Embleton

Infiltration Reduction Plan

Last Updated: October 2026



United Utilities

Water for the North West

Executive summary

Embleton in Cumbria is currently in the intervention stage (see Figure 1) to address infiltration and reduce spills at the Embleton Wastewater Treatment Works Storm Tank Overflow. An initial desktop assessment concluded that groundwater infiltration is possible in the area, and that reducing infiltration could reduce spill frequency at the overflow. CCTV surveys identified the presence of infiltration, and interventions are currently underway as a result. A first phase of remedial work was completed in Summer 2026.

A second phase of remedial work is expected to complete by the end of Winter 2026/27. As more is known on the outcome of the interventions, this Infiltration Reduction Plan will be updated accordingly.

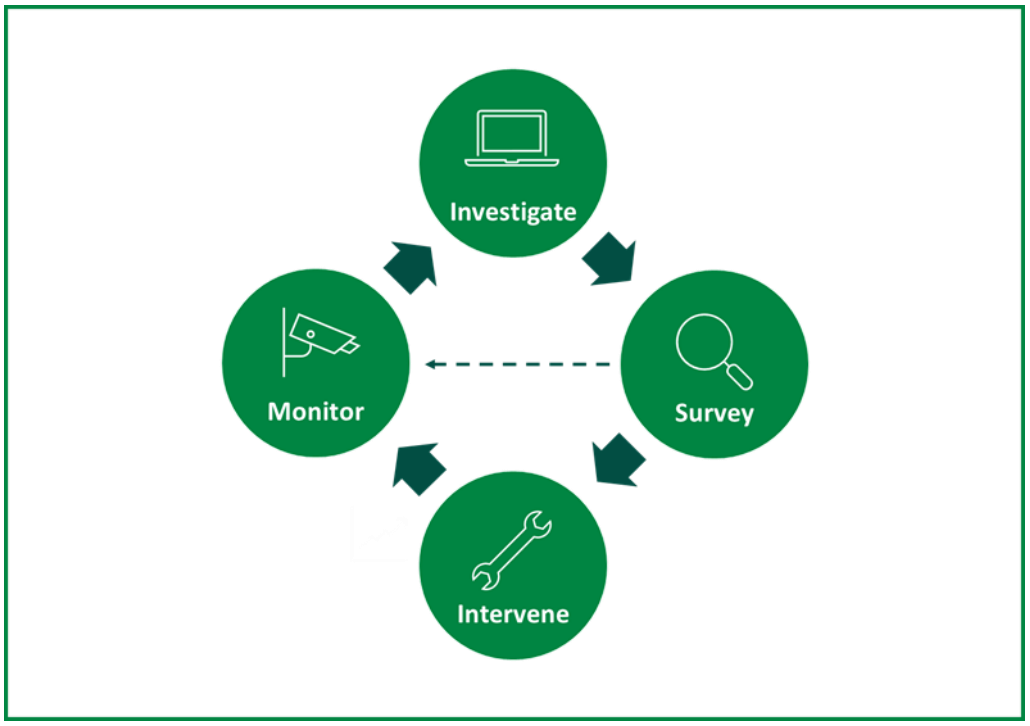


Figure 1: Iterative process to investigate, identify and address groundwater infiltration

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 Embleton drainage area and its associated overflow, Embleton Wastewater Treatment Works Storm Tank Overflow. In 2023, 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.

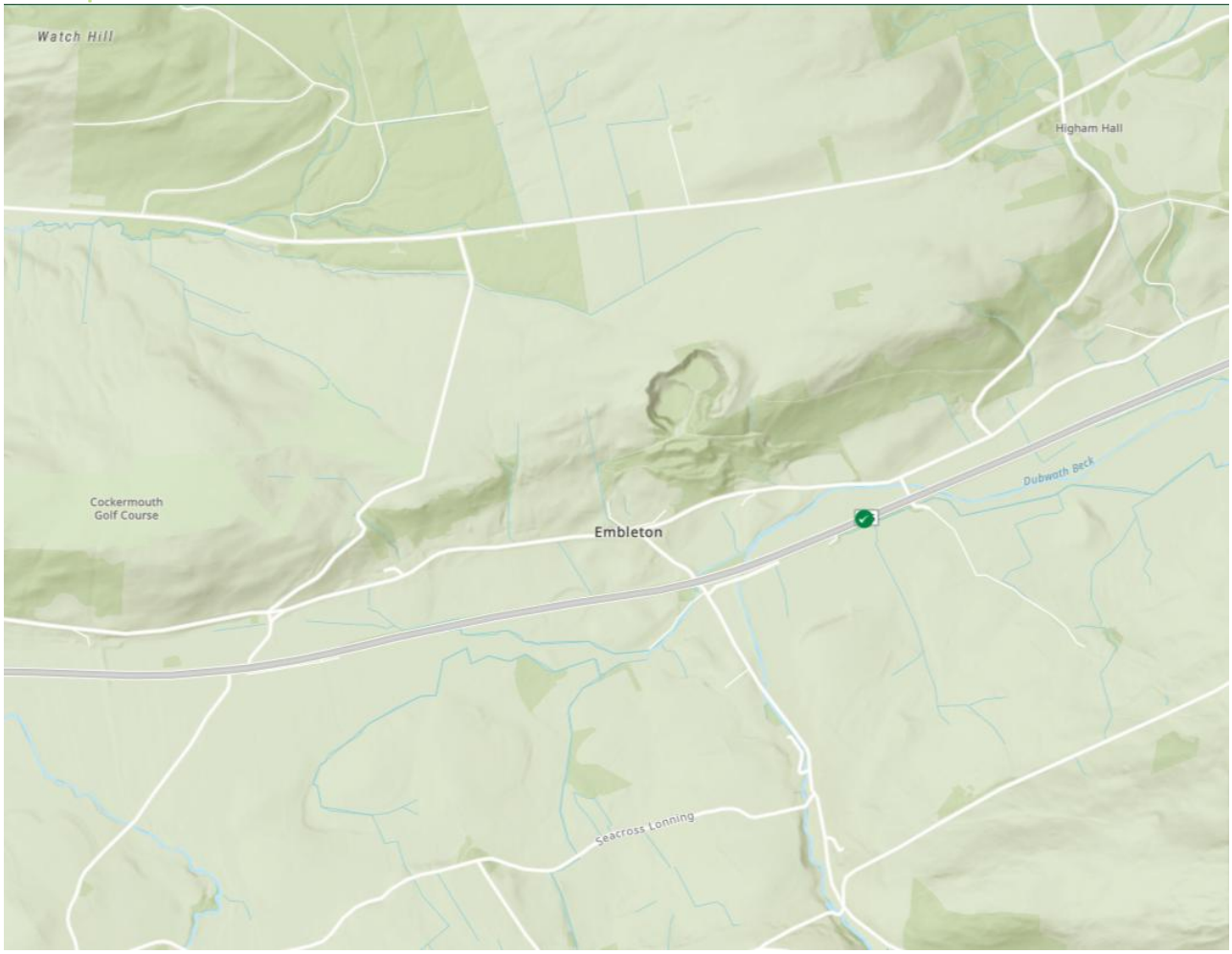


Figure 2: United Utilities – Better Rivers – Storm Overflow Map (September 2024). The green dot marks the Embleton Wastewater Treatment Works Storm Tank Overflow

Embleton is a village located east of Cockermouth. It sits on the border of the Lake District National Park. South of the village, Wythop Beck runs into Dubwath Beck, which flows into Bassenthwaite Lake.

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 seasonal groundwater infiltration was possible in the catchment and rainfall-driven slow response runoff was likely. The contribution of groundwater infiltration to the modelled baseflow used in this assessment could only be determined following further investigations.

The identification of sewers running under or close to watercourses also suggested that further investigation would be required to identify any infiltration into the sewer network.

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

Survey

We completed 490m of CCTV surveys in Autumn/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. Infiltration was detected in a section of the network, and interventions were recommended as a result.

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

In addition, we completed approximately 3,736m of CCTV surveys in Spring/Summer 2026.

Intervention

In Summer 2026, we completed 102m of sewer lining to seal the network and prevent infiltration. A second phase of remedial work is expected to complete by the end of Winter 2026/27.

Next steps

Further interventions are expected to complete by the end of Winter 2026/27. The site will then follow the iterative process displayed in Figure 1 to monitor the efficacy of these interventions 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.