

A PROACTIVE APPROACH TO RELIABILITY IN MUNICIPAL WASTEWATER NETWORKS



BUILDING RESILIENCE INTO THE NETWORK. REDUCING LIFECYCLE TOTEX.

Climate change and growing, denser populations are placing greater demands on wastewater networks. At the same time, budgetary pressures and sustainability imperatives require utilities to achieve more with less. The twin priorities of reliability and cost efficiency may seem contradictory. But the more utilities invest up-front in reliability, the less they need to spend maintaining and repairing the network later.

In this article, we will briefly explore how municipalities can reliably scale their networks to meet the growing demands of climate change and urbanisation, while reducing total expenditure (TOTEX) in the long-term – by taking whole-network view to reliability.

Whole-network perspective

Under simultaneous pressure to maintain service under increasing strain, while also reducing expenditure, many utilities take a firefighting approach to managing their wastewater networks. However, this approach is false economy. Both because it does little to secure reliability in the long run, and because it can actually increase TOTEX over the network lifecycle.

To take a simple example, swapping a faulty pump with a cheap replacement may resolve an immediate issue for less capital expenditure (CAPEX) than a more expensive alternative. But it will likely need more repairs, cause more downtime, and need replacing sooner. Over the pump's lifecycle, the cheaper model will be less dependable, and cost more to maintain.

Perhaps more importantly, wastewater networks are complex systems, defined by an intricate web of interactions. To ensure reliability of the whole, each part must be considered in context – particularly as climate change and urbanisation place increasing strain on the network.

This is why Grundfos takes a whole-network perspective to its solutions. We use a combination of our decades of experience building systems and solutions for wastewater networks, computer simulations, and advanced calculations to ensure every renovation or upgrade supports end-to-end reliability.

Planning for reliability

Every wastewater network is different. As such, any solution must be designed to account for the particular characteristics of that network. We use two main tools to fully assess how any solution will perform and interact within the network before deploying.

SIMPS (SIMulation of Pressurised Systems) is an advanced simulation tool for tackling hydraulic issues. Its advanced calculations precisely simulate your network, even taking unique flow patterns into account – such as high H₂S levels due to long retention times.

CFD (Computational Flow Dynamics) simulates the interactions of liquids with surfaces defined by boundary conditions. This enables us to predict any hydraulic issues in the system before you make any investment – at a significantly lower cost than full-scale point testing or model testing.

And because Grundfos provides a full suite of products – everything from physical pumps, pipes and pumping stations to sensors, monitoring, control, and services – we can be sure every parameter is correct and accounted for.

Intelligent solutions

Having fully and accurately calculated conditions and likely performance, we can implement intelligent solutions to most effectively ensure reliability, and reduce costs.

Grundfos has a number of dedicated controls for remote monitoring and management of the wastewater network, all from one intuitive interface.

One of our key solutions remotely monitors hydrogen sulphide levels, and automatically doses directly into the pressurised pipe downstream of the pump to ensure optimum mixing with the wastewater – preventing build-ups that can be toxic to humans and corrosive to pipes.

Similarly, SEG AUTOADAPT submersible grinder pumps – for small towns and villages – adapt automatically to continuously changing operating conditions, and to the system configuration, which can be set remotely.

For cities, our SE/SL pumps simultaneously increase reliability and reduce energy costs. With the impressive non-clogging capabilities from the large free passage through the unique S-tube impeller, they feature very high hydraulic efficiency, and low wear – typically reducing the need for servicing.

Data-driven optimisation

Maintaining an accurate picture of the network and its conditions is essential for adapting to changing circumstances. The Grundfos iSOLUTIONS Cloud for Wastewater Networks harnesses various streams of

real-time data to give you a comprehensive view of everything in the network.

In broad strokes, this data enables you to first, detect deviations so they can be resolved before they become major incidents (preventing unplanned downtime, or overflows, for example). And second, you can track evolving trends to inform long-term, strategic refurbishment or upgrade plans.

By following this proactive, data-driven approach, you can intervene before minor issues become active disruptions – that are also significantly more expensive to repair – and ensure that CAPEX is invested optimally to best support reliability, and deliver the best possible return on investment.

This approach also supports sustainability, as proactive servicing prolongs the lifetime of equipment, and optimised performance reduces energy consumption to its minimum.

Investing in reliability

The key takeaway is that wastewater network reliability is something that must be proactively planned for and invested in – particularly as climate change and urbanisation intensify operating conditions.

But with the right combination of tools and services, deployed according to a whole-network view, adaptability and resilience can be built into the system, securing long-term reliability. And while it may require greater CAPEX up-front, the greater reliability will reduce OPEX over time, minimising TOTEX.

Grundfos has been helping utility companies design, plan, and build wastewater networks for over 70 years – as well as the equipment used to operate them. As such, we are uniquely placed to offer end-to-end system consultation and services, taking a whole-network view from the outset.

We use this experience – and the tools and solutions discussed here – across three service strands: Optimisation, Operation, and Repair. In all, we act as a long-term partner for maintaining optimal performance, always having the right spare parts to hand – eliminating delays to repair – and always knowing how best to maintain or refurbish machinery.

In doing so, our goal is the same as yours: ensuring your network continues to run reliably, as cost efficiently as possible, far into the future