

**Plumbland**

# **Infiltration Reduction Plan**

**Last Updated: March 2025**



## Executive summary

Plumbland is currently in the Intervention stage (see Figure 1) to address infiltration and reduce spills at the Plumbland Wastewater Treatment Works Storm Tank Overflow (017570072ST). A desktop assessment concluded that there is the possibility of groundwater infiltration and CCTV surveys confirmed the presence of infiltration. Interventions to address this are underway and due to be completed in Spring / Summer 2025.

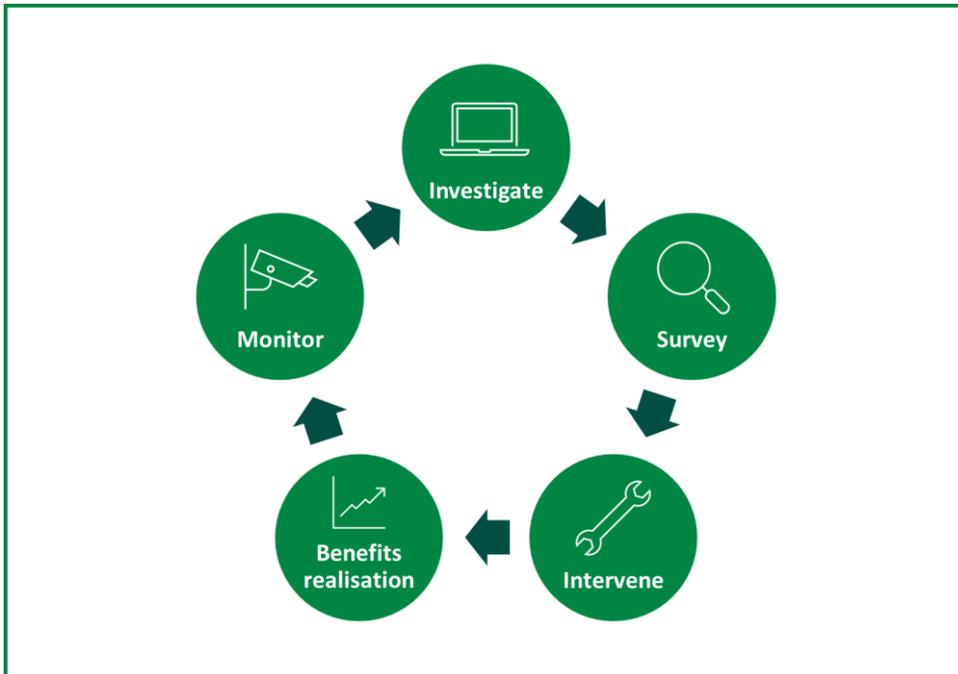
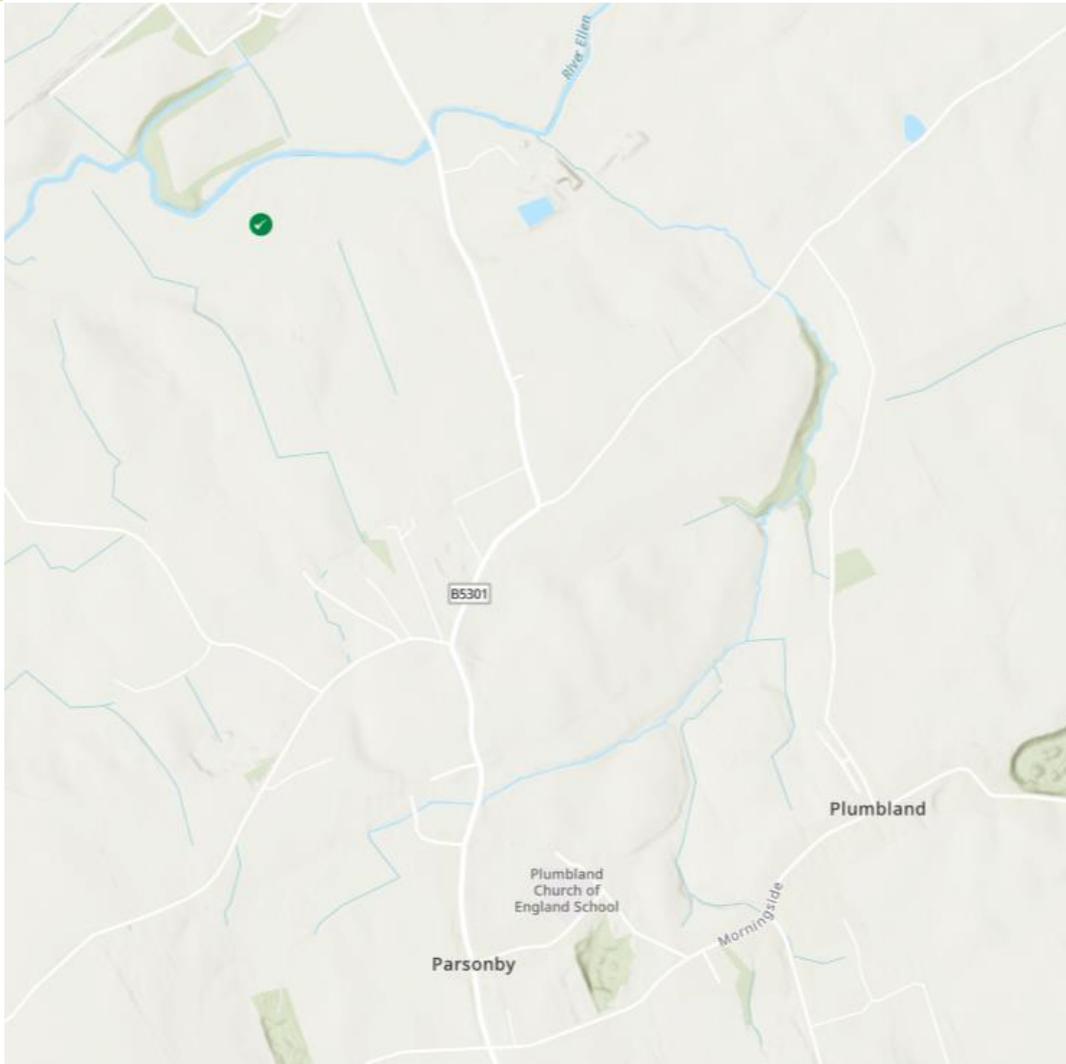


Figure 1: Iterative process to investigate, identify and address groundwater infiltration

## 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 Plumbland drainage area and the associated overflow, Plumbland Wastewater Treatment Works Storm Tank Overflow (017570072ST). In 2022, infiltration was identified as a potential leading cause of the storm overflow discharging. The purpose of this plan is to further investigate and address this. 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 \(November 2024\)](#). The green tick marks the Plumbland Wastewater Treatment Works Storm Tank Overflow.

Located in the Cumberland district of Cumbria, Plumbland is a small village sitting just over 2km north of the border of the Lake District National Park. It is a rural village surrounded by fields, farmland, and hills. The River Ellen and its tributary Flatts Beck lie North of Plumbland village.

## 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 possible in the catchment. Whilst there was little evidence of 'base' infiltration in the system, monitoring at the storm tank indicated rainfall induced infiltration as well as some level of groundwater infiltration due to seasonal high groundwater levels.

Further observations identified areas of the catchment where sewers cross local rivers and streams and rural streams and ditches run down steep banks towards the highway where there are public sewers. It is possible that flow from streams can enter the sewer system via highway gullies, land drainage systems, or defects in the network.

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

## Survey

Over 800m of CCTV surveys were completed in 2024. The CCTV surveys were reviewed by an engineer and assessed using Artificial Intelligence to rapidly identify and locate points of infiltration requiring remedial works. The presence of infiltration was confirmed.

## Intervention

Remedial works to address infiltration are underway and due to be completed in Spring / Summer 2025.

Plans include:

- Relining 815m of the sewer network to seal it.
- Sealing 1 manhole to prevent infiltration
- Replacing 10 manhole covers
- 3 top hats - A top hat is a specialist type of liner to seal a junction or connection where there may be wear and tear or defects allowing infiltration.

## Next steps

Plumbland 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.