Plumbland

Infiltration Reduction Plan

Last Updated: December 2025

United Utilities

Water for the North West

Executive summary

Plumbland is currently in the monitoring stage (see Figure 1) to address infiltration and reduce spills at the Plumbland Wastewater Treatment Works Storm Tank Overflow (017570072ST). An initial desktop assessment concluded that there was the possibility of groundwater infiltration, and CCTV surveys confirmed the presence of infiltration. Interventions to address this were completed in Autumn/Winter 2024.

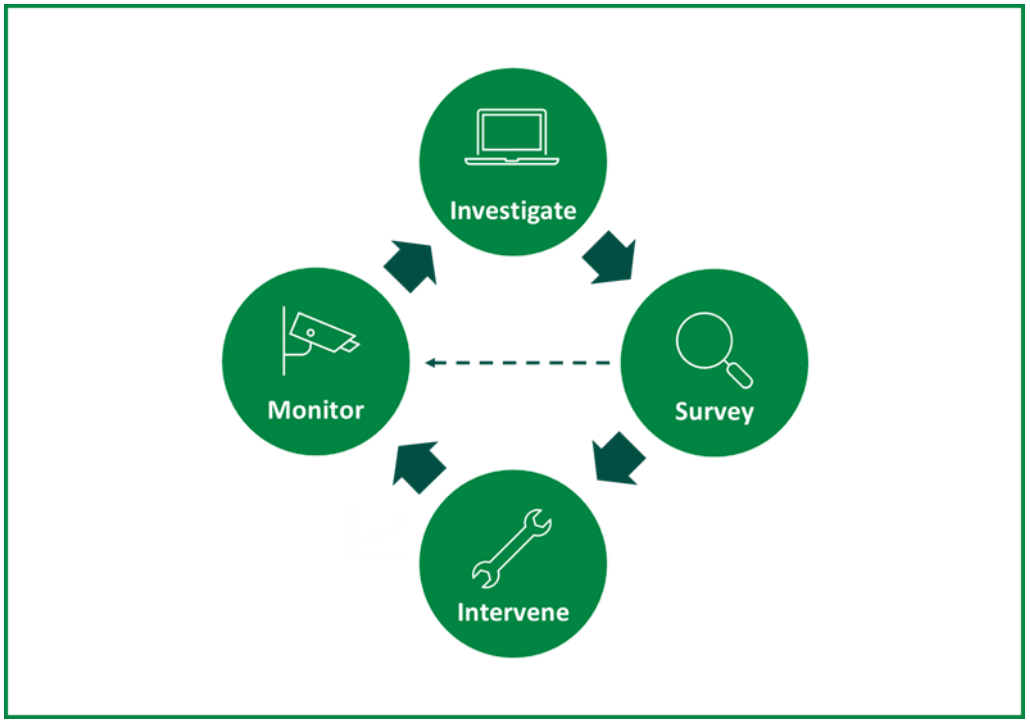

Figure 1: Iterative process to investigate, identify and address groundwater infiltration

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 Plumbland drainage area and its 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 capture the process to investigate, identify and address significant groundwater infiltration.

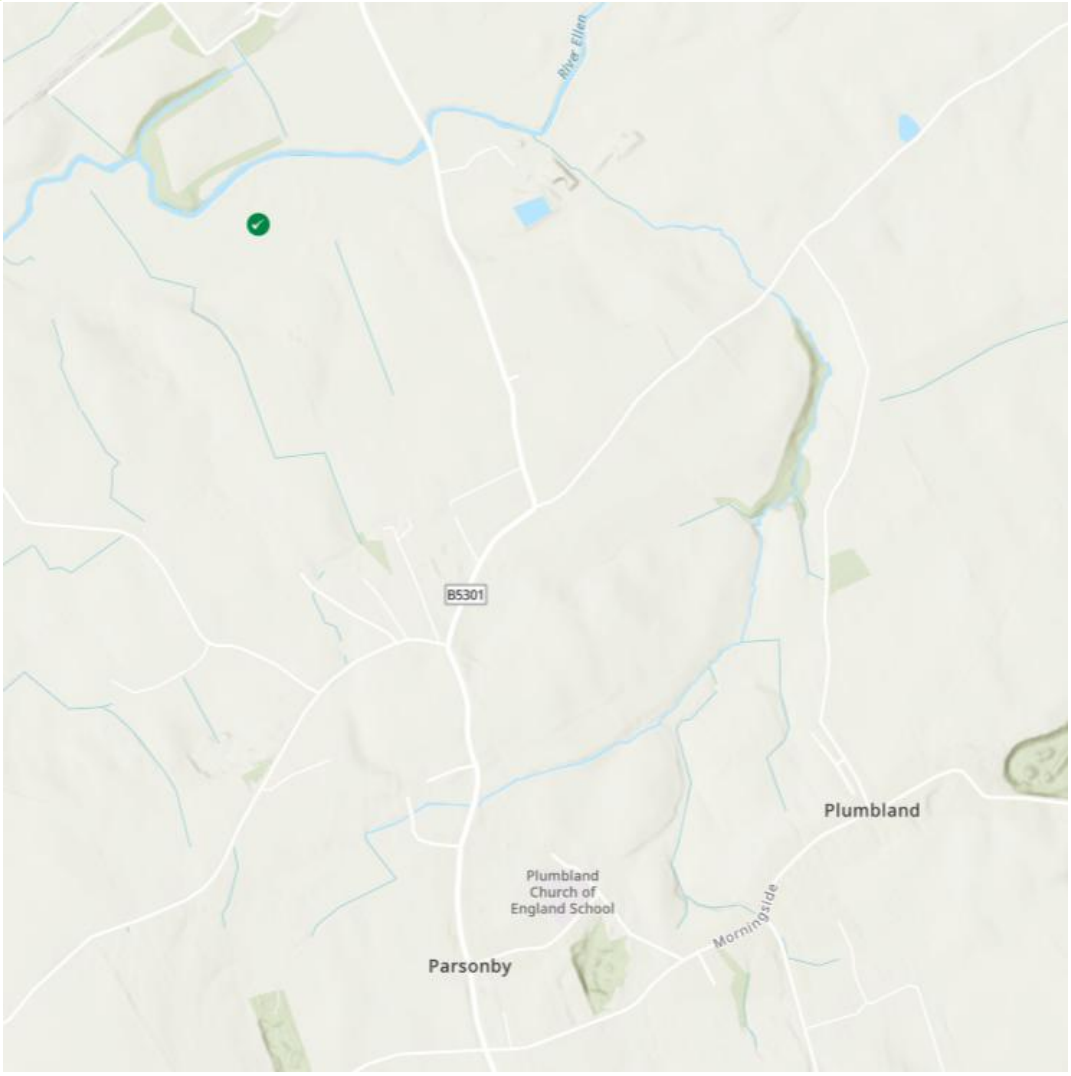

Figure 2: United Utilities – Better Rivers – Storm Overflow Map (November 2024). The green tick marks the Plumbland Wastewater Treatment Works Storm Tank Overflow.

Located in the Cumberland district of Cumbria, Plumbland is a small village situated 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.

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 be completed to see if there was 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

As recommended, CCTV surveys were completed and were then 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 were completed in Autumn/Winter 2024. 815m of the sewer network was lined in order to prevent infiltration. Lateral connection repairs were also installed.

Next steps

Plumbland is currently in the monitoring 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.