

Somerset Rivers Authority Board Paper

River Brue Modelling

RECOMMENDATIONS

The Somerset Rivers Authority (SRA) Board is asked to:

1. Note progress towards completion of the River Brue modelling project.
2. Consider and comment on the summary of findings and recommendations from the modelling project and next steps.

Purpose of the item

To provide the Somerset Rivers Authority (SRA) Board with an update on the final phase of Brue modelling work.

Background and context

The SRA has invested extensively in improving the understanding and evidence base on the operation of the lower Brue since early 2022, when it funded an update to the base model. Further work, using this updated base model, was commissioned by Somerset Council in January 2025, to investigate potential options that could be taken forward in the lowland Brue catchment to reduce flood risk. In previous presentations to the SRA Board, details have been provided of the hydraulic assessment of those potential options. The presentation that was given at the last Board meeting can be found [here](#): final key outputs are described below.

Latest status

The final output of this work consists of several in-depth reports. These are undergoing final review and comment by the River Brue modelling project steering group, which consists of representatives from SRA partner organisations. No material changes are anticipated to the reports at this stage.

These reports detail the preferred options, ones that showed flood risk benefits, that could be taken forward. These options are summarised on the next two pages in Table 1, with the location of the options shown in Figure 1.

Table 1

Option reference number (for Figure 1 map of locations)	Option	Conclusion
1	Lower River Brue conveyance improvements – addressing localised slumping and channel narrowing at Bason Bridge and Hackness Sluice	Minor flood risk benefits. Recommended to take forward as a stand-alone project.
2	Lower River Brue conveyance measures – wider improvements between Cripps River and Highbridge Clyce	Major flood risk benefits. Recommended for further assessment.
3	Highbridge Clyce gates expansion	Some flood risk benefit, but excessive cost. Not recommended to be taken forwards at this time, but to be considered as part of longer-term asset planning.
Not shown on Figure 1	River Brue topping up of low spots	Small flood risk benefits, and no disbenefit in doing the topping up. Recommended to take forward as a stand-alone project by either landowners or the Environment Agency.
6	Mid River Brue conveyance improvements – main benefits shown from works between North Drain and Cripps River	Some flood risk benefit. Recommended for further assessment.
10	Huntspill River lowering – retained water level lowered in advance of flood events	Major flood risk benefits, but potential challenges in terms of environmental and water abstraction impacts. Recommended for further assessment subject to further surveys and consultation.
11	Clyce Hole weir removal – opportunity to remove structure and re-naturalise channels and reduce flood risk	Minor flood risk benefits, but major environmental benefits. Recommended for further assessment as part of a wider project that is not just considering flood risk.
Shown in Figure 1 as 'Set Back'	Set back of flood banks	Minor flood risk benefits, but major environmental and operational/maintenance benefits. Recommended for further assessment as part of a wider project that is not just considering flood risk.

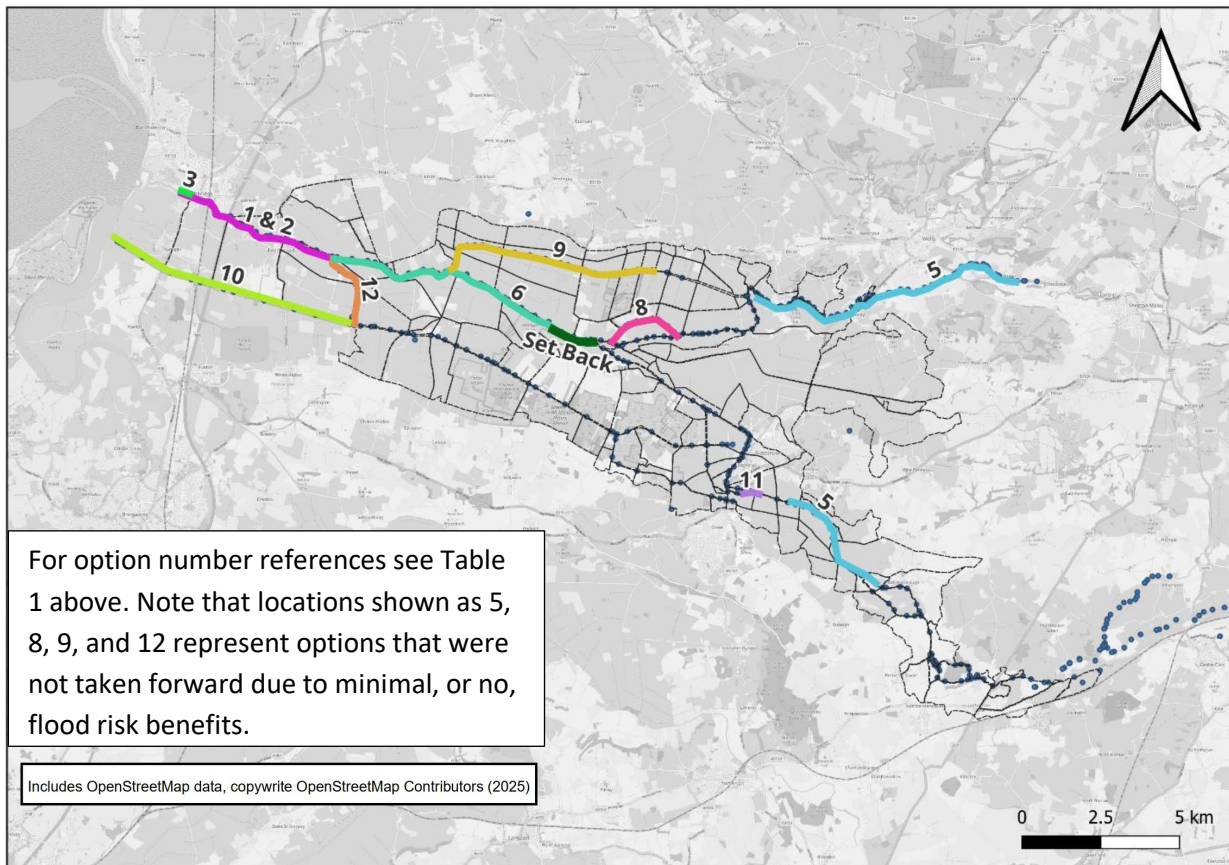


Figure 1 – Overview map

These individual options were combined to assess their cumulative impacts. For all these combined options, a more detailed assessment was then made of flood risk impacts. These combined options are shown in Table 2, on the next page.

Note that Decoy Rhyne conveyance improvements were taken forward at the request of the steering group, despite being shown to provide no benefit on their own. The steering group wished to assess whether if they were combined with other downstream works, they might provide additional benefit.

Table 2

Combined Option number	Individual Option 1	Individual Option 2	Individual Option 3
1	River Brue conveyance improvements from North Drain to Highbridge		
2	River Brue conveyance improvements from North Drain to Highbridge	Huntspill level lowering in advance of flood events	
3	River Brue conveyance improvements from North Drain to Highbridge	Huntspill level lowering in advance of flood events	Highbridge Clyse expansion
4	River Brue conveyance improvements from North Drain to Highbridge	Huntspill level lowering in advance of flood events	Set back of flood banks
5	River Brue conveyance improvements from North Drain to Highbridge	Huntspill level lowering in advance of flood events	Decoy Rhyne conveyance improvements

Flood Impacts

The final reporting contains more data on the flood risk impacts than was previously presented to the Board. It includes maps showing the impacts of flood extents and depth, and also assessments of the duration of flooding. Examples of these are given on the next page in Figures 2 and 3.

Figure 2 shows the impact on flood extents in a 5% (1 in 20) annual probability event for Combined Option 2 (Conveyance improvements and Huntspill lowering). The red areas indicate locations that would no longer flood in this event. There is not a large difference in the relative flood extents, but this is not the only factor to consider in terms of reducing flood risk.

Figure 3 shows the average reduction in flood depth across the different moor areas. Again, this is just presented here for Combined Option 2 and for the 5% (1 in 20) annual probability event. The darker the shade of green, the greater the reduction in depth. This shows that the areas that benefit from these works are mostly around the North Drain catchment.

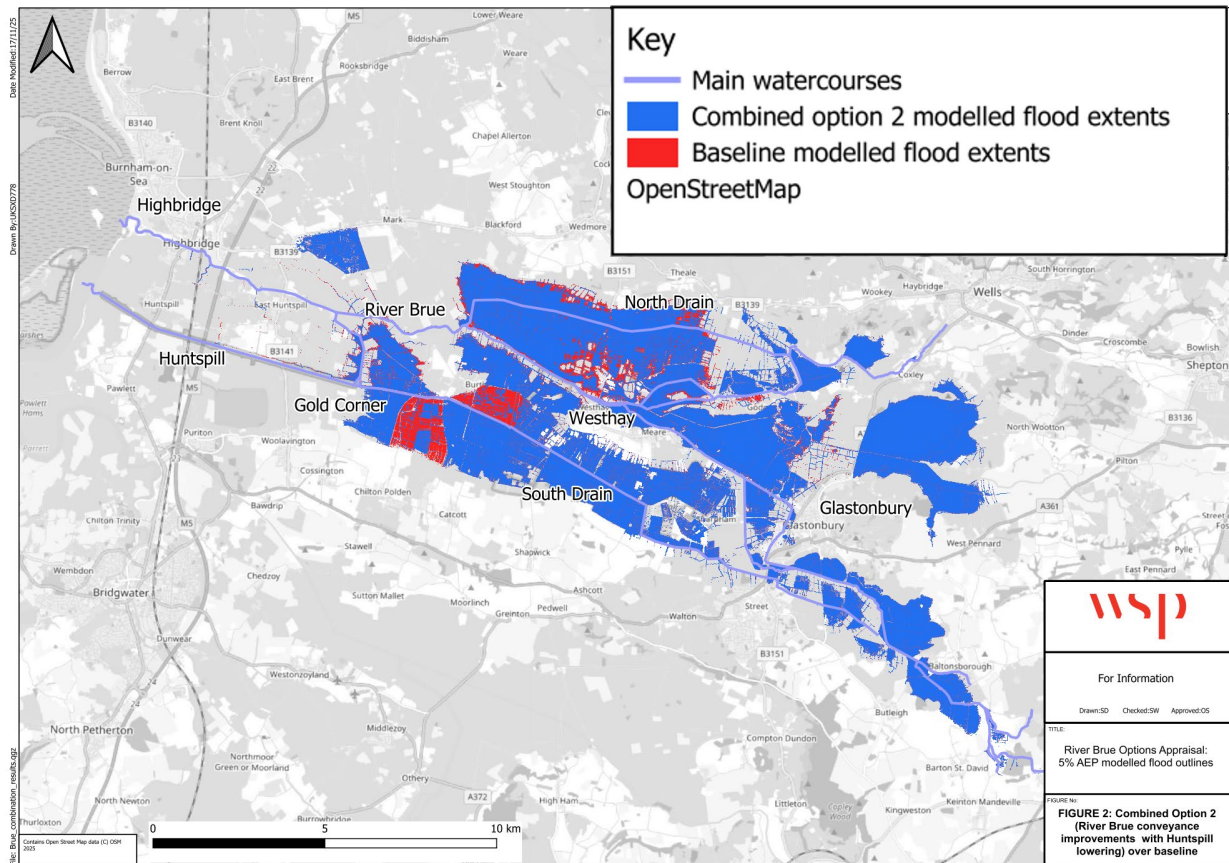


Figure 2 – Flood extent comparison example

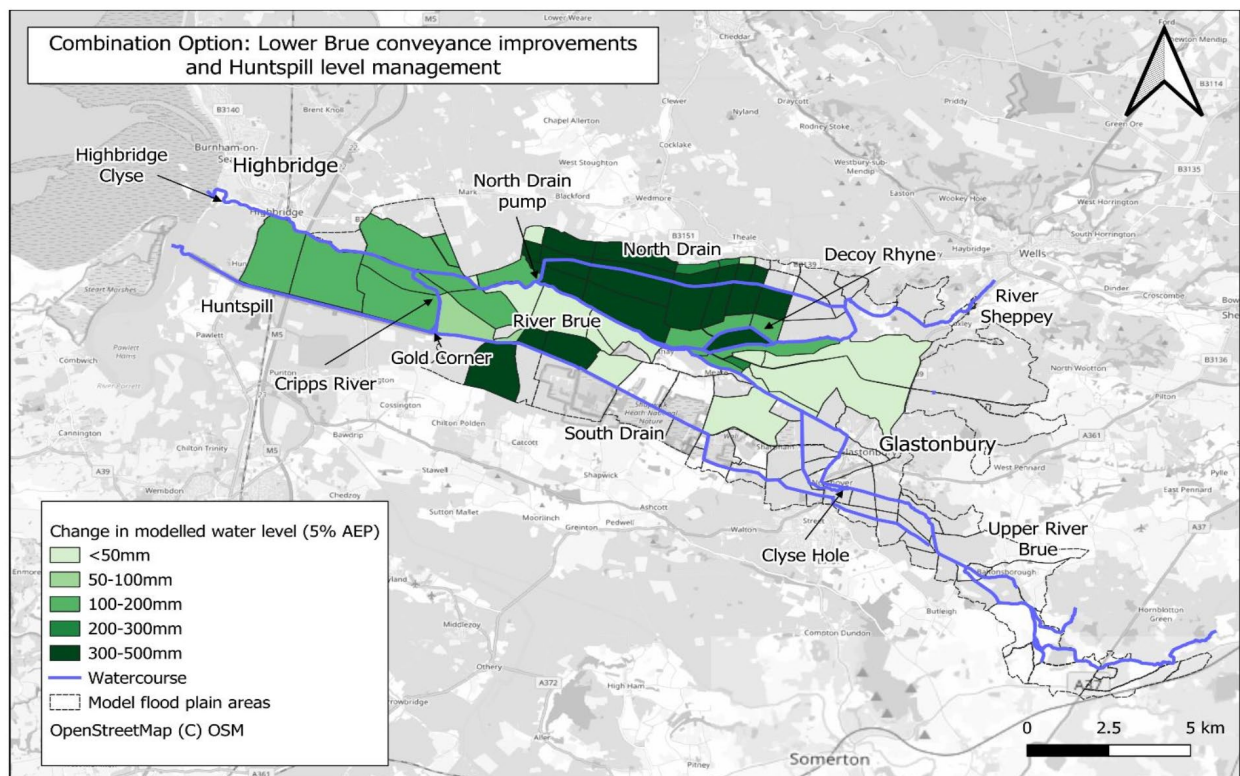


Figure 3 – Flood depth comparison example

Figure 4 (below) is an example of the predicted levels from the modelling at a particular location within the catchment. In this case it is a location within North Drain, but similar results are presented in the reporting for other locations.

Here the predicted flood levels in the baseline (shown by the red line) are compared against the predictions from the different combined options. The horizontal dashed black line represents the typical field level in this area. This shows how with all the combined options they reduce both the depth and duration of flooding. Comparing combined option 2 (thin brown dashed line) with the baseline for example shows for this event that the peak level is reduced by 300mm, but perhaps more importantly the duration of flooding is reduced from around 48 days to only 25 days.

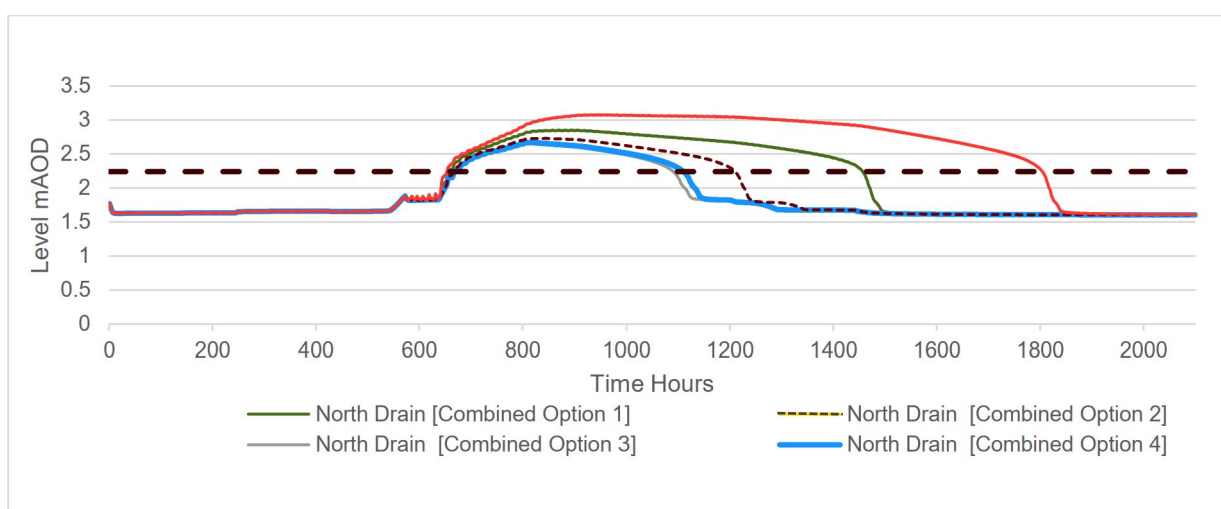


Figure 4 – Flood duration comparison example

Costs and Benefits

A high-level assessment of the costs and benefits of the various combinations of options, as well as the main engineering and environmental challenges and opportunities involved in delivering them was carried out. The benefits considered are primarily based around flood risk changes to properties, roads and agricultural land. At this stage, a number of key assumptions had to be made in calculating these costs and benefits and this will also need improving as part of any future work. Due to the low density of private and commercial properties and critical infrastructure in the study area it will always be challenging to build a strong business case based primarily on prevention of flood-related damages, even when considering the impact on agricultural land and businesses.

It is recommended that the scope of future work should be extended to also include less tangible benefits in terms of amenity, ecology and health as this could strengthen the business case for investment. The report also identifies potential funding mechanisms.

Table 3 below summarises these flood risk related economic benefits and the estimated costs for each combination option, along with the benefit cost ratio.

Table 3

Option number and description	Benefits over Baseline (£k)	Total Cost (£k)	Benefit Cost Ratio
Combined Option 1: River Brue conveyance improvements	£570k	£290k	1.9
Combined Option 2: River Brue conveyance improvements and Huntspill lowering	£1,050k	£1,290k	0.8
Combined Option 3: River Brue conveyance improvements, Huntspill lowering, and Highbridge Clyse expansion	£1,090k	£11,290k	0.1
Combined Option 4: River Brue conveyance improvements, Huntspill lowering, and setback flood banks	£1,060k	£7,590k	0.1
Combined Option 5: River Brue conveyance improvements, Huntspill lowering, and Decoy Rhyne conveyance improvements	£910k	£1,340k	0.7

The purpose of the combined option testing was to identify whether there is value in delivering a number of these options as a Strategic Delivery Programme, taking into account the combined benefits and combined costs to understand whether this would provide better outcomes than simply undertaking a number of stand-alone options.

Based on the Benefit Cost Ratio (BCR) assessments undertaken above, **Combined Option 1**: River Brue conveyance improvements (test options 2 and 6 combined), has the greatest BCR at **1.9** and therefore demonstrates that these options in combination could be economically justifiable.

Combined Option 2 has a BCR of **0.8**. A large proportion of the cost estimate for this option is the assumed costs for consultation, surveys and reports to inform a decision on the maximum allowable pre-lowering of the River Huntspill water level and the duration thereof. A precautionary approach has been taken in assessing these costs and if they are significantly over-estimated then a BCR of 1.0+ would be achievable.

Combined Option 3 includes the significant capital costs for constructing a large overflow structure and therefore has a much lower BCR than the options which are purely channel conveyance improvements.

Combined Option 4 includes the capital costs for setting back a length of flood bank and therefore has a much lower BCR than the options which are purely channel conveyance improvements. There is a large amount of uncertainty in these costs as they are heavily influenced by availability of material, access and ground conditions. Again, a precautionary approach has been taken in calculating these and there may be ways to reduce these costs that will help improve the BCR.

Combined Option 5 demonstrates that adding in the Decoy Rhyne did not provide additional benefit (in fact provides a slight disbenefit) and therefore should not be considered further.

It is therefore recommended that **Combined Options 1 and 2** be considered for taking forwards as projects which could be justified through flood defence funding.

This does suggest that the only option that has a benefit cost ratio greater than 1 is the conveyance improvement option. However, there will be additional non-flood risk related benefits to some of the other options. These are the less tangible benefits described above. For example, setting back flood banks would provide environmental enhancement and could in places also provide amenity benefits. This will increase the overall benefits and therefore increase the viability of options.

Next steps

It is recommended that the items identified as stand-alone projects (topping up of low spots and addressing pinch points in the channel at Bason Bridge and Hackness Sluice) are taken forward once an organisation, or a combination of organisations, is identified to lead on this.

For the remaining options that have been shown to have a flood risk benefit, it is recommended that a strategic approach is adopted to consider the wider opportunities and constraints of these scenarios. There are multiple initiatives currently being investigated in the lowland Brue catchment. If these initiatives can be brought together and the multiple benefits captured this will support a stronger business case for investment. This approach would not just be focused on flood risk, but also include environmental, water availability, sustainable agriculture, amenity and growth. This will give the maximum opportunity to obtain funding and consent, therefore leading to the greatest chance of works being delivered.

An organisation could choose to progress individual elements of the combined options. However, if the options are looked at in isolation it will make it harder to demonstrate their viability and ultimately deliver them.

Potential funding sources other than SRA funding have been identified for these options, some of which will only be available to the options demonstrating wider benefits than just flood risk. These will allow business cases to be developed, but it is likely that SRA funding will need to remain a key element of any overall funding package.

The final outputs for this project will be an options appraisal report, hydraulic modelling report, environmental features report and a set of associated maps showing modelling outputs. Once the steering group has completed its final review and these reports have been issued by consultants WSP this will mark the end of this phase of work. The information provided in the reports represents a major step forward in the lowland Brue catchment. It will enable an organisation (or combination of organisations) that wishes to implement any of the scenarios to progress that work. For scenarios to be progressed an organisation will need to take the lead on securing funding, securing permissions, and undertaking detailed design and implementation.

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Date: 25 November 2025

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