

Pollution incident reduction plan 2024-25



Wessex Water
YTL GROUP

FOR YOU. FOR LIFE.

Foreword

Here at Wessex Water, we understand the importance of the natural environment – both to our own activities and operations within the water cycle and to the customers that we serve. Our commitment to be here 'For You, For Life' extends to the health of the environment in which we operate, which is why we continue to invest in our assets and operations.

We have been successful in 2023 in regaining our status as a 4 Star company as assessed by the Environment Agency (EA). This is a recognition of the marked improvements that we continue to make, particularly in the reduction in the number of serious category 1 or 2 pollution incidents. We are clear on our commitment to operate in an open and transparent way and we were industry leaders in our self-reporting of pollutions to the EA 2023.

Despite significant improvements and strides in the right direction, the occurrence of pollutions and the operation of storm overflows has never been far from media attention and we understand that customers have concerns. We are by no means in the position we want to be in terms of our performance against pollutions, and we are committed to making significant and lasting improvements to how we operate for the benefit of the environment.

The extremes of weather experienced in 2023-24 hampered our performance, with wet weather and corresponding high groundwater levels inundating our sewer systems for much of the year. Longer-term predictions of weather patterns, which come with a variety of confidence levels, show that we need to do more as an industry and as an organisation to plan for more weather extremes in the way that we operate our assets and plan for the future.

This Pollution Incident Reduction Plan (PIRP) demonstrates our root cause analysis, which takes a deep dive into the underlying factors behind our pollution incidents and outlines our action plans and activities to minimise these events into the future. Constant review and scrutiny of our plan allows for appropriate changes to be made where we consider there to be more effective measures in tackling pollution incidents. This can be seen in our governance procedures shown in Appendix 1.

As a team, we have received clear commitment and approval from our Board and Executive Committee to deliver against our PIRP with clear metrics in place to measure our performance and success on an ongoing basis.



Daniel Humphrey

Director of Sewerage
Network

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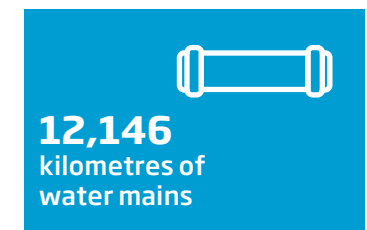
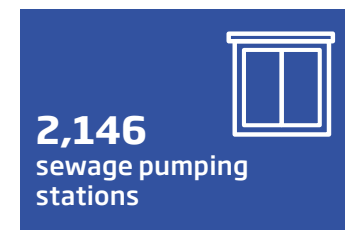
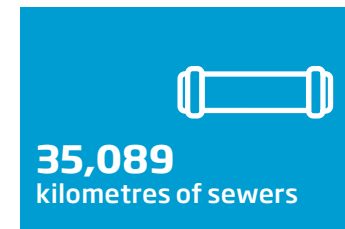
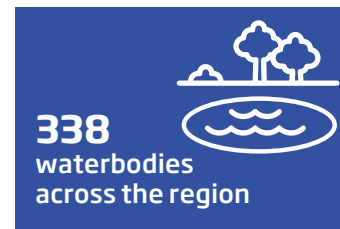
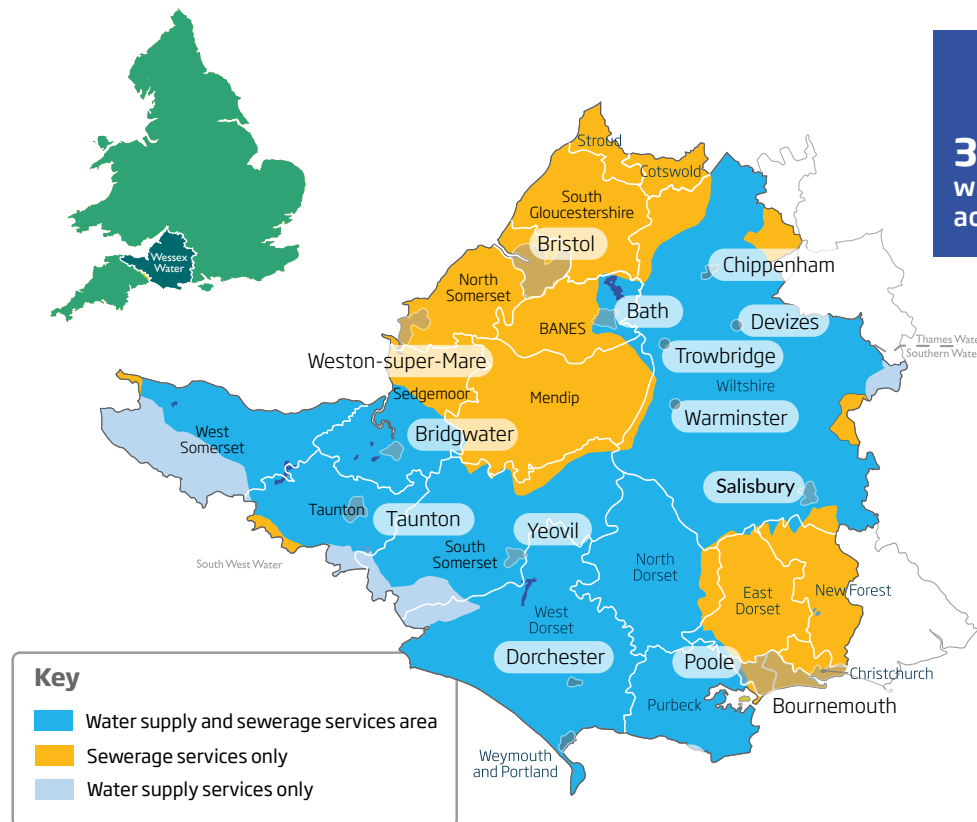
*We have been successful in
2023-24 in regaining our
status as a 4 Star company*

Background, context and targets

The Wessex Water region

The Wessex Water region spans Dorset, Somerset, Bristol and most of Wiltshire, plus parts of Gloucestershire and Hampshire. It contains some of the most nationally and internationally important habitats in the UK - including 470 sites of special scientific interest, 35 special areas of conservation, eight areas of outstanding natural beauty and more than 6,200 areas designated local wildlife sites. In these areas we provide high-quality water services to 1.4 million customers and sewerage services to 2.9 million customers.

To provide these services we have an extensive network of water treatment centres, reservoirs, water mains, water recycling centres, sewage pumping stations and sewers. The improvement, maintenance and monitoring of these assets is our main priority, ensuring high-quality services for all our customers and minimising our environmental impact.



Wessex Water and the environment

One of Wessex Water's four strategic aims is to protect and improve the environment. We consider ourselves an environmental services company and our aim is to ensure that none of our activities cause environmental harm.

Our company is deeply intertwined with the environment; many of the activities we carry out have the potential to cause harm to the air, water or land environment if something goes wrong. We believe that any amount of damage to the environment is unacceptable. The maintenance and improvement of our environment is key to the sustainability and longevity of Wessex Water.

Our dedication to environmental protection is demonstrated in our performance commitments laid out in our business plan in our Asset Management Plan (AMP) 7 period, and next AMP 8, 2025 - 30. Each five-year AMP period we make several commitments that predicate how our performance will be assessed: 24 out of our 46 are related to environmental protection.

There are still instances where sewage or even clean water escapes from our systems. We will continue to improve our processes and invest in pollution reduction so these instances are minimised.



Pollution Incident Reduction Plan (PIRP)

Our original Pollution Incident Reduction Plan (PIRP) document released in 2020 explains our historical and current pollution performance, the initiatives put in place to reduce pollutions and our plans to continuously improve.

This document provides an update on the third year of implementing our plan. It highlights work undertaken, our successes, and our key activities and opportunities to improve and develop the plan further during AMP7 and AMP 8. Our activities to reduce pollution fall into three categories:

• Preventative maintenance

- Ensuring proactive maintenance, repair and replacement of our assets so our sites and networks are reliably functioning optimally.

• Monitoring and analytics

- Installing monitors and collecting data to help inform decisions, proactively identify issues and improve response time, with a focus to change data into information, gaining insight from this which then directs actions. Implementing machine learning to make effective use of significant volumes of data to look for changes in performance or indication of potential issues to move to a more proactive approach.

• People

- Creating a company-wide "zero pollution mindset", ensuring rapid operational responses, improving and delivering staff training, and engaging with customers and stakeholders to reduce sewer misuse.

The PIRP details our plans to reduce pollutions in the immediate future, towards our long-term aim to achieve zero pollution incidents. To support this goal, we have developed an internal governance framework comprising several working groups and documents which follow a 'plan - do - review - act' approach. This continual process allows the PIRP to be dynamic and continually evolve as data and new working practices develop.

The maintenance and improvement of our environment is key to the sustainability and longevity of Wessex Water

Pollution targets and glidepath

Achieving zero pollution incidents will take time and investment. In the immediate future we aim to retain 4-star status in the environmental performance assessment (EPA), becoming one of the top performers for pollution performance in the water sector.

We recognise there is still work to be done in collaborating with customers on reducing sewer misuse, continuing to improve our asset reliability and performance, plus continuing to perform our operational activities to a high standard.

The industry is changing to be driven more by data and monitored activities rather than incidents recorded from when either staff or customers have seen an issue. Using Machine

Learning will allow us to move to more of a proactive and predictive approach to managing our assets, giving greater visibility to our customers. One such initiative is Coast and Rivers Watch, which shows near real-time information about the operation of all our 1,295 storm overflows.

The industry is in discussion with the EA on the future measures and targets that will make up the environmental performance assessment (EPA) and with Ofwat on the determination of the costs and expected outcomes for the next Asset Management Period (AMP) 8 from April 2025 to 2030.

We will continue to focus on a trajectory to zero pollutions.



Coast and Rivers Watch shows near real-time information about the operation of all our 1,295 storm overflows



What is a pollution?

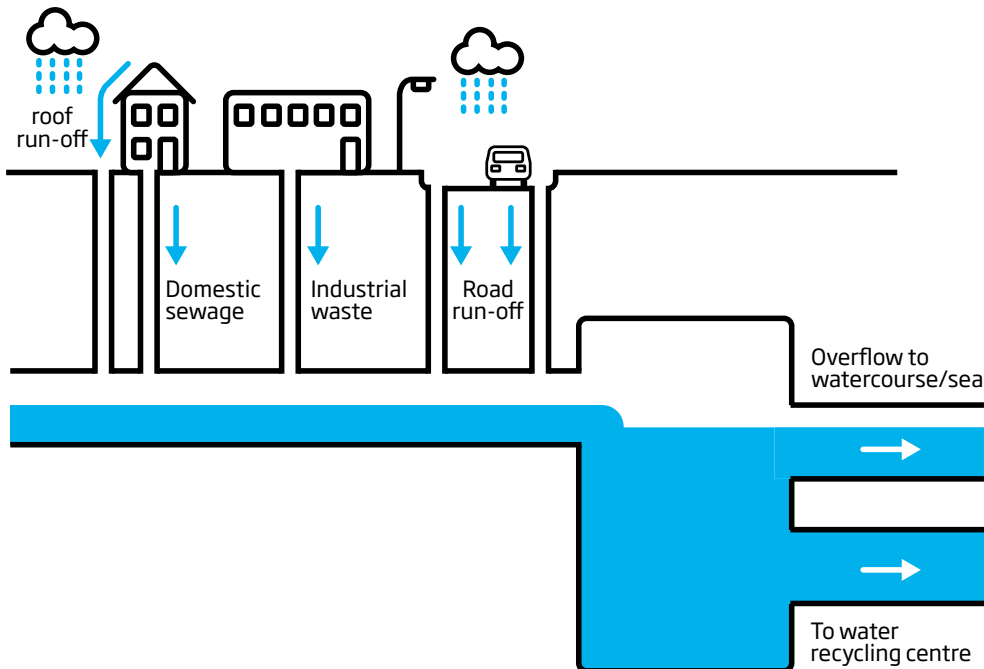
A pollution is defined by the Environment Agency (EA) as a release of a substance into the environment without a permit.

In terms of Wessex Water operations, this is likely to be a release of wastewater or drinkable water into the environment because of something going awry within our network or treatment centre.

Wastewater: Untreated waste from our sewerage network or water recycling centres

Drinkable (potable) water: Chlorinated water from our water networks.

In recent news you may have heard about 'spills' to the environment. The vast majority of these occur via storm overflows as a result of flow entering our sewers, exceeding the network's maximum capacity, during or after prolonged/intense rainfall. Where our overflows operate in this way, as intended and in accordance with their permits, this does not constitute a pollution. However, we continue to work to improve operation of these overflows and set this out in greater detail later in this document.

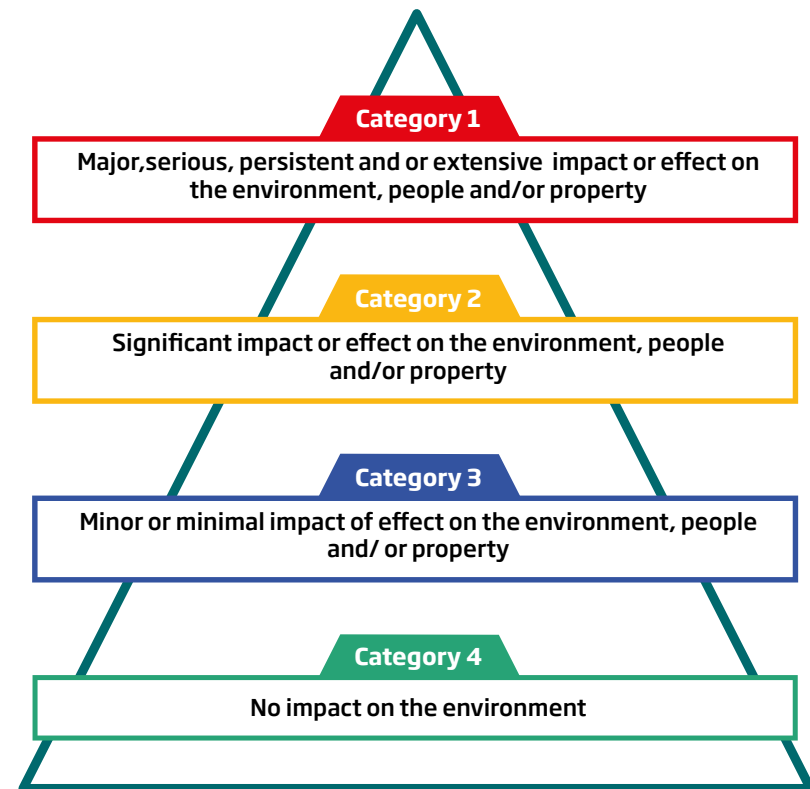


Environmental pollution classes

The EA classifies pollution incidents into four categories based on the severity of impact.

Factors that affect the severity of impact include:

- Duration of incident and duration of the impact.
- Sensitivity of impacted environment.
- Concentration of contaminant.
- Size of area affected.

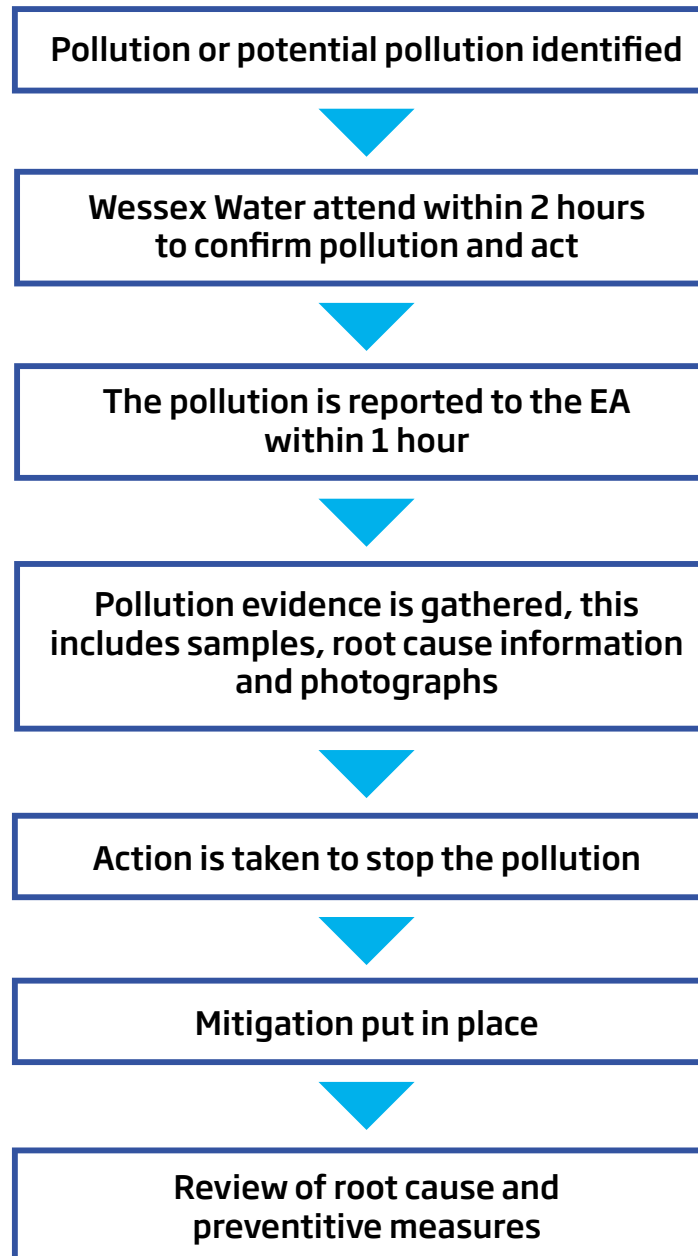


Pollution response and staff training

Our pollution response documentation details our pollution guidance for all areas of the business. This guidance is coupled with training to increase awareness of our procedures and ensure a prompt and proper response should a potential pollution incident arise.

The first few hours of the pollution response are critical for reducing the environmental impact, so it is important that any staff member who may have to attend a pollution incident is well informed. Once we are notified of a potential pollution, we aim to attend within two hours to substantiate a pollution and report this to the Environment Agency within four hours, regardless of the time of day or night. We have consistently improved our self-reporting performance each year since 2018.

Our data shows that in 2023 we met this target 80% of the time. Currently, 680 Wessex Water staff have completed pollution training and are required to repeat this training yearly. For all pollutions, water samples are collected and analysed at our UKAS accredited laboratory in accordance with our pollution response procedures to ensure the correct classification by the Environment Agency.



The first few hours of the pollution response are critical for reducing the environmental impact

Year 4 pollution summary

Reflecting on 2023

In 2023 the number of serious pollutions decreased, with zero category 1 pollutions and one category 2 pollution. Although zero serious pollutions are the only acceptable number, this decrease demonstrates an encouraging step towards our target of zero.

However, we did observe an increase in total pollutions from 110 to 126 (specifically includes incident categories 1-3, see graph 1). This meant we did not achieve our total pollution target (less than 75 pollution incidents) for this year.

Records show that 2023 was the 11th wettest year since 1836 with 1290mm of rainfall, equivalent to 111% of UK average rainfall. This increase in rainfall and associated groundwater levels is reflected in our pollution numbers, with hydraulic overload identified as the root cause for 110 out of the 247 category 4 pollutions. The number of category 1-3 pollutions because of hydraulic overload also increased from 5 to 13 in 2023.

While the periods of intense rainfall give an important context to this increase in lower category incidents, this result is still disappointing. We will continue to review and adapt our pollution incident reduction initiatives to reduce these numbers.

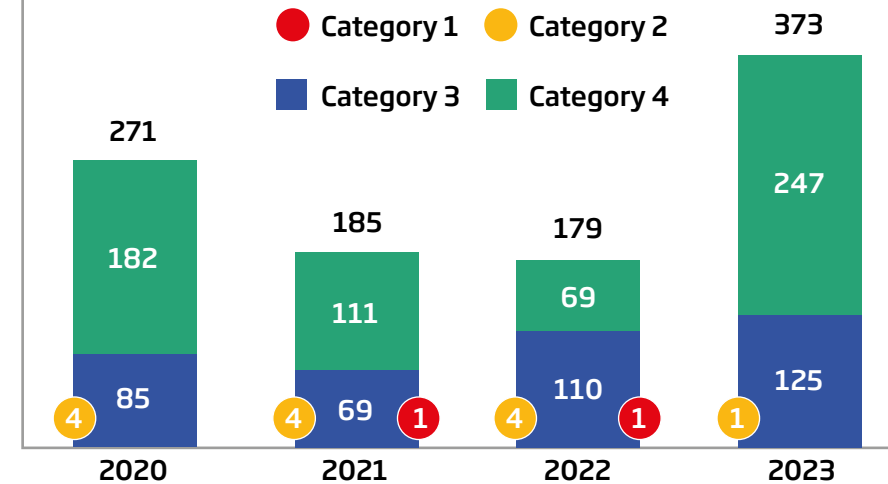
Self-report numbers

Self-reporting is an important organisational value as it demonstrates hard work, openness, transparency and ownership of our pollution incidents - allowing us to better reflect and improve.

Our self-reporting performance figures remained high for 2023 (graph 2), increasing from the previous year. We achieved 94% self reported category 1-3 pollution incidents from our wastewater and drinking water assets. This well exceeds the EA's target of 80%.

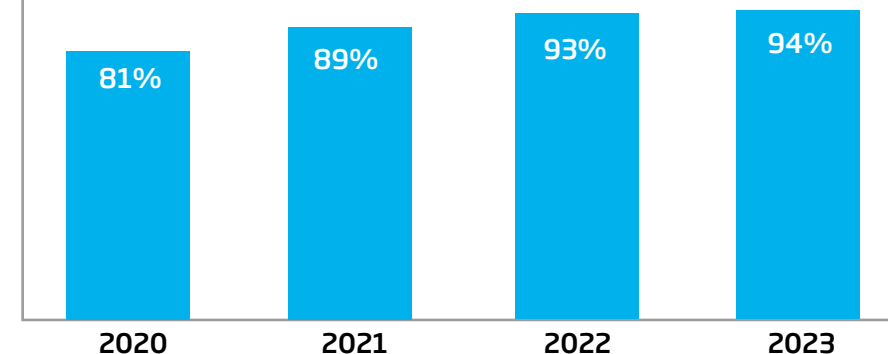
For monitored assets (including WRCs and SPSs), we achieved 100% self-reported incidents against a target of 90%. This high level of self-reporting is a testament to the mindset change that has occurred as a result of organisational culture shifts and staff training.

Total waste incidents (categories 1-4)



Graph 1

Pollutions (Categories 1-3) self reporting %



Graph 2

External factors impacting pollution numbers

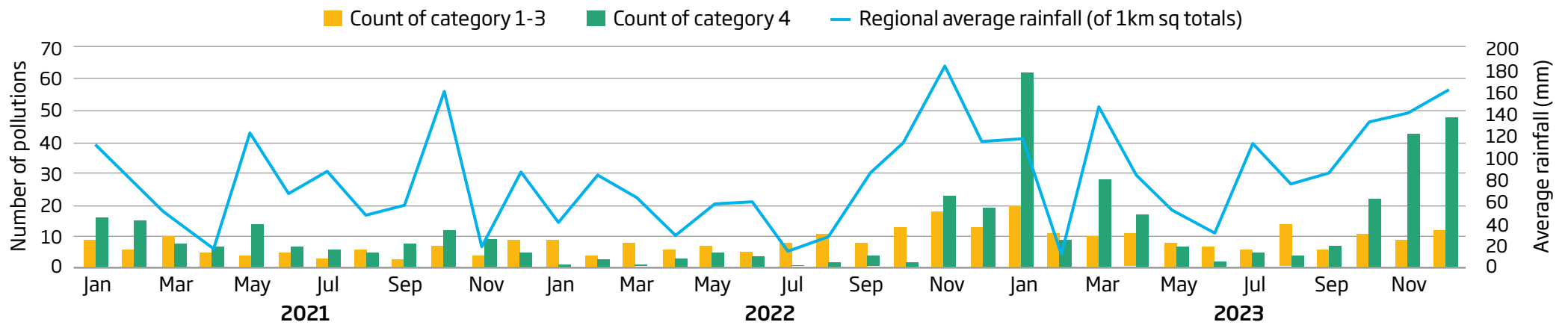
Climate change:

Extreme weather conditions that we have seen recently are predicted to increase in frequency and severity over the coming years. Our assets are vulnerable to the effects of climate change - heavy rainfall, flooding and groundwater levels can hydraulically overwhelm our systems. The graph below shows the effect rainfall has on the number of category 3 and 4 pollutions, with a clear relationship between increased rainfall and increased levels of pollution. Additionally, droughts result in rivers having increased pollution sensitivity due to a decrease in dilution. We as a business are committed to building our climate resilience, limiting the vulnerability of our assets.



heavy rainfall, flooding and groundwater levels can hydraulically overwhelm our systems

Average rainfall and pollutions



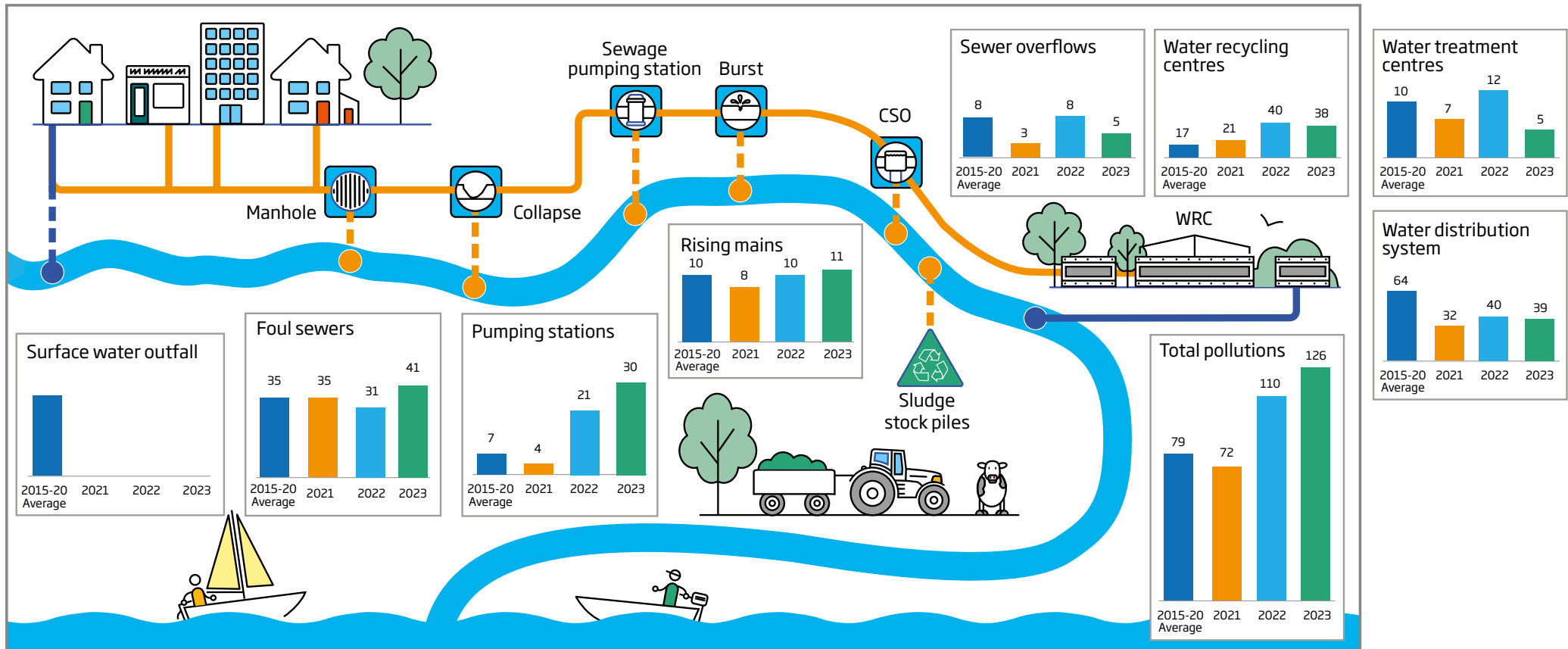
Graph 3

Pollution incidents across asset type

Pollution numbers vary across asset type (see below). Identifying assets that are responsible for pollutions helps us to prioritise funding and most effectively target pollution interventions.

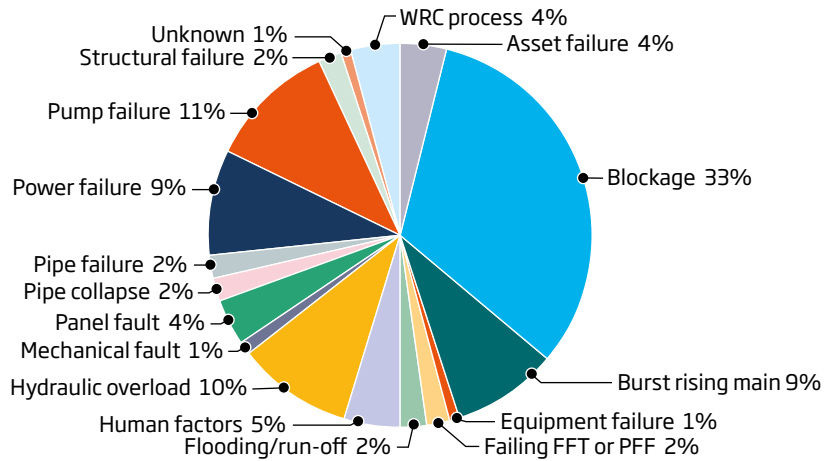
The increase in category 1-3 pollutions in 2023 was primarily connected with an increase in pollutions from foul sewers (31 to 41) and SPSs (21 to 30). The number of pollutions on WRCs decreased slightly from 2022 from 40 to 38; however, this number was still high compared to incident numbers seen prior to 2022. The previous PIRPs have focused predominantly on foul sewers as these assets have, and continue to result in, the most pollutions. However, the level of pollutions connected to SPSs and WRCs has highlighted the need to increase our focus on pollution prevention across these asset types.

Category 3 pollutions from clean water supply assets do not count towards our total pollution numbers as reported by the EA in the EPA assessment; however, serious pollutions and self-report numbers for clean water assets contribute to our overall performance as assessed by the EA. It is important that these pollutions are acknowledged and targeted in our pollution reduction initiatives to best protect the environment.



Root causes

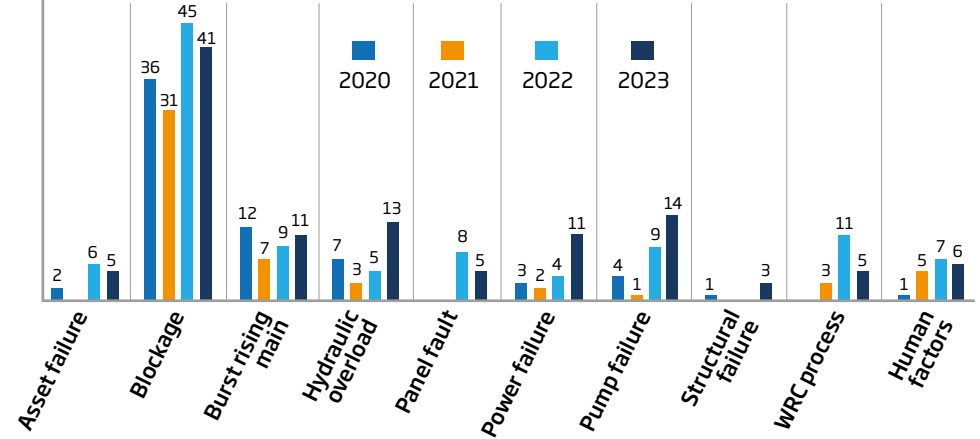
2023 pollution root causes (categories 1-3)



Graph 4

Blockages in foul sewers remained the main cause of pollution for 2023 and, as in previous years, this mostly resulted from sewer misuse - with 41% of blockages caused by wet wipes and rag. However, there was a significant decrease in blockages cause by fat, oil or grease (FOG) in 2023 with a reduction from 29% to 5%. This is likely

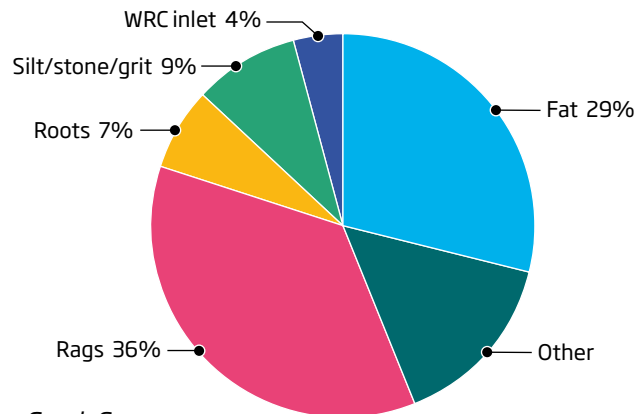
Top 10 root causes for 2023 vs previous years (categories 1-3)



Graph 5

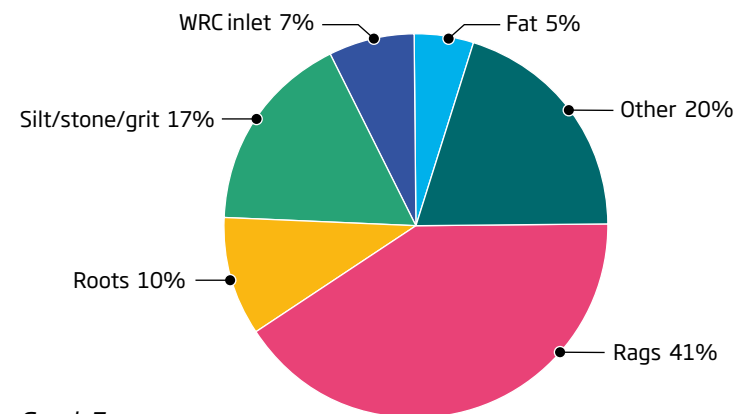
due to the ongoing implementation of pollution initiatives targeting FOG within our sewer network, along with heavy rainfall preventing the settling of FOG along our network. We will continue to drive forward our PIRP initiative on customer behaviours and preventative jetting with the aim of reducing the impact of FOG further.

Blockages root causes 2022 (categories 1-3)



Graph 6

Blockages root causes 2023 (categories 1-3)



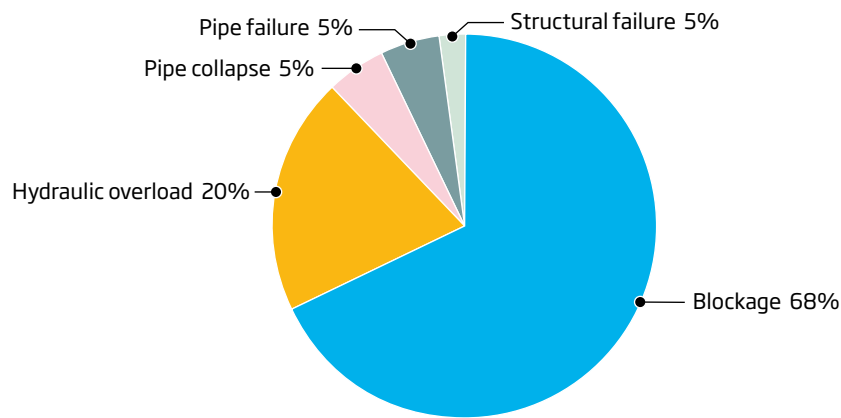
Graph 7

Root causes across asset type

The root cause of pollution varies across asset type. While blockages are the main cause of pollutions at foul sewers and WRCs, on SPSs pump failure and power failure were the cause of 30% of pollutions each (60% in total). Our SPSs and WRCs rely on pumps to move flow throughout our network and processes. If these pumps fail or their power supply is lost, this can result in wastewater backing up and spilling into the environment. The focus of the PIRP has been adjusted to advance initiatives that better target these root causes.

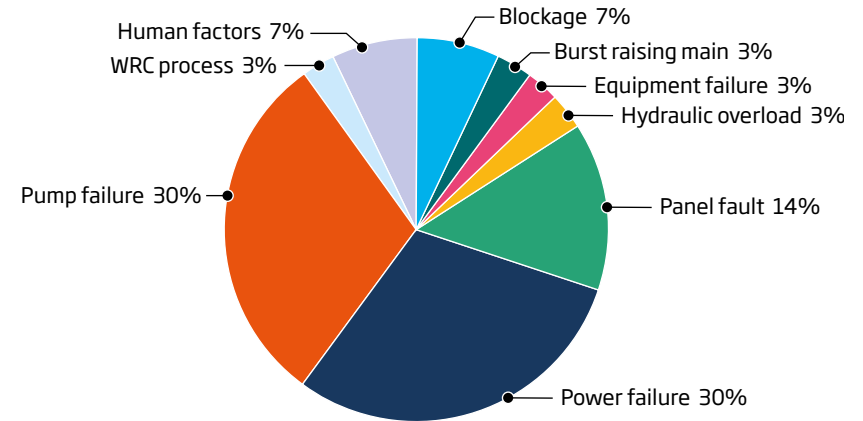
For our clean water assets, water main bursts and leaks cause most pollution incidents. Ongoing initiatives focusing on burst monitoring and reduction aim to reduce these pollution incidents.

Foul sewer root causes 2023 (categories 1-3)



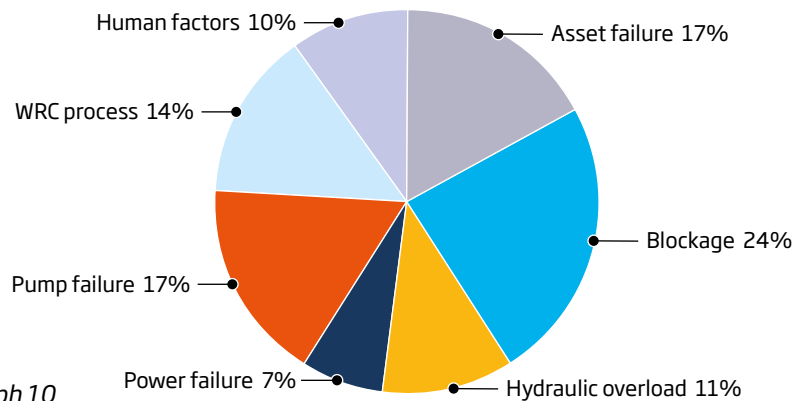
Graph 8

Sewage pumping station root causes 2023 (categories 1-3)



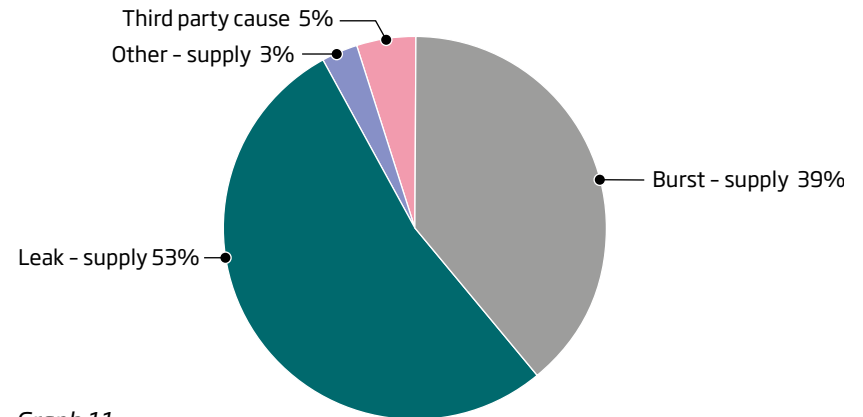
Graph 9

Water recycling centres root causes 2023 (categories 1-3)



Graph 10

Clean water root causes 2023 (categories 1-3)

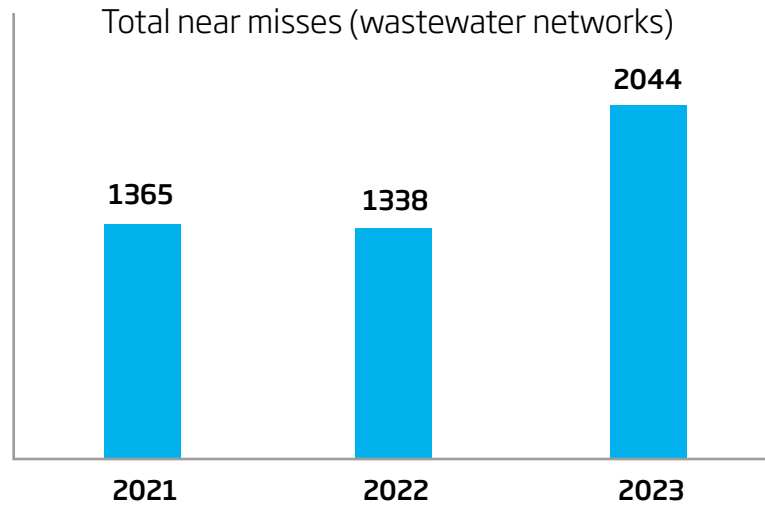


Graph 11

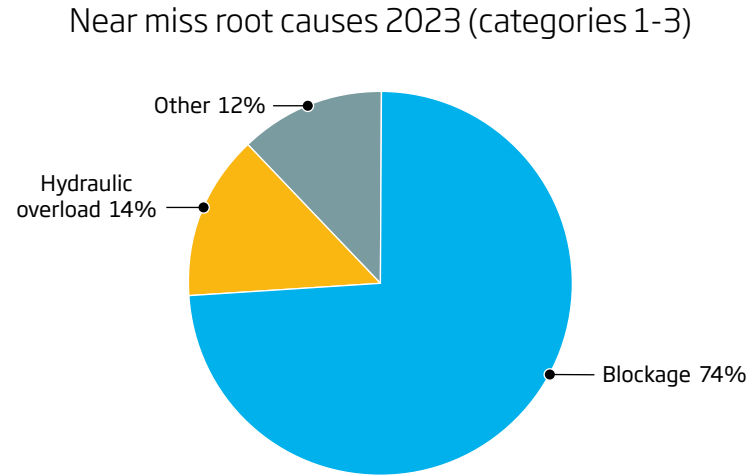
Near misses

As well as recording and analysing our pollution incidents, we also keep a record of near miss incidents. A near miss is classified as any sewer flooding or backing up incident within 30m of a watercourse or environmentally sensitive area. These incidents may have turned into a pollution if not for the swift action of our

operational teams. The number of near misses has increased since 2022 from 1,338 to 2,044. When looking at why these near misses occur, blockages are the cause 74% of the time, echoing the importance of our initiatives to prevent blockages and reduce sewer misuse.



Graph 12



Graph 13



Near miss incidents may have turned into a pollution if not for the swift action of our operational teams

What have we learnt?

Since 2019 we have carried out a lesson learnt review following internal and external flooding incidents. Within these we review the reasons why the incident occurred, any asset failure that occurred as well as maintenance and performance history of the site and asset. These details are used to inform and identify actions that need to be taken to prevent a repeat incident including:

- Specific improvements or changes at the incident location or assets.
- Company-wide improvements to assets of the same type as those that resulted in the incident.
- Change in maintenance frequency.
- Improvements in training, procedures, and awareness.
- Installation of fail safes such as alarms or equipment to prevent or notify of asset failures.

- A change in prioritisation of specific locations or asset types in our investment plans.

As of 2023 we had carried out 658 lessons learnt reviews. We have continued to refine our lessons learnt procedure to further enable us to identify potential problems as early as possible so we can initiate an operational response to avoid the risk of an escape of sewage, either as a pollution or as a flooding incident.

We use the actions identified from our lessons learnt review combined with the root cause analysis that we complete, in order to assess our pollution reduction initiatives and routine tasks. This ensures the right activities are prioritised and helps to identify areas where new initiatives are required.



As of 2023 we had carried out 658 lessons learnt reviews

Wastewater compliance

Our wastewater sites must meet permit conditions set out by the EA before discharging to the environment. If the discharges do not meet these permit conditions, the discharge is reported to the EA as a pollution. The conditions set out within our permits can be categorised into:

- Volume based permits: These state the amount of flow that our sites must treat before they are allowed to discharge untreated effluent into the environment.
- Quality based permits. These state the conditions treated effluent must meet before it is released into the environment.

In 2023, 99.1 % of our WRCs were assessed as compliant by the EA. This high level of WRC compliance prevents environmental pollution from occurring and protects environmental health. Extensive monitoring, preventative maintenance and investment prioritisation will ensure this level of WRC compliance is maintained throughout the implementation of our PIRP. This high level of WRC compliance is the cornerstone of protecting the environment.

Activities and performance across asset type

Sewer network

The sewer network carries wastewater from households to our WRCs to be treated. At Wessex Water we have over 35,000 km of sewers. As noted previously, blockages remained the main cause of pollution along our sewer network in 2023. Most of these blockages were caused by wet wipes and rag that were incorrectly disposed of. To target this root cause, our approach focuses on customer engagement coupled with preventative monitoring and maintenance of the network.

Prevention and resilience

What have we done?

Each year we identify a list of priority locations to survey using CCTV cameras to check the condition of the sewers. Our sewer risk model and hotspot mapping help identify high risk areas using a multitude of data including:

- Sewer age
- Sewer material
- Soil condition
- Food outlet density
- Tree cover density
- Historic incidents
- Hydraulic capacity
- Proximity to an environmentally sensitive area
- Risk

Following the survey, the footage is reviewed to see if there is any damage or other issues requiring action (such as presence of fatbergs). A condition grade is assigned to each individual length of sewer, following a UK industry standard. We use a machine learning tool to review CCTV footage to identify issues or defects and these are used to grade the condition of our sewer. When a sewer has damage or detritus buildup, we will either send a crew back immediately if it is high risk or arrange for the repair in a planned programme of work. This allows us to effectively prioritise operational activities including:

Preventative cleaning

Along our network we have a proactive cleaning programme that targets areas at high risk of a blockages. These areas are cleaned on a regular basis using a combined Jetting-Vacuum unit referred to as a JetVac. The JetVac uses high pressure water and vacuum suction to clean and remove FOG and grit from the network preventing build up and subsequent blockage.

We are moving towards a condition-based maintenance approach for many of our assets to ensure we are effectively prioritising time and funds. The use of pre-CCTV surveys before carrying out any jetting is increasingly important to make the best operational decisions.

In-house team	Count of jobs/year	Sum of Annual meterage (km)
Sewerage JetVac	1129	450.4
Sewerage Jetting	702	76.8
Grand Total	1831	527.2

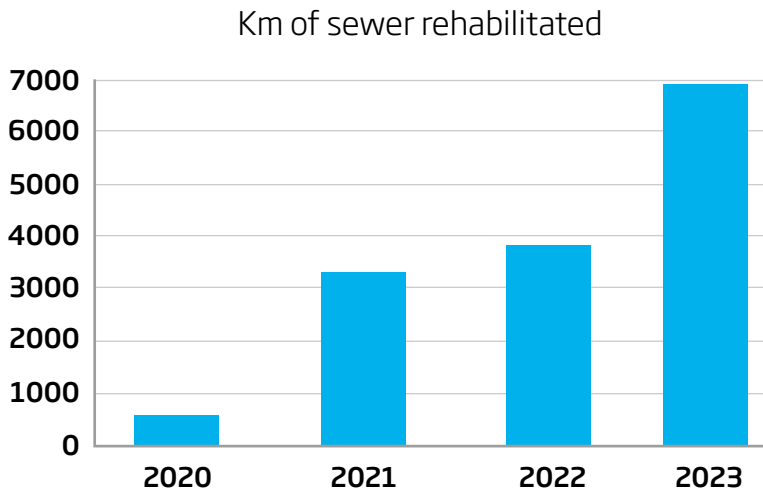
Our sewerage operators also inspect and clean lengths of sewer as planned activities in areas where the diameter of the sewer is small, or risks are sporadic, to better target our activities.

Sewer rehabilitation (re-lining)

Our network can be vulnerable to damage, infiltration and root ingress; small cracks allow groundwater to leak into our network which can contribute to hydraulic overload, while the presence of root growths into our network can cause flow restrictions and increase the likelihood of rag build-up and blockages.

Instead of fully replacing these lengths of sewer, we use a trenchless relining technology that allows us to protect our sewers against these issues in a quicker, more environmentally friendly and less disruptive way. This technology means we can access our assets via manholes rather than digging up the land to form trenches. In 2023, 6900m of sewer (graph 14) was relined via trenchless technology as part of our pollution prevention programme. We assess the impact of the sewer rehabilitation by comparing incident rates from before and after relining is completed and which focus within the immediate area of the repair.

In locations where we have carried out proactive pollution prevention rehabilitation, there has been on average 62.46% reduction in wastewater incidents. This shows the positive impact of sewer rehabilitation with the number of pollutions, blockages, and flooding incidents following a downward trend the year after work has been completed (compared to one year before the work was completed). We have increased the length of sewer that is being rehabilitated year on year to increase the benefits seen from this intervention.



Graph 14

Future planned activities

Our risk models and prioritisation tools are constantly being improved, helping us to identify areas that are likely to require repairs. Work on our 2024/25 programme is well underway, predominantly focusing on sewer relining and small repairs, and will ultimately cover approximately eight kilometres. We have also identified a further 5.5 kilometres which will be delivered beyond 2024.

Monitoring and analytics

The underground nature of our sewer network makes it essentially an unobservable asset, therefore physical checking of network functioning is extremely difficult. As such, we have implemented monitoring and data analysis techniques that allow us to proactively identify issues on our network before they result in a problem. This includes:

What have we done?

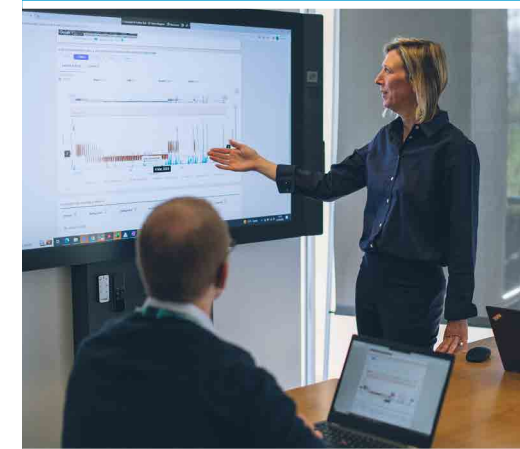
Network monitoring

Throughout 2022 the network monitoring team (NMT) was set up to utilise data captured by sensors installed across our sewer network. Data from these sensors feeds into enhanced analysis and machine learning tools, such as StormHarvester, allowing the team to interrogate and proactively resolve issues before they result in pollution or flooding incidents. Analysis principally focuses on blockages, rising main bursts, pump operation and discharges to the environment measured by monitors known as Event Duration Monitors (EDM). In 2023 the Network Monitoring team made over 400 'good catches' which directly prevented at least 60 pollution incidents. Good catches are classed as issues that may have caused a pollution or negative operational impact if they had not been identified and resolved.

As part of our pollution prevention programme, 2023 saw us double the number of in-sewer level depth monitors installed across the region. This phase of work saw the installation of 800 additional sensors focused on high-risk pollution areas across our sewer network. These monitors measure the depth of sewage within the sewer and can alert us to any abnormalities because of blockages etc. The locations for monitors were informed by historic issues, asset data and the knowledge of our local Operations teams. Data from these devices has the added benefit of allowing us to gain a deeper understanding of how the sewerage network operates aiding maintenance prioritisation and infiltration detection and prevention activities.

Future planned activities

A total of 3,500 in-sewer depth monitors are expected to be installed by the end of 2025, with the aim of installing 10,000 monitors by the end of 2030. This will be combined with the expansion of the NMT to undertake the additional data analysis and alert management that is expected to be required with the significant increase in monitoring.



Data from sensors feeds into enhanced analysis and machine learning tools, such as StormHarvester

As well as this, the machine learning services provided by StormHarvester are being expanded to cover WRC and SPS analysis and alerting as well as the existing coverage of the foul sewer network. This will increase visibility and help us continue to develop a proactive operational framework across more asset types.

Improving asset records

We have spent a lot of time in the last year reviewing and enhancing the asset records of our sewerage assets, particularly for mechanical and electrical equipment. This includes key asset data (such as age, size) but also the condition as assessed by the competent person operating and maintaining that asset. This allows us to prioritise maintenance and make better funding decisions at a local level, but also to provide data to the business for our five-yearly business plans.

Installing monitoring cameras

We have installed more than 100 monitoring cameras at key locations on our sewerage network. These provide real-time, high-quality images from remote or difficult to access locations. The primary purpose of the cameras is to provide early warning of any issues with our assets (such as if a screen has been blocked by rag) and to allow remote monitoring of features such as overflows and pumping stations. The cameras enable us to make more targeted proactive assessment of our assets and allow us to make faster responses to avoid pollution incidents.

People

Most of the blockages that occur on our network are due to sewer misuse. This is primarily customers depositing either fat, oil, grease or wet wipes and other unflushables down the drain instead of putting them in the bin. We have continued to educate businesses and customers on what is appropriate to go down the drain with the aim of changing consumer behaviour and reducing blockages.

What have we done?

Commercial Fats, Oils and Greases (FOG) Programme

In 2022 we established a team of Commercial Engagement officers. This team visits food establishments to improve their awareness and understanding of the impact of FOG on their drains and our sewer network. These locations include takeaways and restaurants, school canteens or care homes - all of which have the potential to have an impact on the network.

The team will usually discuss good FOG management, including scraping waste into food waste bins, not washing FOG down the sink and installation of grease traps to hold and separate the FOG from the washings before the water goes into the drains. The team has visited 1,154 food establishments in total. Out of these, 1,025 (88%) are now compliant with fat traps installed and regularly maintained to prevent FOG build up. It is estimated that this intervention has prevented 1.2million litres of FOG from entering our network since its implementation.

Future planned activities

This is a continuous process as grease traps need to be regularly cleaned to function properly. This team is working with other



water companies and the Water Research Council to introduce updated and enhanced standards for grease traps that are more exacting. This will reduce impact on sewers and make it easier for owners and operators to understand what they need to comply with and why. We continue to target areas with known problems with FOG either in the network or at the WRC and will increase the number of establishments we are working with on an ongoing basis.



Commercial Engagement officers visit food outlets to improve awareness and understanding of the impact of fats, oils and greases on drains and our sewer network

Water recycling centres

Sewage is collected through the foul and combined sewer network and is delivered (by gravity or by pumping) to water recycling centres (WRC). WRCs treat the sewage through a series of treatment processes. These processes are largely biological with some addition of chemical or mechanical processes; these transform the sewage into final effluent that can be returned to the natural environment as per the environmental permit. Our pollution analysis for WRCs has shown that blockages are the main cause of pollution, with asset failure and pump failure a close second and third.

Prevention and resilience

Our water recycling centres vary significantly in size, design and complexity depending on the permit and location, but all have the potential to lead to pollutions if those assets fail to function as intended. As such we have several programmes focussed on proactive preventative actions and maintenance across our WRCs designed to ensure that they continue to operate within their permit and prevent pollution incidents.

What have we done?

Preventative maintenance

Our Proactive Planned Maintenance (PPM) team carry out a programme of planned maintenance on key assets such as inlet screens and compressed air blowers across our WRCs. These assets are critical to the continued efficient operation and compliance of our WRCs, and inlet screens in particular have proven to have the potential to result in pollutions if not properly maintained. The maintenance carried out by the PPM team is completed on a planned rather than reactive basis. This maintenance is scheduled to allow the asset to continue to operate as efficiently as possible and minimise the chance of asset failures or breakdowns. In 2023 we conducted PPM maintenance on 1,305 assets on 267 different sites. This maintenance is completed alongside weekly maintenance tasks that ensure minimum disruption to our sites allowing them to function at maximum capacity.

Inlet cleans

Root cause analysis of previous failures has highlighted that blockages in WRC inlets have resulted in several pollutions. Inlet screens filter incoming sewage, removing large debris such as rag

and grit before it gets into the treatment processes. This leaves the screens particularly vulnerable to blockages. Through evidence and a risk-based analysis we have actioned a programme of scheduled inlet cleans utilising specially designed tankers and equipment to remove the grit, rag and FOG that can build up to cause a blockage. In 2023 the JetVac team completed cleans at 161 WRC inlets removing over 150,000kgs of debris.

Power generators

On our high-risk sites, power generators are in place to ensure the continuous operation of critical systems during power outages. Many processes on our WRCs require a steady power supply to function. Without a generator any interruption in power can lead to significant disruption, potentially resulting in untreated wastewater entering the environment. Currently we have generators in place on 183 of our WRC sites ensuring power resilience to maintain treatment and prevent pollutions.

Future planned activities

We are committed to continuing to implement our programme of preventative maintenance on our WRC assets and inlet cleans throughout 2024. In addition, we have instigated programmes to replace inlet screens at selected WRCs and are undertaking in-depth surveys of Inlet Flow Control systems to ensure they are fully optimised and working to comply with the WRC's permit conditions. To increase resilience at our WRCs we will enhance our programme of regular servicing on our 183 fixed generators on our WRCs to ensure they work as required. We will be installing auto-restart capability for pumps at critical locations which will enable the automatic restart of pumps following a power outage and will reduce the potential for a pollution in such an event.

Monitoring, analytics and compliance

Our WRCs are not manned 24/7, therefore it is important that our assets are monitored so we are alerted when something goes wrong. We utilise a range of techniques to monitor and analyse both the operational and long-term performance of our Water Recycling Centres. This monitoring takes place alongside data gathering and analysis to ensure optimal functioning of our sites.



We utilise a range of techniques to monitor and analyse the performance of our Water Recycling Centres

What have we done?

Alarm management team

In 2023, within our control room, we added a Waste Operational Control (WOC) team consisting of personnel with additional water recycling training. The WOC team provide enhanced monitoring and analysis of telemetry and alarms from our WRCs on a 24/7 basis. This tells us how our site is functioning and if anything has gone wrong so we can initiate an operational response. This improves the efficiency and effectiveness of our response to situations, including prevention of pollution incidents.

Risk management system

In addition to the improvements in processing live telemetry from our WRCs, we have also improved our ability to assess and review the associated risks. Due to the complex nature of the sites, there is a lot that can go wrong. With the introduction of our new risk management system, we have an improved ability to review risks consistently across all our WRCs - ensuring that focus and investment is targeted at sites where it will provide the greatest benefit for WRC compliance and pollution prevention.

Future planned activities

SmartWaste system

In 2024 we have continued to develop the capabilities of our SmartWaste system at Westbury WRC and the associated sewer network. This project will explore how we can collect data from the WRC and sewer network, using both existing and newly installed equipment in new ways to provide additional insight and an enhanced ability to identify and respond to incidents or poor performance. The activities pursued as part of the SmartWaste project will provide immediate benefit at Westbury and will also form proof of concept for a future roll out to additional sewerage catchments.

Root cause analysis

We recognise the importance of analysing pollution incidents to determine why they occurred and how they could be prevented. In 2024 we will be expanding our processes within WRCs to incorporate root cause analysis for every pollution incident, near miss and sample failure. This will be combined with regular meetings of the WRC leadership team to review the findings and ensure relevant actions are progressed across the whole of the company.

People

Our people are a crucial resource in reducing pollution incidents across all aspects including prevention, identification, and response.

What have we done?

Pollution training

Following the introduction of an online pollution awareness course across the company through 2022, we have completed practical pollution training for our Water Recycling Operators. The training comprises guidance on identification and prevention of pollutions which included responding to a simulated pollution event. All our Water Recycling Operators completed the online training in 2023, with over 50% also attending the new practical sessions. Through 2024 we intend to continue the training to ensure all current and new operators have completed the training.

Around the Bend Tours

During the summer of 2023 we opened the doors at 21 of our WRCs, welcoming over 2,000 people as part of our Around the Bend Tours programme. This was a chance for members of the public to learn more about how WRCs operate and the work they do. The tours are an excellent opportunity to highlight how behaviour of the public can impact our ability to successfully treat their wastewater and promote ways they can help us to prevent pollution incidents.

Future planned activities

WasteSmart

This year sees the start of our WasteSmart programme across water recycling. This programme is designed to clarify and standardise operational standards, practices and procedures across our 400 water recycling centres. Part of the implementation of WasteSmart will be a standardised programme of operator training and a competency assessment. This ensures all operators working on our WRCs have the same standard of process knowledge and the awareness to operate our WRCs to comply with our permits and minimise pollution incidents. It is expected all water recycling operators will have completed the initial training in 2024, with the intention of then expanding the programme as part of a comprehensive competence management system for water recycling.



The Around the Bend Tours are an excellent opportunity to highlight how the behaviour of the public can impact our ability to successfully treat their wastewater

Sewage pumping stations

SPSs are below ground tanks or storage spaces that have electromechanical assets to pump the sewage up an incline where gravity will not sustain a flow within a sewerage network. We have over 2,000 pumping stations on our network that vary in size. Our root cause analysis highlighted that pump failure and power failure were the main causes of pollution on this asset class.

Prevention and resilience

Our pumping stations are responsible for moving flow along our sewer network to our WRCs. If these assets fail, flow cannot move through our network and can subsequently back up and/or cause flooding or pollution.

What are we doing?

Proactive maintenance

All SPSs receive at least two scheduled visits per year, with additional visits arranged reactively when required. These scheduled visits are inspection-based and focus on analysing the condition of the equipment and ensuring the site is running as it should. As we install more monitoring on our SPSs, including flowmeters and pressure sensors, we are better able to rely on data and analytics to alert us when the performance of an asset is deteriorating. By measuring the flow and pressure over extended periods of time we can identify where a site deviates from its normal operating capacity, indicating a potential issue. Once we are alerted of an issue, targeted operational maintenance takes place with the aim of improving asset efficiency. This could involve lifting and altering pump functionality or replacing the pump all together. This increased data gathering allows us to have a more targeted response, better prioritising operational time to fix issues that may cause a pollution if allowed to worsen.

Wet well cleaning

The below ground storage tanks on our SPSs are referred to as wet wells. These wells hold the flow from our sewer network before it is pumped further along the network. Wet wells can collect FOG and grit due to the nature of the incoming wastewater. If this builds up it can cause blockages or damage the pumps, therefore it is important that high risk sites are

cleaned on a regular basis. In 2023, 1100 wet well cleans were performed across our highest risk SPS sites.

Power generators

Power resilience at our sewage pumping stations remains a key focus with the goal of reducing the risk of a pollution in the event of a power outage. Approximately 5% of our SPSs have diesel generators permanently installed and we have developed an enhanced maintenance programme to ensure their reliability. The remainder of our sites rely on storage time within the pumping well, along with our pumping station team taking a mobile generator to site (or tankering) if the power outage is expected to exceed the storage capacity. We have been doing modelling work to understand our 'usable' storage capacity at our sites to allow us to prioritise deploying mobile generators to those sites with the least capacity.

Auto restarts

A number of our site failures have occurred following a power outage where the pumps have failed to reset causing all pumps to fail. We have a remote restart function to allow a time delay before the pumps attempt to restart themselves. We are also looking to retrofit remote access to the controllers of our most critical, large sites. This will allow the pumps to reset themselves or us to reset the pumps remotely without an operator needing to attend site. These solutions are being rolled out at a number of our sites in a prioritised programme.

Monitoring and analytics

Our SPSs are covered by our telemetry alarm systems that alert us when something goes wrong on site, allowing us to deploy an operational response. We recognise that this reactive operational response is not optimal, and we are aiming to switch to a more proactive approach via improved monitoring.

What are we doing?

Pump analytics

We have a number of data science projects underway. These use data to help us to understand when our pumping stations are deteriorating in their performance to allow intervention before a major failure occurs. Examples of these include alerting us of



Power resilience at our sewage pumping stations remains a key focus

reduced pumped flow, increased pressure in the pumping main, possible blockage of the non-return valves, air-locking pumps and over-use of energy. On high-risk sites it can be particularly beneficial to install monitoring equipment such as flow and pressure monitors. We have also developed (in-house) a low flow alarm control to pick up airlocked/failed pumps that would otherwise go undetected. This monitoring will develop as more flow meters and/or pressure sensors are installed across our pumping station network.

Storm overflows

What are storm overflows and why do they spill?

Storm overflows are part of an older type of sewer system called a combined sewer system. In this system, rainwater from household drains and road run-off enters the same pipe as the waste leaving homes and businesses. This can result in the flow entering our sewers exceeding the network's maximum capacity. To protect land and properties from sewer flooding, our network has built in overflows (storm overflows) which can automatically spill to the environment if its capacity is exceeded. These spills only occur in wet weather due to rainfall entering the network, or in areas which experience high groundwater. As a result, the wastewater released at this time is heavily diluted. These spills do not constitute a pollution as long as permit conditions are met.

How many do we have and what are we doing about them?

At Wessex Water we have 1,295 storm overflows along our network, each with an event duration monitor (EDM) to record spill start and stop dates/times. The installation of all these monitors was completed in December 2023 giving us a full overview of all spills to the environment along our network. From the 30 April 2024 we have been publishing near real-time

information on discharges from all storm overflows in our area on our website, Coast and Rivers Watch. Later in 2024, this same information was made available on a national map along with all other water companies' data.

Since 1989, each five-year asset management plan (AMP) has included storm overflow improvements. As of 2023, 600 have been significantly improved. New government targets mean that approximately half (650) of our storm overflows require further improvement by 2050. Our AMP 8 plan for 2025-30 includes £400 million to be spent on improving 128 storm overflows. Our primary target is to have each overflow spilling less than 10 times a year by 2050, against an average of 32 times a year in 2023. The ways we reduce the frequency of storm overflow spill is by either increasing the hydraulic capacity along our network or preventing rainwater and groundwater from entering our network. We do this by:

- Increasing the treatment capacity at our WRCs
- Installing storage tanks along our network
- Separating rainwater and crude waste pipes
- Lining and sealing pipework to prevent groundwater infiltration.

For more information about storm overflows visit:

[Storm Overflows Discharge Reduction Plan \(publishing.service.gov.uk\)](https://publishing.service.gov.uk)

[Storm overflows | Wessex Water](#)

[Storm overflow investment | Wessex Water](#)

[Storm Overflow Improvement Dashboard \(arcgis.com\)](#)



Our AMP 8 plan for 2025-30 includes £400 million to be spent on improving 128 storm overflows

Rising mains

A rising main is a sewer which is pressurised, using pumps to move sewage. These mains are essential for moving sewage over long distances or uphill. Due to the pressurised nature of this asset, they can fail by bursting. When they do burst large volumes of sewage can escape very quickly, making containment difficult. In 2023 we had 11 rising main bursts (against nine in 2022), which were likely influenced by the increased rainfall of 2023 and not a systemic deterioration in the group of assets.

Prevention and resilience

What are we doing?

Air valve maintenance

Air can accumulate within rising mains, restricting flow and reducing capacity. This can result in the main being put under higher pressure. We have built in air valves that allow air in and out of rising mains to control main pressure. This extends the life of the rising main and reduces the likelihood of bursts. We have around 900 air valves along our rising mains. These valves are on a maintenance schedule ranging from between every three months to three years, depending on the sensitivity of their location and their risk of blockages.

Rising main replacement

Annually we spend £2.4 million replacing problematic and high-risk rising mains to improve network reliability and reduce chances of serious bursts. This equates to around 7km of rising mains per year.

Future planned activities

Foam pigging

Currently, cleaning of rising mains via pigging is not usually undertaken as the hydraulic pressure from pushing the water along the pipeline has historically been assessed as providing adequate cleaning. However, in 2023, as a pilot improvement idea, foam pigging was used to clean two rising mains that had been operating with less-than-optimal flows. Foam pigging involves using high pressure water to push a pipe sized piece of foam covered in coarse brush called a foam pig up a rising main. This can get rid of any FOG or sediment build-up to return the

rising main to its full capacity. Plans are in place to expand the amount of pigging on the network if it proves to be a sustainable way to maintain the capacity of our rising mains.

Monitoring and analytics

The size of the burst can sometimes make it difficult to monitor when bursts occur. Greater monitoring and data gathering will be required to understand and manage these assets to optimise operational response.

What have we done?

Pressure monitoring and burst detection.

Over the past 12 months we have continued to deploy sensors to help us detect bursts on our rising mains. In total 28 systems were completed in 2023. This forms part of our £9 million AMP 7 programme for burst detection monitoring on our sewerage rising main assets over the five-year investment period. Sites were selected using a consequence-based methodology; those with the highest risk of causing a significant pollution have been prioritised. We currently manage 1,245km of rising main, of which 490km are deemed 'critical rising mains' due to their proximity to main rivers, railways or significant roads plus those passing through sensitive areas such as a SSSI.

Data is retrieved from monitoring assets and then analysed to alert us to a potential (or real) burst. Monitoring flow and pressures allows us to establish normal operating parameters for our rising mains. Significant deviation from this normal is an anomaly that could indicate a burst or a problem on site. Algorithms are used to reduce false alerts, while also extending our performance monitoring.



Annually we spend £2.4 million replacing problematic and high-risk rising mains

Water distribution and production

Prevention and resilience

What are we doing?

We have not added additional tasks to manage our clean water burst and leakage issues. We have a team of people who already focus on these issues:

- We manage burst detection and assess the resilience of our water mains. This is focused on the criticality to serve potable water to our customers and not on pollutions, but it has the same function of identifying where a burst or leak has occurred.
- Our targets for providing drinkable water to customers means we have a key objective of keeping the water distribution network in good order so there are minimal interruptions.

These two factors ensure we have a small number of burst or leaks on our water distribution network.

We pride ourselves on our high-quality drinkable water and this is achieved in production sites by a significant amount of real-time monitoring and controls to ensure we meet the highest standards. These systems ensure we have minimal uncontrolled discharges from our water production sites. There are very few pollution incidents from these sites.

Monitoring and analytics

What are we doing?

Our burst detection tools identify potential issues by monitoring changes in pressure and flow.

Future planned activities

We have introduced annual refresher training for our frontline staff to help them identify pollution incidents and what actions to take.

The main impacts from a discharge of drinkable water to a water body results from chlorine levels in the water and/or sediment, generally created as the burst pushes to the surface or collected as the water runs over land from the site to the watercourse.

We are focusing on mitigating this impact by awareness of de-chlorinate techniques and mitigations for minimising sediment reaching the watercourse such as a silt sock on discharge pipework from de-watering pumps.



We have introduced annual refresher training for our frontline staff to help them identify pollution incidents and what actions to take

CASE STUDY DOMESTIC ENGAGEMENT OFFICERS

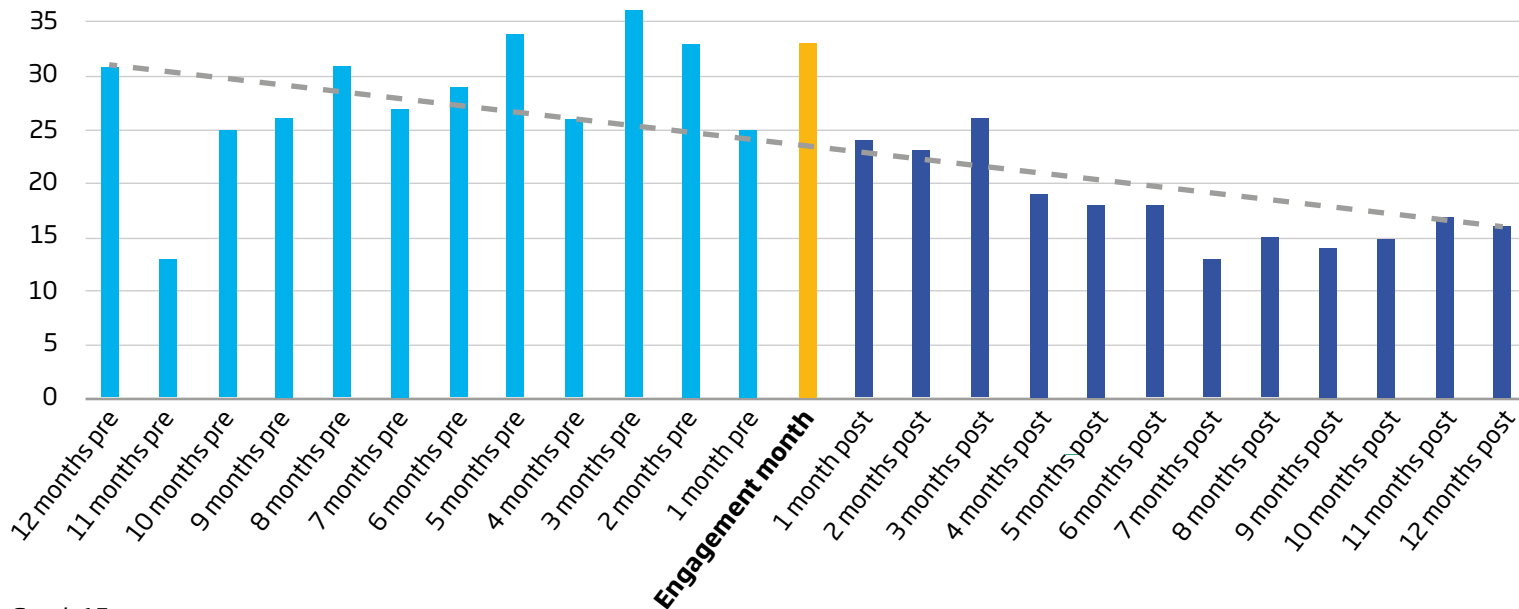
What have we done?

At Wessex Water we have a team of Domestic Engagement Officers (DEOs) who educate and spread awareness on what should and should not be flushed down customer toilets, or disposed of down their sinks. DEOs are assigned properties in "misuse hotspots", which are areas with higher levels of repeat blockages and flooding incidents. They visit these properties to discuss with our customers how to prevent unnecessary blockages on our sewer network. They also drop off informative leaflets or direct customers to our website where they can order a free waste pack. These waste packs form a central part of our "stop the block campaign" and contain devices such as gunk pots to store fat and oil plus drain catchers to help customers keep their drains clear of

blockages. To date, approximately 22,000 households across the Wessex region have engaged with one of the DEOs on sewer misuse. The graph below demonstrates a downward trend for the number of pollutions, blockages and flooding incidents for one year after engagement. This action has also had another unintended side benefit. As our DEOs are visiting customer properties, they have the opportunity to help vulnerable customers who may be eligible for our Priority Services register. With the help of the DEOs we have managed to reach the milestone of having 100,000 people on Priority Services, allowing us to give more people the support they need.



Count of misuse incidents in DEO targeted postcodes - pre and post engagement



Graph 15



Industry best practice

The water industry has several regular forums that meet to share best practise and innovations:

The National Pollution Group meets monthly and includes the UK's main wastewater companies in England, plus Welsh and Scottish Water. Within this forum the industry shares best practice on predicting, preventing, responding and mitigating pollution incidents. We are active participants in this group, sharing and receiving good ideas on how to make a difference.

We also participate in the Network Protection and Sewer Network Abuse Prevention forum which considers best practice to identify and resolve issues with Commercial Food Establishments disposing of Fat Oil and Grease, general misuse of wet wipes, customer education about what can and should be put into the sewer system. As misuse leading to blockages is a high root cause for pollutions across the UK this is a specific targeted forum to work together on continuous improvements.

Both forums hope to reduce the number and severity of pollutions happening across the UK by sharing new ideas, new tools and ways of working to have an overall positive influence on our communities, wildlife and environment.



Future strategy

Our future for the PIRP will remain dynamic, with decisions formed upon the basis of data as part of our “plan - do - act - review” approach. This process allows us to analyse our initiatives to ensure they are having the desired effect of pollution reduction and modify our approach accordingly. Upon reviewing our data for the past few years, there are a number of target areas where we are focusing our efforts for pollution reduction, both from a technology led solution and from our engagement with our customers and other stakeholders.

Intelligent monitoring

An increase in monitoring is likely to form a large part of our future strategy. As we switch to a more proactive approach to pollution prevention, data gathering will underpin how we inform our operational responses and prioritise funding. The main activities we will focus on are:

Network monitoring

In 2023 the network monitoring team identified 400 “good catches” and prevented 60 pollutions. This demonstrates the benefit of this type of initiative, as a result we are expanding the number of in-sewer level monitors with a total of 3500 by 2025 and an ambition for 10,000 by the end of AMP 8. This will be combined with broadening the scope of our artificial intelligence (AI) analysis tool Storm Harvester to include data from WRCs and SPSs, allowing us to view data variation across the region so we can respond proactively to abnormal data patterns that may signal a problem.

SmartWaste

Our SmartWaste system trial in Westbury WRC will explore how we can use installed equipment, as well as data collected from WRCs, SPSs and the sewer network in new ways to provide additional insight and enhanced ability to identify and respond to situations that could result in a pollution incident or poor performance

Burst detection

Our burst detection tools are crucial to minimise the effects of a rising main burst. We will continue to expand the number of pressure and flow monitors on SPS's to increase visibility across our rising mains; an initiative that is already providing good results across our network where these have been installed. This will ensure our rising mains are functioning optimally and prevent bursts.

Customer education initiatives

Blockages remain a stubborn leading root cause of pollution. By targeting the source of these blockages and minimising sewer misuse we will reduce pollutions of this type further. We will continue to expand our initiatives involving customer engagement such as the DEOs, CEOs and social media campaigns as we have already seen positive impacts in the target areas for these programmes.

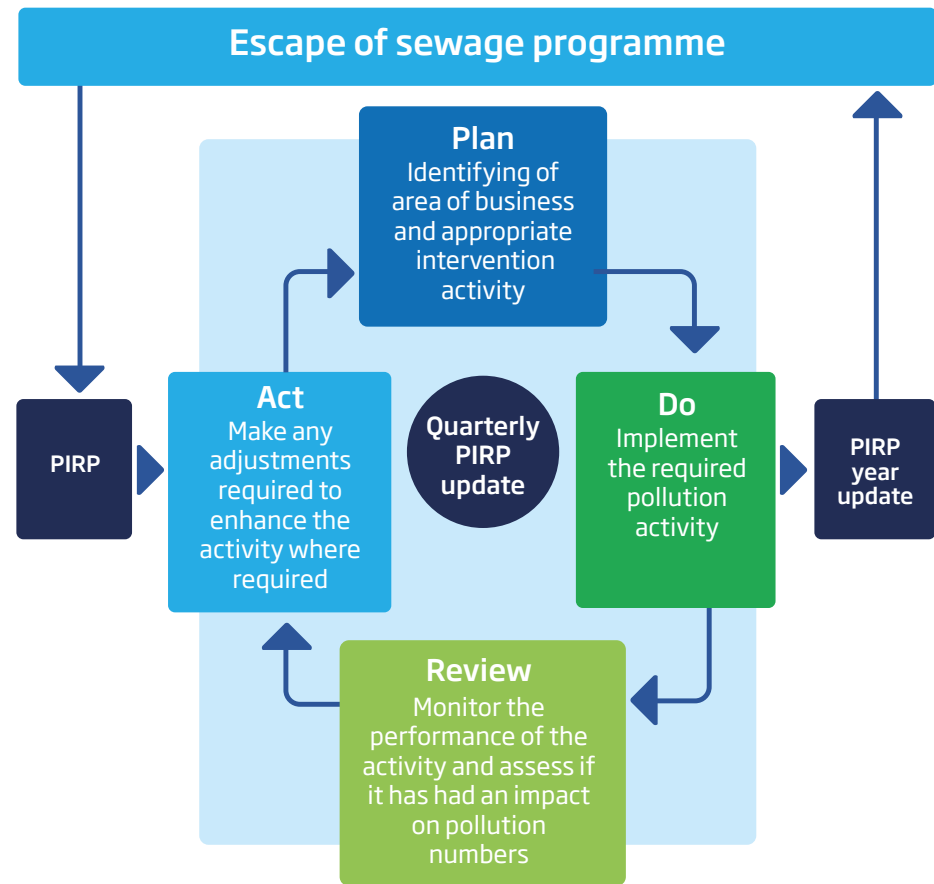


Appendix I

Governance



PIRP actions and root cause correlation



Glossary

AMP 7	Asset Management Plan 7 which encompasses the business plan from 2020-2025
AMP 8	Asset Management Plan 8 which encompasses the business plan from 2025-2030
CEO	Commercial engagement officer
Control Room	The centre in which all our alarms and telemetry are handled and actioned
CSO	Combined sewer overflow which spills to the environment to relieve pressure on combined sewer networks
DEO	Domestic Engagement Officer
Detritus	Waste or debris
EDM	Event Duration Monitor which records the start and stop times of events
Effluent	Treated wastewater from our water recycling centres
Environment Agency	Environmental regulator
Environmental Permit	Conditions set out by the EA that must be met before discharging to the environment
Fatberg	A fatberg is a mass of waste matter formed by the combination of flushed non-biodegradable solids (ie wet wipes) with fat, oil, and grease deposits
Infiltration	When external water such as ground water leaks/ infiltrates into the public or private sewer network
Jetvac	A vehicle that has the capability for both high pressure water jetting and vacuum storage.
Ofwat	The economic regulator of the water sector
Rag	A term used to encompass unflushables items such as wet wipes and sanitary products

Self-report	The act of Wessex water reporting an incident directly to the EA
SPS	Sewage Pumping Station
SSSI	Site of Special Scientific Interest
Storm Harvester	AI software trained on monitoring data that generates alerts based on abnormal data patterns
PR24	Ofwat's price review, detailing the investment and bill levels for 2025-2030 period
Telemetry	In situ monitoring equipment that collects and transmits data
Trenchless	Operational intervention that is done without the need for digging trenches
UKAS	United Kingdom Accreditation Service which assesses the competence of organisations that provide certification, testing, inspection and calibration services
Unflushables	A product that is not designed to be flushed down the toilet ie wet wipes
WOC	Waste Operational Control (WOC) team that monitor and analyse the telemetry and alarms originating from our WRCs on a 24/7 basis and action an operational response when needed
WRC	Water Recycling Centres treat wastewater to make sure it is safe to release into local waterways.
WTC	Water Treatment Centres remove contaminants and bacteria from water abstracted from water sources such as reservoirs and aquifers before delivering clean and safe water to customers for consumption.