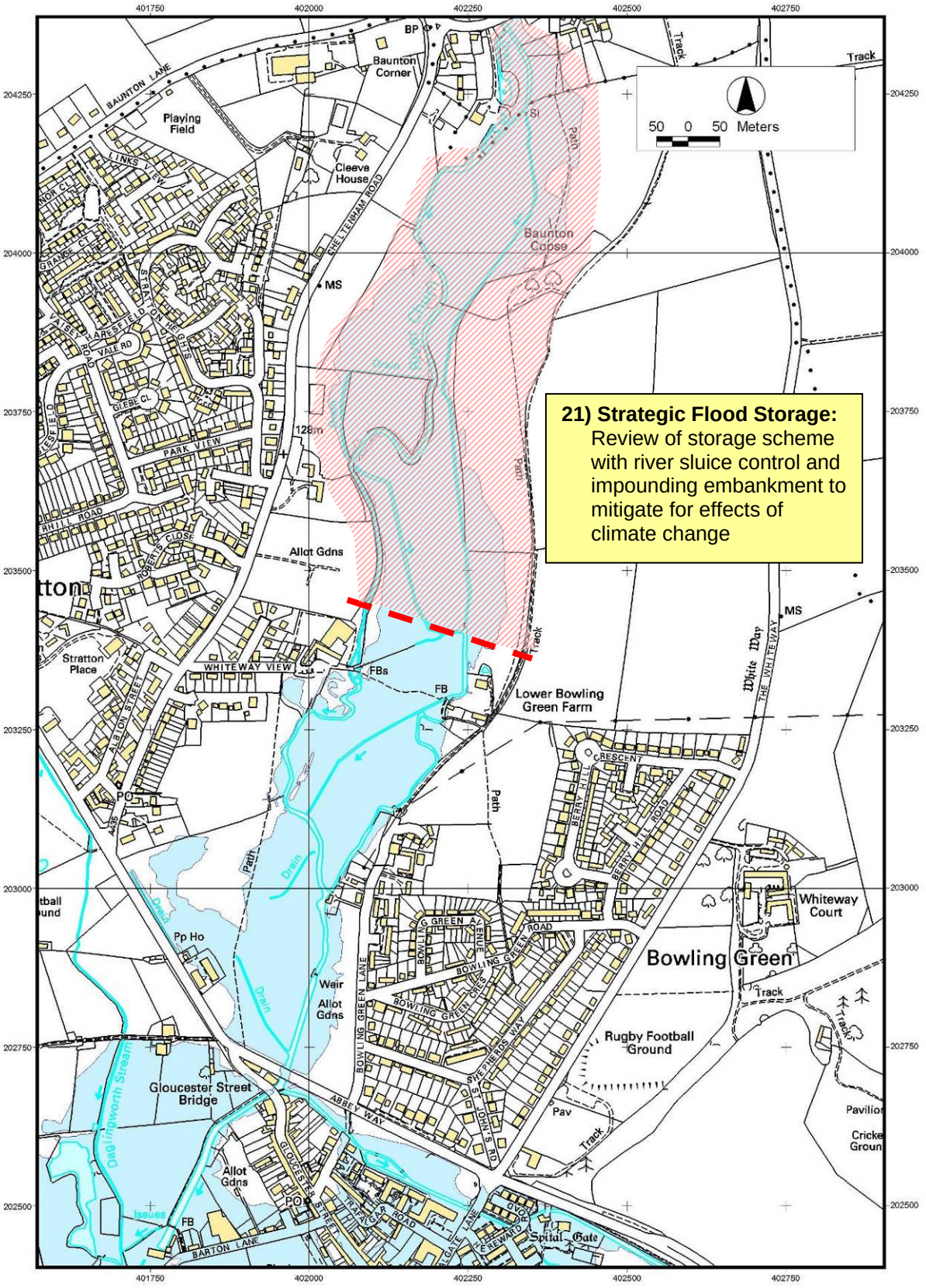


Figure 9 Strategic Flood Storage Option for Review in Medium/LongTerm – Cirencester



9. Opportunities for Partnerships

Flood risk management is generally beyond the scope of any one organisation. We therefore discussed and agreed the Strategy Plan with local authorities and Thames Water, and all are committed to local drainage improvements which have already started.

We identified specific opportunities for partnerships, particularly for environmental enhancements, with:

- Cotswold Water Park
- Cotswold District Council

River Churn, Cirencester:
River control structure that controls the flow into the main river and side channel upstream of town.

10. Delivering the Strategy Plan

Delivering the Strategy Plan will involve, amongst other things, the following;

- Promoting operation and maintenance programmes.
- Local improvements to the river system.
- Improved flood forecasting and warning.
- Improved response to flooding.

It will involve several lead and partner organisations and interested parties, and to help delivery, we propose to form a Working Group.

We will act as Programme Manager for this Working Group to oversee and monitor delivery of the Strategy Plan. We are currently drawing up Terms of Reference for the Working Group.

The Strategy Plan structural measures (see pages 10-12) summarise the physical work recommended to reduce the flood risk to Cirencester and the surrounding areas, split into the short, medium and long term measures. The work will be allocated between the various potential partners with the Environment Agency taking the lead. Current operation and maintenance activities will also continue.

We will further review each of the Strategy Plan proposals to ensure they are 'fit for purpose' before implementing. This is important as our knowledge of the flood risk increases over time. However, it might mean that in some cases the proposals change or become redundant.

Funding

Any money we wish to spend on implementing our options has to be bid for in competition with other schemes, both nationally and locally. We have to prioritise schemes so that money goes to the areas of greatest need.

11. Advice to the public at risk from flooding

We can issue flood warnings to reduce the impact of flooding, by allowing people time to take effective action. We aim to give a minimum of two hours warning where possible.

To find out if a property is at risk from flooding, you can either visit our **website** or phone our **Floodline** service and speak to the operator.

There are actions that you can take which could reduce the stress and damage that flooding can cause. Where feasible, we can provide a flood warning service to properties at risk from flooding from rivers. This is a free service and you can register by visiting our **website** or phoning our **Floodline** service.

You may register several telephone numbers that will be sent pre-recorded flood warning messages, if a warning is issued for that particular area. The same warnings are also sent to the relevant local authorities, emergency services, utility companies and the media.

When flood warnings are issued, we advise you to phone our **Floodline** service to listen to local river level information and forecasts.

Floodline offers three options:

- Option 1 – to listen to local flooding information, then enter the **Quickdial** number for the Churn catchment which is **0112332**.
- Option 2 – to listen to road and travel information.
- Option 3 – to talk to an operator for further advice.

We have produced the following leaflets on what to do before, during and after a flood: *Damage Limitation* and *Flood Products*, which offer practical advice on measures that can be taken to minimise the damage caused by flooding; *After a Flood,* which contains advice on how to clean up and restore a home following a flood.

These leaflets can be either viewed on our **website** or requested via our **Floodline** service.

If you have experienced flooding, it is important that you inform us. You can do this by phoning our **Floodline** service and asking to be put through to Thames Region, West Area Flood Incident Management team.

Our **website: www.environment-agency.gov.uk**

Our 24 hour **Floodline** service: **0845 988 1188**