



Counters Creek
Technical Appendix
Catchment Connectivity



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Section 1

Introduction

- 1.1 This is a technical appendix which provides supplementary information to the main Counters Creek Understanding of Flood Risk and Long-Term Strategy report. Table 1 shows the clauses in the performance commitment to which the supporting evidence relates.

Table 1: Relevant clauses of the performance commitment

Requirement	Appendix section
A sufficient understanding of predicted flooding and flows in the extremities of, and external to, the Counters Creek catchment so that any transfer of flows or risk from outside the Counters Creek catchment to within the Counters Creek catchment are fully understood.	2 and 3

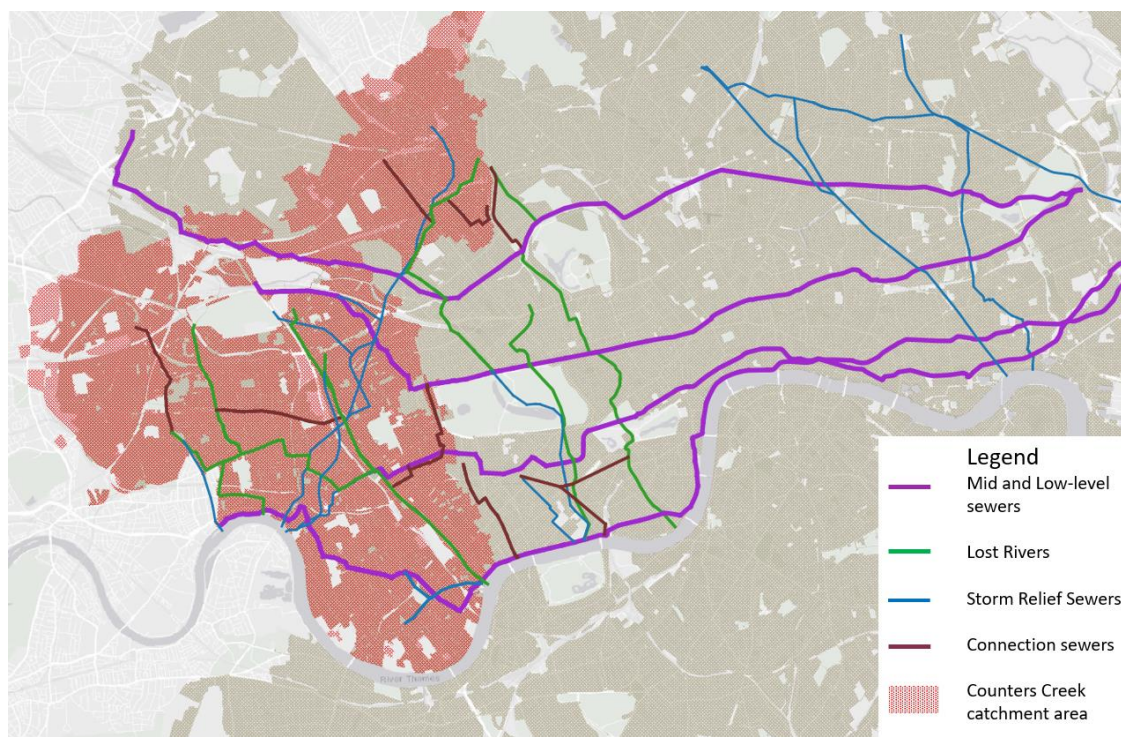
Section 2

Catchment Connectivity

A Connectivity with other areas

2.1 Our understanding of the risk of flooding starts with us having an in-depth knowledge of how the Counters Creek catchment connects with other parts of the London sewerage system and how risk has been managed over time. This allows us to fully assess the impact of rainfall, lost rivers and surface water on flows into the Counters Creek catchment.

Figure 1: Map of Counters Creek catchment showing main sewer connections with surrounding catchments



2.2 Figure 1 shows that the sewerage system was built in 1860's with flows running from west to east via the low-, mid-, and high-level sewers (shown in purple) and the lost rivers, which have been incorporated into the sewerage system running north to south (shown in green). Once the sewer network approached full capacity, new storm relief sewers were constructed (shown in blue), which take flows towards the river via strategic pumping stations or gravity outfalls.

2.3 The storm relief sewers are at a lower level than the local and trunk sewer networks. Flows cascade from connected properties into local and trunk sewers, and into storm relief sewers. When capacity is exceeded flows overflow into the river Thames, or into the Thames Tideway Tunnel once it is operational.

2.4 Counters Creek forms the northwest part of the Beckton catchment. It borders the Mogden catchment which takes flows to the west and Deephams to the north. Deephams is



connected to the Beckton catchment downstream of Counters Creek and this does not increase flood risk in Counters Creek.

- 2.5 We have modelled the risk of flooding from all areas of the Beckton Catchment on each other and the impact from the Mogden Catchment, therefore we have a good understanding of the impact of rainfall upstream and downstream of Counters Creek.
- 2.6 Our model build, verification and other ongoing improvements have allowed us to have a very good understanding of the dry weather and storm flow paths across the whole of the Beckton sewerage network. With the addition of long term monitors we have a detailed knowledge of how the cross-connectivity of the networks responds in storm events, which continues to grow as more monitors are installed. We plan to install further sewer alert monitors across the Beckton catchment as described in section 3.57 of the main report.
- 2.7 In the Counters Creek Catchment itself, Hammersmith and Fulham and Kensington and Chelsea are hot spot areas of flood risk due to their low-lying nature, the density of basement properties and their proximity to the River Thames.

B Risk of flooding from other areas in the Beckton Catchment

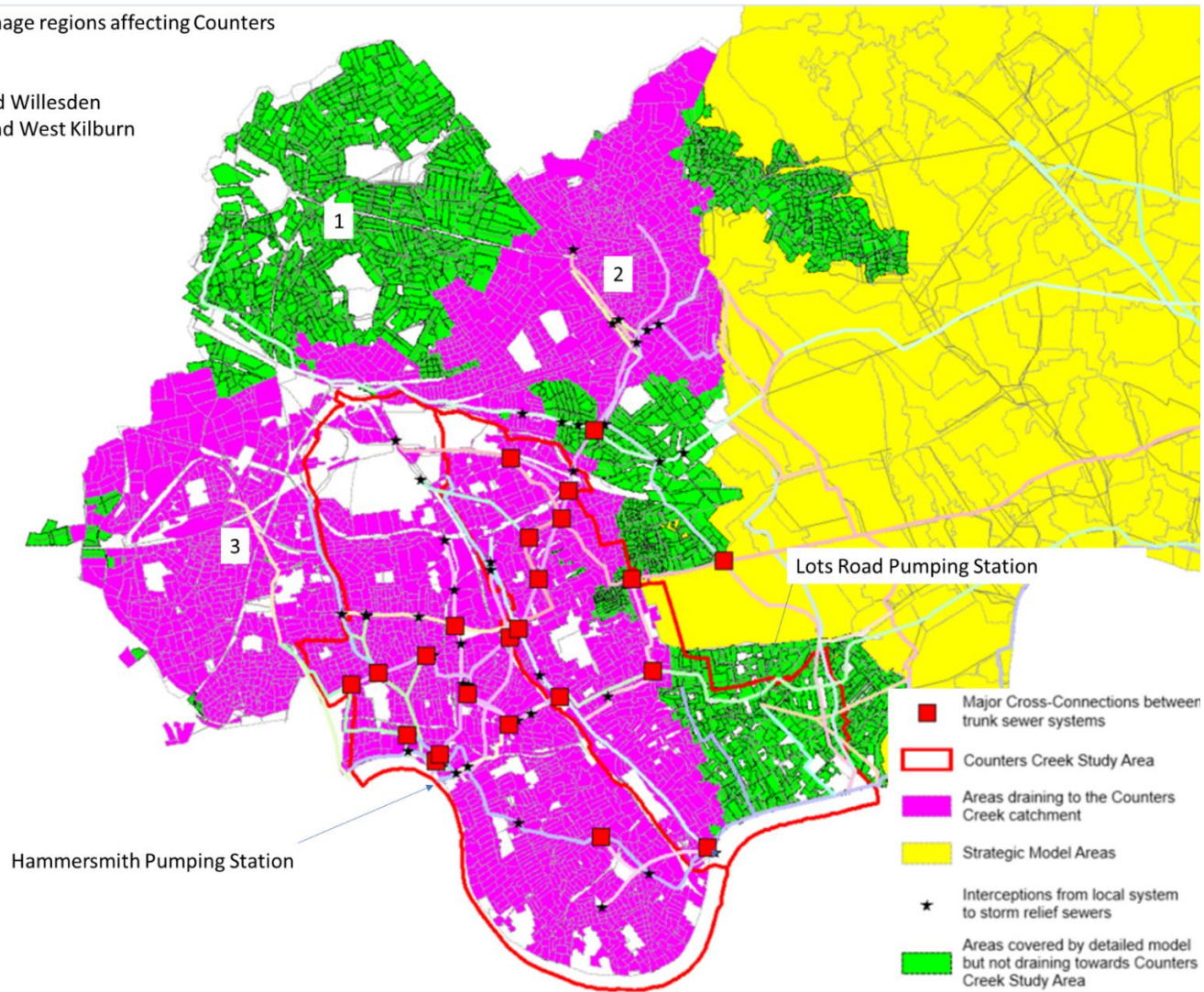
- 2.8 Figure 2 shows the areas which are adjacent to the Counters Creek catchment, and which have the potential to affect flood risk. The red outline is Counters Creek. Areas highlighted in pink show the areas of the catchment which drain to either Hammersmith Pumping Station or Lots Road Pumping Station. These include flows from Maida Vale, West Kilburn and Acton, which contribute flows into the Counters Creek Catchment. The areas shown in green and yellow do not contribute flows to the Counters Creek catchment.
- 2.9 Area 1, Harlesden and Willesden drains to the Mid-Level No. 2 (ML2) sewer which is then conveyed west to east to Wick Lane and the start of the Northern Outfall Sewer (NOS) situated to the north of Abbey Mills Pumping Station. It does not increase flood risk as the cross connection into the Counters Creek Catchment is closed.
- 2.10 Area 2, Maida Vale and Kilburn, drain to the Ranelagh Main Line trunk sewer under normal flow conditions, which connects with the ML2 and drains to the east towards Beckton STW. Under storm conditions, there are various interceptions into the North-western Storm Relief sewer in the area which then convey flows from north to south into the Counters Creek catchment and Hammersmith SPS. The North-western Storm Relief sewer connects with various other storm relief sewers in the Counters Creek catchment, such as the North Kensington Storm Relief Sewer (SRS), the Hammersmith SRS and the Brook Green Sewer. The cross-connections have the potential to increase flood risk, as more flows are passed from north to south and are conveyed into the Counters Creek area. However, in the event that the Counters Creek area is already full, flows are diverted automatically east meaning that flood risk in Counters Creek does not increase as a result of flows from Area 2.



Figure 2: Key sub-regions which contribute to and interact with the Counters Creek Catchment

Beckton key drainage regions affecting Counters Creek

- 1 – Harlesden and Willesden
- 2 – Maida Vale and West Kilburn
- 3 – Acton



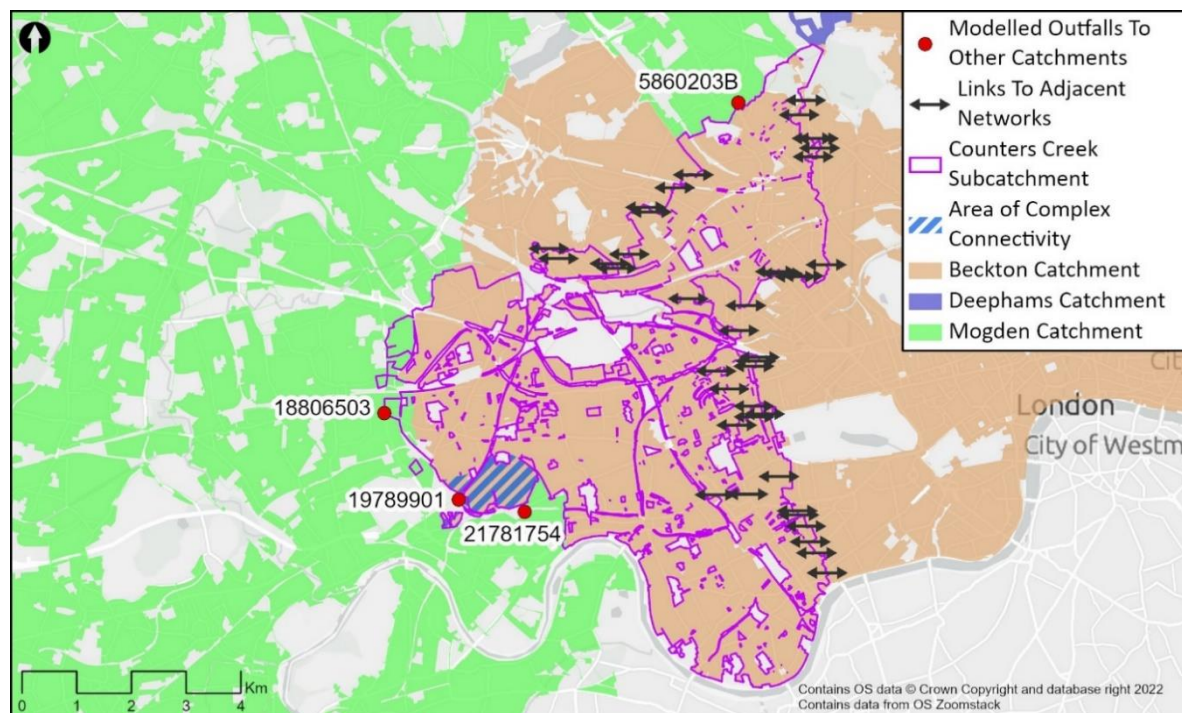


- 2.11 For a 1 in 30-year return period event, the model does not predict flooding for properties in Area 2, as the flood risk has been reduced through flood prevention projects built during AMP5. The analysis to support this is contained in section 4.3.2 of the Stage 3 Report of the London Flooding Review. There is a localised area around the junction of Kilburn Park Road where the model predicts levels to be above basement flooding level but not above ground level, so properties in this area may flood if they have basements. This correlates with properties which reported flooding in extreme rainfall in July 2021. Overland flow is considered to be an influencing factor in flood risk, where flows cannot enter the sewer system, or pond on the surface.
- 2.12 Area 3, Acton, drains to the Acton storm tanks before joining the Stamford Brook Sewer and then the Low-Level No. 1 (LL1) sewer. As the LL1 sewer is one of the main flow routes through the Counters Creek study area, flows from Acton can use available sewer capacity and, therefore, increase flood risk in Acton. The risk of flooding depends on the magnitude and position of the rainfall event. In storm events, there are alternative flow paths in Acton: either via the Acton Storm Tanks or via the Stamford Brook overflow to spill to the river Thames, which provides a relief point for the system.
- 2.13 Modelling results for the 1 in 30-year return period event show levels in the system are high and there is a risk of flooding locally within Area 3. Reported flooding does not correlate well with the hydraulic model and we know that the model over predicts the risk of flooding. We will be undertaking further investigations to improve our understanding of this area as part of our Beckton Catchment Strategy Plan.
- 2.14 The risk of flooding downstream of the Counters Creek area is low because there is available capacity downstream in Westminster, in the Beckton catchment. There is some backing up from downstream catchments, but this is localised and occurs when the storm relief sewers don't have capacity. This does not result in flooding.

C Risk of flooding from cross connections with Mogden Catchment

- 2.15 In the main report we explained that we had undertaken further work to understand the potential risk to flooding from the cross connections with the Mogden catchment.
- 2.16 Figure 3 shows four cross connections as red dots. Site surveys have confirmed connection number 21781754 was planned but never built. Connections 18806503 and 19789901 exist but they drain towards Mogden STW and away from the Counters Creek catchment and therefore will have a low impact on flows in the Counters Creek catchment. 5860203B is a piped connection of 450mm diameter but does not drain through, or surcharge into, the Counters Creek catchment as it connects further east of the catchment. We are confident that these cross-connections do not have an impact on the flood risk in the Counters Creek area.

Figure 3: Beckton catchment cross connections



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D Summary

- 2.17 The risk of flooding downstream of the Counters Creek area is low because there is available capacity downstream in Westminster in the Beckton catchment. There is some backing up from downstream catchments, but this is localised and occurs when the storm relief sewers don't have capacity. This does not result in flooding.
- 2.18 There is a risk of flooding upstream of Counters Creek in Acton, which varies depending on the magnitude and position of the rainfall event. Acton flows are largely controlled by the Acton storm tanks and the new Tideway connection on this site. In this area it is known that the hydraulic model over predicts the risk of flooding, so further investigations will be undertaken as part of our Catchment Strategy Plan.
- 2.19 There is no discernible increase in flood risk from the interactions with the Mogden catchment because the 150mm pipes contribute a very small proportion of the total volume in the connected areas.

