Aylburton Flood Investigation

Location

Aylburton High Street where the Stockwell Brook is culverted under the A48, to the south of 12 High Street. As shown on the Environment Agency's flood risk maps, this location is in flood zone 3 (Figure 2) and is at high risk from surface water flooding (Figure 3).

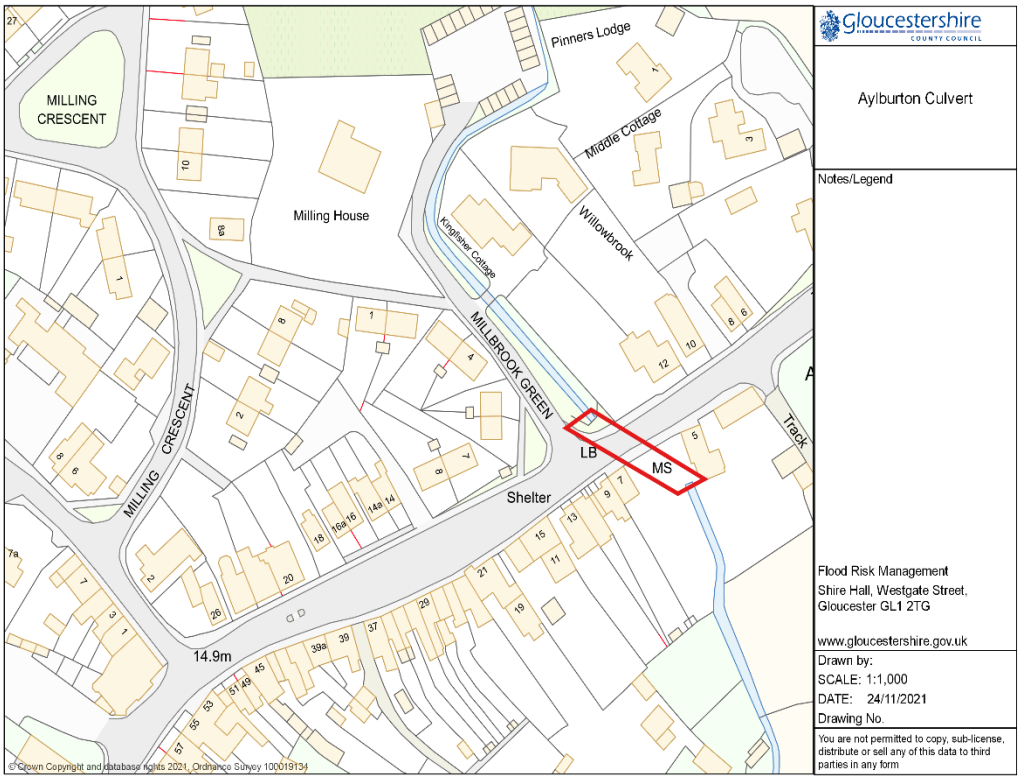

Figure 1: Map showing the location of the culvert under the A48 in Aylburton

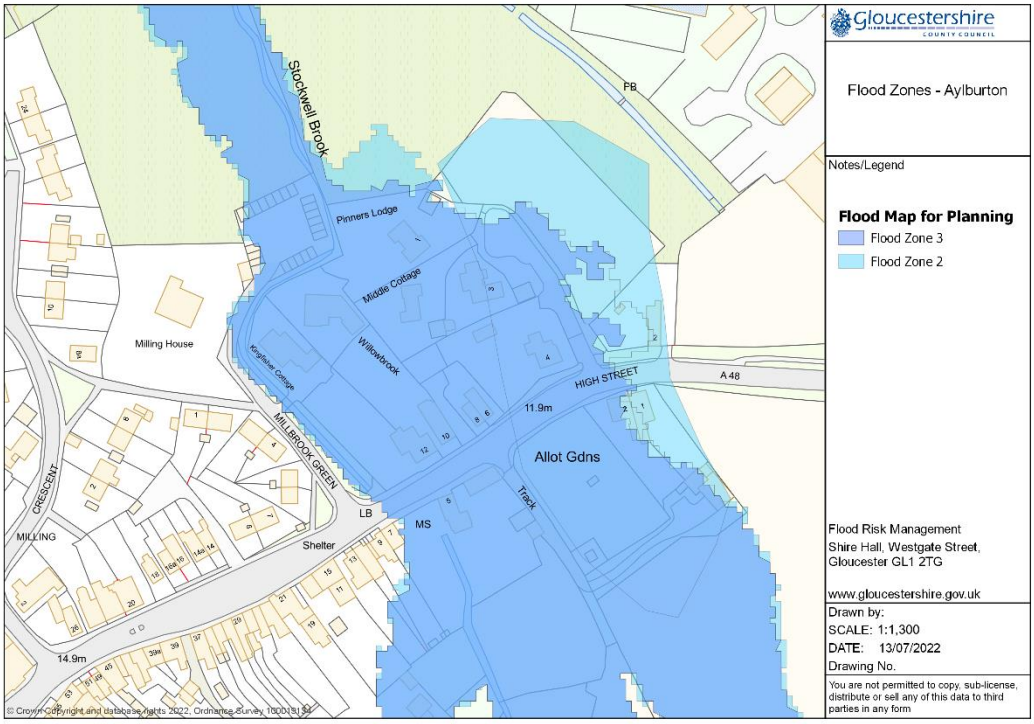

Figure 2: Flood Zones in Aylburton around the Stockwell Brook culvert.

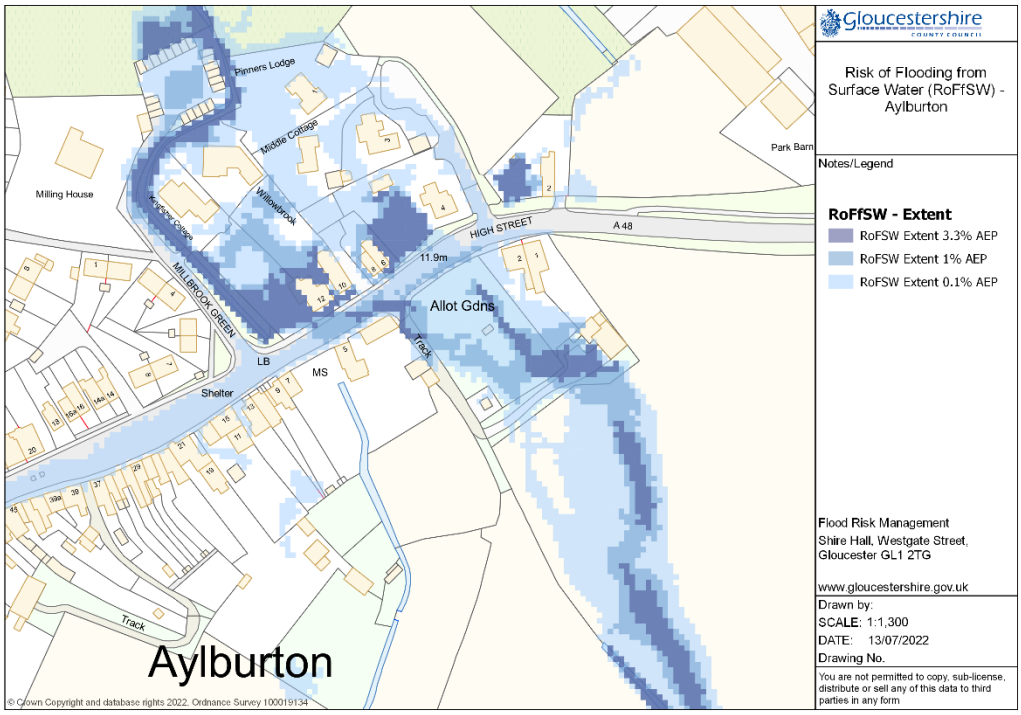

Figure 3: Map showing the Risk of Flooding from Surface Water (RoFfSW) around the Stockwell Brook culvert.

Timeline

February 2020

- 5 properties on Aylburton High Street reported flooding to Forest of Dean District Council, including 12 High Street. This property has flooded multiple times and has utilised property flood resilience (PFR) measures, however the volume of water means these measures are inadequate. From speaking to residents, Forest of Dean District Council determined that the cause of the flooding is the culvert (Figure 4) which does not have sufficient capacity to take the flows of the Stockwell Brook and highway drainage connected into it. It is thought that this culvert is at least 40 years old as it was constructed prior to the residents of No. 12 purchasing the property in the 1970s.

Figure 4: Upstream end of the culvert under the A48, Aylburton.

August 2020

- Forest of Dean District Council asked Gloucestershire County Council to investigate this further, proposing two potential solutions which the feasibility of which would need to be explored;
    a. An upsized culvert with new trash screen
    b. An additional flood relief culvert with new trash screen encompassing both culverts.

November 2020

- GCC received approval from Lead Cabinet Members for funding to pursue investigations into potential work in Aylburton.

December 2020

- Another flood event in which two properties flooding were reported to FoDDC. These properties both flooded in February 2020 too. This flood event was the largest the county had experienced since 2007.

January 2021

- A meeting was organised and attended by GCC FRM Team, GCC Highways and Forest of Dean District Council to discuss the issues surrounding the culvert in Aylburton and to share any information. Issues such as the cover level were first raised at this meeting.

April 2021

- GCC FRM Team received a quote for a feasibility study which would consider the two options suggested by FoDDC and up to two other options that the consultants may have identified. This quote was >£38000 and was out of the budget that had been agreed. Following this, further investigation was undertaken to gain a better understanding of the catchment and the issues being faced, in order to refine the options being considered.

Spring/Summer 2021

- An initial site visit allowed us to see the concerns around the cover level. A desktop exercise had also identified a possible second channel that could act as a relief channel. From speaking to local residents it was confirmed that this channel used to exist, however no longer does. The residents felt the flood risk had increased since this channel was disused. On this site visit, we could see no evidence of this channel from publicly accessible locations.
- A desktop exercise had also shown that the downstream end of the culvert discharges into a concrete lined channel that is the same size as the culvert. If the culvert were to be upsized, this would also need to be changed and the size increased which would require the agreement of the landowners. Any work to the culvert would need to ensure that flood risk was not being increased downstream or elsewhere.
- Following this, we contacted upstream landowners to gather further information about the old channel. We organised a site visit with the GCC FRM Team, FoDDC and upstream landowners to find out more about the upstream catchment and the old channel. The channel that had been identified and mentioned by local residents had not been in use since the 1980s and when it was in use it would flood land that has now been developed for residential use (Maplefields).
- Following this site visit and a subsequent visit to take measurements, it was identified that there is an opening upstream that the Brook must pass through that is currently larger than the culvert. This led to a focus on possible upstream attenuation where we could work with existing features and the natural landscape.

November 2021

- Requested a revised quote for a feasibility study which would look at the possibility of attenuating the water upstream, however this would also need land owner agreement and there are still limitations associated with this.

- Throughout the process residents had also raised concerns about the suitability of the trash screen on the culvert and this is also something we are considering. In November 2021, it was agreed with Highways that they would clear the trash screen as needed while the work in Aylburton was investigated. The condition of the watercourse downstream was also raised with GCC. This was raised with the Internal Drainage Board and clearance was undertaken at the end of 2021.

February 2022

- Undertook a site visit with Cllr Topping which allowed us to speak to a number of residents and gain a better understanding of the mechanisms involved in the flooding. This site visit was invaluable as it allowed us to better understand the scale of the flooding as not all flood events had been reported previously. For example, we were told about an additional 5 properties flooding that we were not previously aware of, 1 property that is affected by flooding and also saw evidence of at least 4 other properties that may be impacted by flooding (e.g. flood boards/sandbags). We also found out more about the frequency of flooding in Aylburton.
- We found out that our understanding of the flooding mechanism to some properties differed to what we had previously believed, highlighting the importance of this site visit. Cllr Topping also arranged for us to see the downstream end of the culvert to confirm our desktop studies as this had not previously been possible due to it being on private land. Some properties along the High Street have benefitted from the curb being raised, but not all.
- We asked for further information about the route of the old channel that a number of residents mentioned to us. Cllr Topping organised with the land owner for us to see the old route of the channel. The channel was manmade and used to supply water to the old tin plate works and paper mill. Has been filled in on LPE since the 80s, apart from one small section which now acts as storage/soakaway for surface water. Unsure of the condition downstream– seems to be issues near Bathurst Pool/A48 roundabout which might indicate the channel is blocked downstream too.
- A number of residents at the southern end of the village reported surface water flooding, often caused by runoff from the highways. Following the site visit, we had a discussion with Highways to highlight the flooding in Aylburton that is not related to the culvert and is caused by runoff. As a number of residents highlighted gully clearance, we offered to help coordinate this in the future if needed (i.e. sending letters in advance to allow better access for cleaning).

April 2022

- We had an initial meeting with upstream landowners in April to introduce the idea of slowing the flow and possible storing more water on their land and to understand if this was something we could investigate the feasibility of further.

June/July 2022

- The feedback we received from the upstream landowner in June wasn't as positive as we had hoped due to limitations with the site that the landowner does not feel can be overcome. We will be continuing these conversations to see if we can find a resolution or if there is another solution that they would be open to us investigating, however it currently appears that upstream work will not be possible.
- We received the revised quote that we had requested in November 2021, as well as a second quote from another company, for the modelling that would need to be undertaken in order for any scheme to proceed and this currently stands at c£12k. However, we do not feel it would be a good use of public money to proceed with this if the landowner is not open to the proposed interventions.

- We continue to be aware of the concerns surrounding the trash screen and have spoken to Highways about the potential of removing it in the future. This is being included in our considerations for any potential future work in the area and the removal of, or any changes to, the trash screen would likely happen at the same time as any work. However, if there is no work planned in the immediate future we have contacted Highways to look into getting the trash screen removed independently of this.

Summary of options considered

1. ***Upsizing the culvert***

Upsizing the culvert was the first option that was considered, however, a number of limitations have been identified. These included the limited cover level above the culvert and also the utilities from Severn Trent and Western Power Distribution which are under the High Street that could be limiting the size of the culvert and any potential changes. The culvert discharges into a concrete lined channel that is the same size as the culvert. If the culvert were to be upsized, this would also need to be changed and the size increased which would require the agreement of the landowners. Any work to the culvert would need to ensure that flood risk was not being increased downstream or elsewhere.

This is likely an expensive option and the cost-benefit ratio would also need to be considered.

2. Reopening the old channel

Following desktop investigations and discussions with residents in Aylburton an old channel that that has now been filled in was identified and considered as a possible relief channel. However, this channel has not been in use since the 1980s and diverted water towards Lydney as a water supply for the old tin plate works and water mill. This channel used to flood the land that has now been developed for Maplefields and there are concerns about diverting water towards Lydney which is a known flood risk area itself.

3. Upstream attenuation

The possibility of upstream attenuation was identified following our site visits over the summer of 2021. Slowing the flow of water upstream would reduce the volume of water reaching the culvert in a storm event and reduce the risk of it overtopping here. We recognise that there are still limitations that would need to be addressed, however we feel these are easier to overcome than those associated with other options. Upstream options would also likely have multiple benefits, such as ecological benefits.

This is our preferred option, however recent discussions with upstream landowners have not been as positive as we would have hoped and it is looking unlikely that we will be able to do work upstream. We will be continuing these discussions to see if a solution can be found.

4. Property Flood Resilience (PFR)

If all options above are deemed unfeasible, we could consider a community-wide PFR scheme. This would enable residents to make their properties more resilient to future flooding. However, this would not address the highway flooding that is also caused by the culvert.

Updates July 2022 – 2025

July 2022 – December 2023

As explained above, our preferred approach was to look at what could be done upstream to reduce the volume of water reaching the culvert. Following further conversations with upstream landowners, we begun to explore if there were any Natural Flood Management (NFM) opportunities. NFM works with the surrounding environment and has benefits to flood risk, water quality and biodiversity. The aim is to slow the flow so that water remains in the upper catchment for longer and reduce the peak of the flood downstream.

With support from the Environment Agency, we undertook a site visit in March 2023 and mapped some proposed locations for leaky woody dams. This proposal combined with a visit to an existing NFM project in the Stroud Valleys with the landowners in August 2023 led to the agreement for around 20 leaky woody dams to be installed upstream on Lydney Park Estate land. The remaining months of 2023 were spent agreeing what this would look like and how this would be done and getting land drainage consent in place ready to start the work in early 2024.

During these conversations with the Estate, potential upstream storage options were identified which led to Gloucestershire County Council commissioning modelling in order to better understand the current flood risk and use this model to explore potential options for reducing flood risk in Aylburton.

A survey of the watercourse was undertaken in October 2023 to collect cross sections of the watercourse and measurements of any structures which are used to build the model.

We were made aware of 1 flooding incident in May 2023. As far as we are aware, although very close, this did not result in any internal property flooding, but the Highway was impacted, and properties were externally affected.

2024

With the guidance of Stroud District Council's Stroud Valleys NFM Project Officer, work started on the installing the leaky woody dams in January 2024 and the Estate's forestry team continued this work until Spring. See photos below of completed leaky woody dams.

In the meantime, the modelling continued and by the end of 2024 the baseline model was complete and ready for validation. GCC approached the Parish Council and local landowners to provide feedback on the baseline model results in order to validate that the model reflects what happens on the ground.

GCC's FRM Team was made aware of 1 flood incident in November 2024. At the time of writing, we have 1 confirmed property report of internal flooding. However, we understand a number of properties were flooded internally in this area, but this has not yet been reflected in flood reports received.

Plans for 2025

Following the completion of the baseline model, the modelling will now move into Phase 2 which is looking at potential mitigation options. As outlined above, our preferred option has always been upstream attenuation and with the opportunities that have been identified with the Estate this will be explored further using the model.

In summer 2024, Highways informed us that old pipes had been found under the Highway towards Lydney. This would align with what has been reported about the old secondary channel that is no longer used. If further information can be found about what route this could take and where this would discharge to, this could also be modelled as another option.

Upsizing the existing culvert is not currently in our plans as it is financially unviable for the reasons as set out in the summary of options above.

Julia Hall
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Gloucestershire County Council
6th January 2025