An audit of the surface water outfalls, "Outfall Safari" along the Ravensbourne, Quaggy and Pool

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ACKNOWLEDGEMENTS

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1. AIMS

The Outfall Safari programme in London works with local communities to survey each tributary of the Thames that flows above ground within Greater London on a four-year rotation. The Outfall Safaris form part of a wider programme of work to improve the condition of London's rivers by improving water quality and supporting the restoration of habitats and wildlife populations.

Much of outer London is served by a separate drainage system, where foul sewers carry wastewater to sewage treatment works, while surface water drains discharge to the nearest watercourse. Cross-connections between these systems can result in sewage entering the surface water network and being discharged into rivers through surface water outfalls. These can arise from misconnections, blockages, or failing or poorly designed infrastructure. Further information on water quality across London can be found here. Surface water outfalls can also provide a pathway for other pollutants, including road runoff and chemicals washed into surface water drains.

Through systematic surveys of surface water outfalls, signs of pollution can be identified and assessed across a catchment. The resulting data are shared with Thames Water for follow-up assessment and potential inclusion in the Surface Water Outfall Programme (SWOP), as well as with Catchment Partnerships and Environment Agency representatives. This helps to identify and prioritise potentially polluting outfalls for further investigation and action to improve water quality across London's rivers.

The 2026 Ravensbourne, Quaggy and Pool Outfall Safari included the following watercourses:

- Ravensbourne
- Quaggy
- Pool
- The Beck
- Kyd Brook
- Chaffinch Brook

The aims of the 2026 Ravensbourne, Quaggy and Pool Outfall Safari were to:

- Record and map dry-weather conditions of outfalls across the Ravensbourne catchment.
- Assess and rank the potential pollution impact of outfalls and report polluting outfalls to Thames Water for further investigation.

- Recruit and engage volunteers from communities surrounding the Ravensbourne, providing them with the knowledge and information needed to identify and report pollution to Thames Water and the Environment Agency on an ongoing basis.

2. METHODS

The Outfall Safari programme is designed to identify and assess potentially polluting surface water outfalls in urban river catchments. Thames Water assigns known outfalls a unique reference number and What3Words location to support the identification of individual assets. The development of long-term records associated with individual assets could, in future, enable pollution histories to be tracked over time. Trained volunteers systematically conducted bankside surveys, recording both known Thames Water outfall locations and any additional outfalls identified during the survey that were not currently recorded as known Thames Water assets. Survey data were recorded and submitted using the Cartographer survey platform. A comprehensive guide to the Outfall Safari methodology and associated resources can be accessed via ZSL's London's Rivers webpage: A guide to running an Outfall Safari (London's Rivers | ZSL).

Each outfall was assessed using a standardised survey method. Surveyors recorded the flow of discharge from the outfall, ranging from no flow to high flow. Outfalls were then scored against two indicators of potential pollution: the downstream visual impact, scored from 0 to 10 and ranging from no visible effect to an impact extending more than 30 m downstream of the outfall; and the condition of the discharge, scored from 0 to 10 and ranging from no visible or olfactory evidence of pollution to severe indicators such as gross odour, gross sewage or a very extensive pollution problem. The scores for these two indicators were combined to give each outfall an overall score between 0 and 20. Flow was recorded as part of the assessment but did not contribute to this score. Any outfall scoring 10 or above was required to be reported immediately to Thames Water for further investigation, with volunteers also encouraged to report these outfalls to the Environment Agency where possible.

Surveyors photographed each outfall as part of the assessment. Submitted surveys were subsequently reviewed and quality checked by ZSL staff through Cartographer, with photographs used alongside the recorded survey information to verify assessments and approve records.

Volunteers also recorded sections of river that could not be surveyed from the bank due to restricted access or insufficient visibility of the channel. These records were used to identify sections requiring additional survey effort, with in-channel surveys subsequently undertaken by ZSL staff where required.

3. RESULTS

A total of 21 volunteers took part in the Outfall Safari training on 31/03/2026. Surveys were conducted between 02/04/2026 and 20/06/2026. In-channel surveys were required and were completed on 15/07/2026, 20/07/2026 and 21/07/2026.

Of the 45.6 km of un-culverted waterways identified to be surveyed, 38 km (83.3%) of the river was surveyed, comprising 29.9 km (65.6%) of bankside surveys and 8.1 km (17.7%) of in-channel surveys. A further 4.9 km (10.8%) was classified as inaccessible, while 2.7 km (5.9%) was not surveyed (Table 1; Figure 1). Sections classified as inaccessible could not be safely or effectively surveyed due to factors including restricted access, dense vegetation and a lack of safe access to the channel.

Table 1, Coverage of the Ravensbourne, Quaggy and Pool during the Outfall Safari surveys.

	(km)	(%)
Surveyed bankside	29.9	65.6
Surveyed in-channel	8.1	17.7
Inaccessible	4.9	10.8
Not surveyed	2.7	5.9
Total	45.6	100

Surveys identified 236 outfalls within the Ravensbourne, Quaggy, Pool and the other surveyed tributaries (Figure 1). Although the majority showed no evidence of pollution, 18 (7.6%) surface water outfalls scored ≥6 (Table 2; Table 4).

Table 2, Number of outfalls and their respective scores.

Outfall Score	0	4	**6**	**8**	**10**	**12**	**16**
Number of outfalls	208	10	7	5	3	2	1
Percentage (%)	88.1	4.2	3.0	2.1	1.3	0.8	0.4

Six outfalls scored ≥10 (Figure 2), meeting the threshold for immediate reporting to Thames Water under the Outfall Safari survey protocol. Details of these high-scoring outfalls and their associated reporting reference numbers are provided below.

- Survey Number 2: Score 12, Reference number to EA N/A, Reference number to TW 1817447
- Survey Number 42: Score 12, Reference number to EA N/A, Reference number to TW 1817447
- Survey Number 188: Score 10, Reference number to EA N/A, Reference number to TW N/A
- Survey Number 212: Score 16, Reference number to EA N/A, Reference number to TW 1645961
- Survey Number 219: Score 10, Reference number to EA N/A, Reference number to TW 1646005
- Survey Number 236: Score 10, Reference number to EA 01623765, Reference number to TW 01623765

3.1. THAMES WATER REFERENCE NUMBERS

Prior to the Outfall Safari survey season, Thames Water assigned reference numbers to 304 outfalls in the Ravensbourne. During the surveys, volunteers or ZSL staff identified and scored 112 of these assets. Surveyors also discovered 124 outfalls that did not have an associated Thames Water reference number (Table 3; Figure 3).

Table 3, Thames Water Outfall Reference Number Information.

Total number of Thames Water outfalls assigned reference numbers	304
Outfalls present and recorded with a Thames Water reference number during the survey	112
Number of outfalls recorded with no Thames Water reference number	124
Number of outfalls with a Thames Water reference number that were found to not be present	5

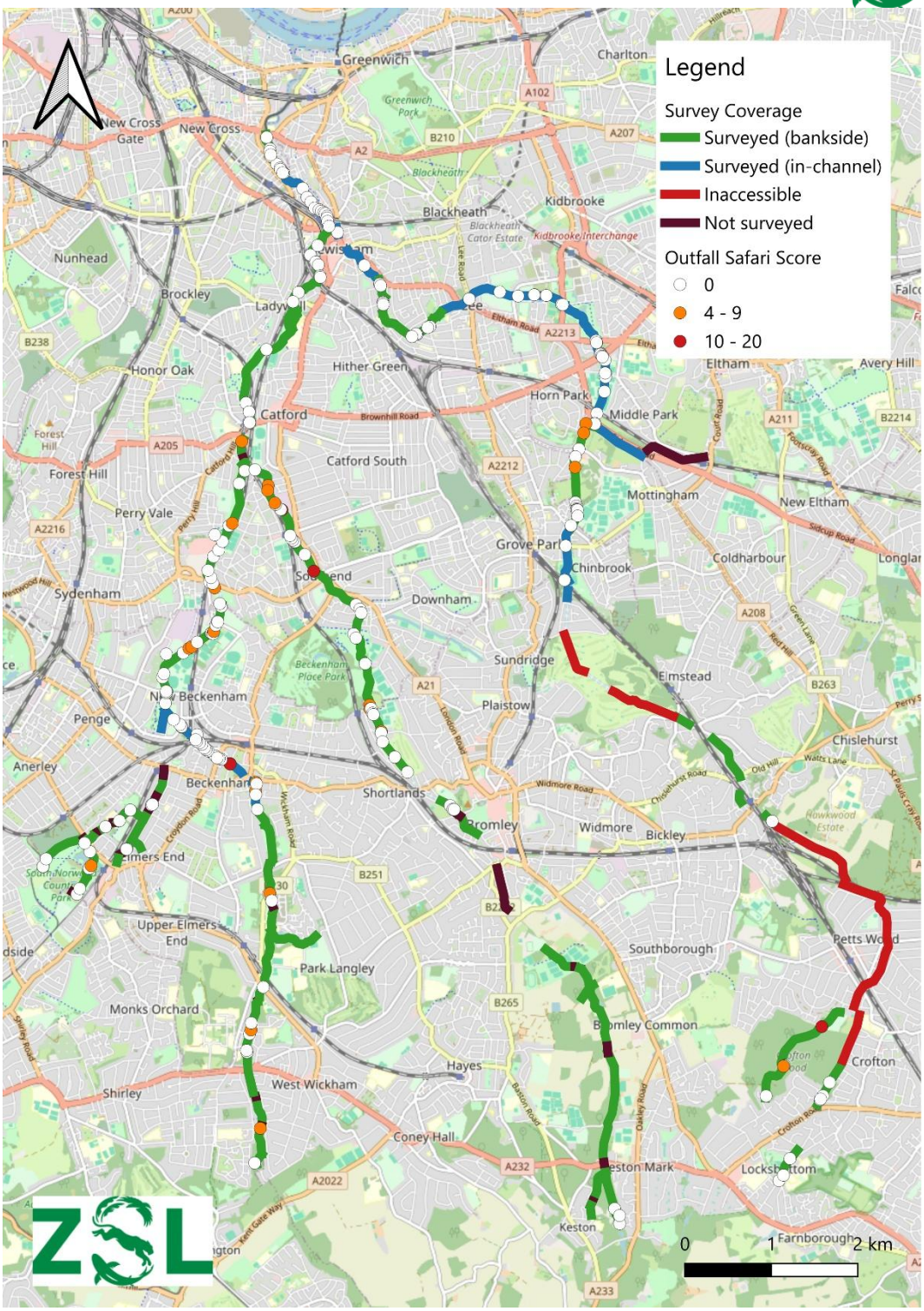


Figure 1, Surveyed sections of the Ravensbourne, Quaggy and Pool Outfall Safari area, with the locations and scores of assessed outfalls.

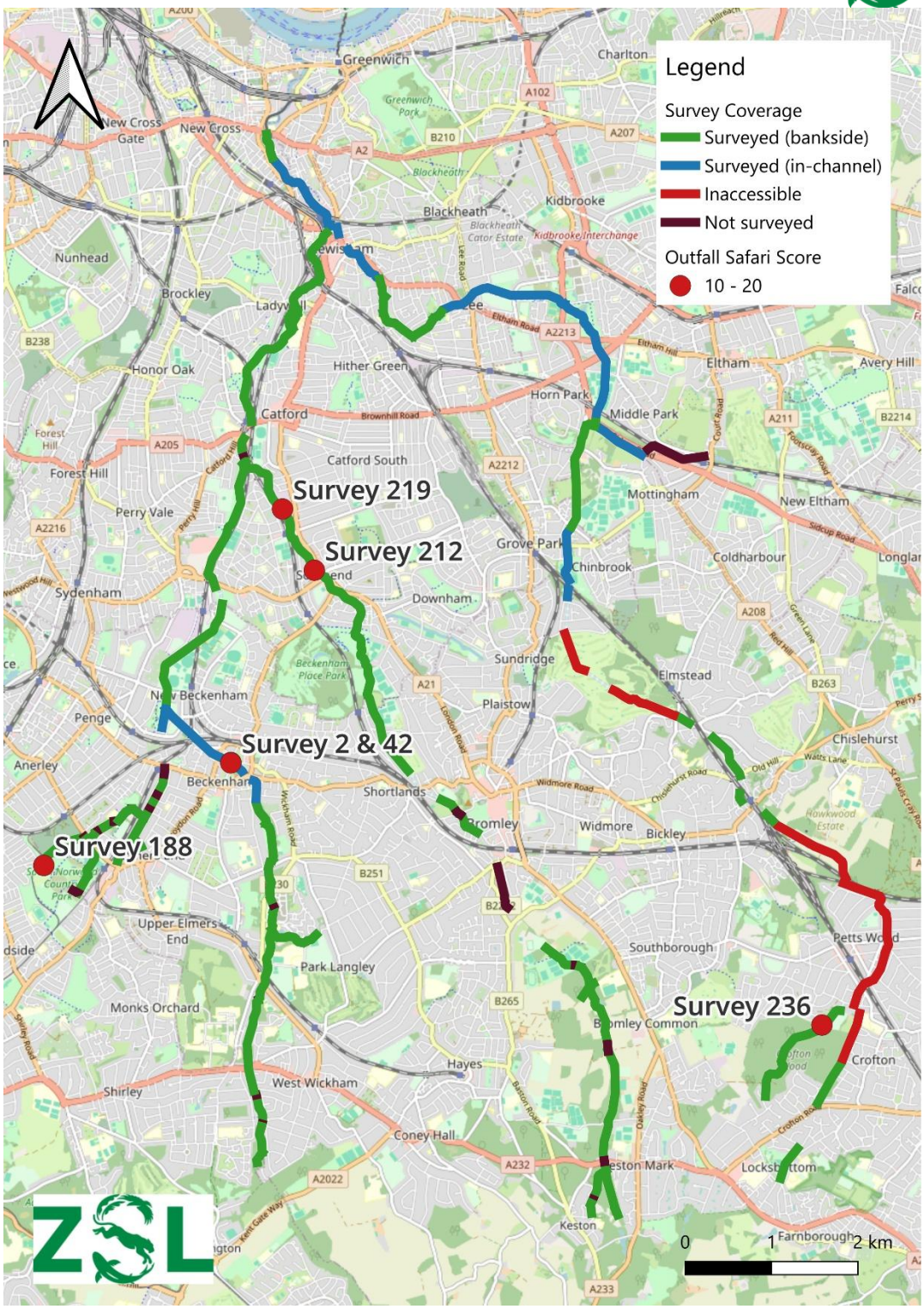


Figure 2, Locations of high-scoring outfalls (Outfall Safari Score ≥10) identified during the 2026 Ravensbourne, Quaggy and Pool Outfall Safari.

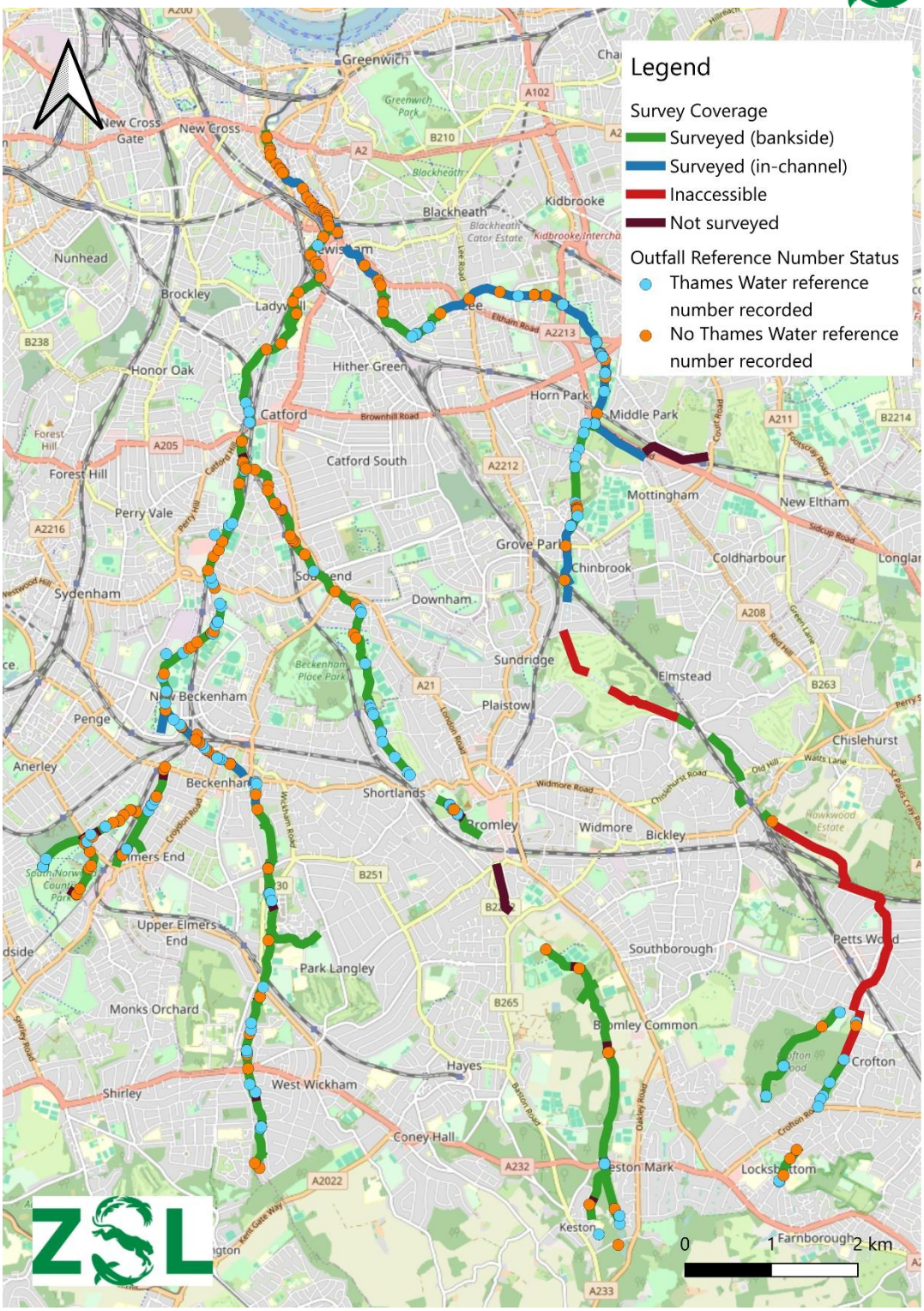


Figure 3, Locations of assessed outfalls with and without a recorded Thames Water reference number.

4. DISCUSSION

The 2026 Ravensbourne, Quaggy and Pool Outfall Safari provided an updated assessment of surface water outfalls across the Ravensbourne, Quaggy, Pool and the other surveyed tributaries. Of the 236 outfall assessments, the majority showed no visible evidence of pollution, with 208 (88.1%) scoring 0. 18 outfalls (7.6%) scored ≥6, including six (2.5%) that scored ≥10. Outfall Safari surveys provide a snapshot of conditions at the time of assessment. Some outfalls may discharge intermittently and therefore show no evidence of pollution when surveyed, while the impact of individual outfalls may vary between surveys. The results should therefore be interpreted only as a snapshot of outfalls that are polluting at the time of survey.

The survey also provided an opportunity to assess the accuracy and completeness of existing outfall location information. Of the 236 outfalls assessed, 112 were recorded with a Thames Water reference number, while 124 had no associated reference number. In addition, five outfalls assigned a Thames Water reference number prior to the survey were recorded as not present. These findings highlight the value of field-based surveys for verifying existing outfall records and identifying additional outfalls. Outfalls without a Thames Water reference number cannot necessarily be assumed to be Thames Water assets, and further investigation is required to establish their ownership and status. Similarly, locations recorded as not present may require further verification to determine whether existing location information needs to be updated.

Survey coverage was affected by access, safety and visibility constraints. Of the 45.6 km of watercourse identified for survey, 83.3% was successfully surveyed, comprising 65.6% surveyed from the bankside and 17.7% surveyed in-channel. A further 10.8% was classified as inaccessible and 5.9% was not surveyed. Restricted access through private or managed land, limited safe access to the channel and dense vegetation prevented some sections from being safely or effectively surveyed. In-channel surveys enabled an additional 8.1 km to be assessed, although these were only possible where suitable access points and safe river conditions were available. In some areas, tidal conditions or sections where the channel passed underground further limited the extent of safe in-channel survey.

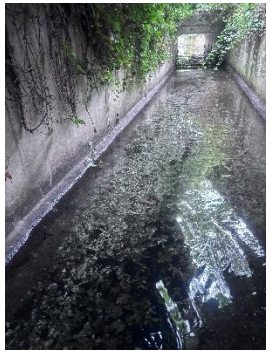
There is an element of subjectivity in assigning Outfall Safari scores, particularly where outfalls are viewed from a distance or visibility is restricted, which may result in some outfalls being under- or over-scored. Photographs submitted with each assessment and subsequent quality checking by ZSL staff provided an additional level of verification. As outfalls scoring ≥10 are

required to be reported immediately to Thames Water, clear training and guidance on applying the scoring criteria consistently are particularly important.

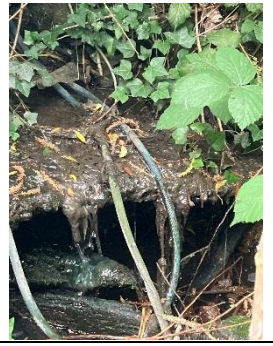
The 2026 survey was undertaken during the first year of using Cartographer as the survey recording platform, and some teething issues were encountered. In particular, pre-existing outfall locations displayed as points on the survey map could be interpreted by volunteers as indicating where an outfall was expected to be present. Some mapped locations did not correspond with an outfall observed in the field, while displaying existing locations may also have directed surveyors' attention towards mapped points and increased the risk of previously unmapped outfalls between these locations being overlooked. Future surveys should reinforce during volunteer training that the entire allocated river section should be systematically searched irrespective of the locations displayed on the map. Consideration should also be given to how pre-existing outfall locations are displayed within Cartographer to minimise potential bias while retaining useful information for surveyors.

Despite these limitations, the 2026 Ravensbourne, Quaggy and Pool Outfall Safari benefited from an engaged volunteer network and enabled a substantial proportion of the survey area to be assessed. Citizen science provides an important means of identifying potentially polluting outfalls and verifying existing outfall information across an extensive river network. Continued refinement of outfall location information, clearer guidance on the use of Cartographer, and consideration of access, vegetation and river conditions when planning surveys should help improve the efficiency and completeness of future Outfall Safaris.

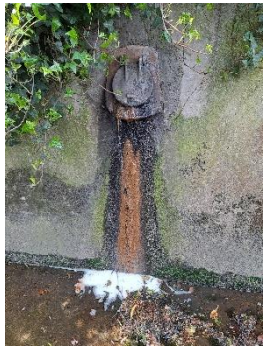
Table 4, Details and photographs of outfalls with an Outfall Safari impact score of ≥6.

Survey Number	Location (latitude, longitude)	Bank Side	Thames Water Reference Number	Outfall Score	Image 1	Image 2	Image 3
1	51.40625, 0.02446	Right	BECK0021	6			
2	51.40906, -0.02868	Left	N/A	12			
36	51.40711, -0.02442	N/A	BECK0020	8			

							
42	51.40902, -0.02869	N/A	N/A	12			
101	51.37122, -0.02367	Right	BECK0009	6			
105	51.38143, -0.02523	Left	BECK0015	6			

							
113	51.44433, 0.030483	Left	QUAG0035	8			
117	51.43981, 0.028684	Left	QUAG0021	6			
138	51.4124, -0.00355	Right	RVBS0043	8			

							
175	51.42729, -0.03128	Left	N/A	8			
185	51.43399, -0.02833	Right	POOL0010	6			

188	51.39837, -0.05982	N/A	CHAF0047	10			
211	51.43791, -0.02236	Left	N/A	6			
212	51.42903, -0.01478	Right	RVBS0035	16			

							
219	51.43539, -0.02008	Right	N/A	10			
223	51.43739, -0.02244	Right	N/A	6			

235	51.37767, 0.063366	Right	RVBS0171	8			
236	51.38178, 0.06974	Right	N/A	10			

Table 5, Areas identified as inaccessible and their respective start and end points.

Nearest road to inaccessible section start	Inaccessible section start (latitude, longitude)	Nearest road to inaccessible section end	Inaccessible section end (latitude, longitude)	Length (m)	Reason for inaccessibility
New Street Hill	51.422675, 0.027069	Sundridge Avenue	51.413923, 0.045229	~1280 m	No access through Sundridge Park Golf Course.
Barfield Road	51.402910, 0.061632	Hazelmere Road	51.3970988, 0.0736486	~1130 m	No access through Hawkwood Estate owned by National Trust.
Hazelmere Road	51.396553, 0.073138	Shepperton Road	51.383760, 0.075180	~1250 m	No safe access; channel runs between residential properties.
Shepperton Road	51.3830531, 0.0759866	Sparrow Drive	51.3782484, 0.0732096	~560 m	No access through Crofton Junior School; dense vegetation in Roundabout Wood preventing safe access.

Table 6, Areas identified for in-channel surveys, their respective start and end points, and associated access points.

Nearest road to in-channel start point	In-channel start point (latitude, longitude)	Nearest road to in-channel end point	In-channel end point (latitude, longitude)	Nearest road to in-channel access point(s)	In-channel access point(s) (latitude, longitude)	Length (m)	Notes
Deals Gateway	51.4718591, -0.0217867	Granville Grove	51.4639012, -0.0107410	Brookmill Road Station Road	51.4717781, -0.0218436 51.4648837, -0.0119578	~1320 m	Access points at Brookmill Park and Confluence Park. Northern section becomes tidal so was

							not considered safe for in-channel survey. End point at Lewisham Police station, where the channel goes underground.
Lee High Road	51.4622263, -0.0091313	Eastdown Park	51.4592361, -0.0039120E	Lee High Road	51.4600213, -0.0051775	~560 m	Access via Lidl car park wall.
Brightfield Road	51.4558591, 0.0063694	Kidbrooke Park Road	51.4566426, 0.0265530	Weigall Road	51.4576338, 0.0174286	~1570 m	Access through gate at Weigall Road Playing Fields.
Eltham Road	51.4528229, 0.0320812	Kippington Drive	51.440977, 0.039859	Mottingham Lane	51.4442856, 0.0306531	~1070 m	Access adjacent to Mottingham Lane.
Marvels Lane	51.4335134, 0.0280380	Portland Road	51.4262145, 0.0274526	Chinbrook Road	51.4308762, 0.0272982	~660 m	Access at Chinbrook Meadows.
Kings Hall Road	51.4146217, -0.0395041	Church Avenue	51.4081582, -0.0268217	Kings Hall Road	51.4139491, -0.0397155	~1360 m	Access at Cator Park.
Kelsey Park Road	51.4071727, -0.0248895	Manor Way	51.4052930, -0.0244776	Manor Way	51.4054039, -0.0244234	~230 m	Access at Kelsey Park by the River Beck Stepping Stones.