Cirencester Sluice Gates
Background and Operational Information

1. Introduction

1.1 Stream and river flow of water through Cirencester can be manually controlled by the operation of sluice gates. The operation of these gates is undertaken by riparian landowners. A riparian landowner is where a water course runs through, or adjacent to, someone's land. The Town Council is one such landowner.

1.2 This document outlines the original purpose of the sluice gates and the way in which the Town Council's sluice gates are operated and under what conditions they are operated to manage the flow of water through Cirencester. This document should be read in conjunction with the quick guide which provides an operational overview of how and when the sluice gates are operated.

1.3 The background and quick guide documents are based on current operational practice and take account of consultation with local community groups, stakeholders and partners, as well as improvement works which the Environment Agency has carried out as part of the River Churn Flood Risk Management Strategy and the on-site training and review undertaken in the Spring of 2022.

1.4 Mitigating the risk of flooding, responding in an emergency and ensuring the sufficient flow and environmental condition of the water, falls within the role and remit of various statutory bodies:

1.4.1 The Environment Agency (EA) is responsible for main river flood issues. They are responsible for managing flooding and flood prevention in those water courses. The EA is an executive, non-departmental public body which works to create better places for people and wildlife and supports sustainable development. It is the principal flood risk management operating authority. It has the power (but not the legal obligation) to manage flood risk from designated main rivers and the sea.

1.4.2 Thames Water is the water provider for Cirencester and is responsible for the local sewer system and any flooding that may affect the sewers.

1.4.3 Gloucestershire County Council is responsible for strategic flood risk assessment across the County, including Cirencester and the Cotswold district. As the lead flood authority for the area, the County Council is responsible for:

- investigating and reporting flooding incidents;
- managing flood risk from surface water, groundwater and ordinary 'non-main' watercourses;
- producing a local flood risk management strategy;
- consenting works on ordinary water courses.

Whilst the County Council is legally responsible, the authority for consenting and enforcement of the Land Drainage Act has been delegated to the district councils' flood risk management teams enforcing works to maintain the flow on ordinary water courses.

1.4.4 Cotswold District Council (CDC) is the local authority which provides emergency response in the event of flooding; CDC is part of the Gloucestershire Local Resilience Forum which provides a multi-agency response to major emergencies in the county.

1.4.5 Cirencester Town Council (CTC) operates the sluice gates at Gloucester Street and Gumstool Brook; CTC also provides support to, and liaises with, CDC in the event of an emergency and provides resources at a local level.

1.5 In addition, there are local community groups and non-statutory organisations who provide support, advice and information:

1.5.1 Farming Wildlife Advisory Group provides independent environmental advice to the farming community, building a reputation for its ethical ethos and stewardship schemes which deliver environmental benefits to farmland.

1.5.2 Friends of Gumstool Brook is a group of local people interested in Cirencester's Gumstool Brook and its associated streams – all connected to the River Churn in one way or another. Founded in 2013 'The Friends of the Gumstool Brook and associated waterways' was set up in response to deteriorating environmental and water conditions, especially with the growing phenomenon of a summer 'drying up' and occasional flooding of the Gumstool waterways.

1.5.3 Churn Catchment Flood Prevention Group was set up as a continuation of a Flood Action Group. The aim is to put pressure on agencies and authorities to ensure those living within the Churn River catchment do not have to endure the hardship of flooding in the future.

1.6 Private Operators

There are two private operators of sluice gates in Cirencester:

1.6.1 Bathurst Estate (Barton Mill)

1.6.2 Old Mill House (New Mill)

1.7 The Memorandum of Understanding quick guide is the operational document used by the Town Council in operating the sluice gates. It is reviewed annually to ensure it is fit for purpose. It is important to note that officers will only deviate from the operational guidance outlined in this Memorandum, if directed to do so in an emergency by the flood authority or Environment Agency.

1.8 In situations of high-water levels and/or risk of flooding, the Town Council is not lawfully able to close the sluices gates to reduce the water flow and risk of flooding downstream, as it could be legally liable for upstream impact.

1.9 The operational guidance in this Memorandum will only be amended, if approved by the statutory agencies listed in 1.4. Any recommended changes to the operation of the sluice gates, as outlined in this Memorandum, must be formally considered by the Cirencester Flood Agency Group before being considered by the Town Council.

1.10 It is acknowledged that weather fluctuations, ground water table, changes in land use and maintenance/improvements to local infrastructure all have an impact and vital that the Memorandum of Operation is used and reviewed as a 'living' document which can respond to changing circumstances.

2. The Purpose of the Sluice Gates and Other Factors

2.1 The two sluice gates at Barton Mill and New Mill were originally designed to control water to power the two mills when in operation. The Gloucester Street sluice was designed to divert The Churn into the Barton Mill Pond to power Barton Mill.

2.2 Since the mills ceased to be operational, the purpose of the sluice gates has been to maintain water levels for the environmental benefit and to manage the flow of water through Cirencester.

2.3 Other factors affecting the flow and level of water are the various culverts situated along the water courses in Cirencester; in times of high levels of water they served to divert water into local flood plains. However, some were blocked up decades ago during times of drought to retain as much water as possible in the water courses.

2.4 There are many watercourses which are not visible or easily accessible which flow under streets and houses through Cirencester; with historic properties being built with flood cellars. Over time some of these cellars have been blocked up and used for other purposes.

3. Flow of the River Churn

3.1 The River Churn flows to the sluice gates at Gloucester Street, which split the flow of the water into two main routes.

Route 1: The main river that flows through the Jack Gardner, the Abbey Grounds, the rear of Beeches Road and Beeches Wood, under the Tesco roundabout and past the picnic area and Tesco's.

Route 2: The Mill Pond that joins the Daglingworth Stream (locally known as Gumstool Brook) just above the Swimming Pool and flows through the culvert into the Abbey Grounds, into The Waterloo, under London Road, Beeches Car Park, Victoria Road school field, City Bank Playing fields, under City Bank View and around the Watermoor Point (formerly Mitsubishi) site meeting up with the main river prior to flowing under the bypass to the Picnic area.

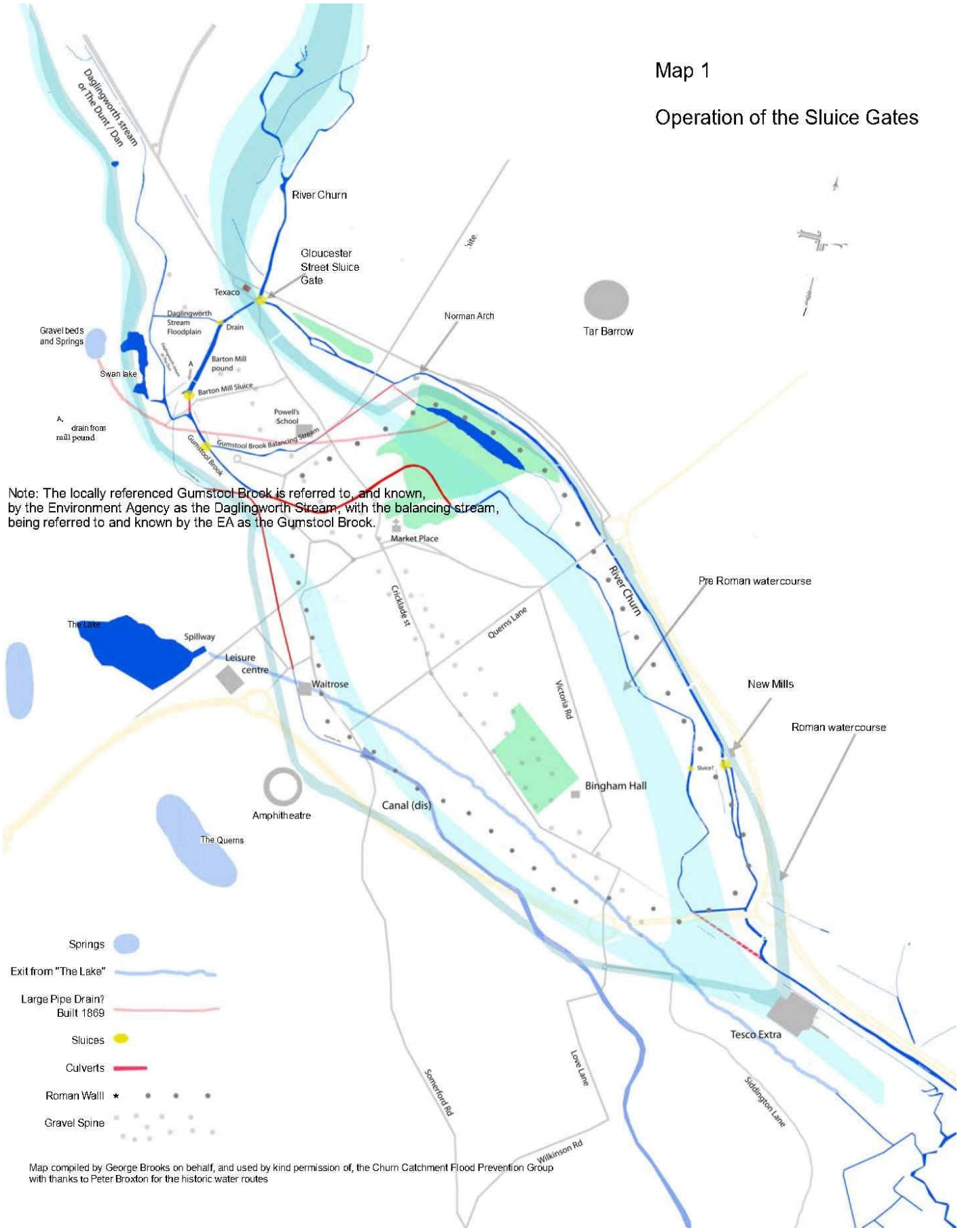
3.2 The stretch of water from Barton Lane to Thomas Street, fed from the Daglingworth Stream, and the Barton Mill Pound is locally known as Gumstool Brook. The offtake which flows along the back of The Mead to Powell's School is referred to as the balancing stream. From the school it flows through a culvert to meet with the River Churn at Hereward Road. At this point it is the feed to the Abbey Lake. The outflow from the lake flows through Corinium Gate to meet with the flow from the swimming pool culvert at the Waterloo.

4. Sluice Gate Location

4.1 The main sluice gates are at Gloucester Street and are operated by Cirencester Town Council, as shown in the maps below. At this location there is one large gate and two small gates which are operated according to the level of water, measured by a numeric gauge.

Map 1

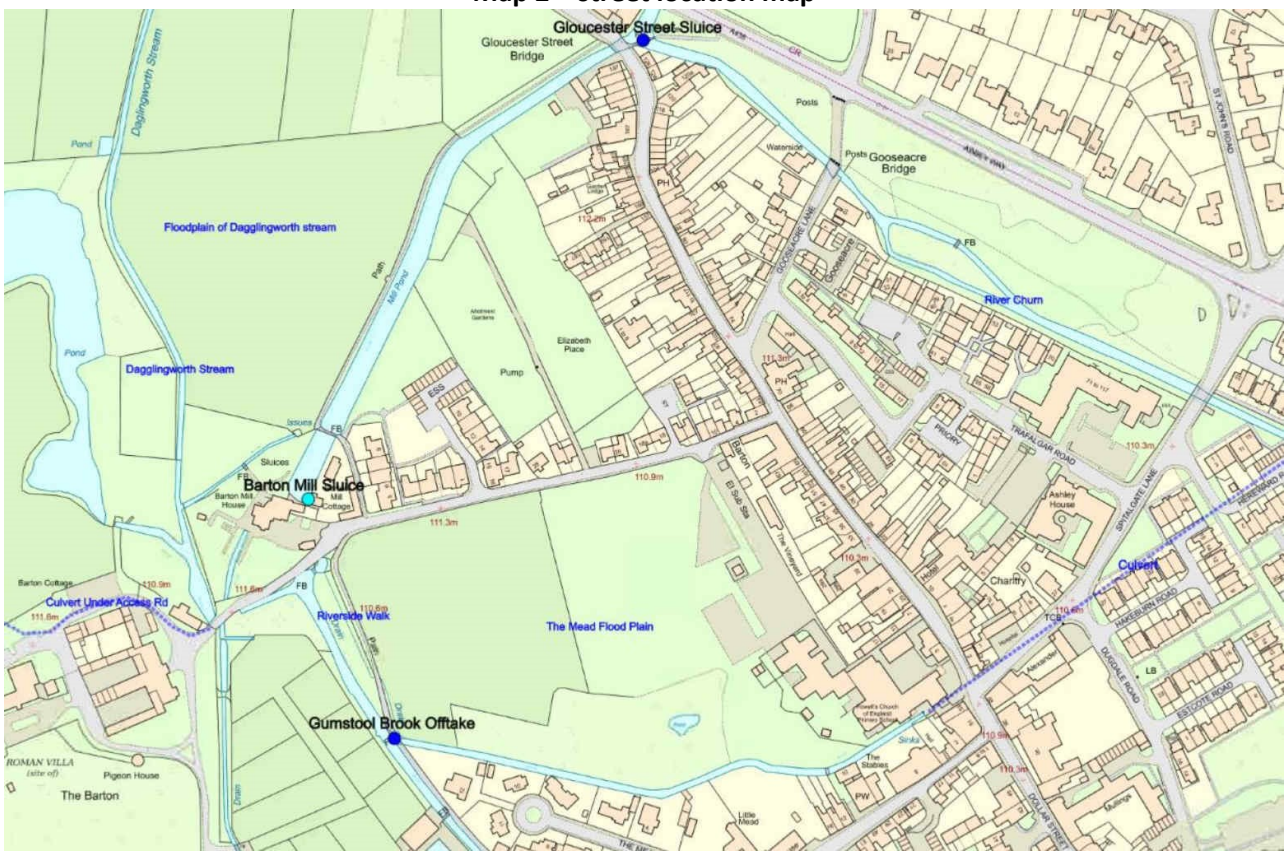
Operation of the Sluice Gates



Note: The locally referenced Gumstool Brook is referred to, and known, by the Environment Agency as the Daglingworth Stream, with the balancing stream, being referred to and known by the EA as the Gumstool Brook.

Map compiled by George Brooks on behalf, and used by kind permission of, the Churn Catchment Flood Prevention Group with thanks to Peter Broxton for the historic water routes

Map 2 – street location map



4.2 There are three other sets of sluice gates:

- Daglingworth Stream (Gumstool Brook) offtake, operated by the Town Council controlling flow alongside Powell's School;
- Barton Mill, Mill Pond, operated by the Bathurst Estate;
- Old Mill House, City Bank, operated by a private landowner.

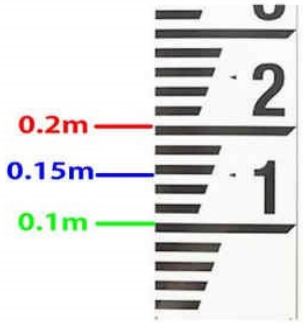
5. Sluice Gate Operation

5.1 The water level at the Gloucester Street and Gumstool Brook sluices will be checked weekly by the Town Council's Land and Property Team when the water level rises above 0.15 on the Gloucester Street gauge. This is visually and using online data provided by the Environment Agency: https://check-for-flooding.service.gov.uk/river-and-sea-levels?q=Cirencester

5.2 Adjustments to the sluices are to be made according to the level of water, and other sluice gate operators notified, in accordance with the table below:

Gloucester Street	Large Gate	Small Gates	Monitoring	Communication
at or below 0.1	Fully Closed	Fully Open	Weekly	Advise New Mill Owner and Bathurst Estate when large gate fully closed
at or above 0.2	Gradually Open to keep level at or below 0.2 until Fully Open	Fully Open	Daily	New Mill – inform the owner of each large gate adjustment Barton Mill – inform Bathurst Estate when large gate fully open
fallen to, or below, 0.15	Close Gradually	Fully Open	Weekly	None

5.3 The water level gauge is situated at Gloucester Street bridge and is monitored using the gauge guide information as below:



5.4 **Gloucester Street – Water Level Gauge at or under 0.1m**

When the water level is at, or under, 0.1m the large gate will be fully closed and the two small gates fully open. The water level will be monitored weekly.

5.5 **Gloucester Street – Water Level Gauge at or above 0.2m**

When the water level is at, or above, 0.2m the large gate will be gradually opened to keep the water level at or below 0.2 until fully open. The water level will be monitored daily.

The owner of the New Mill, City Bank, sluice gate will be notified of each gate movement and when fully open the Bathurst Estate will be informed.

5.6 **Gloucester Street – Water Level Gauge fallen to, and or below, 0.15m**

When the water level has fallen to, and or is below, 0.15m the large sluice gate will be gradually closed until the water level falls to and or is below 0.1m. The water level will be monitored weekly. At, or below, 0.1m the large sluice gate is fully closed. The owner of New Mill and the Bathurst Estate will be notified when the large gate is fully closed.

5.7 **Daglingworth Stream (Gumstool Brook) Offtake**

The offtake sluice on the Daglingworth Stream (denoted on Map 1 and known locally as the Gumstool Brook), is only opened in stages if rising water levels start to flood the public footpath and only if water levels along the Mead Flood Plain (denoted on Map 1 as the Gumstool Brook Balancing Stream) are lower than that in the Daglingworth Stream.

When the sluice gate is gradually opened, inform the owner of the New Mill, City Bank, sluice as opening will increase flow to the Churn and Hereward Road. When water levels start to fall gradually close the sluice gate until it reaches the top of the 'V' notch, as shown in the picture below:

5.8 **New Mill, City Bank**

This sluice gate is privately monitored and operated by the owner and at full flow, i.e. when the Gloucester Street sluice gate is at or above 0.2m, will be opened gradually until fully open in order to maintain appropriate levels of water. If it is not opened, it will flood the Mill House and Beeches Road, but not as far back as the Abbey. This advice is subject to guidance from the Environment Agency which may be given from time to time independently of this memorandum of operation in an emergency. In the event of an emergency and the private owner not being able to operate the sluice gate themself the Town Council will operate the sluice gate with the permission of the owner.

5.9 **Barton Mill**

This sluice gate is privately monitored and operated by the Bathurst Estate; if it is not operated in response to increases in flow in the Mill Pond there is a risk of flooding of the footpath. Recent work undertaken by the Environment Agency has reduced the risk of flooding at Mill Place. The Agency has installed a gauge close to the gate so that the owner can now easily check the levels. This and the additional information are subject to guidance from the Environment Agency which may be given from time to time independently of this memorandum of operation in an emergency. In the event of an emergency and the private owner not being able to operate the sluice gate themselves the Town Council will operate the sluice gate with the permission of the owner.

5.10 **Barton Mill – Additional Information**

Under low flow conditions in the River Churn the two sluices at Barton Mill should be closed thus retaining a head of water in the Barton Mill channel.

When flows in the River Churn increase and water levels in the Barton Mill channel start to rise, the partial opening of a gate at the mill would establish an increased sweetening flow along the Barton Mill channel.

Maintaining a constant water level in the channel is difficult to achieve with an undershot gate and is likely that frequent gate adjustment will be required.

When the Gloucester Street sluices are fully open and water levels are rising, the Town Council will contact the Bathurst Estate.

When the reading on the gauge board at the mill reaches 111.30m, one gate should be opened by 150mm (100mm if the height of one or both gates have been reduced). This configuration approximates to the condition of the sluices as used for all return periods in the recently revised mathematical model.

If water levels continue to rise there is a risk that the grounds of the Mill House will flood via the sill of the disused sluice situated opposite the main sluice gates. This risk can be reduced by either opening the gates further when the reading on the gauge board reaches 111.30m or by blocking off the disused sluice or raising the sill.

Assuming that the disused sluice is blocked off and one main sluice gate is open 150mm or 100mm as noted above, water levels could be allowed to rise to the predicted 1 in 30-year level of 111.64m as recorded on the gauge board.

If water levels continue to rise, consideration can be given to opening the sluice gates further or taking no action and allowing water levels to continue to rise. Eventually water will overtop the right bank footpath to spill into the flood plain of the Daglingworth Stream. Water exiting from the flood plain is controlled by a culvert under the access road to the estate and thus restricts flow passing down to the Mead and Corinium Gate.

If, despite allowing water to overtop the footpath, the reading on the gauge board reaches 111.80m there is a risk that water will overtop the left bank and flood Barclay Court. In this situation consideration will need to be given to opening the sluice gates further to try to prevent the water level from rising above 111.90m. At this level water will be spilling over the right bank footpath to a maximum depth of approx. 150mm.

5.11 **Abbey Grounds Dam Boards**

This structure is operated by the Town Council and controls water levels in the Abbey Grounds lake. The structure is not operated unless the water level in the lake needs to be lowered for inspection, maintenance or emergency reasons.

5.12 Due to the rate of flow through the main gates at Gloucester Road, when the level is above 0.2m Cirencester Town Council will also regularly check the levels at the Barton Mill, Mill Pond and New Mill, City Bank.

5.13 To assist with the prompt and effective operation of the sluice gates advice and information is obtained via BBC weather forecasts, the Met Office and Environment Agency flood warnings; this information is monitored by the Town Council's Land and Property Manager and senior management team.

6. Routine Maintenance

The Town Council's Land and Property Team check the course of the river, monthly, for obstructions and ensure that the grids at the culverts and lake are kept clear. During the Autumn and Winter the Land and Property Team cut back vegetation on the river banks within its own land ownership, including areas around the Mill Pond. The Environment Agency clears the trash screen at Thomas Street using the Agency's permissive powers.

7. Local Knowledge and Information

7.1 The River Churn can back up into the Jack Gardner area of open space and gets close to the properties on Trafalgar Road which are adjacent to the Jack Gardner open space. It can also flood across the Beeches Road, spreading out at the City Bank sluice and floods again at the Kingsmeadow picnic site.

7.2 Mill Place has flooded on one occasion when the Barton Mill sluices were not opened sufficiently.

7.3 Water levels in the Gumstool Brook, as it passes along the back of the Mead and down to Powell's School are determined by levels in the River Churn, which backs up from Hereward Road, and flow taken from the Daglingworth Stream.

7.4 In most conditions, flow from the Daglingworth Stream is controlled by the new sluice. In very low flow conditions no flow is taken from the Daglingworth Stream. As water levels increase flow will pass into the Daglingworth Stream (locally known Gumstool Brook) over a V notch plate fixed to the sluice. Flow through the sluice can be cut off at any time if required leaving back up from the River Churn to determine levels in the Gumstool Brook (Balancing Stream). (see Map 1 and Map 2 for local terminology).

7.5 Back up from the River Churn can be partially controlled by limiting flow passing through Gloucester Street Sluices. However, this action will have the effect of diverting additional flow into them Daglingworth Stream via Barton Mill and raising water levels in the stream. (see Map 1 and Map 2 for local terminology).

7.6 At high waters levels the new sluice can be bypassed via a ditch which runs along the public footpath from Barton Mill to discharge into the Daglingworth Stream (locally known as Gumstool Brook) immediately downstream of the new sluice. The possibility of closing off this ditch is being considered by the Agency.

7.7 It should be noted that at times of flooding, the responsibility of the Town Council is to ensure that water flows through land in its ownership without restriction. It therefore follows that the same responsibility falls on riparian owners throughout the length of the river. The legal position is that sluice gate operators cannot hold water back during times of high flow and potentially flood at that point – the water must be allowed to flow through at the potential risk of flooding 'downstream'. The rights and responsibilities of riparian owners are enforced through the Land Drainage Act 1991, Water Resources Act 1991 and Public Health Act 1936.

7.8 At times of low flow, i.e. drought conditions, the current advice from the Environment Agency is that flow from the River Churn should not be diverted to increase the natural flow in the Daglingworth Stream – the impact on local biodiversity and habitats is noted at these times and should this advice change at any time then the Town Council will amend the operation of its sluices.

8. Emergency Planning

8.1 In its role in providing local leadership, for and on behalf of the people and place of Cirencester, it is important that the Town Council provides advice and support in building resilience against the impact of an emergency or disaster.

8.2 Advice and support can be provided so that planned actions are undertaken before and during an emergency or disaster which in turn minimises the impact on the community and in helping the local community to recover more quickly after an event.

8.3 Building resilience within the community will assist in identifying local needs and priorities arising from an emergency/disaster.

8.4 The importance of flood related issues is noted by the Town Council and as such, flooding and emergency response falls within the remit of the Land and Property Group.

8.5 Gloucestershire County Council's Local Flood Risk Management Strategy (LFRMS) was adopted in 2014. It identified the extent of flooding in Gloucestershire, established priorities for managing flooding, and how GCC will work together with Risk Management Authorities (RMAs), other stakeholders, and local communities to manage flood risk.

8.6 In line with statutory obligations, the Strategy focuses on flooding from surface runoff, groundwater and ordinary watercourses, whilst considering the linkages with other sources of flooding. As part of the County Council's leadership role, GCC has identified flood risk which is the operational responsibility of other organisations and will continue to work closely in partnership to support reduction in flood risk across the county irrespective of source.

9. Useful Documents and Information

https://gumstool.org.uk/links/

Emergency Out of Hours: 01285 623000

www.cotswold.gov.uk/environment/flooding

www.cotswold.gov.uk/environment/flooding/flood-reports-and-reviews

www.cirencester.gov.uk/community-response-latest-news-1

https://check-for-flooding.service.gov.uk/river-and-sea-levels

www.environment-agency.gov.uk/homeandleisure/floods

www.gloucestershire.gov.uk/planning-and-environment/flood-risk-management/flood-guide

www.thameswater.co.uk/help/emergencies/flooding

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Bingham House, No. 1 Dyer Street, Cirencester, Gloucestershire, GL7 2PP
T: (01285) 655646/F: (01285) 643843/E: info@cirencester.gov.uk/W: www.cirencester.gov.uk