

Flooding in Thames Ditton - Analysis of Flood Survey Data

1. SUMMARY

Since the flooding of Alexandra Road and River Bank in 2014, the Residents' Association Flood Group have been working with the Environment Agency to develop ways in which similar (or worse) flooding can be prevented in the future. There is no easy solution to the problem, and to gather more information, the Residents' Association were granted funding by Elmbridge Borough Council to conduct a detailed survey of the height of the river bank along the critical lowest section from Riversdale Road to Aragon Avenue.

In 2014, the river level reached 6.71m related to a local datum. This was 2.2m higher than the normal summer level and the Environment Agency indicates that there is a 1 in 10 chance of this level being reached every year. The 'High Risk' level defined by the Environment Agency as having a risk of being reached of 1 in 33 every year is 7.5m. This level would result in some 200 properties being affected in Thames Ditton. Climate change will make the situation worse.

The surveys determined that the existing height of the main part of the river bank - river side walls through gardens - varied between about 6.5m and 7m. To provide a reasonable level of protection, this should be raised to at least 7.5m. This seems to be practical using a combination of additional walls, temporary barriers across boat clubs and glass-based flood defences on top of existing walls through riverside gardens. A detailed plan showing the heights measured is below.

The cost of this is likely to be around £1 million, but may be higher if existing walls need significant strengthening and specialised pumps need to be purchased and installed. Based upon the survey results, the Environment Agency have now agreed to fund a more detailed study to investigate potential options and recommend a preferred approach.

2. BACKGROUND

Following the flooding of Alexandra Road and River Bank in 2014, the Residents' Association (RA) have been having detailed discussions with the Environment Agency (EA) and others to try to improve the flood resilience of the main 'High Risk' area that includes some 200 properties. The EA have been working on a temporary barrier solution, but this has yet to be finalised (Oct 2022) and discussed with residents.

The Environment Agency define the 'high risk' area as that being susceptible to flooding at a probability of 1 in 33 each year. Based upon current modelling, this equates to a flood water height of approximately 7.5m AOD (related to a local datum), which is a rise of 3m above the normal summer river level, and 80cm higher than the flood level reached in February 2014. This level does not include an allowance for climate change which will tend to mean that this level will be reached more frequently into the future. It also assumes that the Thames Barrier will be operated as in February 2014 to prevent tidal spikes that can add 30cm to the river height.

The temporary barrier must run along streets and pathways and cannot run directly along the river bank in Thames Ditton because there are some 60 properties whose gardens front onto the river. The proposed routing is therefore down Riversdale Road, along River Bank to Queens Road, along the footpath to Aragon Avenue, down to the river bank at Albany Reach and across the KGS playing fields to cross Summer Road.

This routing will mean that the 60 riverside properties will be on the river or 'Wet Side' of the barrier and hence not be protected. Not only will they be liable to flooding, but when fully deployed, the barrier will form an impassable barrier and hence the 'wet side' properties must effectively be evacuated.

In 2014 the flooding that affected Thames Ditton reached 6.7m AOD, which the EA suggest has a 1:10 probability of happening every year. Reducing the probability to 1:20 means increasing the river bank height to at least 7m AOD.

The RA have been actively considering alternative approaches to barrier provision that would provide the same level of protection as the Temporary Barrier, but not leave 60 properties unprotected.

This would mean increasing the height of the river bank itself through residents' gardens. Obviously this would require all residents' agreement, which would mean that the design would have to not reduce amenity etc.

The first step was to actually measure the height of existing defences through gardens and in other relevant locations so that what might be necessary to improve defences can be determined. The RA applied for CIL Funding from Elmbridge Borough Council to obtain this data. The aim was to:

- a) Identify a reasonable route along the river bank and existing flood walls that could be raised to improve resilience;
- b) Identify the lowest points along that route and determine the practicability of raising them to reduce flood risk for the area. The minimum rise would be to increase the level to at least 7m AOD;
- c) Consider the implications and potential costs of raising the level to at least 7.5m AOD to remove the need for the full temporary barrier deployment and the problems that that would cause to the 60 'wet side' properties.

The street drains in the area discharge directly into the Thames and hence as the river level rises they become less and less effective. As the flood level exceeds the height of streets, these can potentially flood due to the drains providing a path for flood water to back up from the river onto the street - as happened in 2014.

The RA are in active discussion with Thames Water to improve the situation. They have surveyed and cleaned the drains and undertaken some repair. They have also installed a non return valve at the end of Alexandra Road to prevent flooding through the drains. Unfortunately, as the river height rises and reaches the level of the road, the drains become ineffective because there is nowhere for the water to go. This means that even if the river bank has not been breached by flood water any rain has nowhere to go and hence will potentially cause flooding. Also there may be groundwater seepage caused by the rising water table. For a temporary barrier, portable pumps are provided to deal with this and any alternative approach would also require pumps in strategic locations.

Although Thames Ditton is normally not subject to tidal impacts because of Teddington Lock, when flooding occurs it is possible that the river level downstream of Teddington Lock will rise sufficiently so that upstream flood water cannot discharge over the weir. In 2014, for example, tidal spikes of 20 to 30cm were observed in Thames Ditton and at the height of the flood, the Thames Barrier was used some 35 times to stop these spikes worsening the flooding situation.

3. SURVEY APPROACH

The survey was divided into three main parts. The first was to measure the height along the potential route of the temporary barrier at the lower points. This started along Riversdale Road, River Bank, then Albany Reach and the footpath from Queens Road to Aragon Avenue, along the last section of Aragon Avenue and down the footpath to the river bank and to the gate to the KGS playing fields. This was primarily so that the EA (and us) could see exactly the level of protection provided by the barrier, which is 1m high.

It is clear from the results that temporary barrier will generally provide protection to at least 7.5m AOD, but there is a low point at the bottom of the slope to the river bank at the end of Aragon Avenue, which is 6.36m AOD which will reduce the level of protection. It should be possible to relatively easily raise this without reducing the amenity to overcome this problem.

The second part was to measure heights at the other side of the KGS playing field. This was done to see if there might be a potential 'back route' for flood water to the lower sections of Summer Road (Aragon Avenue to the level crossing) if a scheme was developed that could easily raise the river bank level to say 7m AOD. The lowest point was found to be 6.85m AOD, which suggests that there may be a potential problem.

The main part of the survey was to measure river bank heights across the riverside gardens of 'wet side' properties along a potentially suitable route for locating a permanent barrier. This is dealt with below.

4. ANALYSIS OF PROPERTIES ALONG THE RIVER BANK

Before discussing the detail, it is necessary to say that any plan would not involve high brick walls cutting off residents' view of the river and stopping access to moorings. The aim would be to provide a combination scheme using steel framed glass panels where a river view is important, mainly on top of existing walls and providing access to moorings through flood resistant gates. Where a view is of limited benefit, a wall could be provided as it is much cheaper. The boat houses would generally utilise demountable barriers as they need constant access.

The properties along the river bank that have the lowest gardens that need to be considered for potential installation of a permanent barrier are:

- 15 houses on Riversdale Road;
- 13 houses on River Bank;
- 20 properties in Albany Reach flats;
- TD Skiff and Punting Club;
- The Albany Pub/Restaurant;
- The BYMC boat Club;
- 4 houses at the end of Aragon Avenue;
- The KGS Boat Club.

Detailed design may well involve changes to this list.

The comments below are points that arose during the survey and led to the locations being selected for height measurements. Any scheme would obviously be the subject of detailed design and discussion and agreement with affected residents. and may well change significantly from that described.

In undertaking the survey, it was found that in most residential gardens there is a wall close to the river that currently provides a flood barrier and also have some steps leading down to a riverside mooring. Not surprisingly, there is normally a sloping garden from the property itself and hence when the LIDAR plot that we have used in the past shows a level of above 7m AOD, the wall is somewhat lower. The lowest point is about 6.6m AOD and along River Bank the highest is just over 7m AOD. Along Riversdale Road, the heights measured were similar.

Approximately one third of the river bank poses a few more challenges because of the Skiff and Punting Club, the public slipway, The Albany Pub, the BMYC and the KGS Boat Club.

The Skiff and Punting Club needs frequent access between its boat house and the slipway. In discussion with the Commodore it seemed that the most appropriate solution would be two moveable barriers that could be placed across the boat house doors. The side access could probably have a flood proof door/gate.

The Albany Pub has a wall across part of its river frontage that could be raised, but the main challenge is between the end of the building across the side access and the edge of the car park. This is partly fenced, which could be replaced by a wall with a flood proof gate to allow side access.

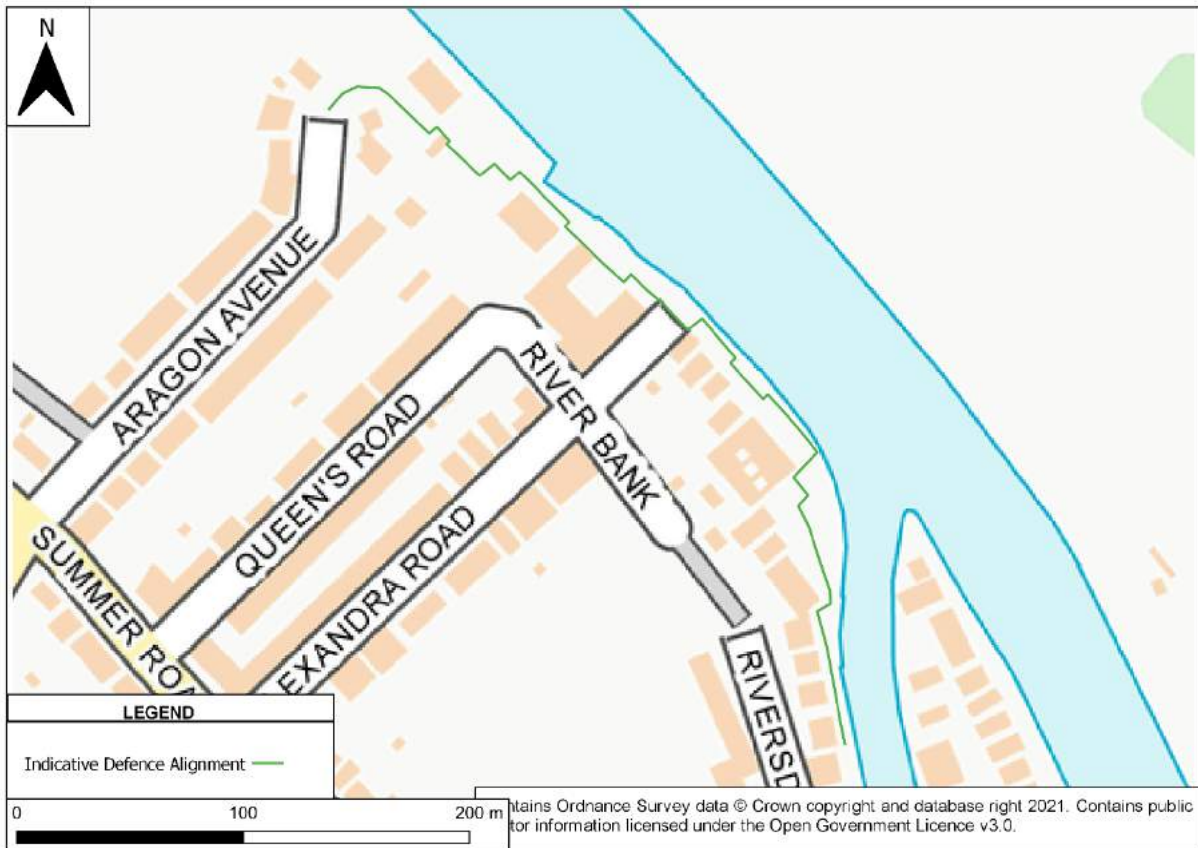
The BMYC requires full access for boats across its width and it seems that moveable barriers would be essential.

The KGS boat house is quite low with a wide access to the river and would be very difficult to reasonably protect. It is assumed that it was designed to be occasionally flooded and from a practical point of view it was assumed that a wall would pass around the back of it. The riverside properties at the end of Aragon Avenue do not have direct river access and hence it was assumed that a wall could be constructed at the end of their gardens where there is currently a footpath.

The currently proposed routing of the temporary barrier comes down from Aragon Avenue onto Albany Reach and across the KGS playing fields. It was assumed that the section of the temporary barrier from Albany Reach and across the playing fields would still be utilised and a facility could be

provided that allowed it to connect to the end of the permanent flood wall at the south side of Albany Reach. This would significantly reduce the cost and complexity of the permanent barrier in this section.

The indicative alignment of the proposed permanent barrier is shown in the figure below.



5. Survey Results Summary

A plan showing the survey results is shown below. Unfortunately some of the details on the plan base are not correct, for example the location of the Skiff and Punting Club. However, it should enable anyone interested to easily determine particular locations and heights of interest.

The figures given are the heights at the point where the associated marker is located.

Looking at the results as a whole, it is clear that it does not seem practical to increase the river bank level to a uniform height of 7m AOD, as was originally hoped. The length of bank that it would be necessary to raise would be quite long and include potentially difficult locations across the Albany car park and across the boat clubs. In addition, existing walls in property gardens would be breached in many locations with flood water potentially crossing some gardens and getting close to property walls.

It does, however seem practical to consider providing a barrier to a height of nominally 7.5m AOD and hence remove the need for the temporary barrier along Riversdale Road and River Bank etc. with the problems that that would cause for 'wet side' properties.

A very rough costing has been undertaken and the cost of this scheme could potentially be £1 million, including an allowance for strengthening existing walls on which the barrier would sit to be able to absorb the very great forces of the water pressing on the barriers. This does not include an allowance for the necessary pumps that would be required as the street drains would cease to function during a flooding event.

6. The Good News

As indicated above, the funding for this survey was obtained from Elmbridge Borough Council. The Environment Agency provided a letter supporting our application.

The results of the survey have been shared with the Environment Agency and discussions have continued with them.

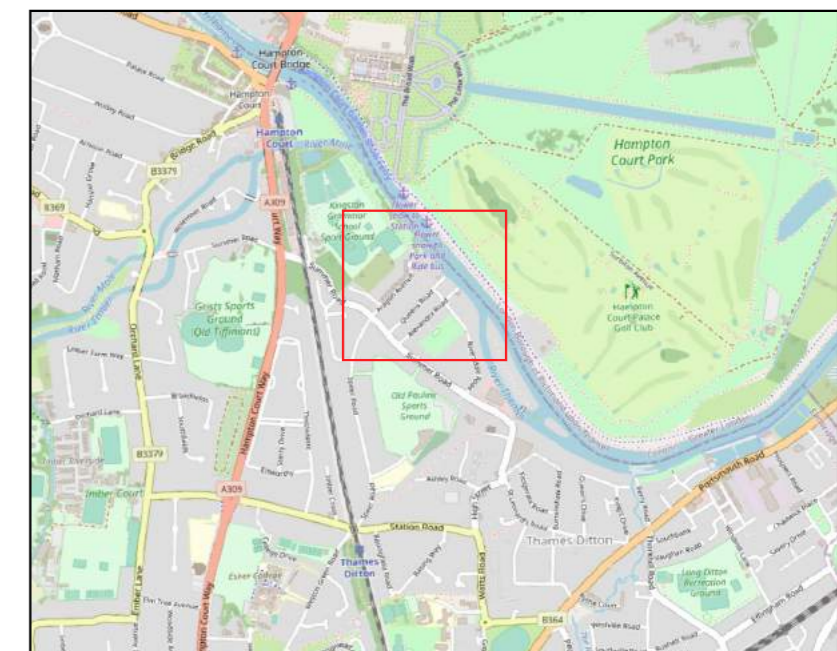
Recently, October 2022, the Environment Agency have advised us of two developments.

Firstly, work on planning for a Temporary Barrier has been proceeding. It has been delayed because of safety issues that arose when this type of barrier was last deployed and in some cases the pressure of water caused movement of the barrier itself. These issues have now been overcome and it is expected that a design for Thames Ditton will be completed by the end of 2022. This will then be subject to local consultation and assuming acceptance, should be ready for deployment if necessary during the winter of 2023/4.

Secondly, as a result of the surveys and various discussions with the EA, the section dealing with Thames Ditton have applied internally for funding to take the work started by the survey forward to look in more detail at options for a permanent barrier. Funding has nominally been approved for next financial year (2023) and the EA will be making the necessary arrangements to ensure that a consultant is in place and ready to start as soon as funding is available in April. The consultant will look at all options, including that suggested above arising from the surveys and recommend a preferred approach. This will take into account the impact of climate change and the projected situation with the use of the Thames Barrier and tidal spikes and hence may be considering a barrier higher than 7.5m AOD. Also, because the currently defined 'High Risk' area doesn't take into account these factors, the consultant will potentially be looking at a larger area.

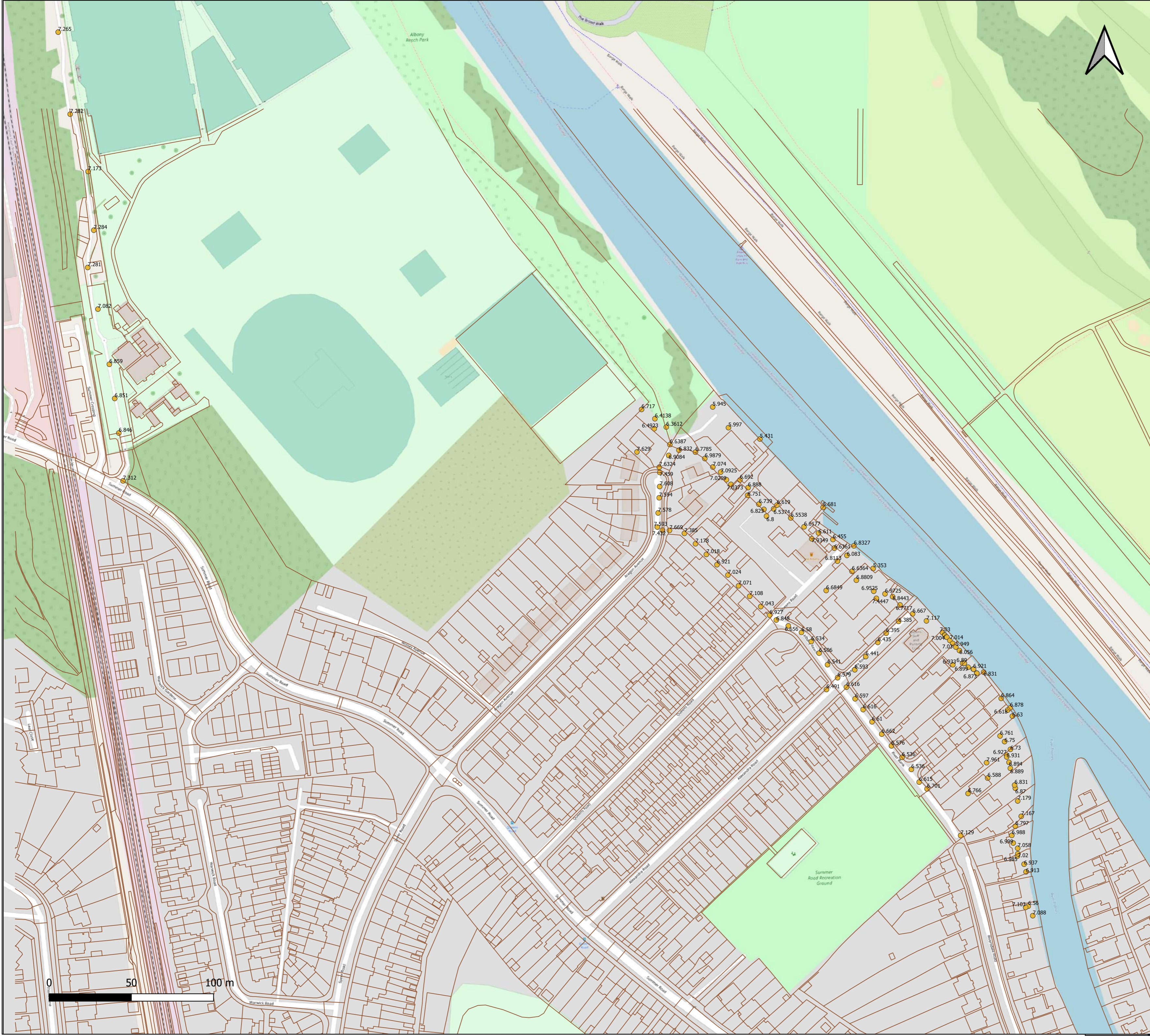
Overall the aim will be to develop the most cost effective solution. It is expected that initial proposals will be ready for discussion with residents towards the end of 2023 and based upon experience with a similar scheme in Godalming it might be expected that implementation would be completed in 2027/8 (15 years after the 2014 flood and our first discussions with the Environment Agency). At that point, the temporary barrier would no longer be required and hence 'wet side' properties would only be at risk if there was a flood for a few years.

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Thames Ditton Defence Levels

- Defence Levels (mAOD)



Drawn By: RC **Date:** 17/03/2022 **Scale:** 1:2,500
Checked By: RC **Date:** 17/03/2022 **Original at A2**
Approved By: JG **Date:** 17/03/2022
Status: S1 **Revision:** P01
Figure Title: Insert title / figure number
File Name: 2021s1399 - Thames Ditton Defence Levels.ggz

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