



Slimbridge Parish Neighbourhood Development Plan

Reg 15 submission

Slimbridge Parish Flooding Report | 2023

1 Introduction

Slimbridge Parish has suffered from flooding and sewage problem for many years. The objective of this document is to summarise the context and evidence of flooding in the Parish, discuss the remedial work carried out, and identify any further actions required. It is an evidence base for Policies contained in the Slimbridge Neighbourhood Development Plan (NDP).

The evidence is drawn from the Regulation 19 representations made to the Stroud District Council's Draft Local Plan consultation in July 2021, evidence gained from the NDP questionnaire survey of Parish Residents in 2022, and many years of records collected by the Parish Council. Although they are interlinked, the discussion is broadly separated into three aspects:

- 1) Flooding from the Rivers (the Severn, Cam and Lighten brook), and the Gloucester & Sharpness Canal.
- 2) Other surface water flooding.
- 3) Sewage.

Reference 1, Stroud Strategic Flood Risk Assessment, provides further useful evidence and detail.

2 Context

Much of Slimbridge Parish is low lying and relatively flat with the water table close to the surface in some areas of the Parish. Some flooding is inevitable in low lying agricultural areas but the incidences of surface water and sewage flooding which have affected some properties are not acceptable. This has long been the subject of Parish concern with representations to the Parish Council, residents' meetings in the Village Hall, meetings with Severn Trent, Gloucestershire County Council Local Lead Flood Authority and even the involvement of the Constituency Member of Parliament.

Some remedial work has been carried out by Severn Trent on the sewerage system in Slimbridge village and by Gloucestershire County Council Highways Department on the surface drainage systems along St John's Road and Churchend. These seem to have a beneficial effect but will not benefit all properties throughout the Parish and have yet to be tested in the most severe weather conditions.

3 Residents' Views

In the initial consultation for the Neighbourhood Development Plan (March 2021) a number of questions were asked regarding flooding and sewage. The full results are contained in Appendix A, but in summary:

- Approximately a quarter of the homes were in an area susceptible to flooding, with Cambridge being worse than Slimbridge,
 - A large majority of respondents were not convinced that sufficient work has been carried out or that the infrastructure is in good condition.
- Approximately a fifth of the homes were susceptible to sewage flooding, again Cambridge was slightly worse than Slimbridge.
 - A large majority of people affected by sewage problems are not convinced that work on the sewerage system has solved the problem.

Flooding, especially with sewage, is a devastating experience with gardens covered or even coming back up through toilets. Some residents have installed non-return valves to protect their properties from the sewerage system.

4 Overview of the water and sewerage systems

4.1 Rivers and Canal

The rivers/brooks to consider are the river Severn, the river Cam and the Lighthen brook (Lighthenbrook).

The river Severn has a very high tidal range and winds/low pressure systems can generate storm surges on top of the tide. It obviously has the greatest potential for flooding, but the land has long been protected by flood defences and (apart from the WWT and New Grounds) the Gloucester & Sharpness Canal. Provided the defences are maintained in good condition, the risk should be low.

The river Cam provides drainage from the northeast of the Parish only. After the Cam has passed under the A38 at Cambridge on route to the Gloucester & Sharpness Canal it is mostly above ground level, following the old Cambridge Arm of the canal. It poses a potential flooding threat if the water should not flow freely. There is no knowledge of any dredging of the river Cam.



Figure 1 Water levels in the River Cam well above the road and properties. February 2020

Figure 1 shows the river Cam presents a significant risk of River Flooding. The Environment Agency (EA) Map (Figure 2) confirms the flood risk.

The Lighthen brook flows through the west of the Parish passing through a culvert under the A38 at Rocket Rentals then along the west of St John’s Road in an open watercourse adjoining housing. It then flows through a second culvert and resurfaces in The Close to make its way between the rows of houses, then out to open fields and under Lightenbrook Lane before joining Gilgal brook. Both culverts obviously impose a limit on the maximum flow. Anything in excess of this may result in the Lighthen brook overtopping. On the 23rd December 2020 the culvert under the A38 became blocked, possibly due to poor maintenance. The depth of water resulted in the A38 being closed for a time. When the emergency services unblocked the culvert, a large volume of water flowed down the Lighthen brook. The second culvert was unable to take all the flow which resulted in the water flowing down St John’s Road. In addition to the Lighthen brook problems a few low-lying properties in Slimbridge were flooded by water running off the saturated fields. Owing to the date, some of these properties had to be vacated over Christmas.

The Environment Agency Flood Risk for Planning (Fig 2) shows their assessment of the risk of flooding from the sea and rivers.

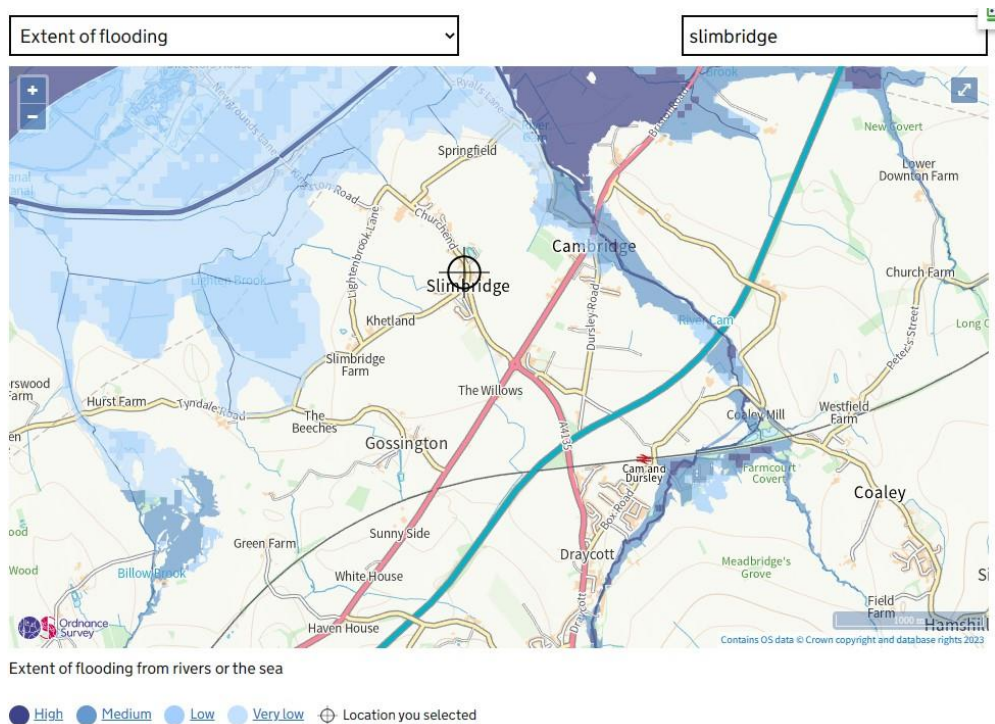


Figure 2 Environment Agency Flood Risk from the sea and rivers Map

Reference 1 notes that some overtopping of the Gloucester & Sharpness Canal has occurred when levels were high in December 2020. A flood holding area has been created between the Cam and Wickster’s Brook to manage future events.

4.2 Surface Water Flooding

4.2.1 Background

Another Environment Agency Map, Figure 3- shows a risk of surface water flooding, similar to that which occurred on the roads through Slimbridge village during heavy storms.

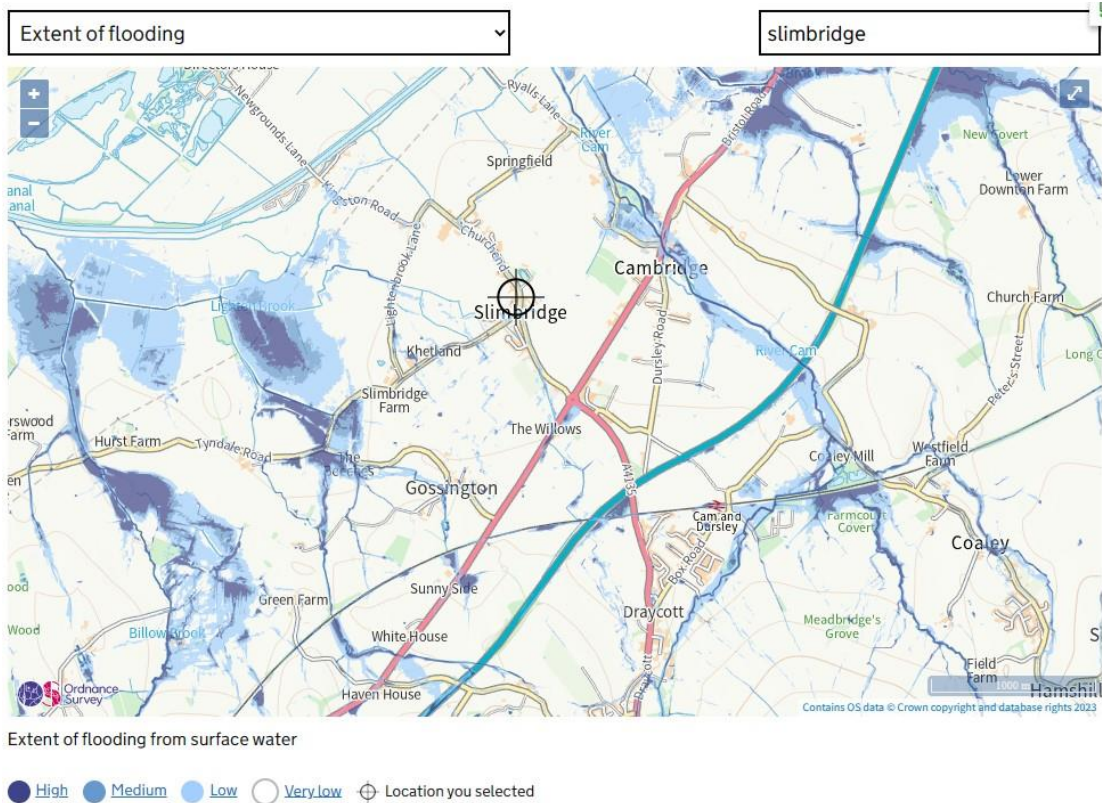


Figure 3 Environment Agency Flood Risk from Surface Water

For some years the Parish Council have been recording reported flooding instances, Figure 4 shows recorded instances of flooded roads which aligns with Figure 3.

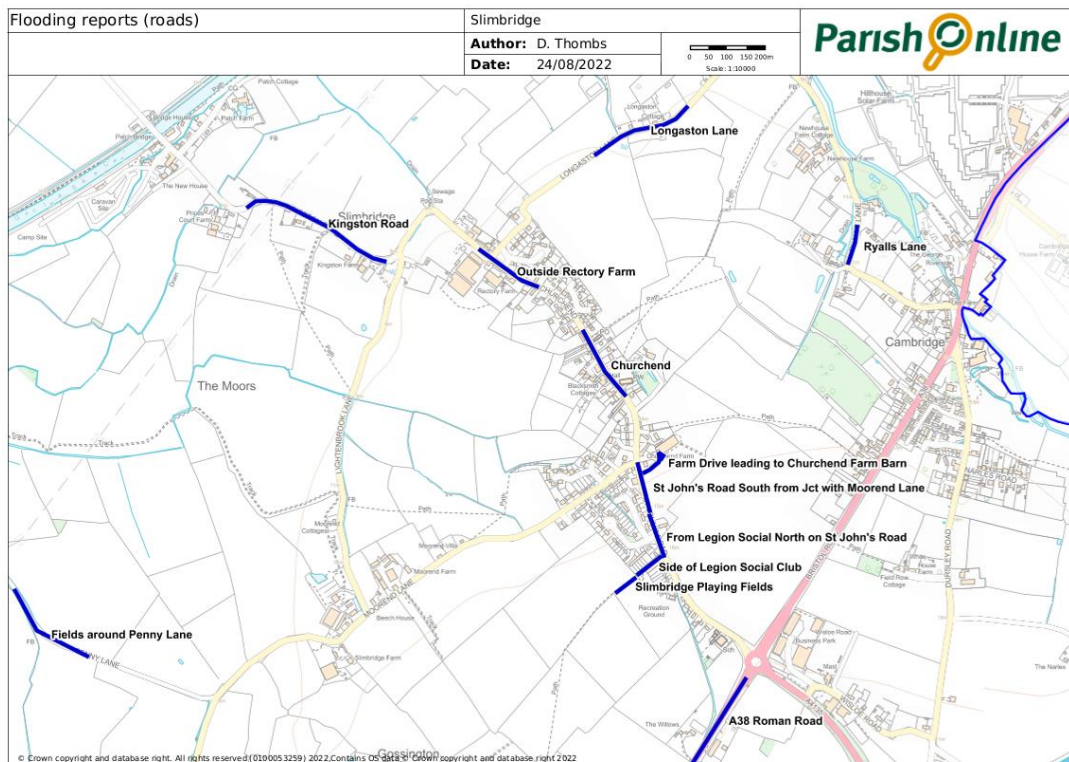


Figure 4 Recorded instances of Road Flooding



Figure 5 Flooding in Ryalls Lane February 2020. The ditch is full and cannot drain the road.

Surface water flooding occurs after prolonged periods of wet weather have raised the water table to the surface and the fields can absorb no more water. A sudden, heavy downpour at this time can cause water to run off the fields onto the roads. Examples of this run-off are shown in Figures 6 and 7.



Figure 6 Water running from the playing fields towards St John's Road.



**August 2007 Run-off from Fields behind Churchend Farmhouse
joining St John's Road near Junction with Moarend Lane**

Figure 7 Surface water running off the fields towards St John's Road.

4.2.2 Remedial Works

In 2016 Gloucestershire Highways spent £k600 improving St John's Road drainage by replacing the centuries old underground culvert with a 300mm modern drainage pipe, in the centre of Slimbridge village. The existing kerbside gulleys were reorientated to feed the new drainage pipe. It was interesting to observe how the new system coped with the standing water on the A38 in December 2020. The new system was initially overwhelmed as far as Churchend but then responded well as the road flooding throughout Slimbridge village ebbed away to nothing within an hour.

4.3 Sewage

4.3.1 Background

The sewer system covers the majority of the populated parts of Slimbridge Parish. There are gravity feeds to three pumping stations which eventually deliver sewage to the Coaley Treatment Facility.

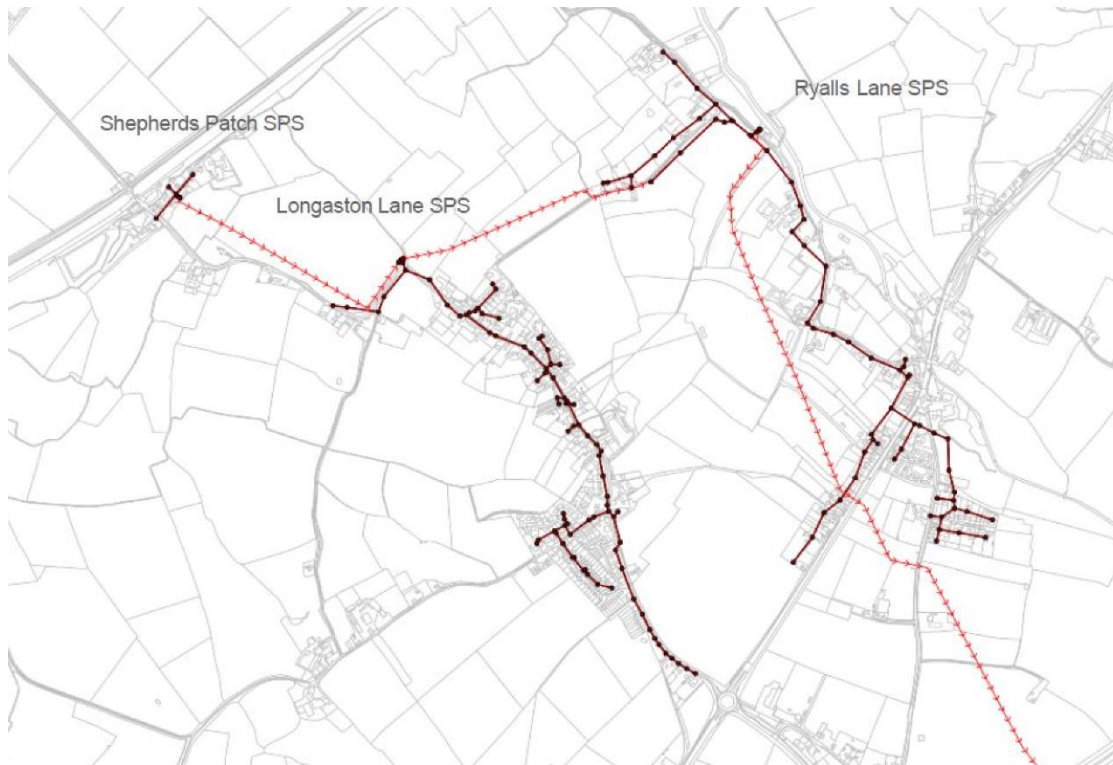
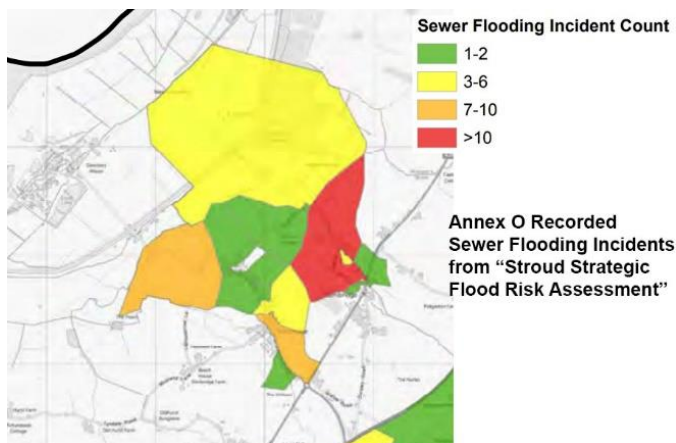


Figure 8 Schematic of Slimbridge Sewerage System



There is history of sewage flooding in Slimbridge Parish. Figure 10 shows a count of sewage flooding incidents from Severn Trent records. This map is from Appendix O (Page 139) of Reference 1. The shaded areas do not indicate the extent of flooding but just the number of incidents in a particular postcode area. The reference does not state the period over which these incidents occurred.

Figure 9 Figure O from Reference 1. Recorded instances of sewer flooding by postcode

It has already been noted that the water table is high, and water infiltrates all underground pipework. Infiltration into the sewerage system has been blamed for high flow rates during periods of exceptionally wet weather increasing the flow rates above the pipework capacity.



Figure 10 Infiltration affects all underground pipework. Here the gas main contains water.

Appendix A shows the problems were worse for Cambridge residents who have not benefitted from the remedial work discussed below. The problems will continue to be monitored.

4.3.2 Remedial works by Severn Trent

In 2018 Severn Trent spent £M1.2 firstly inspecting the sewers for evidence of damage or infiltration, and secondly trialling a new system of flood grouting the sewers¹. The aim was to reduce the rate of infiltration by 75% (ref 3). This work was limited to St John's Road and Churchend. Details can be found in references 2 and 3.



Figure 11 Severn Trent works to grout sewer pipes in St John's Road and Churchend

A second piece of work was the installation of a holding tank near the White Lion on the A38. Presumably the intention is to provide capacity in the event of a storm surge.

4.3.3 Evaluation of the remedial work

The infiltration reduction project has been reported as successfully reducing the liquid levels in the pumping station during periods of rain and restoring the daily cycle of liquid levels. This indicates the rate of infiltration has been reduced. The system has only once been tested with a large flow of surface water (December 2020) and although there was some sign of backing up initially the system coped well. There were no issues with sewage flooding in Slimbridge village.

There is no public record of any evaluation of the holding tank. This installation will not benefit residents on Dursley Road (the connection is downstream of the holding tank) nor will it benefit residents of Ryall's Lane who are downstream of the A38 and Dursley Road sewers.

4.3.4 Outstanding Sewerage Issues

The flood grouting has undoubtedly improved the infiltration level and hence the pressure in the sewers along St John's Road and Churchend during periods of heavy rainfall.

It is worth noting that the majority of properties in the parish of Slimbridge have external open trap drains feeding from kitchen sinks / washing machines etc. If surface water reaches these, the water will flow down these drains, into the sewerage system and nullify any work done to reduce infiltration. The performance needs to be further monitored during exceptionally heavy rainfall when there could be surface water flooding.

¹ Where the pipework was physically damaged the pipes were lined.

Neither the infiltration reduction nor the holding tank will help the properties along Ryalls Lane which are downstream of the holding facility and not covered by the infiltration reduction project. Some properties on Ryalls Lane still cannot use their toilets during periods of heavy rain.

4.4 Untreated discharges into the River Cam

There has recently been national scrutiny of the frequency of untreated sewage discharges into the nation's rivers. The local data for 2022 is:

Location	No of Discharges	Cumulative Hours
Coaley Sewage Treatment Works	52	599
Draycott Combined Sewage Outlet	47	224

While these facilities are outside the Parish, the discharges are into the river Cam which flows through the Parish joining the Gloucester & Sharpness Canal upstream of Shepherd's Patch before continuing down to the Bristol Waterworks intake. Although the Canal is not a recognised swimming location, it is used recreationally by paddleboarders, canoeists and fishermen. Water is also extracted by WWT.

Presumably the discharges are as a result of lack of capacity in the treatment works, and/or in the pipework from Draycott to the Coaley STW.

4.5 Planning Implications

While the Parish tries to deal with the issues it already has, it is imperative that the situation is not made worse by adding to the burden, either by:

- a) Adding to the surface water flood risk by removing fields capable of slowing down the flow of surface water and replacing them with hard surfaces with fast runoff, or:
- b) Adding to the volume of sewage at points where the system cannot cope.

It is essential that effective Sustainable Drainage Systems (SuDS) are used. Given the sparsity of reliable data, evaluation will be difficult.

5 Key Issues and Future Actions

- Incidences of flooding and sewerage problems are still a serious issue in various parts of the parish and a number of residents are not convinced that the problems have been solved.
- Available evidence indicates that the incidences of rainfall events causing flash flooding will become more severe and more frequent (Climate Change).
- Some properties remain at risk of surface flooding from waterlogged fields.
- Flood defence and watercourse management is a key requirement. Ditches, culverts and flood holding areas must be maintained in a condition to fulfil their function.
- Some properties remain at risk from sewage flooding.
- Surface water flooding into open trap household drains has the potential to nullify the infiltration project benefits.

- The Coaley Sewage Treatment Plant does not appear to have the capability to meet peak demand with the current catchment.

The proposed continuing actions are:

- 1) Continue to monitor surface water and sewage flooding reports.
- 2) Work with Severn Trent to find solutions for those properties which have not benefitted from improvements to date.
- 3) Ensure that future developments do not make flooding events more frequent or more serious.
- 4) As a longer term project, compile a schedule of riparian owners and ensure they know their responsibilities for maintaining the water management infrastructure.
- 5) Monitor the frequency of sewer discharges at Coaley and Draycott and ensure remedial work is planned at an appropriate priority.

6 References

- 1 Stroud L2 SFRA - Stage 1 Draft Report v2.0 (Nov 2019) Appendix J
https://www.stroud.gov.uk/info/Stroud_Level_2_Strategic_Flood_Risk_Assessment.pdf
- 2 Slimbridge Infiltration Case Study, [PowerPoint Presentation \(wwtonline.co.uk\)](#)
- 3 Slimbridge Infiltration Reduction 2019, [Slimbridge Infiltration Reduction \(2019\) | Water Projects \(waterprojectsonline.com\)](#)

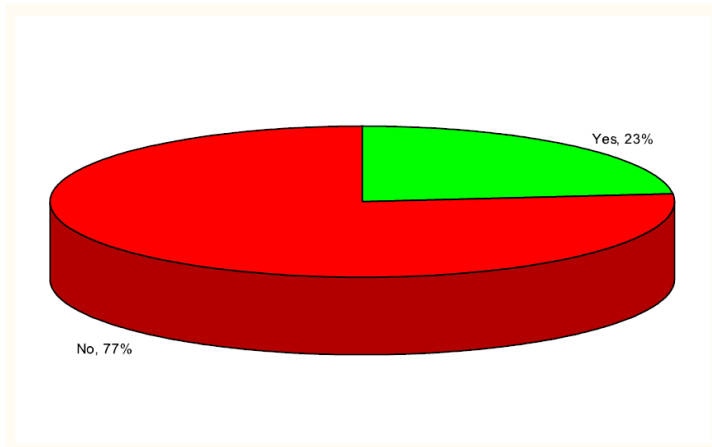
Annex A Slimbridge Residents response to NDP Questionnaire 2022

There were 244 responses from 212 households.

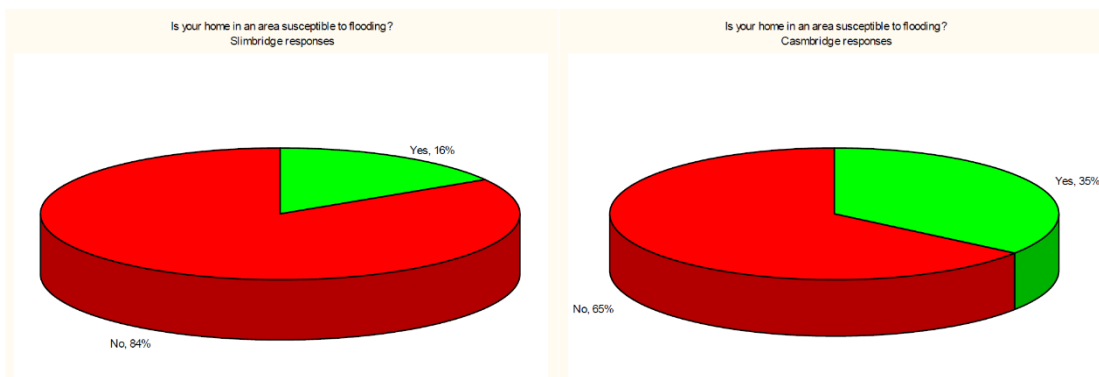
Q69 Is your home or business in an area susceptible to flooding?

Question 69 Is your home or business is in an area susceptible to flooding?

Category	Count
Yes	56
No	184
Missing	4



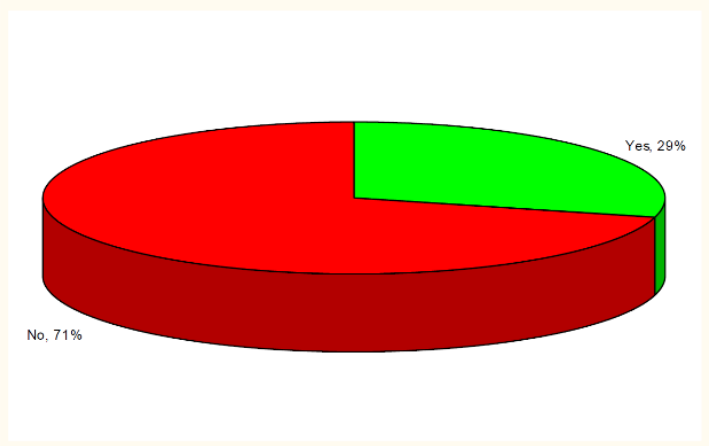
Almost a quarter of the houses in the Parish are susceptible to flooding with Cambridge being far worse affected than Slimbridge



Q70 Are you satisfied that sufficient work has been completed on flood defences to secure it from further flooding?

Question 70 Are you satisfied that sufficient work has been completed on flood defences to secure it from further flooding? [Choice]

Category	Count
Yes	16
No	39
Missing	1

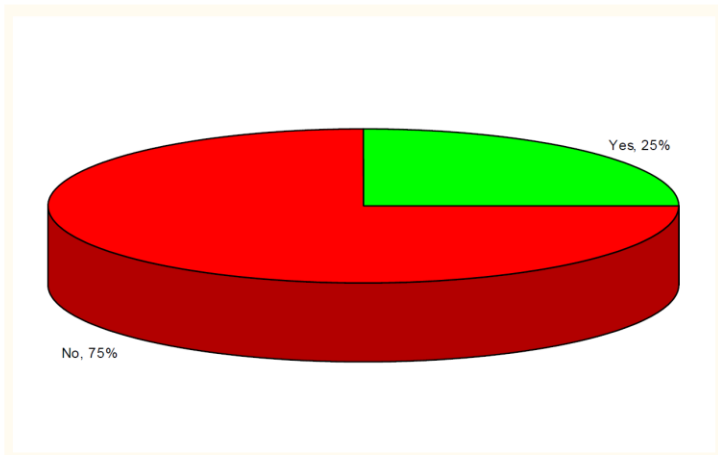


A large majority of people affected by flooding are not satisfied that sufficient work has been completed on flood defences to secure it from further flooding

Q71 Are these defences regularly maintained and from your knowledge and observation are you satisfied that infrastructure such as drainage ditches are in good repair and adequate to deal with the problem?

Question 71 Are these defences regularly maintained and from your knowledge and observation are you satisfied that infrastructure such as drainage ditches are in good repair and adequate to deal with the problem? [Choice]

Category	Count
Yes	14
No	42
Missing	1

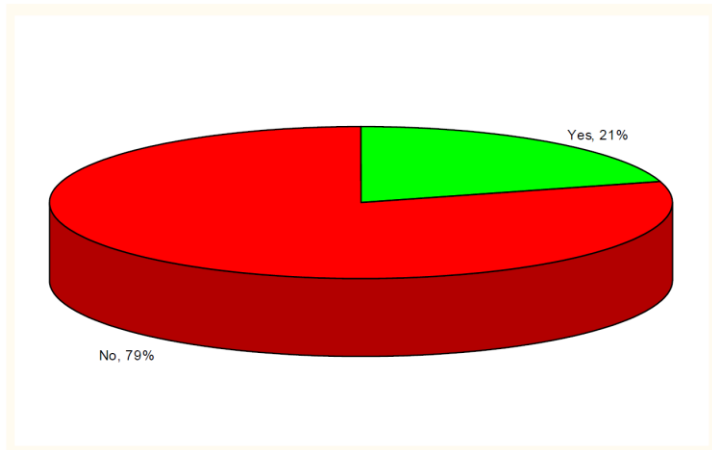


A large majority of people affected by flooding are not satisfied that the infrastructure is in good repair.

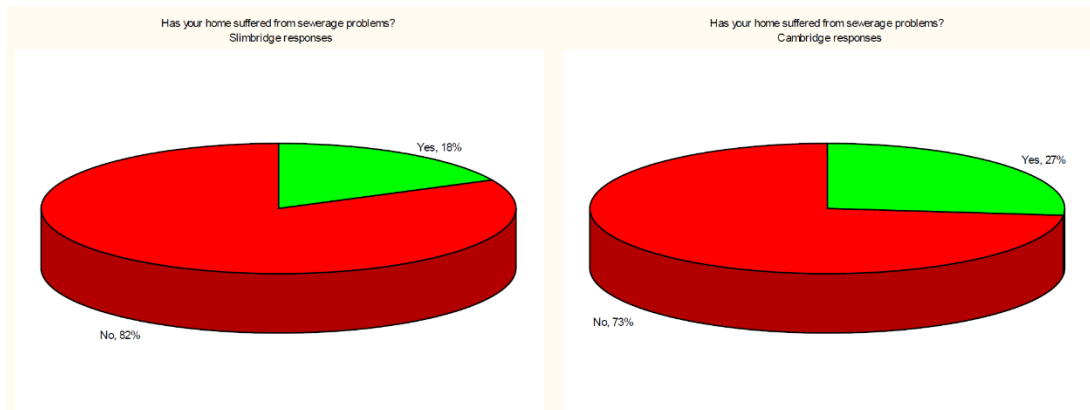
Q72 Has your home or business suffered from sewerage problems?

Question 72 Has your home or business suffered from sewerage problem?

Category	Count
Yes	49
No	190
Missing	5



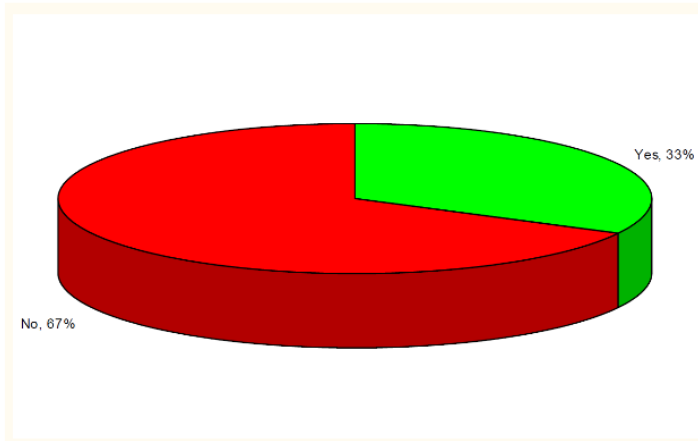
Over a fifth of the houses in the Parish are susceptible to sewerage problems with Cambridge being worse affected than Slimbridge



Q73 Work has recently been carried out on the sewerage system. Are you satisfied that the work completed on the system will solve the problems associated with it?

Question 73 Work has recently been carried out on the sewerage system. Are you satisfied that the work completed on the system will solve the problems associated with it? [Choice]

Category	Count
Yes	16
No	33
Missing	0



A large majority of people affected by sewerage problems are not satisfied that work on the sewerage system has solved the problems.