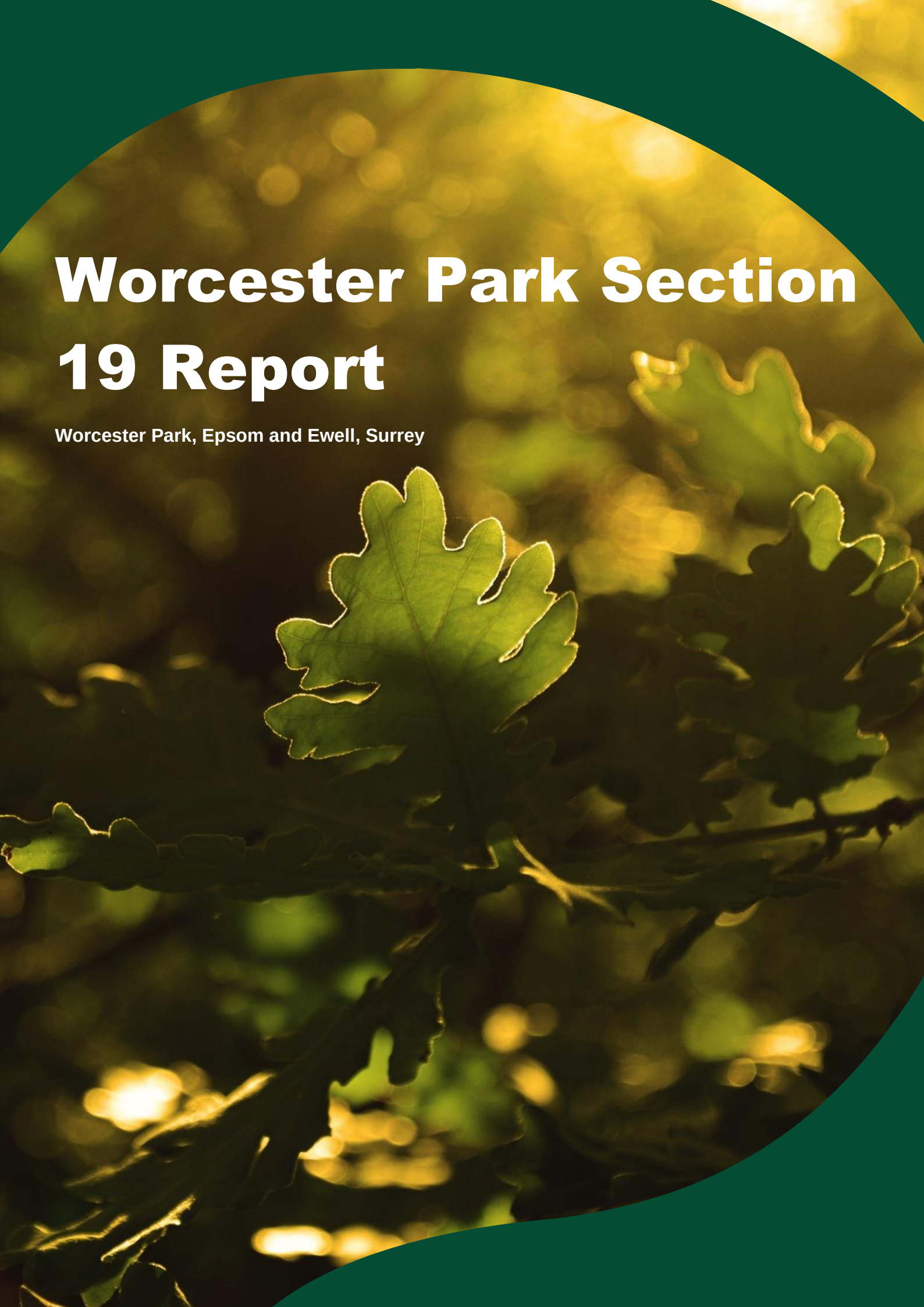
Worcester Park Section 19 Report

Worcester Park, Epsom and Ewell, Surrey



Contents

Purpose

This document has been prepared specifically for the purpose of meeting the requirements of Section 19 of the Flood and Water Management Act 2010. This document will be published in two parts. The first part will identify the source, pathway and receptor of the flood event. The second part will provide recommendations and the response of the relevant Risk Management Authorities.

This document is not an action plan or an agreement that the recommendations provided in this report will be completed by the relevant RMAs, unless there is a duty to do so. This report focuses solely on the flooding within Surrey. However, the findings of this report will be shared with The London Borough of Sutton and The Royal Borough of Kingston Upon Thames in order to work collaboratively with the neighbouring lead local flood authorities (LLFAs).

The section 19 investigation is undertaken following the principles and objectives of the local flood risk management strategy. The investigation considers the wider area to provide catchment scale actions/recommendations, in order to provide a holistic approach to managing flood risk.

The supporting data has been put together based on records of internal property flooding and road closure information from a variety of sources. While every effort has been made to verify the information, the nature of the data and the methods used to collate this information mean that it does not include every occurrence of flooding. This data only identifies where flooding has been reported and is indicative only.

Section 19 Flood Investigation Requirement

Under the Flood and Water Management Act (2010) the Lead Local Flood Authority (LLFA) must (to the extent that it considers it necessary or appropriate) undertake an investigation on becoming aware of a flood incident within its area.

A LLFA is defined under Section 6(7) of the Flood and Water Management Act as being the County Council for that area. Section 19(1) requires that the investigation determines the RMAs that have relevant flood risk management functions and whether each of those authorities have exercised or is proposing to exercise those functions in response to the flood.

Section 19(2) requires that the LLFA publishes the results of its investigation and notifies the relevant risk management authorities accordingly.

Trigger for the Section 19 Report

The Worcester Park area is the focus of this Section 19 investigation. There were over 35 internal property floods and 71 external floods. This property flood data is based on information recorded by RMAs following resident engagement during and after the incident.

The number of internally flooded properties exceeded the threshold for a Section 19 investigation. The threshold for this Section 19 is ten internal property floods.

Introduction

On the 25th July 2021 heavy rainfall fell across the County of Surrey. In Epsom and Ewell this rainfall was recorded to be approximately 20mm of rainfall which is almost half the average monthly rainfall for July which is 42mm. At its peak approximately 10mm of rainfall fell in 15 minutes. This resulted in internal and external flooding within the Worcester Park area from surface water flooding. The main areas reported to have been affected are: Avon Close, Edenfield Gardens, The Avenue, Stoneleigh Park Road, Woodlands Avenue, Dewsbury Gardens, Ardrossan Gardens and Kinross Avenue. A summary of this can be seen below in Table 1.

Internal flooding	35
External flooding	71
Total	106

Table 1: Summary of flooding in Worcester Park

This report will describe the source of flooding, the causes of the flooding and explain which risk management authorities have responsibilities related to the flooding in Worcester Park. Recommendations will then also be made for the various risk management authorities and other parties to consider.

Methodology

This investigation has been undertaken using desk and site-based studies to better understand the potential causes of the flooding which occurred on the 25th July 2021.

Desk Study

A review of the available data was undertaken and can be seen compiled below for the area.

Site Location

Worcester Park is situated within the northern most section of the district of Epsom and Ewell, Surrey and acts as a sub-catchment for the Beverley Brook (Figure 1). The area borders the boundary of The Royal Borough of Kingston Upon Thames and The London Borough of Sutton. The area is comprised of residential housing with a recreational park in the west named Shadbolt Park. A railway line runs north to south along the eastern boundary. The open channel of the Beverley Brook is designated a main river is situated north-east of the Epsom and Ewell boundary.

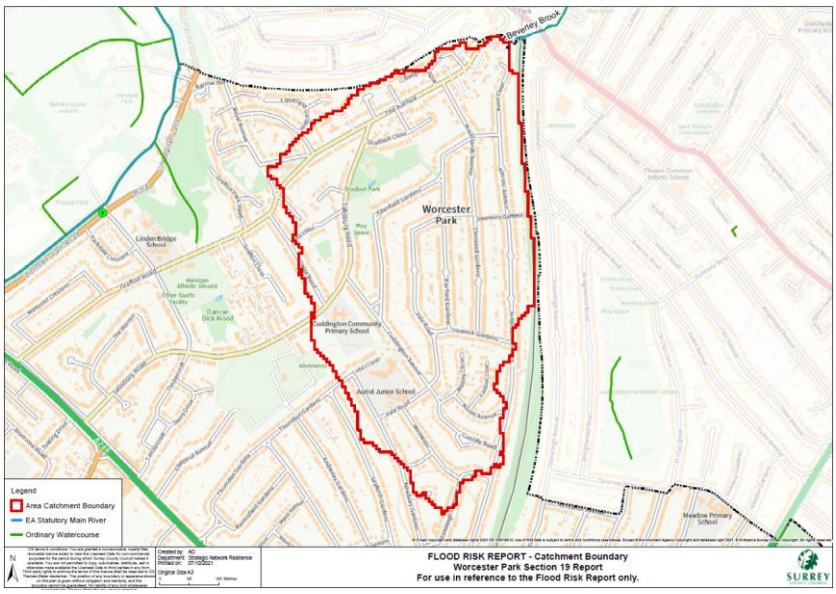


Figure 1: Site Location

Topography
The Area slopes south westerly towards the Beverley Brook falling in elevation by approximately 35m from the top of the catchment to the Beverley Brook. The areas of lower elevation depicted in blue in Appendix A –Topographical Map, correspond with the areas that experienced property flooding.

Historical Maps
A review of the first edition ordinance survey maps has revealed that the area was previously comprised of agricultural fields, defined by a series of ditches (watercourses) that flow into the Beverley Brook. This can be seen in Appendix B – 1st Edition Ordinance Survey Map.

Geology
A review of the British Geological Survey geology maps revealed the site is underlain by bedrock deposits of the London Clay Formation, comprised of clay and silt. No superficial deposits were noted to underly the site. The bedrock deposits of the London Clay Formation were classified as an Unproductive Aquifer.

Fluvial Flood Risk
A review of The Environment Agency Extent of Flooding from Rivers and Sea mapping revealed the area is situated within a Flood Zone 1. This is defined as an area of land with less than a 1 in 1000 annual probability of flooding from rivers and sea. This can be seen in Appendix C – Fluvial Flood Risk.

However, this is likely the result of modelling not having been undertaken, due to the culverted nature of the watercourse upstream of the open channelled Beverley Brook.

Surface Water Flood Risk
A review of the Environment Agency Extent of Flooding from Surface Water mapping revealed the area is at a low to high risk of surface water flooding. This is defined as between a less than 1 in 1000 and a greater than 1 in 30 annual probability of flooding. This can be seen in Appendix D – Surface Water Flood Risk.

Reservoir Flooding
The area is not situated within an area defined by the Environment Agency as being at risk of reservoir flooding.

Groundwater Flood Risk
Due to the underlying geology the risk of groundwater flooding is considered to be low. A review of the BGS borehole data did not reveal any evidence of groundwater within local boreholes. In addition, a review of the BGS groundwater susceptibility maps revealed isolated pockets of limited potential for groundwater flooding to occur and limited potential for groundwater to occur below the surface. However, this is predominantly situated along the railway embankment.

Sewer Flooding
The Epsom and Ewell Strategic Flood Risk Assessment[1] has revealed 19 cases of sewer flooding however the locations of these and whether they fall within Worcester Park is not known. A review of the London Borough of Sutton's Surface Water Management Plan revealed the Worcester Park area has been impacted by 21-50 incidents of sewer flooding. However, the location of these and whether they are within Surrey's boundary is not known.

[1] https://www.epsom-ewell.gov.uk/sites/default/files/Final%20SFRA%20Update%20June%202018.pdf

Historical Flooding

A review of The Environment Agency historical flood maps has revealed multiple records of flooding associated with the Beverley Brook, but only one is noted to have impacted the Worcester Park area. In this instance the record of flooding related to Avon Close but no further information is available. Additionally, the area is reported to have experienced flooding in July 2007.

Flood Defences

No flood defences were identified within the Beverley Brook Catchment area of Surrey. However, downstream of the outlet from the Thames Water drainage system, in The London Borough of Sutton, the Beverley Brook has undergone changes to improve the local areas resilience to flooding. The Beverley Brook flood alleviation scheme was completed in 2012 and utilised greenspace as floodable storage areas for the Beverley Brook. This was noted to reduce the risk of flooding to approximately 90 properties. Additionally, there are short sections of flood walls situated along the banks of the Beverley Brook through Worcester Park and Motspur Park[2].

Surface Water Drainage

The drainage system in this area comprises gullies and laterals which are connected to the Thames Water Surface Water drainage system. This surface water drainage system transports surface water through a network of pipes to be discharged into the Beverley Brook.

A review of the Thames Water mapping has revealed that there are four large surface water pipes that discharge into the Beverley Brook. These pipes are draining the local area of Worcester Park but also the surrounding residential areas within The London Borough of Sutton and The Royal Borough of Kingston Upon Thames.

The gullies on Avon Close and Dewsbury Gardens have historically been jetted on a two-year cycle and gullies situated in the remainder of the area have been cleaned on a yearly cycle. Of the eight gullies on Avon Close three at the end of the close have been repeatedly obstructed by vehicles from 2014. Prior to the flooding in July 2021 the gullies were inspected and jetted in July of 2020 at which time they were confirmed to be operational. Following the flooding all eight of the gullies were inspected and were confirmed to be operational on arrival and operational upon leaving.

Wetspots

A review of the Surrey County Council wetspot data base revealed Avon Close is designated as a historic wetspot, however, no further details were identified. No additional wetspots were identified within Worcester Park.

Telemetry

A telemetry system comprises a series of monitoring devices that record the height of the water level along a watercourse. The Environment Agency has a series of monitoring stations situated along the Beverley Brook. The nearest monitoring device on the Beverley Brook is situated on Green Lane immediately downstream of the outlets for the Thames Water drainage system. This monitoring station monitors the level of the Beverley Brook and plots the level on a graph in real time. The records from the flooding that occurred on the 25th July can be seen in Appendix E - Shoothill Gauge Map Beverley Brook Telemetry System[3].

A review of this data shows the highest level recorded was in July of 2007 with a river level height of 2.85m above stage datum (mASD). The recent flooding on the 25th July resulted in rivers levels of 2.76mASD, which is less than 100mm from the highest recorded river levels.

[2] https://www.sutton.gov.uk/info/200487/flood_risk_management/1279/flood_risk_information_and_maps/3
[3] https://www.gaugemap.co.uk/

The graph shows a very short lag time with a sharp rise in the height of the water. This is likely the result of multiple surface water drainage systems conveying water into the Beverley Brook, with little or no attenuation. The identified drainage systems appear to drain surface water from the Worcester Park area, in addition to other local residential areas from The Royal Borough of Kingston Upon Thames and The London Borough of Sutton. This results in water levels rising rapidly in the Beverley Brook, submerging the outlets to the drainage system and causing a hydraulic lock.

Critical Drainage Areas (CDA)

A review of the Epsom and Ewell Strategic Flood Risk Assessment[4] revealed the Worcester Park catchment area for the Beverley Brook is not currently listed as a locally defined CDA or defined as a CDA by The Environment Agency. The Environment Agency refers to a Critical Drainage Area (CDA) as an area within Flood Zone 1 which has 'critical drainage issues'[5].

A review of The London Borough of Sutton's Surface Water Management Plan[6] revealed the Worcester Park area is designated as a critical drainage area. However, The London Borough of Sutton define a CDA as "a discrete geographic area (usually within an urban setting) where there may be multiple and interlinked sources of flood risk and where severe weather is known to cause flooding of the area thereby affecting people, property or local infrastructure". There are 12 identified CDA's within Sutton and the report notes Worcester Park as being one of the top five highest risk CDA's.

Site Investigations

Surrey County Council Flood and Climate Resilience Site Investigation

The sites below have been investigated following reports from residents. Only areas that have been reported to the council have been investigated.

Site Walkover Avon Close

On the 2nd of August 2021 a site walkover was undertaken at Avon Close to investigate the source and impact of the flooding.

Avon Close is situated at the bottom of the catchment area for the Beverley Brook, at the lowest elevation within the residential area.

Residents reported that the gullies and the manholes began to surcharge at approximately 15:00 on the 25th July. Water surcharging from the manholes and gullies in the northern part of Avon Close flooded the road up to number 44 Avon Close and flowed into the front of properties in the north and west of Avon Close. A manhole in the rear garden of number 21 Avon Close also surcharged, causing water to flow north through the rear gardens and resulted in flooding from the rear of the properties. Additionally, some residents reported water surcharging from within their property, up through their kitchen and bathroom wastepipes. The properties were impacted by surface water flooding from the front, the rear and from within the properties. This resulted in flood depths of approximately 500mm. Water was reported to have subsided by the following morning.

Additional flooding was also reported to have occurred on the 28th July and the residents reported that this was foul sewer flooding. This is likely linked to high river levels noted in the Beverley Brook on the 28th July 2021 as shown on the Shoothill Gauge Map for 28th July 2021.

This investigation revealed properties were flooded internally from 23 Avon Close up to 64 Avon Close. In addition to this 15, 16 & 17 Avon Close were also flooded externally. This is due to the fall

[4] https://www.epsom-ewell.gov.uk/sites/default/files/Final%20SFRA%20Update%20June%202018.pdf
[5] https://www.sutton.gov.uk/info/200487/flood_risk_management/1279/flood_risk_information_and_maps/3
[6] https://www.sutton.gov.uk/info/200487/flood_risk_management/1279/flood_risk_information_and_maps/2

in topography from south to north. As result, those in the north experienced a greater depth of flooding than those in the south. The properties along the eastern edge of Avon Close are also situated at higher elevation than those to the west and were therefore not impacted, with the exception of the north-eastern properties.

During the site walkover the Beverley Brook was also inspected from the outlet of the Thames Water drainage system up to Pembury Avenue. Visual inspection of this section of the watercourse showed evidence that the Beverley Brook was out of bank to the north, had flattened the vegetation and deposited silt and debris atop this. Based on this evidence it would suggest that the water level was above the height of the Thame Water drainage system's outlet pipe.

The table below shows a summary of the reported flooding at Avon Close.

Internal flooding	28
External flooding	4

Table 2: Summary of flooding at Avon Close

Site Walkover Kinross Avenue & Ardrossan Gardens

On the 16th and 17th of August 2021 a site walkover was undertaken at Dewsbury gardens, Kinross Avenue and Ardrossan Gardens to investigate the source and impact of the flooding.

Ardrossan Gardens is situated on a hill and spans from the top of the Beverley Brook catchment area from the south to the lower section of the valley in the north. Where the topography flattens and the gradient is shallower, the road then becomes Kinross Avenue. The area between these two roads is intersected by Dewsbury Gardens, marking the end of Ardrossan Gardens (steep gradient) and the start of Kinross Avenue which has a shallower gradient leading to Avon Close.

This investigation revealed that properties were flooded externally at the front and rear along the eastern side of Kinross Avenue and Ardrossan Gardens. This was the result of surface water run-off from the upper catchment, flowing down Ardrossan Gardens into the lower lying Kinross Avenue. This surface water run-off was worsened by the surcharging Thames Water drainage system which was unable to discharge into Beverley Brook due to hydraulic lock as stated above. This system was noted to be surcharging on Dewsbury Gardens, further impacting the adjacent properties on Ardrossan Gardens and properties along Kinross Avenue.

Additionally, one resident reported the area had suffered from flooding approximately 14 years ago and noted two other events in their 60-year residency. The tables below shows a summary of the reported flooding at Kinross Avenue and Ardrossan Gardens.

Internal flooding	1
External flooding	21

Table 3: Summary of flooding at Kinross Avenue

Internal flooding	0
External flooding	26

Table 4: Summary of flooding at Ardrossan Gardens

Site Walkover Edenfield Gardens
On the 17th of August 2021 a site walkover was undertaken at Edenfield Gardens to investigate the source and impact of the flooding.

At this location residents reported external flooding of the road and the 25th July 2021 effecting properties along the southern side of Edenfield Gardens from 53 Edenfield Gardens to 65 Edenfield Gardens. Of these properties, two were impacted by sewer flooding. 59 Edenfield Gardens was impacted by internal sewer flooding when a manhole in the garage surcharged and flooded the ground floor of the property. 57 Edenfield Gardens was also flooded externally by sewer flooding, when a manhole on the driveway surcharged. Both 57 and 59 Edenfield Gardens were impacted by additional sewer flooding on the 28th July and the 1st of August 2021. However, the other properties in the area did not report external flooding during this time and the last event was independent of heavy rainfall.

Properties along the eastern side of Edenfield Gardens later reported that they were impacted by flooding partly from surface water run-off into the sub-floor voids of the property and partly from a surcharging foul sewer from Number 119 Edenfield Gardens down to Number 57 Edenfield Gardens. At the junction of Edenfield Gardens and Fairford Gardens water flowed off Shadbolt Park flooding properties from 37 Edenfield Gardens down to 28 Edenfield Gardens. The flooding of Edenfield Gardens is predominantly external property flooding, specifically in the garages and under the sub-flood voids of the property. Surface water continued to flow north-east towards the Beverley Brook which resulted in internal property flooding on Woodlands Avenue, predominantly at the roundabout. Flooding was also reported to have impacted one basement property internally on The Avenue although the source of ingress into the property is not known. The table below shows a summary of the reported flooding at Edenfield Gardens, Woodlands Avenue and The Avenue.

Type of flooding	Surface water flooding	Sewer flooding
Internal flooding	5	1
External flooding	0	10

Table 5: Summary of flooding at Edenfield Gardens, Woodlands Avenue and The Avenue

Surrey County Council Highways Investigation

On the 29th of July 2021 Surrey County Council Highways undertook a drainage investigation of the eight gullies and associated laterals situated on Avon Close. Prior to the clean, the silt levels were recorded to be between 50% in seven of the assets and 75% in one other. Therefore, the assets were not blocked during the event, although their functionality may have been impaired. These drainage assets were jetted and confirmed as clear and freely discharging into the Thames Water drainage system.

Thames Water Drainage Investigation

Avon Close and Dewsbury Gardens

On the 16th of August 2021 Thames Water conducted a CCTV survey of their surface water drainage system. This investigation surveyed the pipe network along Avon Close down to the Beverley Brook.

The Thames Water surface water mapping shows the system in Avon close to comprise of the following: A 750mm pipe runs along the rear gardens of properties on the western side of Avon Close and is the main surface water pipe which takes water from Worcester Park into the Beverley Brook. A 225mm surface water pipe starts in the carriage way of Avon Close adjacent to 39 and 42 Avon Close and joins the 750mm pipe at the end of the road to the north. A 350mm starts at the front of 21 Avon Close and flows north-west to the 750mm pipe, flowing under 21,23 and 25 Avon Close to where it joins the 750mm pipe in the rear garden of 27 Avon Close.

This system was camera surveyed and the results and actions were as follows: The 750mm pipe was identified as serviceable although it was noted there was an increase in the deposition of silt at the outlet, however this is not obstructing the pipe. An obstruction of silt was noted in the 225mm pipe which was jetted and confirmed as serviceable following this works. The 350mm pipe was confirmed as serviceable. It should be noted that the condition of the pipe prior to the flooding is not known, and the flooding may have resulted in the increase in the accumulation of silt during the surcharge of the system.

Thames Water have also confirmed the drainage network at Dewsbury Gardens is connected to surface water drainage on Ardrossan Gardens and Kinross Avenue which are linked to the same drainage system as Avon Close and discharge into the Beverley Brook.

Edenfield Gardens

On the 20th of October 2021, an obstruction comprising of silt and roots was removed from the surface water system. On the 9th of January 2022 18 meters of the surface water system was surveyed, which identified a concrete blockage and a partial collapse of the pipe. On the 18th February 2022 the pipe was excavated, the concrete was removed and the damaged section of pipe was replaced. Additionally, on the 6th of February a obstruction comprising of cooking fat was identified and removed from the foul system.

Conclusion

The area is situated on top of what would have been a historical flood plain, with the once tributaries of the Beverley Brook now culverted into pipes. These culverted watercourses now form part of the Thames Water surface water drainage system.

The geology of the local area is comprised of impermeable material which prevents infiltration and increases surface water run-off. As the area has urbanised infiltration has further decreased due to the increase in the amount of hardstanding. These further increase surface water run-off during heavy rainfall events.

With the increase in urbanisation more properties have discharged their surface water into the highway. The highway drainage, in this case the gullies, are only designed to discharge water that falls on the road, and not this additional property drainage. This increases the amount of water that is put through Surrey County Council highway drainage and into the Thames Water surface water drainage system.

We are experiencing a greater frequency of higher magnitude rainfall events, which is the result of climate change. On the 25th of July 2021 Environment Agency rain gauges recorded approximately 20mm of rainfall, 10mm of this was recorded to fall within 15 minutes of the rainfall event. The average monthly rainfall for July in Epsom and Ewell is approximately 43mm. Therefore, a quarter of the average monthly rainfall fell within a 15-minute period and half a month's rainfall fell within in a 9-hour period. This is further supported by the data captured by the local telemetry system at Worcester Park which shows rainfall on the 25th of July resulted in one of the highest recorded water levels in the Beverley Brook.

From the investigations conducted by Thames Water, Surrey County Council Highways and Surrey County Council Flood and Climate Resilience Team it has been confirmed that both the Surrey County Council highway drainage system and the Thames Water drainage system were operational. Thus, they did not cause the flooding but were instead overwhelmed by the sheer volume of water. This is an exceedance event where water levels in the Beverley Brook were above the height of the Thames Water drainage system's outlet and therefore prevented the discharge of water. This caused surface water to back up within the pipe network, eventually surcharging at the gullies and manholes which prevented the overland surface water run-off from draining.

However, it should be noted that it is not only the Epsom and Ewell section of the Worcester Park area that discharges into the Beverley Brook. There are additional sub-catchments which cross into The Royal Borough of Kingston Upon Thames and The London Borough of Sutton. These areas are also discharging into the Beverley Brook via surface water pipes identified on the Thames Water mapping. Therefore, solely addressing the flow rates within the Epsom and Ewell sub-catchment of the Beverley Brook will not eliminate the rapid response of the Beverley Brook. This is because the outlets could still become blocked by water draining from the wider catchment area.

Recommendations

The following options should be examined by the risk management authorities and residents to be assessed for their feasibility and financial viability. These should be considered as part of an adaptation to the catchment rather than specific intervention which will remove this surface water flow route. Recommendations are not instructions and need to be examined by the relevant Risk Management Authority or individual.

1. Residents may consider forming a flood action group in order to improve the awareness of flooding in Worcester Park and work as a community to improve their resilience to flooding. Assistance could be sought from the National Flood Forum to aid in the creation of this group.
   Relevant RMA - Residents, Epsom and Ewell Borough Council & The National Flood Forum
2. Homeowners may consider implementing property flood resilience measures. These measures can either be in the form of resistance measures which aim to reduce the ingress of water into a property. Or resilience measures could be installed which do not restrict the flow of water but instead allow for a faster recovery following a flood event.
   Relevant RMA - Residents
3. The residents may consider creating an action plan for what do for when their property is affected by flooding. This will detail what the residents should do in the event of a flood. Support may be sought from Epsom and Ewell Borough Council.
   Relevant RMA – Residents & Epsom and Ewell Borough Council
4. Thames Water may consider measures to restrict the rapid surge of water within their surface water drainage system. This is to reduce the amount of water that discharges simultaneously from the four outlets into the Beverley Brook during times of heavy rainfall.
   Relevant RMA - Thames Water
5. Thames Water in partnership with other RMA's may consider working with the local residents to remove misconnections, report issues and promote education of the system. This is to prevent avoidable obstructions and reduce water ingress which may be overloading both the foul and surface water systems and causing them to surcharge.
   Relevant RMA – Residents, Thames Water, Surrey County Council Flood and Climate Resilience Team, Epsom and Ewell Borough Council and The Environment Agency
6. A community level project to reduce run-off can help to mitigate the effects of flooding. An example of this would be the installation of water butts across the catchment to reduce surface water runoff. Community level funding may be available to support these projects and consideration may be given by resident to raise this at the flood action group for the flood action group and risk management authorities to work collaboratively and progress this.
   Relevant RMA - Residents
7. The highway act provides an opportunity for the highway authority to reduce run-off onto the roads. This may be an option to compel landowners to provide sufficient drainage for driveways and extensions. This work would reduce the discharge of surface water run-off. This could also be addressed through the installation of SuDS. Either by retrofitting from residents or other catchment management schemes. Risk Management Authorities should also help to educate residents in order to proactively limit the discharge of water onto the highway.
   Relevant RMA – Residents and all RMAs
8. Risk management authorities may consider options to reduce the risk of surface water flooding through capital intervention within this catchment.
   Relevant RMA – All RMA's
9. Surrey County Council Highways may consider increasing the cleaning regime of gullies in the Worcester Park area.
   Relevant RMA - Surrey County Council Highways

10. Surrey County Council Highways may consider issuing notice or providing signage prior to cleaning the local gullies to ensure vehicles are not obstructing the highway drainage at the time of jetting.
    Relevant RMA - Surrey County Council Highways
11. Epsom and Ewell and the Environment Agency may consider designating the area as a Critical Drainage Area, or similar to restrict development within this catchment. This may also include reviewing permitted development applications to consider flood risk.
    Relevant RMA – Epsom and Ewell Borough Council, Surrey County Council Flood and Climate Resilience Team and The Environment Agency
12. Relevant RMAs to review EA Catchment flood Management Plan (CFMP) 2009 and the London Borough of Sutton Surface Water Management Plan (SWMP) 2011. In order to consider accepting the flood risk and redeveloping the area as a long-term consideration.
    Relevant RMA – All Risk Management Authorities
13. The Environment Agency may consider re-assessing the fluvial flood risk designation for the culverted sections of the Beverley Brook and include the area in the Flood Alert and Flood Warning areas for the Beverley Brook.
    Relevant RMA – Environment Agency
14. The recommendations made within this report should be considered collaboratively with The Royal Borough of Kingston Upon Thames and The London Borough of Sutton.
    Relevant RMA - The Royal Borough of Kingston Upon Thames, The London Borough of Sutton & Surrey County Council Flood and Climate Resilience Team

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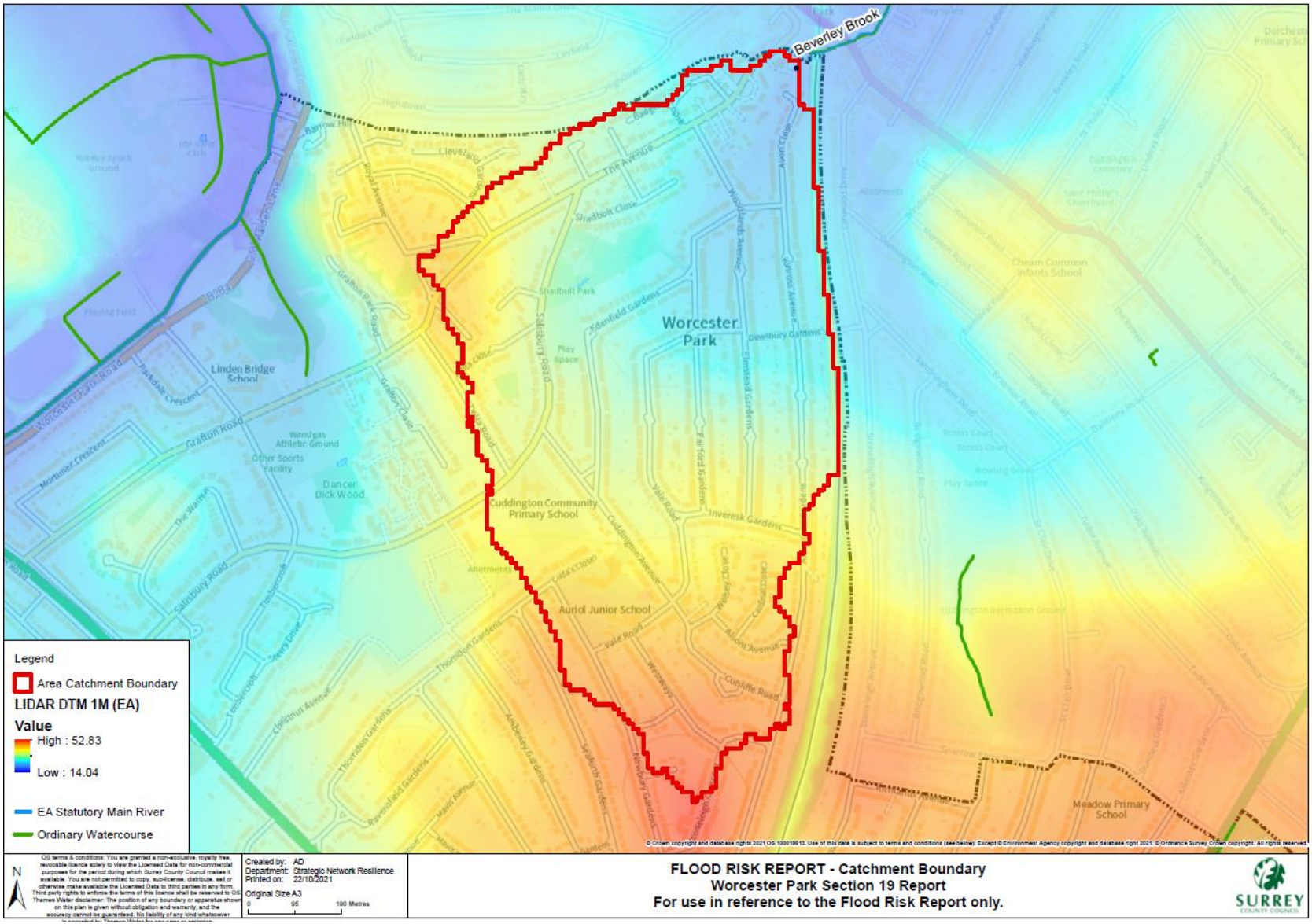
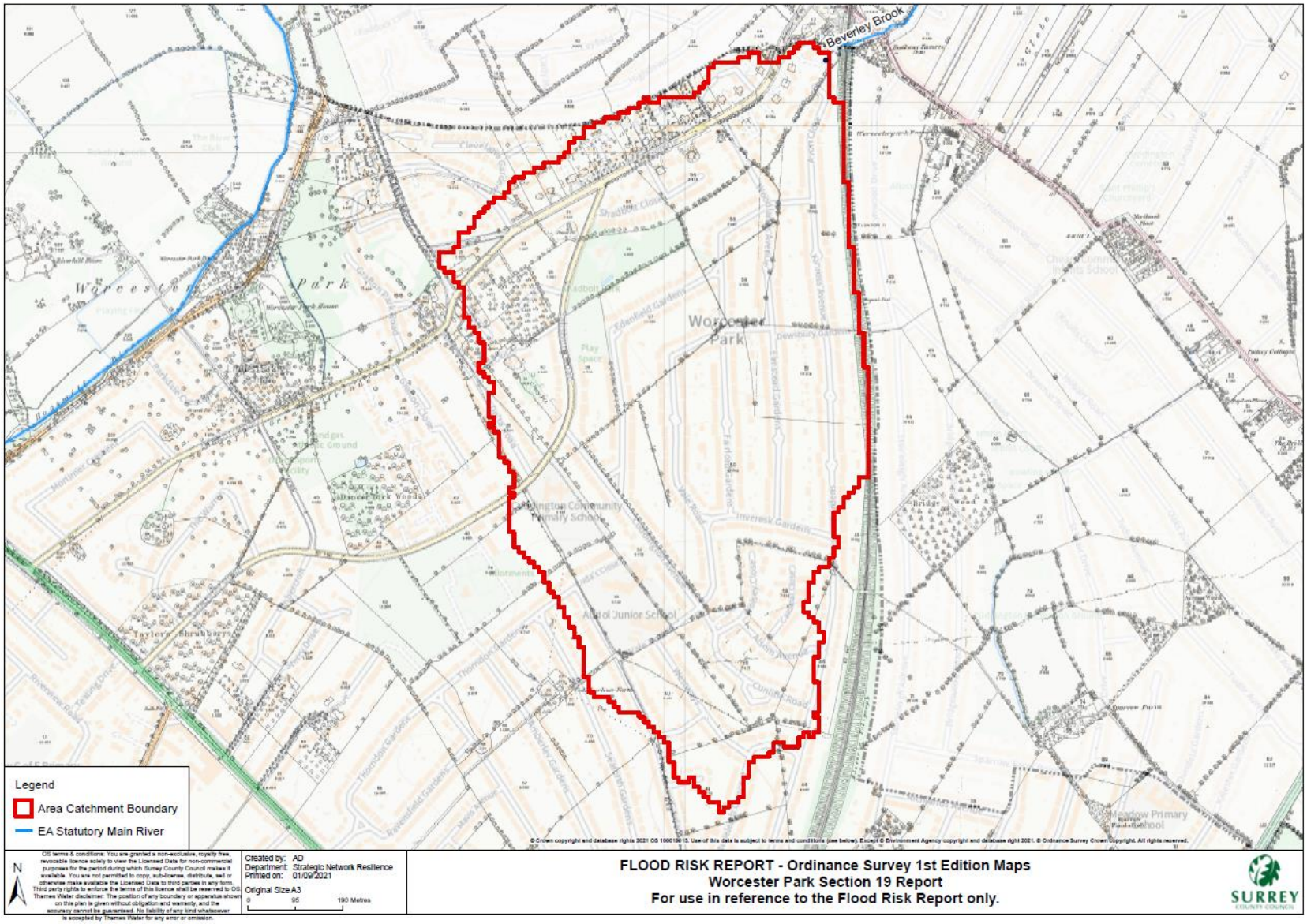
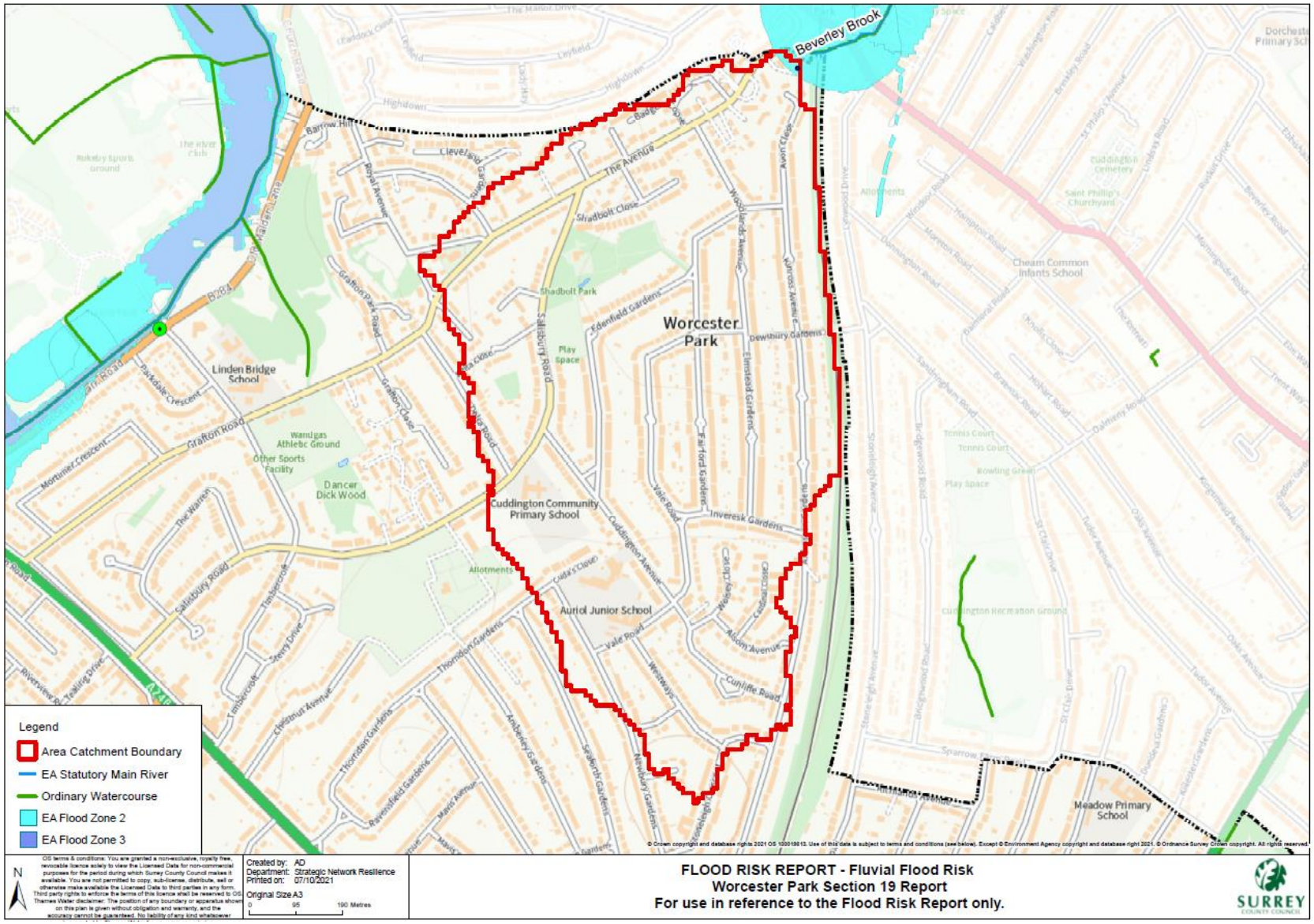
Appendix A –Topographical Map



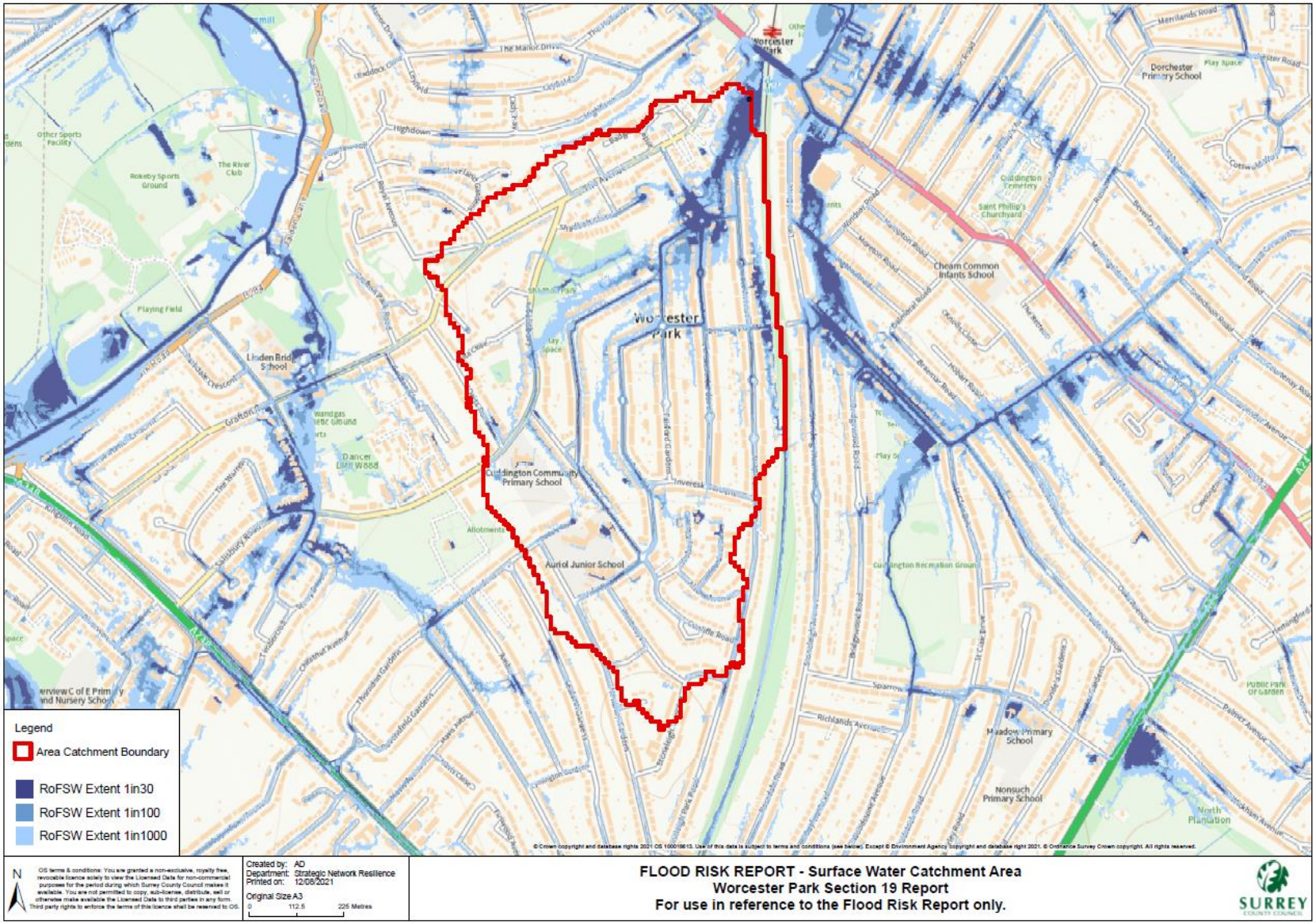
Appendix B – 1st Edition Ordinance Survey Map



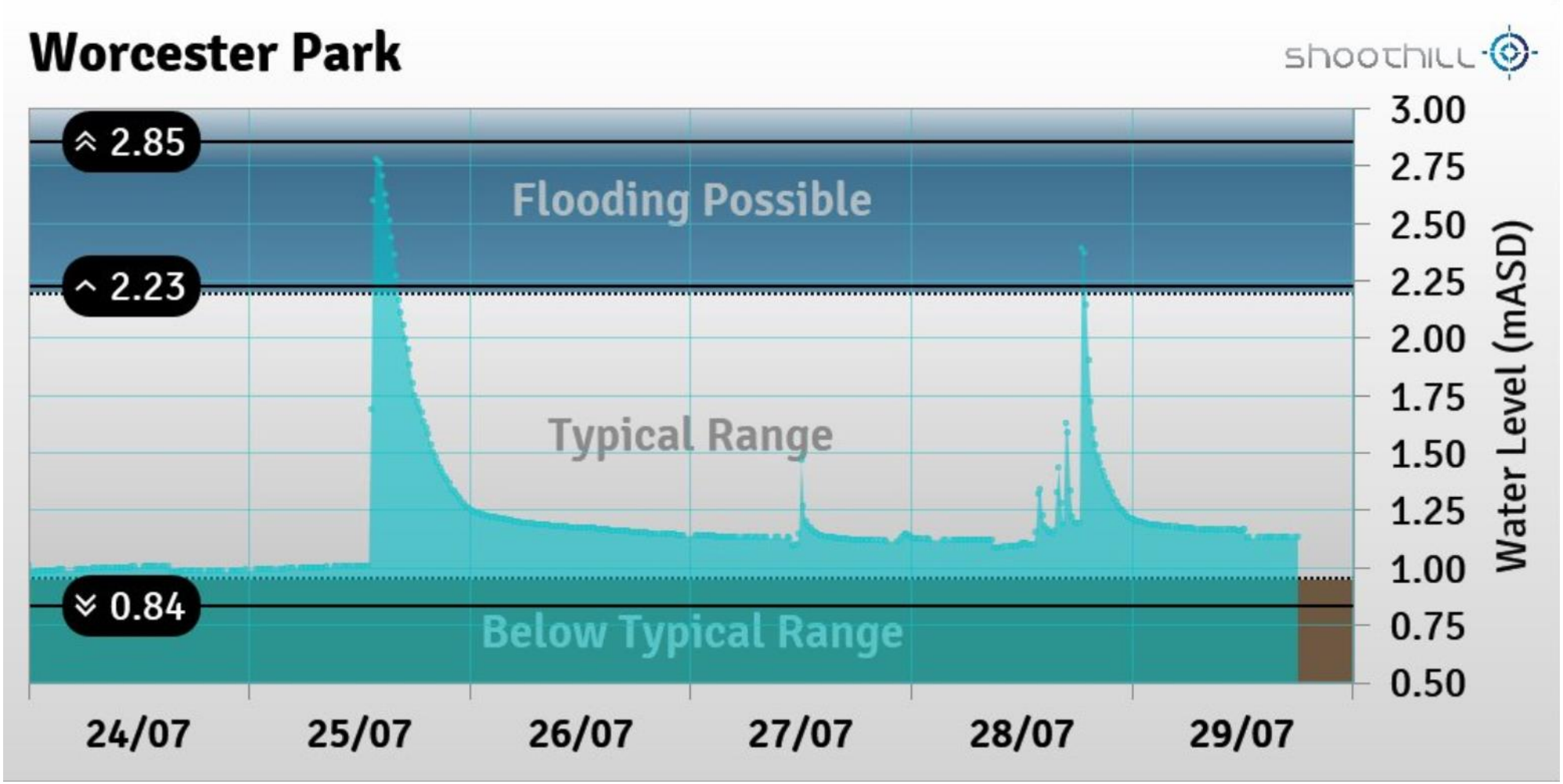
Appendix C – Fluvial Flood Risk



Appendix D – Surface Water Flood Risk



Appendix E - Shoothill Gauge Map Beverley Brook Telemetry System



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[7] https://www.gaugemap.co.uk/#!Detail/1275
www.shoothill.com