

**Kirk Bampton**

# **Infiltration Reduction Plan**

**Last Updated: March 2025**



## Executive summary

Kirk Bampton in Cumbria is currently in the intervention stage (see Figure 1) to address infiltration and reduce spills at the Kirk Bampton Wastewater Treatment Works Storm Tank and Overflow (017670126ST & 017670126SO). A desktop assessment concluded groundwater infiltration is likely in the area. CCTV surveys have confirmed infiltration, and remedial works are expected to be completed in Spring/Summer 2025.

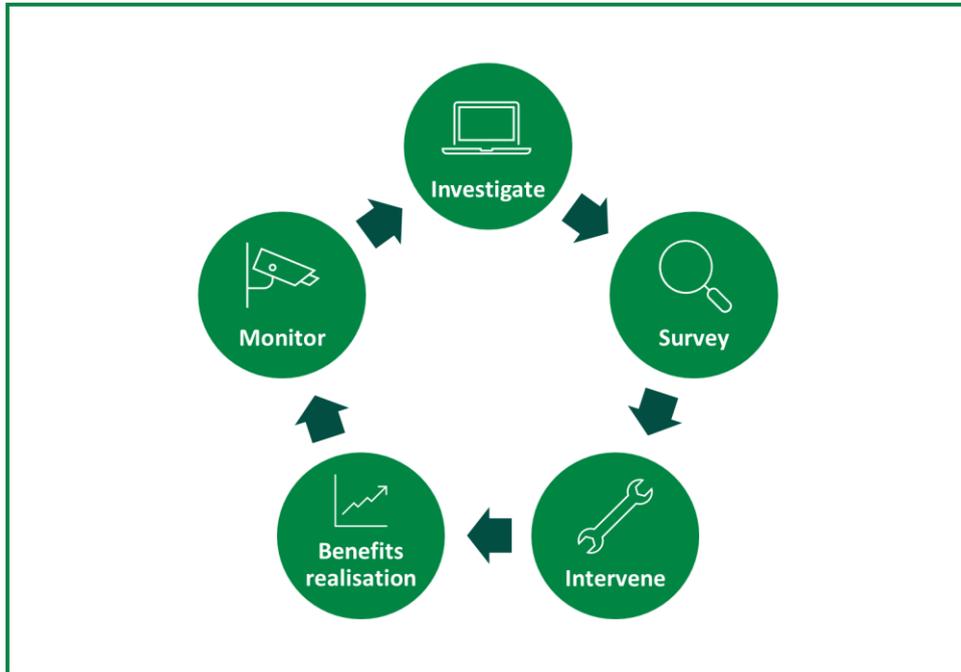
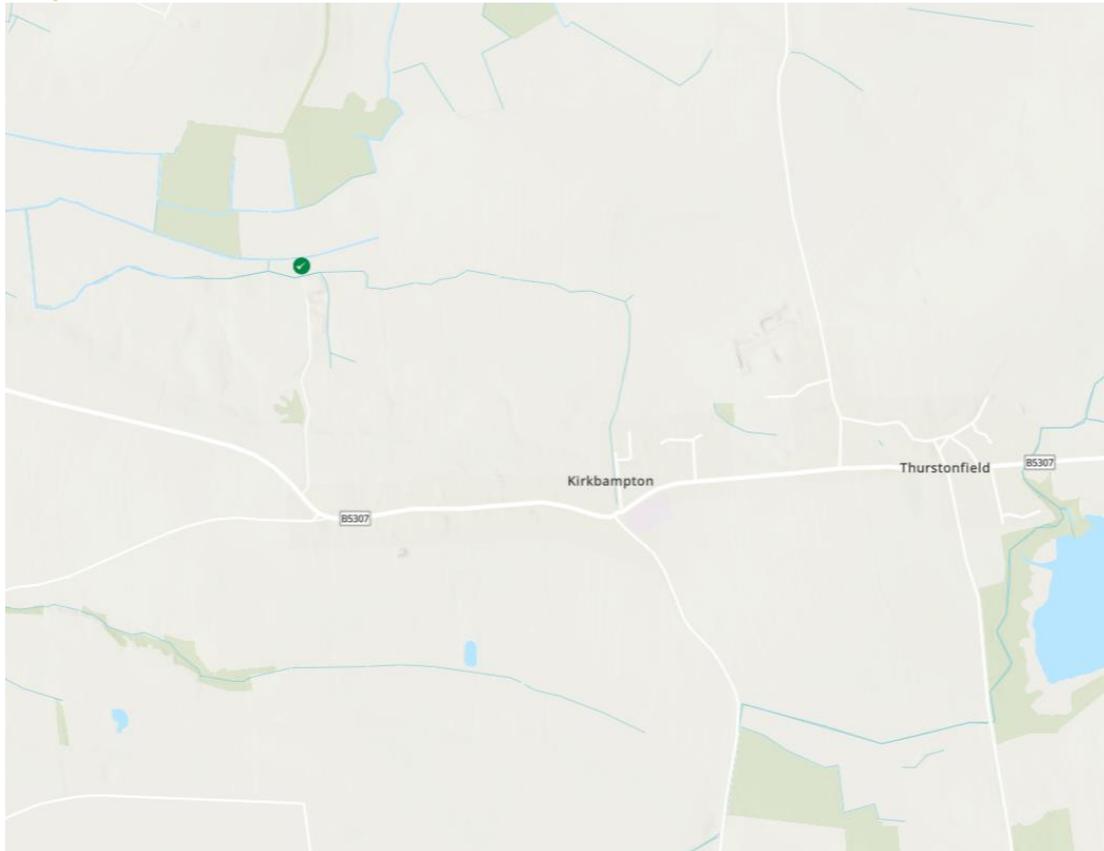


Figure 1: Iterative process to investigate, identify and address groundwater infiltration

## Context

Sometimes, water can enter our wastewater pipes that 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 Kirk Bampton WwTW drainage area and the associated overflow, Kirk Bampton Wastewater Treatment Works Storm Tank and Overflow (017670126ST & 017670126SO). 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 Kirk Bampton Wastewater Treatment Works Storm Tank Overflow.

Kirkbampton village in Cumbria is 6 miles west of Carlisle and is surrounded by farmland and scenic countryside. The small village has a relatively flat landscape considering its proximity to more undulating hills towards the Lake District National Park to the south and the coastal marshes and plains to the north.

## Investigate

A 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 likely in the catchment. Monitoring at the storm tank evidences seasonal changes indicative of groundwater infiltration. Further observations also noted areas of the catchment where the sewer crosses watercourses. It may be that flow from these rivers can enter the sewer system via cracks in the sewer system or when there is a rise in ground water levels.

From these findings, it was recommended that CCTV surveys are completed to see if there is infiltration of the water course into the sewer. CCTV surveys can also identify infiltration of the watercourse into the sewer or land drainage connected into the sewer, which can be removed.

## Survey

As survey works were recommended through the desktop investigations, 1167m of CCTV surveys were completed in Winter 2024 and identified areas of infiltration within the catchment. The CCTV surveys were reviewed by an engineer and assessed using Artificial Intelligence to rapidly identify and locate points of infiltration requiring remedial works. Seeping and running infiltration was discovered entering the pipe at various joints along the sewer length, we investigated the suspected source of the infiltration and suspect it is entering from the adjacent Powburgh Beck.

The network was also checked for inflows and no lateral connections are suspected of receiving flows not bound to receive.

## Intervene

Remedial works to address infiltration are expected to be completed in Spring / Summer 2025. Remedial works at Kirk Bampton could include, but not be limited to, relaying sewers, lining sewers and disconnecting inflows, the best methods for the specific points of infiltration are currently being assessed.

## Next steps

Kirk Bampton is currently in the intervention stage of identifying and addressing infiltration. The site will follow the iterative process displayed in Figure 1 to monitor the efficacy of the remedial works and identify new points of infiltration, should they arise.