CASE STUDY

Sealing private infrastructure to **reduce groundwater infiltration in the Pan Parishes**

We found water flooding in through a manhole on private land

Background

The Pillhill Pan Parish Forum was set up by a collection of Parish Councils to improve the environment and stop disruption caused by groundwater flooding in the area. The local area was heavily affected by groundwater infiltration, with groundwater pressures so high that the water was forcing its way into the sewer system through joints in pipework.

This infiltration was leading to pollution, flooding, interruptions to water service and disruption for locals. To manage the overwhelming amount of groundwater causing these problems, over 30 tankers on average were used to remove excess water from the sewer system and transport it to our treatment works. The tankers are large, noisy, and disruptive, and were operating 24/7 resulting in road closures and frustration to residents.

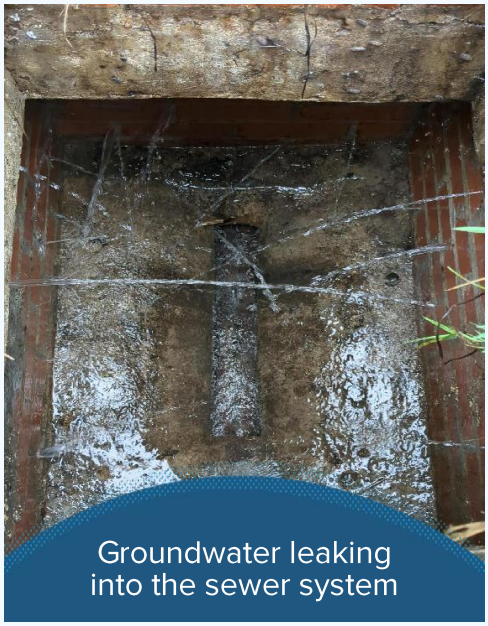
This was not a viable or sustainable solution, and we wanted to do better for our customers and the environment. We used our Pathfinder approach of trialling interventions in a small catchment area to find the best solution and discovered that sealing private laterals to reduce groundwater infiltration was the optimal course of action.

Having determined an effective, long-term, and low-impact solution, we set out to seal private pipework at scale to finally put an end to the groundwater infiltration affecting the Pan Parishes.

Our approach

- **Partnership working:** Up to 42% of the network is privately owned, so we must seek permission before undertaking repairs. This made collaboration an essential part of the project, and we worked with homeowners, business owners and local authorities to scale the project as much as possible.
- **Sealing and relining:** We set out to seal over 300 private pipes (2.5km) with Tubogel, 2km of our own network through traditional relining methods, as well as sealing 68 manholes.
- **Monitoring:** We've installed 36 sewer level monitors, 26 temperature sensors and advanced telemetry at our stations to monitor, target and measure infiltration and understand the relationship between groundwater and sewage.

  Sewage is generally warmer than groundwater, so the temperature sensors help us find out when there might be groundwater getting into a sewage pipe. We also drilled three boreholes to measure groundwater level.



Groundwater leaking into the sewer system

Outcome

Despite exceptional groundwater levels, at some sites the highest on record, we now have no tankers operating in the area. By comparison, in previous years roughly 30 would have been needed. This reduction of tankers has cut costs, reduced carbon output, and stopped the long-term disruption that tankers had been causing to customers and the community.

With a combination or relining and sealing both private and public pipework, we have permanently and sustainably put an end to a problem that has been plaguing the people of Pan Parishes for years. Additionally, this has been achieved without negatively impacting the environment, and with minimal cost and disruption for customers.

We'll continue to monitor the results through the sewer level monitors and boreholes we installed, using the data and learning to inform similar projects in areas where groundwater infiltration is an issue.

Benefits

- Reduced pollution, CO_2 output and energy consumption.
- Lower cost and disturbance thanks to the 'no-dig' approach.
- Improved private pipework for residents.
- Ended disruption for residents caused by tankers.

Costs

The project cost totalled £2.3 million, including the investigation into pipework, Tubogel relining and manhole repair. This is balanced by the estimated £1.3 million that will be saved over the next five years by using Tubogel instead of digging up infrastructure to repair it, as well as huge tankering cost savings and other benefits.

This is a large-scale project, with over 500 properties identified as needing their private pipework repaired. This pipework is not under Southern Water's ownership but the homeowner's responsibility. We covered the costs to make sure we could move forward at scale and without delays, and to help understand if private laterals should be included in infiltration programmes across the sector.

No tankers needed means less disruption caused to our