Brough

Infiltration Reduction Plan

Last Updated: October 2026



United Utilities

Water for the North West

Executive summary

Brough in Cumbria is currently in the intervention stage (see Figure 1) to address infiltration and reduce spills at the Brough Wastewater Treatment Works Storm Overflow. An initial desktop assessment concluded that significant groundwater infiltration was possible, and that spill count may be reduced if this was addressed. CCTV surveys confirmed the presence of infiltration, and interventions to address this were completed in January 2025.

As groundwater infiltration has been found but is yet to be confirmed as the leading cause of spills to the environment, interventions have been completed to address the localised infiltration identified during surveys. As more is known on the outcome of the interventions, this Infiltration Reduction Plan will be updated accordingly. Further interventions are planned for Spring/Summer 2027.

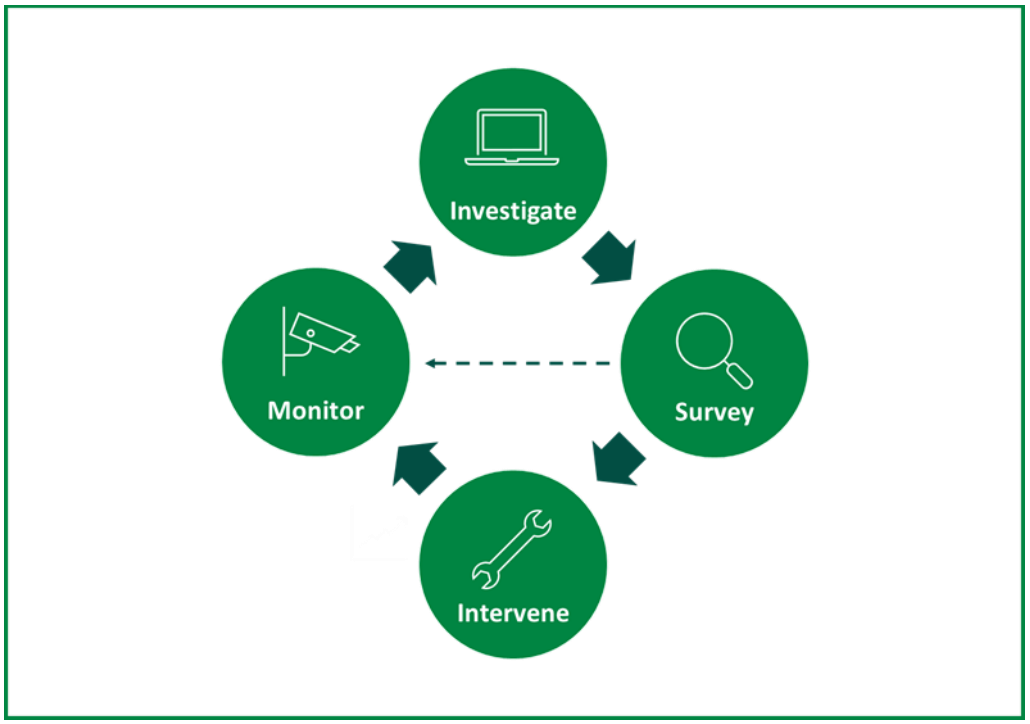


Figure 1: Iterative process to investigate, identify and address groundwater infiltration

Context

Sometimes, water can enter our wastewater pipes, for which they were not designed to receive. One source of these additional flows can be groundwater infiltration which can occur through pipe defects, leaky joints or issues with manholes. Extra water in the network can cause the sewer capacity to be exceeded, leading to sewer flooding or contributing to storm overflow activations.

As part of our ongoing work to maintain an effective network and achieve Better Rivers for the North West, our Infiltration Reduction Plans demonstrate our efforts to date and next steps to address infiltration and inflows in the catchment. This plan covers the Brough drainage area and its associated overflow, the Brough Wastewater Treatment Works Storm Overflow. In 2022, infiltration was identified as a potential leading cause of the storm overflow discharging. The purpose of this plan is to capture the process to investigate, identify and address significant groundwater infiltration.

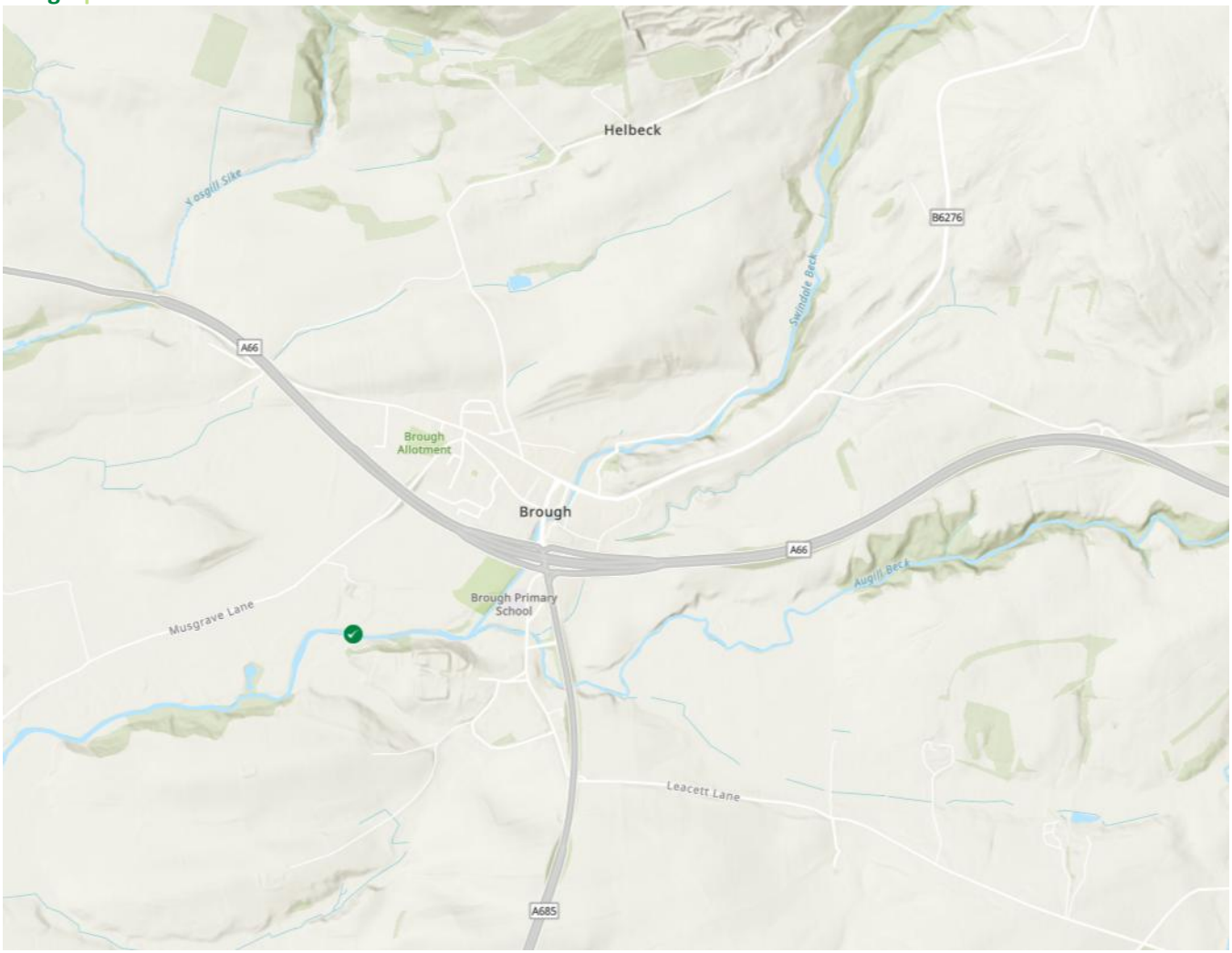


Figure 2: United Utilities – Better Rivers – Storm Overflow Map (September 2024). The green dot marks the Brough Wastewater Treatment Works Storm Overflow

Brough is a town in the Eden Valley, Cumbria. It sits to the west of the Pennines but has a relatively flat topography. Swindale Beck, a tributary of the River Eden, runs through the town.

Investigation

An initial desktop study was undertaken using available data to understand the extent of infiltration in the sewer network of the drainage catchment. The following data (where available) was analysed to determine the scale and location of potential infiltration:

- Relevant flow and depth data
- Operational information
- MCERTS data
- Hydraulic models of the catchment
- River levels
- Groundwater (borehole) data
- Spill analysis
- Topographical and sewer maps

The assessment concluded that significant groundwater infiltration was possible in the catchment. There was evidence of an elevated baseflow, possibly because of seasonally varying groundwater levels. Any reduction in baseflow at Brough was identified as being sufficient to reduce spills.

Further observations also identified areas where sewers crossed the local river. It can be that flow from watercourses enters the sewer network via cracks, or when there is a rise in the water level.

From these findings, it was recommended that CCTV surveys be completed to see if there was infiltration of the watercourse into the sewer. These surveys could also identify if there is land drainage connected into the sewer which, if found, would then be assessed for removal.

Survey

As recommended, we completed 815m of CCTV surveys in Winter 2024. The surveys were assessed using Artificial Intelligence to rapidly identify and locate points of infiltration. They were then reviewed by an engineer to assess for any required remedial works. The presence of infiltration was confirmed, and interventions were recommended as a result.

Checks were carried out on all lateral connections; none are suspected of receiving flows not bound to receive.

Intervention

Interventions were completed in January 2025. This included 5m of patch lining of the sewers in order to seal the network.

Further interventions are planned for Spring/Summer 2027.

Next Steps

Brough is currently in the intervention stage of identifying and addressing infiltration as shown in Figure 1. Interventions are planned for Spring/Summer 2027. The site will then follow the iterative process to monitor the efficacy of these remedial works and identify new points of infiltration, should they arise.

As groundwater infiltration has been found but is yet to be confirmed as the leading cause of spills to the environment, interventions have been completed to address the localised infiltration identified during surveys. As more is known on the outcome of the interventions, this Infiltration Reduction Plan will be updated accordingly.