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ENVIRONMENTAL RISK REDUCTION

WHITE PAPER

Effective asset management is all about the data

Avoiding data overload to gain a greater understanding of the wastewater network

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Avoiding data overload to gain a greater understanding of the wastewater network

The UK's water system is a study in sharp contrasts. The network built for Victorian Britain is now mapped and monitored using machine learning. Centuries-old assets use AI sensors to track storm events. And sewers laid in the late 1800s are today battling a global climate crisis, population boom, and expanding built environment.

Britain's combined sewer system is no longer fit for purpose – but government estimates say overhauling the network would cost a prohibitive £150bn to £650bn. Instead, water companies have turned to technology to augment the UK's aging infrastructure, prevent pollution events, and create sustainable drainage solutions.

Data now informs everything from asset management to Net-Zero strategy – and is critical currency in navigating pressures from customers, regulators, and the media.

It quantifies progress in reducing CSO discharges, speeds response to consumer feedback, and demonstrates due diligence in line with increasingly strict environmental laws.

Thanks to AI-based detection systems, CCTV, ultrasonic water flow meters, customer chatbots, and other innovations, there's no shortage of information across the water sector.

However, as companies finalise their AMP8 plans, knowing what to do with that data is a key differentiator.

Is real-time reporting leading to data overload? Are we tracking irrelevant information (and paying for the privilege)? And how can the right data deliver ongoing cost savings, compliance, and customer satisfaction?

knowing what to do with that data is a key differentiator

This white paper explores the evolving role of information in the UK water industry – and why a real-world definition of data can shape a better route through AMP8 and beyond.

Data is not the same as fact. It is far more important to a business that the data acquired is accurate.

USING DATA TO DEFINE THE WAY FORWARD

As water companies prepare their PR24 business plans, it's not too late to re-engineer data strategies to address weaknesses and intelligently take on Ofwat's challenges.

Similarly, providers must begin collecting data now to meet stretching AMP8 requirements and plans for AMP9, as good long-term asset investment needs more than a five-year horizon. This data will enable them to make decisions with added efficiencies, resilience, and outperformance in mind.

An asset management specialist will create a clear roadmap

A more targeted approach to data can drive operational improvements and address broader agendas, such as carbon reduction and environmental, social, and governance (ESG) goals. The objective is a balanced combination of quantitative and qualitative data that provides both practical and 'big picture' insights, turned into insightful information and intelligence allowing you to:

- Understand your network
- Improve environmental water quality
- Optimise your infrastructure
- Drive your sustainability, ESG, and Net-Zero aims
- Build a robust asset investment strategy

Reviewing data use in the short term can lock in future efficiencies, particularly as demands grow for forward-looking flood

and pollution prevention solutions, such as green infrastructure planning and sustainable drainage systems (SuDS) or natural flood risk management (NFRM).

Working with an environmental consultant at this stage provides a vital end-to-end view of your network – when there's plenty of scope to influence cost, design, and delivery models. An asset management specialist will create a clear roadmap to meet civil infrastructure and sustainable drainage requirements, achieving efficiencies upfront and 'designing in' savings and data-led decision-making.

Crucially, a turnkey advisor will also have the capabilities, equipment, and experience to act on that data, with eyes on your assets and expert practitioners in the field.

An environmental services provider that can deliver the whole process of consult, prevent, and respond will be best aligned to partner with water companies.

UNDERSTANDING YOUR NETWORK WITH NEED-TO-KNOW DATA

The digitalisation of the water sector has transformed how providers interact with their assets. Thanks to thousands of strategically placed monitors, most water companies now process network information in real time, allowing instant visibility of water quality, flow rates, and pressure levels. Meanwhile, machine learning algorithms evaluate large data sets and identify patterns and anomalies, helping providers focus maintenance efforts and prevent pollution incidents.

it's important to sort the essential from the excessive

Millions of data points are readily available, but are they all relevant?

For decades, water companies have invested time and resources in tracking information that's arguably outdated. For example, DG2 – an obsolete metric used to gauge pressure across a distribution network – still appears in some companies' monthly reports. Pressure management remains a core element of customer service, but is now measured using the more comprehensive Pressure Management Indicator (PMI).

Similarly, some providers record highly specific data fields – from gasket manufacturer to gear teeth condition – that do nothing to drive investment decisions

Your data should help you understand your assets and accelerate practical improvements – and it's important to sort the essential from the excessive.

With specialist guidance, it's possible to do more with less, refining your data strategy to focus on customer expectations, core objectives, and stakeholder requirements.

Key considerations should include:

- **Asset performance monitoring** – Tracking the performance of pipes, valves, and hydraulics to highlight issues, optimise maintenance and repair schedules, and extend asset life.
- **Predictive maintenance** – Collecting and analysing data from sensors to identify potential asset failures, plan maintenance and repairs, and prevent incidents and downtime.
- **Leakage reduction** – Monitoring network water pressure and flow rates to predict and pinpoint leaks to reduce water loss.
- **Environmental management** – Assessing water quality, environmental impact, sustainability, and regulatory compliance.
- **Customer service** – Gathering customer feedback and requests to gauge satisfaction and response levels.

SOLVING ISSUES WITH ACTIONABLE INSIGHTS

Every estate is unique and demands a bespoke approach to asset management and maintenance. Having defined a broader focus for data collection, it's necessary to map your network's individual behaviour – and the background conditions that influence it.

To develop an actionable view of your assets and inform future asset investment plans, your data should deliver intelligence across four areas:

- **Descriptive: what's happening?** Accurate live information and effective visualisation of current and potential issues.
- **Diagnostic: why is it happening?** Drilling down to root cause and isolating all relevant information.
- **Predictive: what's likely to happen?** Using AI-based algorithms to map historical patterns and forecast specific outcomes.
- **Prescriptive: what's the appropriate action?** Tailored recommendations based on champion/challenger testing outcomes and proven analytical techniques.

A 'full-circle' system empowers you to provide reliable flows, avert potential problems, and take corrective action – then use frontline data to address recurring issues. Your ideal set-up is a network of multi-sensor flow and level monitors that offer quality insights, backed up by skilled operators making rational, real-time judgments and informed action plans.

- Monitors track dry weather flow (DWF) conditions, which share trend analysis of hydraulics for a particular catchment.
- AI sensors calculate the network's response during rainfall or a storm event. This information is mapped with historical modelling to build an accurate picture of the assets' normal behaviour.

- Network activity is evaluated under CSO criteria to pinpoint 'frequent spillers' and assess their implications.
- With the thumbprint of the network now established, flow variations and changes in hydraulic activity are readily identified – pointing to blockages, faults, and potential pollution hazards.
- Using real-time software, issues are fed back to data centre-based specialists who instruct you or your service provider to investigate the anomaly.
- The system also supports asset performance with daily network health checks that trigger maintenance visits if problems are detected.

COLLECTING THE RIGHT DATA AT THE RIGHT TIME

Data is key to understanding and managing the wastewater sewer network. However, too much data can make it hard to action effective decisions.

too much data can make it hard to action effective decisions

There are two possible ways to overcome this issue:

- Reducing data granularity
- Introducing smart sensor technology

Granularity of data is important when modelling a wastewater catchment that's subject to flash hydraulic response. In less responsive catchments, however, the level of detail can often be decreased.

When deciding whether to receive data in near to real time, consider the benefit of having data available at every second. What impact does this have on SCADA systems already struggling with available bandwidth?

The challenge for smart sewer network monitoring suppliers is designing technology, tools, and specific AI and machine learning algorithms that can locate the data equivalent of a needle in a haystack. Spotting a subtle change before a problem occurs is the driver of successful forecasting and asset management.

A further and often overlooked consideration is high data transfer volumes versus the availability of the national communications network (2G, 3G, 4G, 5G, LTE, and CAT M). Ofcom has reported the extensive funding required to prepare the current infrastructure for future demand. To stay one step ahead, technology suppliers must create new, more efficient ways of moving data from A to B.

This limitation in the existing telecommunications infrastructure means uploading data in near real time can put undue strain on a network that's constantly shared by gaming sites and other smartphone traffic.

With that in mind, uploading data daily while receiving intelligently triaged alarms outside the daily upload – and managing data jitter efficiently – goes some way to alleviate the untold congestion on our telecoms network.

PREDICTING AND PREVENTING EVENTS WITH DATA MODELLING

To address loss of service, flooding, and pollution risks, you need a mix of smart network monitoring, real-time and predictive data analysis, and 'boots-on-the-ground' expertise. Partnering with a strategic service provider helps you shape your ideal approach to data capture, then put insights to work in a business context.

Data modelling – defining the data structure and content you need to achieve your goals – boosts the quality, efficiency, and integrity of your information, leading the way to enlightened decision-making.

This is likely to be a combination of:

- **Network modelling** – Creating a detailed model of your network to optimise effectiveness, pinpoint risk areas, and plan future infrastructure upgrades.
- **Water quality modelling** – Simulating the movement of water through the environment to locate potential contamination sources and design maintenance or remediation measures.
- **Asset management** – Creating a comprehensive inventory to locate worst-offending assets, schedule repairs, optimise performance, and predict incidents.

SHAPING BETTER BUDGETING, INCIDENT PREVENTION, AND RESOURCE PLANNING

A trusted advisor – with both robust data capabilities and qualified environmental practitioners – will help you make the most of your data outputs. Combining analytics with onsite knowledge, a qualified risk consultant will detect why issues are arising, act in advance to prevent them, and expertly respond should an incident occur.

Starting with the outcome, such as a spill or blockage, they can map back through the asset to collect data that's relevant and important to those consequences. Indicators, such as flow variations, weather variables, and network characteristics, build a reliable picture of sewer behaviour over time, helping you take preventive action when system stressors and anomalies are identified.

Critically, the right partner will also uncover the reality behind the numbers – through the eyes of experienced ecologists. While a pollution event might be classified as Category 1-3 on paper, only a skilled specialist can evaluate the exact impact in the field.

- Highly trained teams – spanning marine, biology, contaminated land, terrestrial ecology, and wetland specialisms – can provide ongoing analysis of an incident's impact on waterways, wildlife, and human health.
- Data is collected via water, sediment and soil testing, SCAT surveys, and macro and micro invertebrate sampling.
- Environmental consultants not only design a targeted solution for the current spill, but also provide strategic consultancy to rule out recurrences.

the right partner will also uncover the reality behind the numbers

Incidents are moments of truth for water companies – when collected data can build a better way forward. Too often, however, these insights go untracked.

Capturing facts from pollutions, failures, and outages is key, so ensure every incident is followed by a comprehensive review of causes, circumstances, and lessons learned. Combining this information with day-to-day data outputs helps you focus efforts, energy, and budget on preventing future environmental harm and tackling your most pressing network priorities.

ADOPTING DATA-LED PLANNED PREVENTIVE MAINTENANCE (PPM)

While emergency response is an essential strand of your data strategy, an informed approach to planned preventive maintenance (PPM) is your strongest defence against pollution, system failures, and regulatory non-compliance.

a tailored PPM programme based on your estate's unique requirements and challenges

Data-driven PPM, monitored and delivered by a skilled environmental advisor, extends the life of aging assets – and lays a solid foundation for future-facing sustainability initiatives. Working from an in-depth understanding of your network, your partner will shape a tailored PPM programme based on your estate's unique requirements and challenges.

This plan might incude:

- **Infrastructure mapping** – Offering a comprehensive overview of your infrastructure, primary pollution sources, and emerging issues. Mapping usually involves an OS19X-qualified team producing CAD drawings of your underground estate. This highlights time-critical repairs and longer-term targets for routine cleaning, maintenance, and monitoring, helping you systematically manage upgrades, budgets, and resources.
- **Environmental asset assessments** – Identifying pollution hotspots with a risk matrix displaying an asset's potential for spillages and ecological harm. These evaluations expose the vulnerabilities of individual sewers and the sensitivities of their surrounding environments.
- **CCTV surveys** – Remotely diagnosing existing or longer-term drainage problems, including collapsed drains, concrete or grout accumulation, cracked or displaced pipes, and root intrusion. High-resolution footage shares accurate details of physical system defects, showing their overall effect on network performance.
- **Sonar tracing services** – Using pulse signals to trace defective or collapsed sewers hindering network flow and triggering spills. When a CCTV survey uncovers a drainage concern, sonar tracing equipment finds the system fault's location, line, and depth – providing the data to determine the most cost-effective repair strategy.
- **System monitoring and alarms** – Assessing network effectiveness and critical water quality indicators with wireless telemetry systems. A tailored web-based platform displays values, graphs, and reports in real time, highlighting key indicators including dissolved oxygen and ammonia levels, temperature and pH values, and turbidity.
- **Smart sewers** – Providing systematic sewer management through digital twinning and artificial intelligence. Flow and assets are digitally tracked and controlled throughout your infrastructure,

offering real-time performance data and advanced warning of pollution events. The result is improved energy efficiency, fewer CSO discharges, reduced sewer flooding, and lower carbon emissions.

REALISING THE BENEFITS OF A 'HANDS-ON-YOUR-ASSETS' APPROACH

Delivering on AMP8 requirements, ESG goals, and regulatory commitments demands a new definition of data. Because transforming the UK's water network is not just about the numbers. It's about modernising Bazalgette's blueprint to meet next-generation challenges – using leading-edge technology and frontline expertise.

Designing your data capture around quantitative and qualitative data offers rich, workable insights and – vitally – the detailed story behind them. While AI and data-driven solutions can pinpoint problems, they don't have hands on your assets. They can't see field issues first-hand or understand how they affect your business, contribute to external pressures, and provide opportunities for positive change.

Partnering with an end-to-end service provider helps you to:

- Maximise data across your entire estate
- Understand your assets – and their vulnerabilities
- Ensure a tailored design and build for your network
- Implement solutions that specifically benefit your infrastructure
- Provide the basis to test and assess these efficiencies

Measurable value comes from a combination of tech-led data and person-to-person dialogue. So aim for an approach that provides valuable automated data, plus practical insights at every stage – from asset management consultancy, design and implementation, and data monitoring through to planned preventive maintenance, emergency response, and post-incident analysis.

transforming the UK's water network is not just about the numbers

The water sector is awash with information. But to meet the rigours of AMP8, evolving environment legislation, and exacting customer expectations, providers need to cut the noise and focus on quality and context.

It's time for data to deliver more from less. With a blend of targeted tech and tailored support, water companies can make smart, real-world decisions that drive lasting results.

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