



Pollution Incident Reduction Plan

April 2025



from
**Southern
Water** 

Foreword

No pollution incident is acceptable – either to me or to the hard-working, dedicated teams at Southern Water.

As we share our sixth annual Pollution Incident Reduction Plan (PIRP), it's worth noting that pollution incidents have halved over the past five years. However, we still have much to do to improve further as we start to deliver our new five-year Business Plan.

In 2024 our pollution rate increased at the beginning of the year, and we put in an extra £10 million of targeted investment to reduce pollution incidents as the year went on. This approach – using a fast learning and response cycle – is key to making effective progress as we near the end of our Turnaround Plan and seek to achieve good performance in line with the Environmental Performance Assessment (EPA) measures set by the Environment Agency (EA) for 2025.

The actions we took under last year's PIRP meant we increased resilience at wastewater pumping stations, carried out the next phase of rising-main calming to minimise bursts, and reviewed our 24,000 sewer level monitors to increase their efficiency. We've been monitoring our sites proactively, using innovative machine learning tools, including Samotics technology and condition-based monitoring, which enable risks to be identified earlier so that we can intervene and put right any problems before they cause an issue.

The pollution reduction work from successive annual plans has yielded clear benefits: we can measure how many pollution incidents have been avoided. We need to maintain our focus on serious pollution incidents – those labelled category 1-2 incidents. Our analysis of the root causes for these shows that blockages, bursts and electrical issues are the main problems.

Over the life of our Business Plan for 2020–25, we've invested £23.3 million in pollution reduction. As we make further investments over the next regulatory period to 2030, we'll front-load much of our pollution activity towards the beginning of this period, reflecting the priority our customers attach to the issue. We expect to see the number of pollution incidents reduce, taking us closer to our target of zero category 1-2 incidents by 2030.

Southern Water's Turnaround Plan – the plan to speed up performance improvements over the last two years of the regulatory period now ending – has brought a 30% reduction in pollution incidents. While there was a slight increase in incidents in 2024, we know that wastewater pollution incidents were affected by exceptionally heavy rain and high groundwater levels; water pollution increases are being driven by improved reporting and not worsening performance.

The faster we find out about a pollution incident, the faster we can react to reduce its impact on the community. While we monitor our sites and our network, our customers also play an important role when they see a potential pollution incident and report it directly to us. Over the past year, this “self-reporting” of pollution incidents has increased by 12%. Thank you to those customers who helped by making a report.

Our pollution reduction work remains a top priority for me and my leadership team at Southern Water: we're determined to press on with this at pace. Importantly, our decision to appeal the funding allocated to us for the next five years by our regulator won't affect the way we drive our pollution reduction work. We continue to work closely with the Environment Agency, and under increased scrutiny by regulators, stakeholders and customers; we want to be transparent not just about progress made in reducing pollution incidents, but also about where we fall short.

Our region is a precious and beautiful part of Britain, with environmentally sensitive areas, such as bathing waters, shellfish beds and unique chalk streams, so protecting these is imperative, and our duty. I want to be honest with customers that there's still a long way to go in tackling pollutions and what causes them.

I approve and commend this 2025 Pollution Incident Reduction Plan. My team and I are confident that it will enable us to reduce pollutions further, protecting the environment and the communities we serve. Rightly, our customers and communities will hold us accountable for delivering on this Plan.

Lawrence Gosden
Chief Executive Officer
April 2025

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Executive Summary

Our 2025 Pollution Incident Reduction Plan (PIRP) shows how we are tackling pollution incidents over the coming year, as part of a longer-term approach, taking us into the next Business Plan 2025–30.

The 2025 PIRP has five key workstreams consisting of 28 initiatives, aiming for ‘benefits’ of 75-90 pollution incidents avoided, with a focus on reducing serious pollution incidents.

The plan takes a close look at pollution incidents from 2024, analysing the root causes and taking account of which actions were the most effective. Four case studies demonstrate how projects have made a difference by avoiding incidents.

The 2024 PIRP pollution reduction interventions and delivery

Pollution Category	2019	2020	2021	2022	2023	2024*
Category 1: Major damage to environment, people and/or property	3	0	3	2	4	1
Category 2: Significant damage to environment, people and/or property	4	4	9	3	9	14
Category 3: Minor damage to environment, people and/or property	423	398	360	353	221	254
% Self-reported	87%	88%	90%	90%	69%	82%
TOTAL	430	400	372	358	234	269

Table 1: Performance summary by category 2019 to 2024

*pending EA final publication of EPA performance

The 2024 PIRP pollution reduction interventions and delivery

Pollution incidents are categorised by the Environment Agency (EA) for their Environmental Performance Assessment (EPA). They are divided into Category 1, 2 or 3, according to the impact they have on the environment, with category 1 being the most serious. Category 4 incidents are not included. Incidents are measured over a calendar year (January to December), and the 2019 to 2024 results are shown in Table 1.

In 2024 we recorded 269 category 1-3 pollution incidents – this was a 15% increase in pollution incidents compared to 2023. The 2024 Pollution Incident Reduction Plan (PIRP) invested £2.7 million and delivered a 34-pollution reduction benefit in year. During the year, as we responded to pollution incidents we were seeing particularly in our network, we added a further £9.3 million, with most benefits being seen in the fourth quarter of 2024.

Our performance trends have shown us that in 2024, a total of 34% of the pollution incidents happened in the first quarter (Q1) of the year, when high groundwater levels and sustained heavy rainfall on our sites and in the network affected failure modes – the causes of malfunctions on our sites and in the network.

Wastewater pumping stations and treatment works showed an increase of 38% in pollution incidents, with catchments taking a longer than usual time to drain down, given the high groundwater levels. Foul sewers did not show any material change in annual pollution figures. We also looked at sites polluting for the first time – a total of 60% of pollution incidents were from these ‘newcomer’ sites, consistent with the previous year.

Delivery of our 2024 Pollution Incident Reduction Plan (PIRP) and a critical review

The PIRP benefits were tracked, showing that they were delivered as planned with the £2.7 million investment. Two resets in May and September 2024 where we reviewed our work, resulted in additional funding injections of £4.8 million and £4.5 million respectively. The resets and additional funding enabled benefits of 40 pollution incidents avoided per year, to flow through to 2025. Our PIRP activities continue to follow the plan, and the total spend on the PIRP for the 2020–25 Business Plan (AMP 7) will be £23.3 million.

We continue to increase our analytical capability in Operational Control, establishing a Rapid Analytical Intervention Desk (RAID) to maximise the growing condition-based monitoring intelligence being generated, with further enhancements planned in 2025.

An analysis of root causes and how this shapes our future plans

We carried out a deep dive analysis into foul sewer pollution incidents, looking at blockages, hydraulic overload, sewer collapses and rising main bursts. We also studied the sewer level monitors.

Interventions to achieve goals under the 2025 PIRP and beyond

We are proposing to invest as much in pollution reduction in 2025, as during the whole of the 2020–25 Business Plan. Our key objectives are to achieve zero category 1 to 2 pollution incidents by 2030, develop a five-year roadmap for pollution reduction covering the next Business Plan (2025–30), and to continue to draft annual Pollution Incident Reduction Plans (PIRPs), with the regulatory requirement from 2026.

From 2020–23, we reduced category 1-3 pollution incidents from 400 to 234. In 2024, we had 269 pollution incidents. The target of our [Business Plan 2025–30](#) (AMP 8) is to achieve 91 category 1 to 3 incidents and 0 category 1 to 2 incidents by 2030. In 2025 we are aiming for Amber status on the Environmental Performance Assessment (EPA) RAG status, which is less than 139 category 1 to 3 incidents and less than one category 1 to category 2 incidents.

The effectiveness of future interventions under the 2025 Pollution Incident Reduction Plan (PIRP) and the strategy for the next Business Plan 2025-30 (AMP8).

There are five key workstreams in our 2025 PIRP, consisting of 28 initiatives. These will be tracked and audited as part of a segregated internal audit and review programme.

Focusing on serious pollution incidents

Improvement activities under the next Business Plan 2025–30 (AMP8) consider serious pollution reduction as a key focus. Serious pollution numbers are off track in 2024, with 14 category 2 and one category 1 for 2024. Unfortunately, this is higher than last year's total and puts us at a Red RAG (Red Amber Green) status under the Environment Agency's Environmental Performance Assessment. In 2025, we have a target of just one serious pollution to achieve Amber status.

The 2025 PIRP addresses issues with the prevention and detection of frequent blockages and bursts in our network, alongside the development and integration of improved systems, processes and training frameworks. This ensures an appropriate response to incidents, minimising environmental impact.

The 2024 PIRP pollution reduction interventions and delivery

An overview of pollution performance in 2024

Between 2023 and 2024, there was a 15% increase in pollution incidents across the region that we serve in the South East. This was due to the intense rainfall and high groundwater during the first quarter of the year, and an unexpected increase in incidents caused by mechanical/electrical issues and blockages during the third quarter.

Poor pollution performance in the first quarter of the year prompted a pollution reset in May 2024. Further funding of £4.8 million was approved because of this reset in July, with 12 pollution benefits. Delivery started in mid-August. The majority of this funded an additional 8000 sewer level monitors (SLMs), targeting two areas: distance from the watercourse and environmental sensitivity. This work is due to be completed by April 2025.

We undertook an analysis of root causes for 269 pollution incidents in 2024, covering categories 1-3, including near misses. This showed that electrical, mechanical and blockage failure modes unexpectedly spiked in the third quarter.

A further reset in September, which was approved in December, resulted in a further £4.5 million of funding with 27 pollution benefits to directly address the spike in the third quarter.

We also prioritised a significant Rising Mains Rehabilitation programme, with almost twice the forecasted spend in the year and over three times the amount of lining works undertaken, including the largest diameter and longest pipe sections in our industry and the UK, both in 2024.

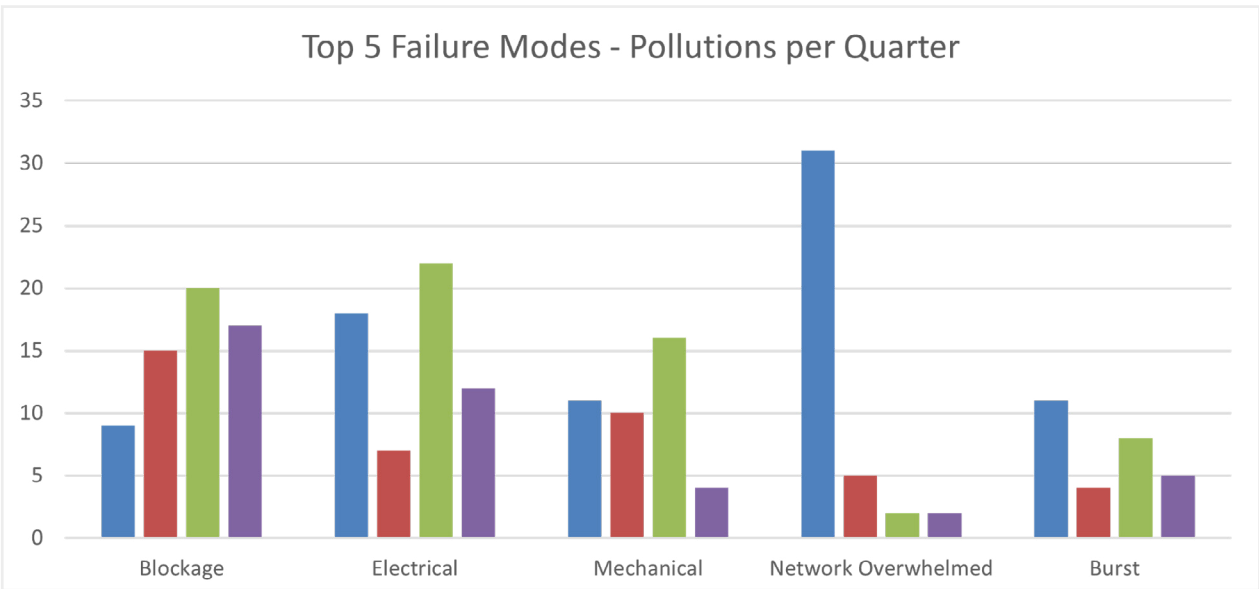


Figure 1: Top 5 failure modes – pollution incidents per quarter

Performance for category 1 to 3 pollution incidents impacting water courses

Although we missed the 2024 target, Q1 performance was impacted by our highest groundwater levels for 10 years; the benefits of the PIRP and specific activities to limit future groundwater impacts are being realised, which can be seen in the reduced run rates in the later part of 2024.

Serious pollution incidents – category 1 and 2

We recorded 15 serious pollution incidents in 2024, compared to 13 in 2023.

The results of analysis carried out into root causes for the incidents and consideration for the reduction plan initiatives are included in this report.

Pollution incidents category 1-3

We recorded 269 category 1-3 pollution incidents in 2024. This was higher than our previous forecast of 238-264 pollution incidents.

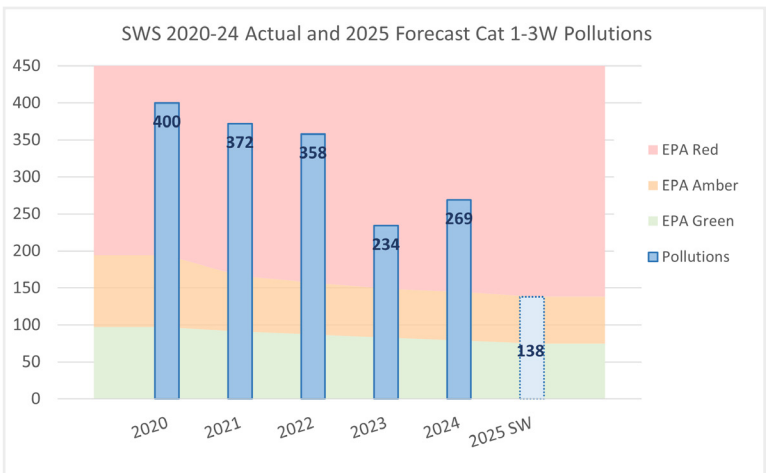


Figure 2: Category 1-3 pollution incidents for 2020-2024 and forecast for 2025

To achieve Amber performance in 2025, we need to improve the run rate seen in Q4 of 2024 or the equivalent of no more than two category 3 pollution incidents per week.

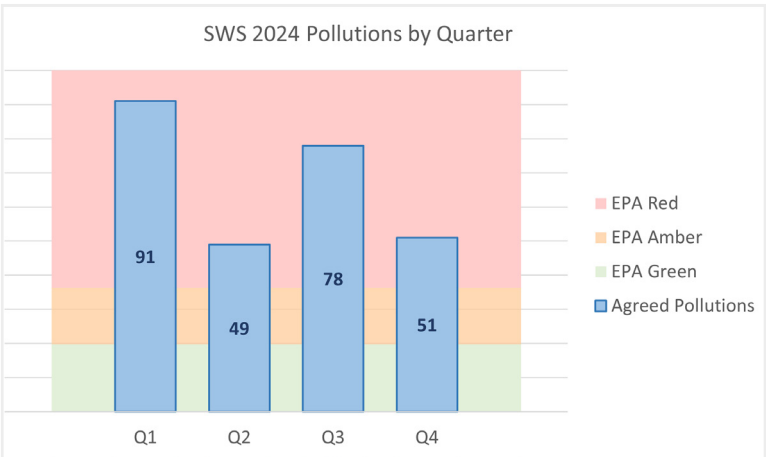


Figure 3: Forecast run rate 2024

Insights from 2024 – asset class 2024 versus 2023

Our category 1-3 pollution performance shows a 38% increase in wastewater pumping stations and treatment works, and a 12% decrease in rising mains and no change for foul sewers.

In 2024, 34% of the pollution incidents happened in the first quarter of the year, when there was a ten-year high in groundwater levels, as well as sustained heavy rainfall, including the wettest period ever recorded during the first two months of the year. For wastewater pumping stations and treatment works this lead to a 38% increase in pollution incidents, with catchments taking a longer than usual time to drain down, given the high groundwater levels.

In September 2024, we completed some analysis highlighting that a significant proportion of pollution incidents from wastewater assets had ‘operational grip’ contributing factors – not necessarily meaning the pollution was preventable, but that identification, detection or response was not as effective or efficient. Operational grip action plans are in progress, and these will continue to be tracked through the PIRP.

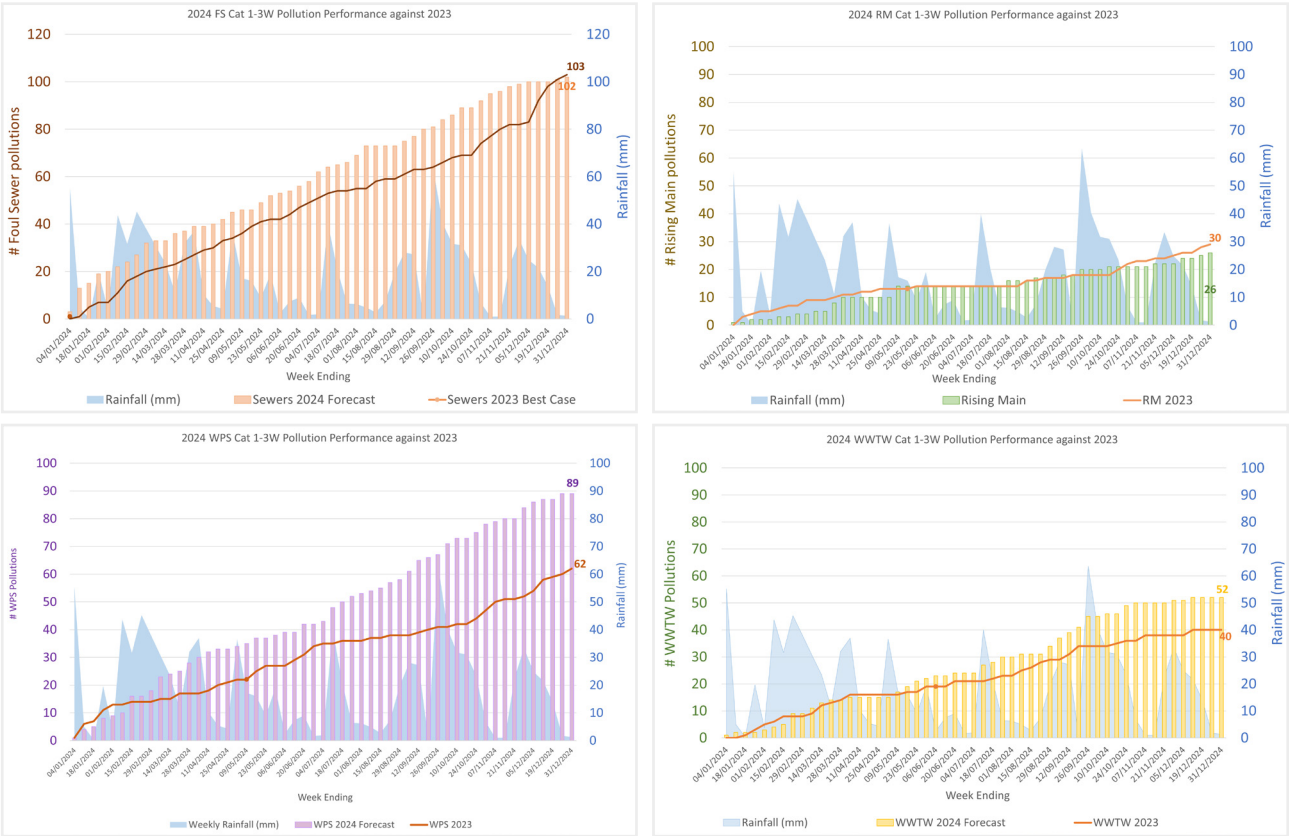


Figure 4: 2024 category 1-3W pollution performance per asset type

Pollution performance for category 1-3 incidents by asset class failure mode.

This section shows the performance by asset class failure mode – the different asset types have different causes of malfunction, which have altered as we have progressed through the year.

Different types of failures relating to pollution incidents varied in significance throughout 2024, with a substantial decline in incidents from overwhelmed networks and a spike in all other failure modes in the third quarter (Q3).

The types of failure changed in each quarter of the year from Q1 to Q4 as follows:

- Q1** – this part of the year was dominated by the network being overwhelmed with groundwater and rain
- Q2** – blockages were prominent during the second quarter, while the network was overwhelmed; electrical pollution incidents were lower than in the first quarter of the year
- Q3** – there was a further increase in blockages and mechanical failure modes and a substantial increase in electrical issues; a deep dive into this is underway
- Q4** – there was a decrease in all failure modes from Q3, most substantially in mechanical and electrical issues.

Premise 2024	Q1	Q2	Q3	Q4	Total
Foul Sewer (FS) / Combined Sewer Overflow (CSO)	38	22	23	19	102
Wastewater Pumping Station (WPS)	28	14	28	19	89
Wastewater Treatment Works (WWTW)	15	9	21	7	52
Raising Main (RM)	10	4	6	6	26
Totals	91 (34%)	49 (18%)	78 (29%)	51 (19%)	269

Table 2: Pollution performance and asset spills 2019-2024

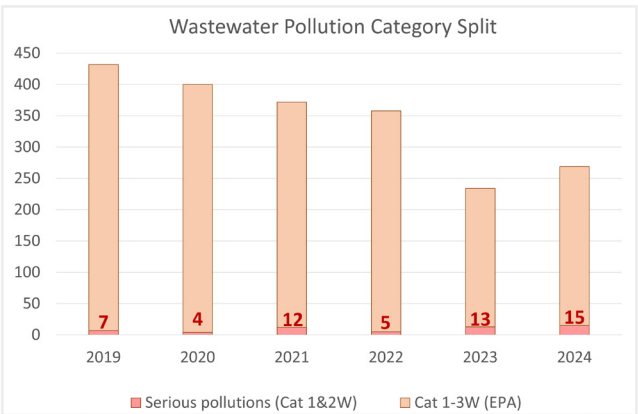


Figure 5: 2019-2024 Pollution performance

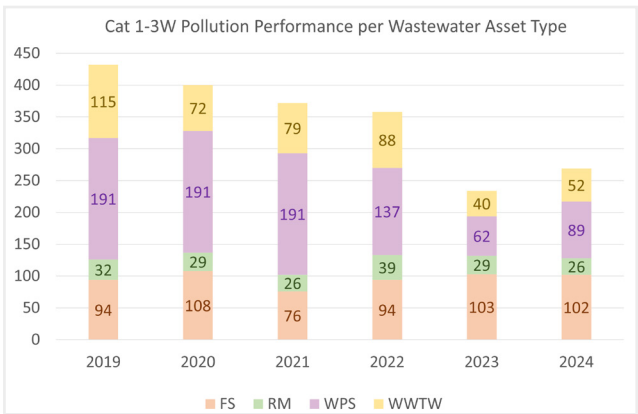


Figure 6: 2019-2024 Pollution performance and asset splits

Insights 2024 – the impact of rainfall and ground water on failure modes

There were high groundwater levels throughout 2024, and significant rainfall impacted pollution run rates in the early part of the year.

Changes over 2024

The months of April, June and December saw the lowest pollution numbers, with June coinciding with low rainfall across the regions. The key failure modes declined in frequency during the fourth quarter of the year, with very few pollution incidents happening in December, below June’s performance despite higher rainfall. The proposed review at the end of Q1 2025, aimed to understand the improved performance and whether this had been maintained into 2025.

Weather

The highest daily rainfall was seen in February, September and November – however November pollution incident numbers were improved, indicating a potential decoupling of the relationship between poor weather and pollution incidents.

Groundwater

As 2024 began, there was a significant variation in long term averages (LTA) for groundwater levels across all regions. Although this variation did decline over the year, groundwater levels remained above the LTA. This contributed significantly to our pollution incidents in the first quarter of the year, with the impact remaining significant at the end of the year.

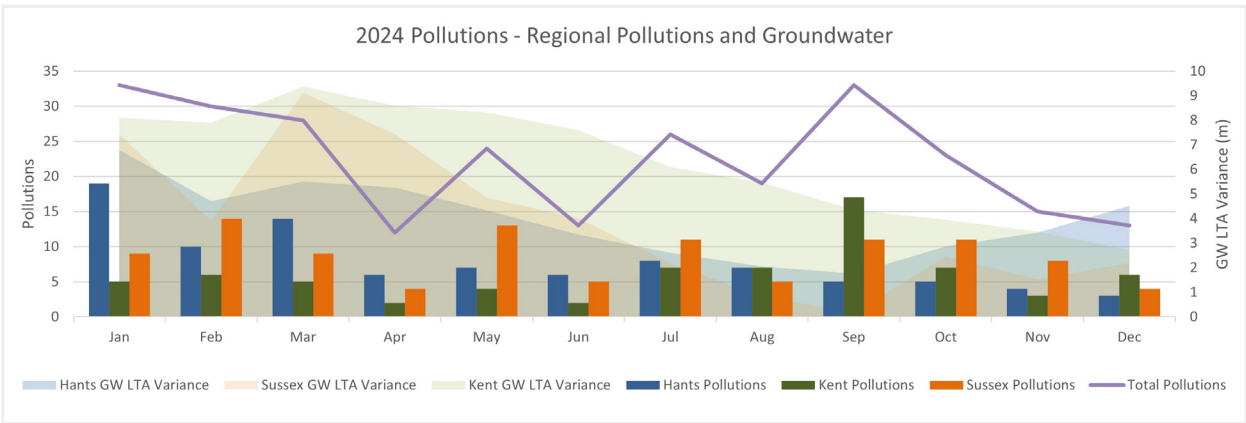


Figure 7: 2024 Pollution incidents by region and regional variance from groundwater long term average (GW LTA)

Insights from 2024 – an analysis of newcomers

The rate of 'newcomer' pollution sites – sites that polluted for the first time – remains the same as 2023 at 62%. The rate of repeat pollution sites reduced to 14% from 25% in 2023, demonstrating that the targeted site and/or asset investments continue to show a pollution benefit of 20-37 avoided incidents.

Newcomer sites/assets in 2023 (category 1-3)

Newcomer sites refer to sites that polluted in 2024 with no previous category 1-3 pollution history between 2020 and 2023. Looking across the entire wastewater asset base, 60% of the pollution sites were newcomers in this year. Foul Sewers have the largest proportion of newcomers (93%), causing challenges to determine the location of sewer level monitors. Wastewater treatment works have the lowest proportion of newcomer sites (31%), meaning the repeat rate is highest for treatment works.

Premise	No. Newcomer Sites	Total Sites	%
Rising Main	10	22	45%
Foul Sewers	91	98	93%
Wastewater Pumping Stations	24	70	34%
Wastewater Treatment Works	12	39	31%
Wastewater Summary	137	229	60%

Table 3: 2024 Newcomer sites/assets (category 1-3W)

Repeat pollution incidents in 2024 for category 1-3W (pollution to a watercourse)

Repeat pollutions refer to sites that polluted in 2023 and again in 2024. The number of repeat pollution sites has decreased from 25% in 2023 to 15% in 2024. This is due to the significant decrease in wastewater treatment works repeat pollutions from 2023 (42%) to 2024 (23%).

Premise	No. Repeat Sites	Total Sites	%
Rising Main	5	22	23%
Foul Sewers	4	98	4%
Wastewater Pumping Stations	16	70	23%
Wastewater Treatment Works	9	39	23%
Wastewater Summary	34	229	15%

Table 4: Repeat pollutions 2024 (category 1-3W)

Insights from 2024 – category 4 pollution incidents

Analysis shows a reduction in category 4W pollution incidents year on year, suggesting the PIRP programme is effective for both incident types – category 3 and category 4.

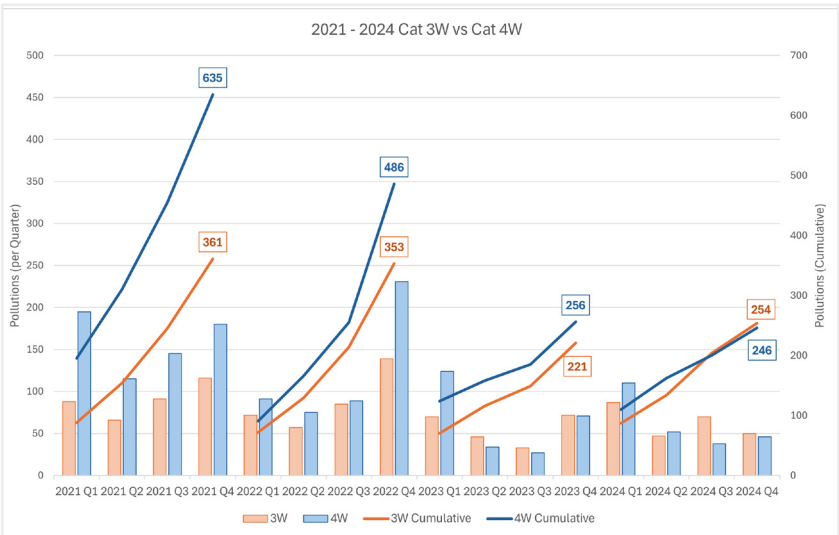


Figure 8: Year-on-year pollution incidents (category 3W and category 4W)

An initial comparison of category 3W and category 4W pollution incidents shows that the root cause of category 3 incidents is more often mechanical and electrical than for category 4W, suggesting that asset failure is more likely to result in a higher impact event.

Category 4W pollution incidents show a higher rate of incidents due to the network being overwhelmed, and they are more prevalent in our network from sewers and rising mains. This can be attributed to the fact that network overwhelm generally occurs in wetter weather, when environmental impact can be less damaging due to more dilute sewage and higher river flow, for example.

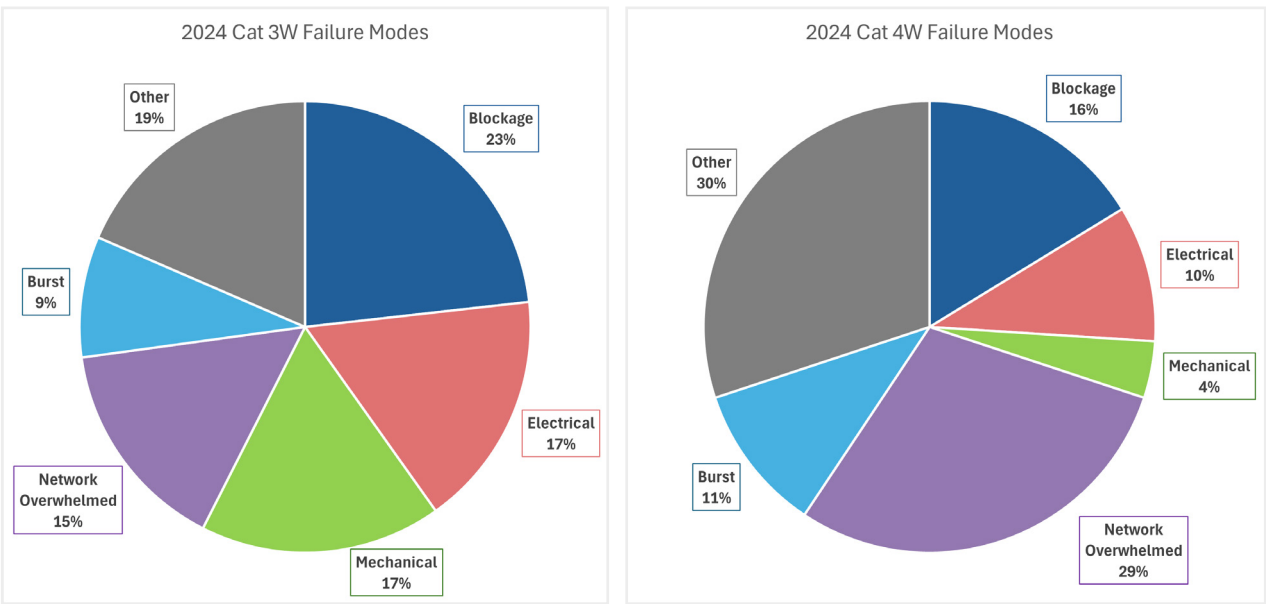


Figure 9: 2024 Failure Modes (category 3W and category 4W)

Current data suggests a year-on-year reduction in category 4W pollution incidents, with category 4W numbers dropping below category 3W for the first time in the later part of 2024.

Considering differences in data quality, it can be seen that category 3W and 4W pollution incidents have both dropped significantly since 2021 and comprise the same top 5 root causes. This suggests the PIRP programme has been impactful on both pollution types, to this point.

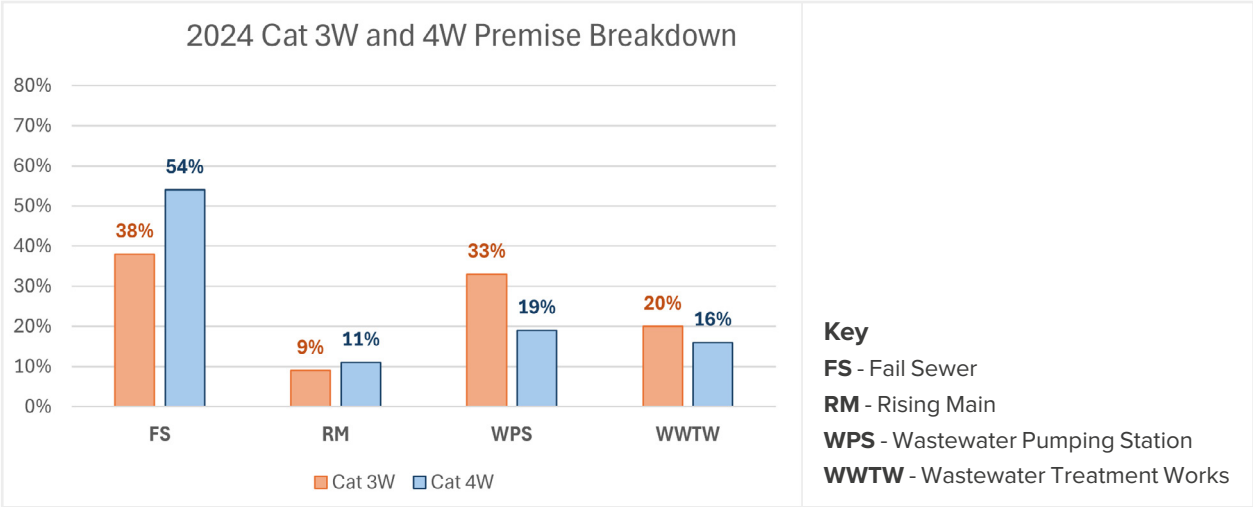


Figure 10: 2024 category 3W and 4W premise breakdown

Network overwhelm will be the target of the 2025 PIRP through the Infiltration & Inundation (I&I) model remedials programme and putting a Specialist Compliance Intervention desk in place for networks, where experts can assess the requirements.

Clean water pollutions

Pollution insights from 2024 – water pollution reporting

Clean water pollution reporting has improved due to training and awareness programmes in 2024, while total leakage is reducing in line with the Leakage Delivery Plan.

Reporting and leakage takeaways 2023–2024

Our analysis suggested that improvements were required for the proactive identification and reporting of clean water pollution incidents with 17 category 3W pollution incidents recorded on our database. This triggered a step-change in identification and reporting, with the roll-out of pollution training in the Water Directorate and Control Centre.

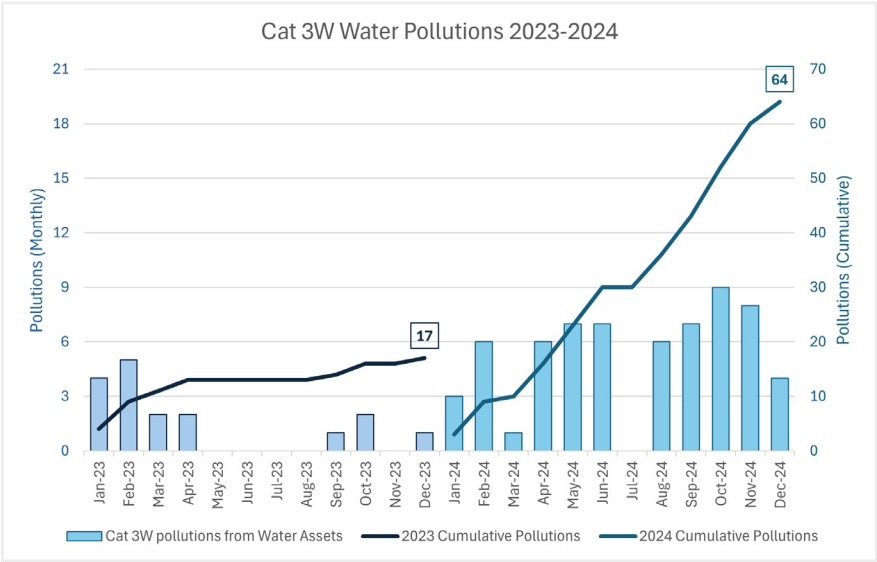


Figure 11: 2023-2024 Water pollution reporting

A significant improvement in pollution reporting was shown in 2024, with 64 category 3W events – an increase of 376%.

Pollution insights from 2024 – third party

There were 159 third party incidents recorded on the company pollution database in 2024. The breakdown of third-party root causes is shown in the pie chart in figure 12, these are:

- Private assets (wastewater pumping station, sewers, storage tanks): 28%.
- Misconnections into the surface water system: 15%.
- Sewer blockages attributed to a third-party source: 7%.
- Paints and/or chemicals being poured by third parties into the sewer network: 11%.
- Damage being caused by third parties to Southern Water assets: 9%.

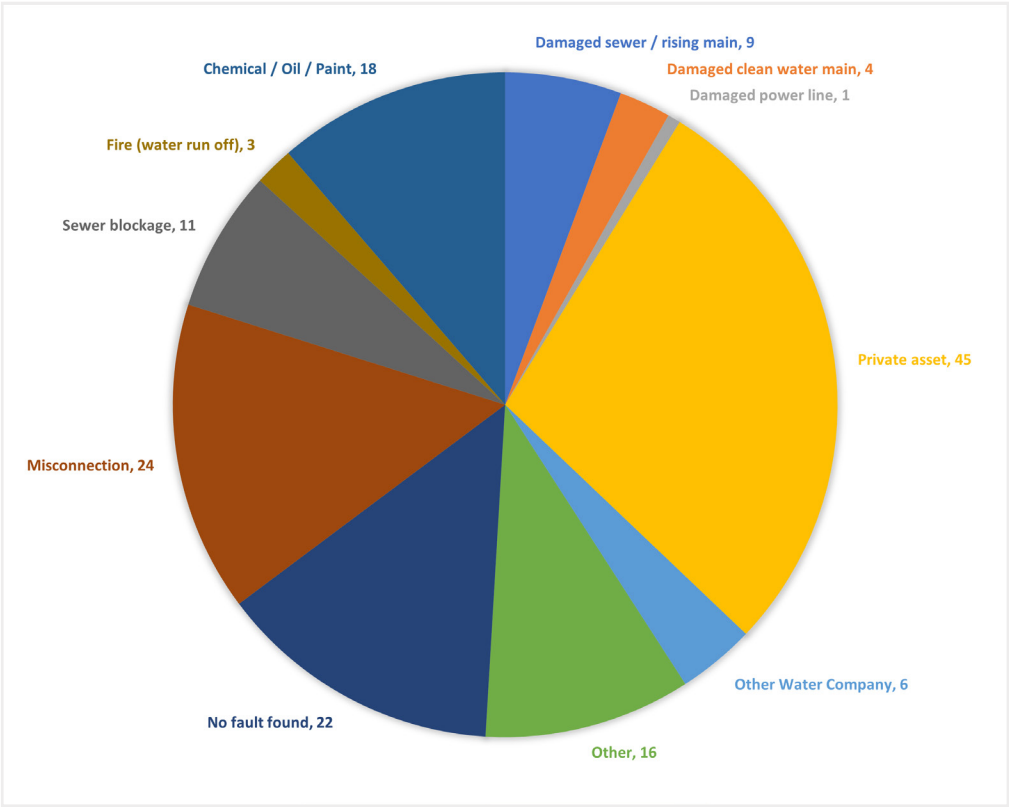


Figure 12: Third-party root causes 2024 (in actual numbers)

Insights from 2024 – human factors

Reviews of human factors have looked at individual pollution cases and been used for diagnosing improvement needs in the Operational Control Centre (OCC), and driving collaborative transformation.

Following more than 50 staff interviews in a psychologically safe environment, a plan for improvements was developed with the OCC management team. This work was given high priority, due to significant involvement of the OCC in the detection, verification and response stages of pollution incidents.

Highlights of the work so far include:

- clarifying and streamlining the Pollution Control Lead role
- creating a shared incident folder structure for information sharing on pollution incidents
- setting up liaison meetings between key staff in the OCC and other pollution related roles
- developing a self-steered problem-solving forum for continuous improvement
- carrying out a shift wellbeing and communication review
- developing and delivering essential training.

We continue to review individual pollution incidents where human factors are seen to be involved.

Slips and knowledge-based mistakes are by far the most numerous from our cohort of 20 reviews since February 2023. As well as categories, we have analysed the themes from the incidents and note that 'Procedures' and 'Interdepartmental Communication' are the main issues we will need to address in 2025–26.

There have also been lesser issues with alarms being parked, based on assumptions that turn out to be incorrect, and the actions of third-party suppliers – contractors or external agencies such as power suppliers.

Good progress has been made via improved training reducing alarms parked and we will be working on strategies to address supplier issues. We have streamlined our processes and reporting to make our reviews quicker and will be increasing human factor investigation resource in 2025. We expect the new Pollution Management System to reduce human factors, for example by removing manual transfers of information.

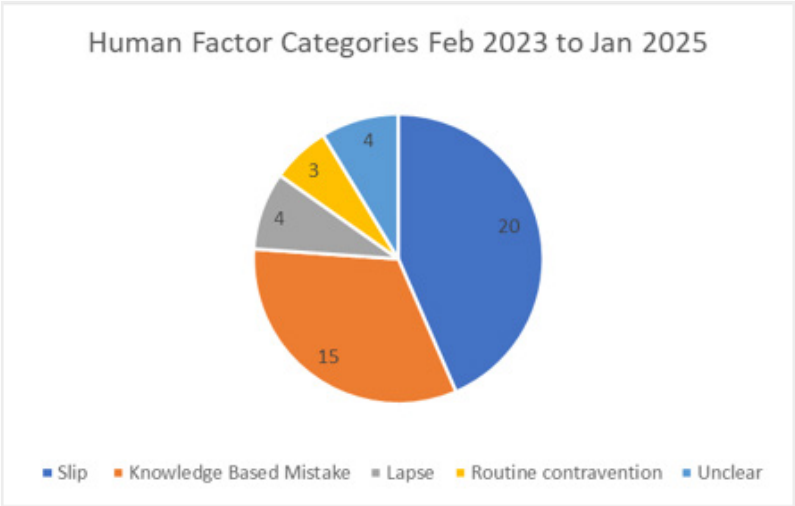


Figure 13: Human factor categories February 2023 to January 2025

Categories (high-level description for reference):

Errors:

- **Slips** - ‘actions-not-as-planned’.
- **Lapses** - forgetting or losing our place in a task.
- **Mistakes** - Where we do the wrong thing believing it to be right = rule-based mistakes (using familiar rules or solutions)/knowledge-based mistakes.

Contraventions:

- **Routine** - Breaking the rule or procedure has become a normal way of working.
- **Situational** - Breaking the rule due to pressures.
- **Exceptional** - To solve a new problem you feel you need to break a rule.

Theme	Total Cases	2024 Cases
Alignment with procedure	8	8
Interdepartmental communication	8	4
Alarms parked on assumptions	5	4
Third party action	4	4

Table 5: Human factor themes

Delivery of our 2024 Pollution Incident Reduction Plan (PIRP) and a critical review

An overview of our 2024 PIRP delivery and a critical review

The 2024 PIRP benefits were tracked, showing that they were delivered as planned with the £2.7 million investment. The two resets in May and September 2024 resulted in additional funding injections of £4.8 million and £4.5 million respectively. The resets and additional funding enabled benefits to flow through to 2025 of 40 pollution incidents avoided per year.

PIRP and pollution performance for 2024

The 2024 PIRP invested £2.7 million and delivered a pollution reduction benefit of 34 in the fourth quarter of 2024.

The number of pollution incidents in 2024 is 15% higher than in 2023. This is due to intense, higher than average rainfall in the first quarter of the year, combined with high ground water levels over an extended period. This meant there was an increase in the number of times that the network was inundated or infiltrated, resulting in the network overwhelmed failure mode.

The third quarter also saw an unexplained spike in mechanical, electrical and blockage failure modes – a further deep dive is in progress to assess this.

The rate of repeat pollution sites has reduced to 15% from 25% in 2023, demonstrating that the targeted site and/or asset investments continue to show pollution benefit. More work is required to reduce in year repeats.

	2021	2022	2023	2024
Incidents per 10,000km sewer	94	90	59	68

Table 6: Incidents per 10,000km of sewer

We continue to increase our analytical capability in Operational Control, establishing a Rapid Analytical Intervention Desk (RAID) desk to maximise the growing condition-based monitoring intelligence being generated, with further improvements planned in 2025.

Our 2024 plan set out to deliver a phased estimated benefit of 37 to 67 pollution incidents avoided, at a cost of £2.7 million. A further £4.8 million was released following a reset in May 2024 for an additional 8000 sewer level monitors. Further funding of £4.5 million was approved in December for PIRP phase 2, due for delivery by April 2025. Our PIRP activities continue to follow the plan, and the total spend on the PIRP for the 2020–25 Business Plan (AMP 7) will be £23.3 million.

Key project progress:

- **Water pumping station resilience** – all sites initially selected as part of the 2024 PIRP, were completed by the end of the year, with an additional 30 sites selected as part of the May pollution reset. These additional sites are underway.
- **Final effluent early warning model** – this was completed.
- **Rising main calming phase 2** – 63 additional rising mains were fully calmed by the end of 2024, in addition to the 30 from phase 1.
- **Sewer level monitor initiatives** – a review of the initial set of sewer level monitors revealed that some blockages were occurring rapidly, in between data transmissions from the devices. SLM Data Frequency was implemented to address this, and interim alerts can now be received on new devices. SLM phase 2 – to increase our estate by 8,000 sewer level monitors – is underway, and these devices will all be capable of sending interim alerts.
- **Samotics SAM4 CBM System** – all 250 devices were installed and reporting by the end of 2024 in line with the plan, with benefits monitored in the first quarter of 2025.
- **Control Room pollution awareness, RAID and playbooks** – the RAID team went live in October 2024 and has already had a positive impact on pollution avoidance. The roll out of Playbooks to support controllers in alarm response was successful, although it proved more difficult than expected to get these embedded, resulting in a potential impact to overall benefit (to be reviewed at the end of 2025 Q1).

Root Cause Insights	Project Description	Total Cat3 Benefits	Phased Cat3 Benefits 2024	Delivery Status
Catastrophic Prevention	WPS Resilience incl. Advanced Back Up Control	11	3	
	WPS Resilience Additional Sites	13	4	
	WWTW Flow Compliance - Inlet Penstock Related Issues	5	2	
	Rising Main Calming - Phase 2	10	10	
Catastrophic Detection	Static Models WWTW (Sentrix) to Detect Emerging Risks and Issues	5	2	
	SLM Data Frequency Optimisation	4	1	
	Rising Main Burst Detection Model	2	1	
	SLMs Phase 2 (8,000 Installation)	12	2	
Chronic Prevention	Samotics SAM4 Health CBM System	8	1	
	Catchment Inflow & Infiltration Reduction Model	0	0	
	Groundwater Planning Process & Remedials (Flooding taskforce)	6	2	APRIL
	G2G Agile WWTW Pollution Improvement (surveys)	0	0	
Chronic Detection	Final Effluent Early Warning Model	5	1	
	Pollution Spotter (Self-Reporting)	0	0	
Incident Response	Control Room Pollution Awareness, RAID & Playbooks	10	3	
	WW Incident Management Improvement Plan	2	1	
	Field Resources POC (Pollution HIT & Proactive Response)	3	1	
		90	34	
PIRP Phase 2				
Root Cause Insights	Project Description	Total Cat3 Benefits	Phased Cat3 Benefits	Delivery Status
Chronic Prevention	Implement CCTV on All Jetting Tasks	3	0	APRIL
	Survey Inspect and Remediate Worst5 Catchments	10	0	JULY
	Install New Forest CBM Package	2	0	APRIL
	Upgrade CBM Bronze to Silver	2	0	APRIL
	Install Samotics Next Phase Forward	8	0	APRIL
	Complete G2G Phase 2 Remedials	2	0	APRIL
		27	0	

Table 7: PIRP 2024 project plan summary

Influencing factors outside of the direct control of the PIRP included:

- High ground water levels in the first quarter of the year and associated pollution incidents relating to overwhelmed networks.
- An increase in newcomer sites for wastewater treatment works and wastewater pumping station pollution incidents, decoupling a high reoccurrence rate.
- A high spike in the third quarter of the year (see Figure 1 Top 5 failure modes) in both sewer blockages and electrical failures, leading to a reset and increased investment in condition-based monitoring interventions across critical electrical systems and network digitisation.

No.	Work-stream	Project Description	Leading KPIs	Measures of Success	2024 Benefit Achieved
1	Catastrophic Prevention	WPS Resilience incl. Advanced Back Up Control	Achieved – all sites reviewed and remediated.	Monitoring - Reduction in pollutions from sites at beneficial use with all remedial works complete.	7
2		WWTW Flow Compliance - Inlet Penstock Issues	Achieved – with support from operational teams.	Monitoring - Reduction in number of work orders raised for reactive inlet works.	4
3		Rising Main Calming - Phase 2	Achieved – 63 rising mains calmed.	Monitoring - Reduction in the number of burst rising mains	10
4	Catastrophic Detection	Proactive System in Control (Sentrix) to Detect Emerging Risks and Issues WWTW	Achieved – Models in place and alerts coming into Proactive Control Centre.	Monitoring - Proactive work orders completed with before and after data to track accuracy of alerts.	4
5		WW Networks SLM Data Frequency Optimisation	Achieved – 98% of alerts consistently reviewed.	Monitoring - Completed proactive work orders with before and after data, reducing the severity of incidents and preventing pollutions.	4
6		Rising Main Burst Detection Model	Achieved – 98% of alerts consistently reviewed.	Complete – full benefit seen in 2024 as POC, continuing in PIRP 2025.	2
7	Chronic Prevention	WTW / WPS Asset Monitoring Using Samotics CBM System	Monitoring – 250 devices installed; alert numbers being monitored.	Monitoring - Proactive work orders completed, reducing pressure on operational teams.	0
8		Customer Engagement Strategy for FOG and Unflushables	Not completed – initiative removed, pending inclusion in PIRP 2025.	Not complete – initiative reviewed, and it was determined that benefit would not be achievable	0
9		WWN Groundwater I&I Model, Planning Process and Remedials	Achieved – Model in use as BAU.	Monitoring - Proactive interventions raised through usage of the model, increasing prevention of infiltration related pollutions.	Enabler
10		G2G Agile WWTW Pollution Improvement	Not achieved – remedials moved to PIRP additional.	Not complete – due to funding restrictions, remedials delayed into 2025 – funding approved in Dec 2024.	0
11	Chronic Detection	WWTW Final Effluent Early Warning Model	Delayed - Working proof of concept on 6 WWTWs.	Delayed - Completed proactive work orders, and subsequent prevention of pollution incidents.	0
12		Pollution Self-Reporting Improvements	Complete – social media campaigns will continue.	Monitoring – 12% improvement in 2024, exit at 83%.	Enabler
13	Incident Response	Control Room Pollution Awareness, RAID & Playbooks	Achieved – ABCs, Playbooks and RAID live.	Monitoring - Reduction in pollution incidents due to improved ownership and escalation by front line team.	2
14		WW Incident Management Improvement Plan	Ongoing – level 4 remaining.	Monitoring - Improved incident management, and associated reduction in severity of pollution incidents through improved management.	2
15		Pollution High Impact Response Team	Ongoing – compliance with agreed time frame for proactive work orders.	Monitoring - More timely response to pollutions, with a root cause mindset improving understanding of root causes of pollutions.	0

Table 8: KPIs and measures of success

The 2024 pollution reduction benefits

The number of pollution incidents avoided by putting in place measures under the plan, are known as the benefits. The 2024 PIRP pollution reduction benefits of 58 are forecast to carry over into 2025. We are on track with the 2024 plan delivery to achieve the expected benefits and this is expected to continue into 2025.

Our plans to address wastewater pumping station pollutions focussed on pumping stations with repeat category 3 history, and once these sites were completed, additional sites were selected based on a history of both category 3 and category 4 pollutions to address any future risk.

We continued to invest in condition-based monitoring in 2024, installing 250 Samotics SAM4 devices. These allow proactive asset health monitoring, therefore identifying risk earlier for proactive remediation instead of reactive fixes. The devices require a short period of machine learning, needing time therefore to show benefits, with these expected in 2025.

Learning from our first generation of sewer level monitors, we selected devices under phase 2 which would have the capability to provide interim alerts, as part of data frequency improvements to address rapidly forming blockages. This had a positive effect on pollution reduction in 2024. The installation of the 8,000 additional devices is ongoing, and the associated benefit is forecast in 2025. In addition, a programme of remediation and relocation of the initial 23,000 devices is in progress to address issues identified throughout 2024 with the first phase of devices. This will allow the sustained benefit from the 2023 initiative to continue providing pollution reduction to the expected level into 2025.

Our work in rising main calming saw a total of 93 rising mains fully calmed by December 2024. However, the slow start for phase 1 meant this benefit went into 2024. Phase 2 included learnings from this, which supported the delivery of 60 additional rising mains, as part of the 2024 PIRP.

The majority of 2024 initiatives were delivered by December 2024 as planned, and the carry over into 2025 includes the additional activities funded in December, which will not be reflected in the forecast until phased benefits are agreed in the first quarter of 2025.

Following an external review of the PIRP, a new role, Head of Pollution Performance, reporting directly to the Managing Director, has been appointed. This will provide additional focus, support and drive the next step change in pollution performance required under the Business Plan 2025–30 (AMP 8).

The 2025 PIRP has been developed based on failure modes. PIRP investment has been approved, with delivery due to begin in April 2025.

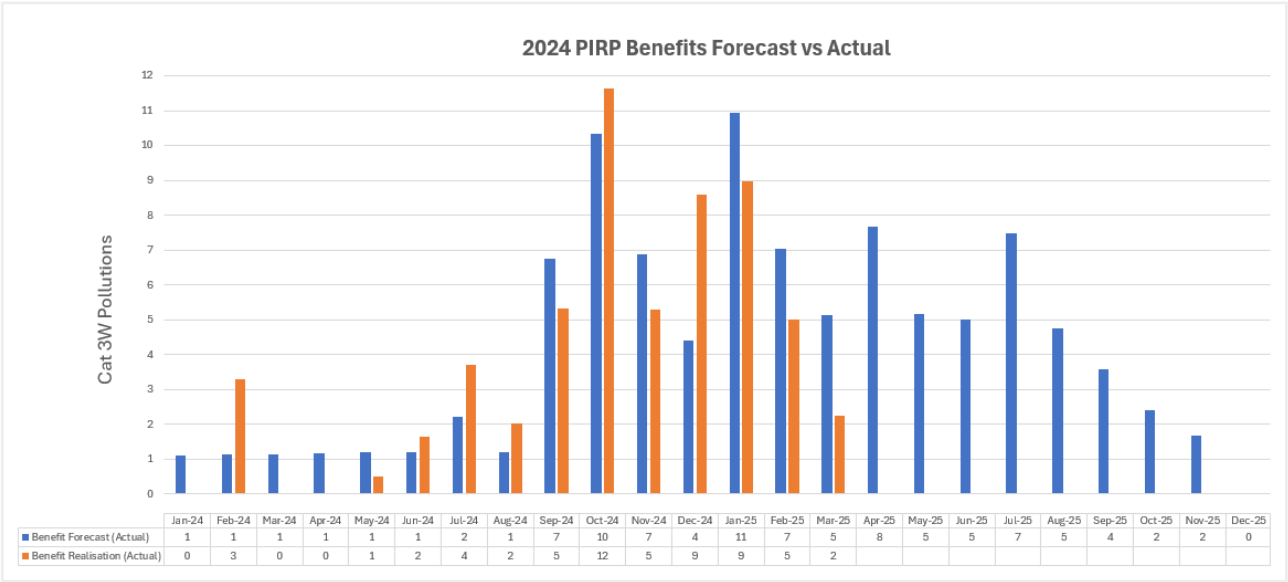


Figure 14: 2024 PIRP pollution reduction benefits – actuals vs forecast

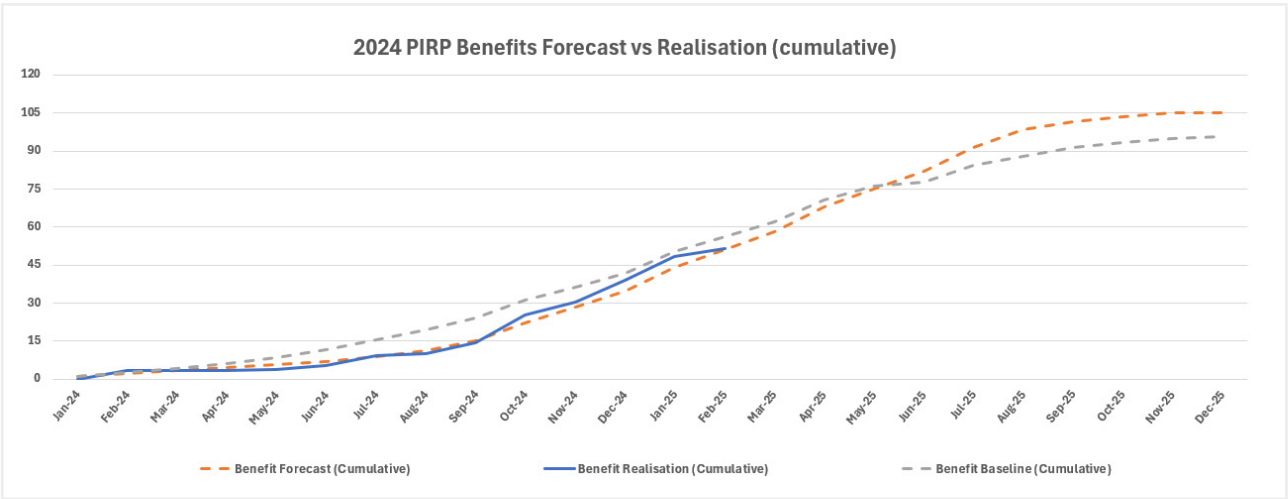


Figure 15: 2024 PIRP benefits forecast vs realisation (cumulative)

An external review of the PIRP and key recommendations

A review of the PIRP was carried out by a third party after being commissioned in September 2024. The review provided a set of key recommendations which are being implemented:

- **Create an end-to-end agile pollutions taskforce** with clear responsibilities and rigorous governance, for example leading indicators tracked in daily meetings.
- **Create a single pollutions plan across reactive and proactive measures** that addresses the end to end pollutions process and sufficiently covers both proactive and reactive measures, integrating CAPEX & OPEX, BAU and one-off projects.
- **Sufficiently resource and finance** the plans to overcome completion for shared and out of hours resources, limited funding for the PIRP and lengths of procurement/additional funding timelines.
- **Invest in analytics to better understand how data** (e.g. rainfall, asset condition, root cause) can unlock a step change in pollution reduction.
- **Fully optimise the pollution response and investigation process.**
- **Implement new training for operational and response staff** including training on deployment of additional assets during emergencies e.g. sandbags and generators.

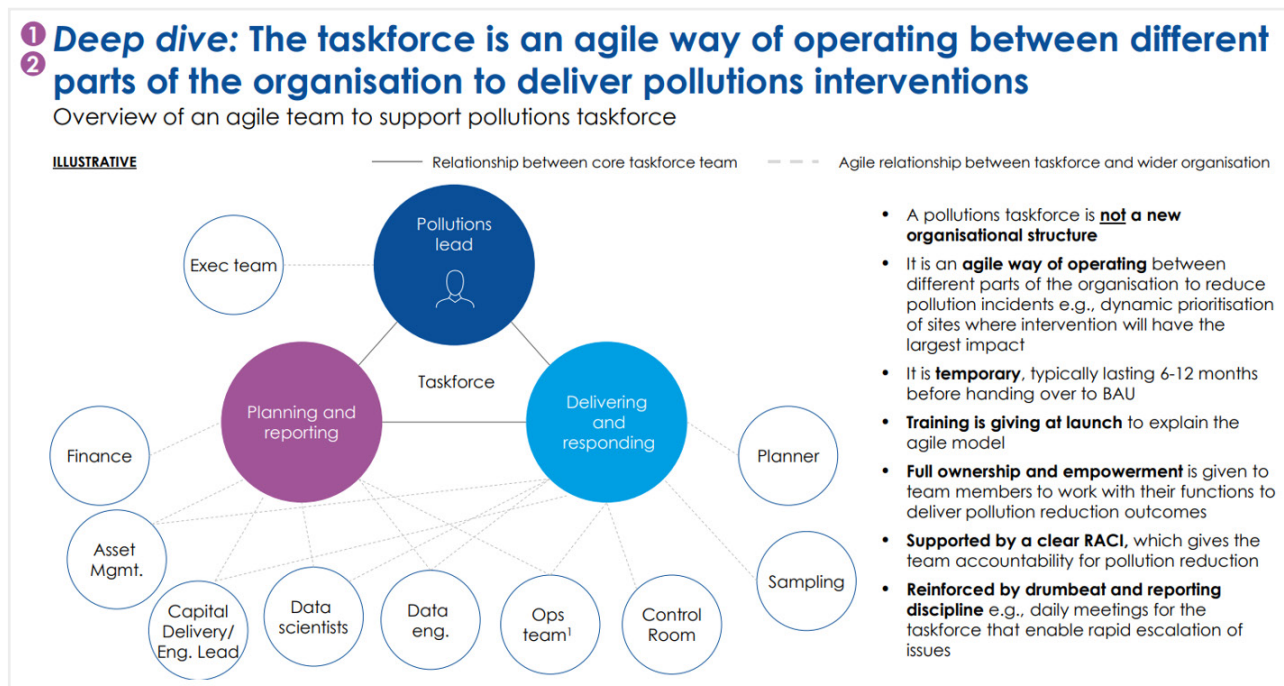


Figure 16: Task force structure and deployment progress

Following the review, the new Head of Pollution Performance has been brought into post, supported by a team to drive the focus on pollution reduction, with a direct reporting line to the most senior levels.

Case Studies

Case Study: Taking a deep dive into condition-based and proactive maintenance

We have invested £23 million in condition-based and proactive maintenance during the Business Plan 2020–25, resulting in an annual pollution reduction benefit of 39 realised across foul sewer, wastewater pumping stations and wastewater treatment works.

The 2025 PIRP will see the three lines of defence strategy maturing with the “planned reactive flip” transformation plan, the roll out of Samotics for increased water pumping station and wastewater treatment works resilience and VisNet – improved power monitoring for increased power resilience.

The following condition-based monitoring (CBM) and proactive maintenance initiatives have saved a total of 61 pollution incidents from 2022 to the end of 2024:

- The installation of 32,000 sewer level monitors on our sewer network by May 2025.
- Putting in place a better system to monitor wastewater pumping stations and wastewater treatment works called Sentrrix (previously known as the Pumping Station Risk Viewer).

In response to changing technology, the identification of new risks and our understanding of the resource requirements, additional activities were undertaken to maintain the benefit we get from these initiatives. The activities include:

- going live with the RAID (Rapid Analytical Intervention Desk) team in October 2024
- relocation and remediation of existing first-generation sewer level monitors
- the installation of 8,000 additional sewer level monitors in strategic at-risk locations.

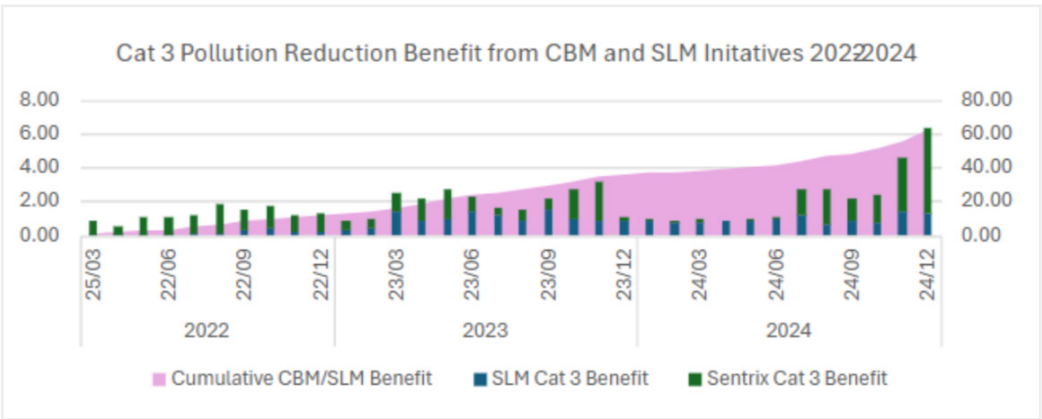


Figure 17: Category 3 pollution reduction benefit from CBM and SLM initiatives 2022-2024

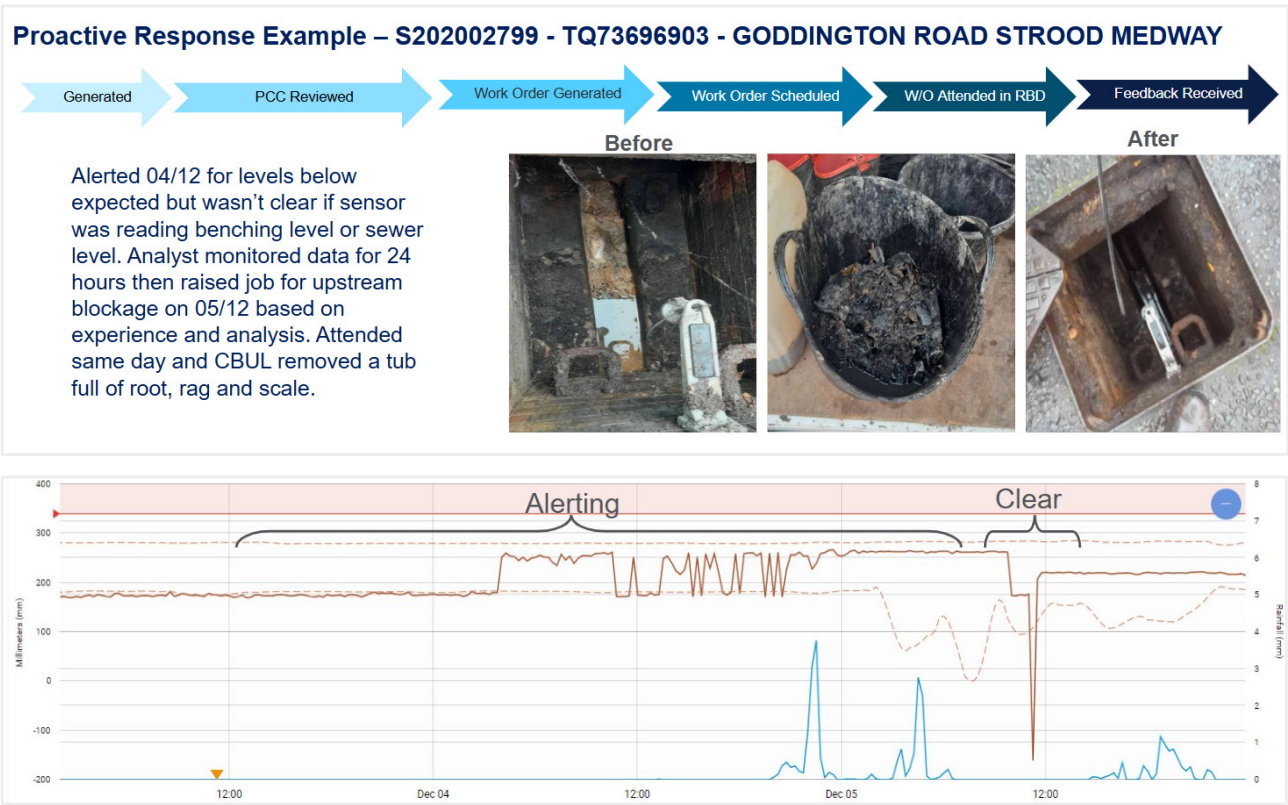


Figure 18: Sewer level monitor example

Case Study: Focusing on RAID, the Rapid Analytical Intervention Desk

As investment in condition-based monitoring (CBM) increased during 2020–25, the volume of alerts received by the Proactive Control Centre also increased.

A gap was identified in our out of hours ability to review alerts. Learning from this 2024 PIRP, led us to roll out a team of dedicated analysts in September 2024. The analysts review urgent alerts raised by the various CBM initiatives providing 24/7 coverage of urgent alerts.

During the Business Plan 2020–25, there was investment in the type of condition-based monitoring (CBM) that generates a volume of alerts for asset health issues. The Proactive Control Centre review these alerts and then raise work orders, with our front-line teams then attending to resolve the issues. As more CBM Models were developed, the volume of alerts increased and a gap in the out of hours (OOHs) ability to review urgent alerts was identified.

The **RAID** team was established to:

- provide 24/7 coverage of urgent alerts from our CBM models and devices; in the future, sewer level monitor alerts will also be reviewed
- raise out of hours (OOHs) work orders, to address emerging risks identified outside of core Operational Control hours.

This team’s work allows us to proactively resolve asset risk prior to failure, improving the pollution reduction benefit from condition-based monitoring (CBM).

It is important to note that RAID has had a positive increase on the benefits from our CBM initiatives, and it is not the only change that took place in Q3 and Q4 of 2024, so the increase in benefits reflects all changes.

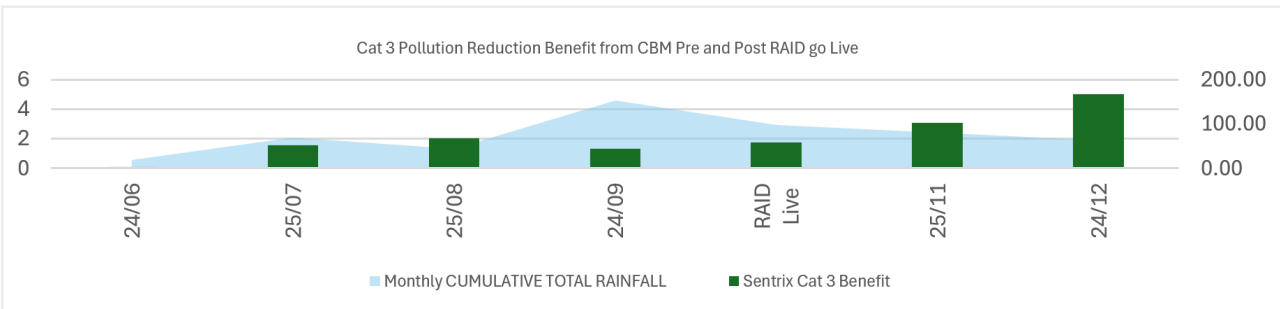


Figure 19: Category 3 pollution reduction benefit from CBM pre and post RAID go Live

RAID Example:

- An alert came in on 30/10/24 as a high-level, 'Fill time over 30 day average'.
- On review it was identified the flows coming into the site had reduced from 29/10.
- Ops attended and confirmed there were no flows going into the site.
- Work Order 1386047 was raised for CBUL to investigate upstream blockage.
- On investigation CBUL located a block within the WPS grounds this was jetted to remove the blockage and flows were restored.
- As a result, a potential spill to the environment has been prevented.

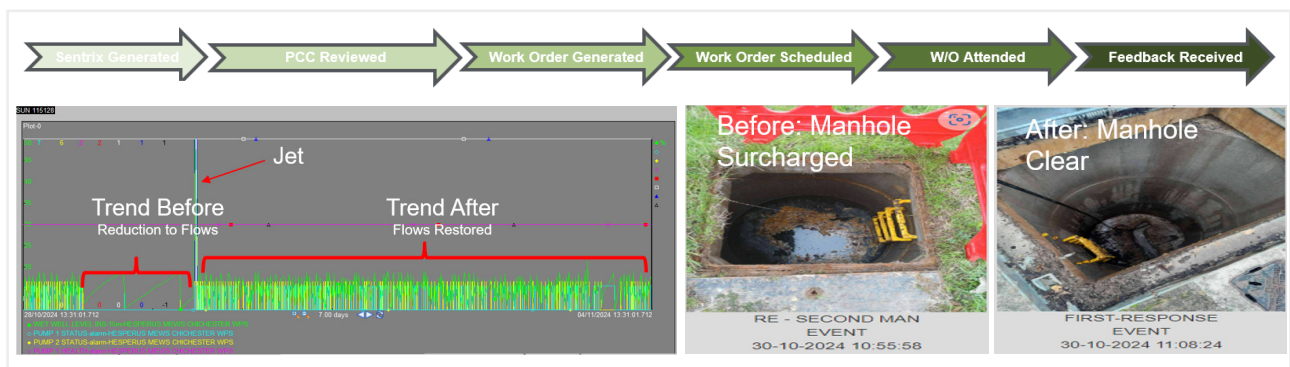


Figure 20: RAID example

Case Study: Making improvements in self-reporting

There was a 12% increase in self-reporting performance across the year. Self-reporting is when we report a pollution incident to the EA – this relies on our customers spotting a possible pollution incident and contacting us in the first instance, using our pollution reporting communications channels, such as our website. When we are the first to know, we can immediately take action to stop the incident and therefore reduce any impact on customers and the environment.

The increase in this type of reporting followed a deep dive into self-reporting in the early part of 2023 and the successful deployment of the Self Reporting Improvement Plan with contributors from across the business. Self-reporting has been trending to a Green RAG (Red Amber Green) status since July. Self-reporting improved considerably in the second half of the year due to the successful implementation of new and improved processes as part of the improvement plan.

In 2024 we reported 61% of incidents within four hours.

The task force team are in early talks with an interactive signage company called Hello Lamp Post, with the idea to educate customers on storm overflows. These will be added to the QR codes on our pollution spotter signage being deployed across the Southern water region. Also, social media adds will continue to run with the reporting message bi-monthly for 2025.

In 2024 we achieved 82% for all assets and 86% for telemetered.

We are aiming to continue the positive trend into 2025 and target Green on the Environmental Performance Assessment RAG status.

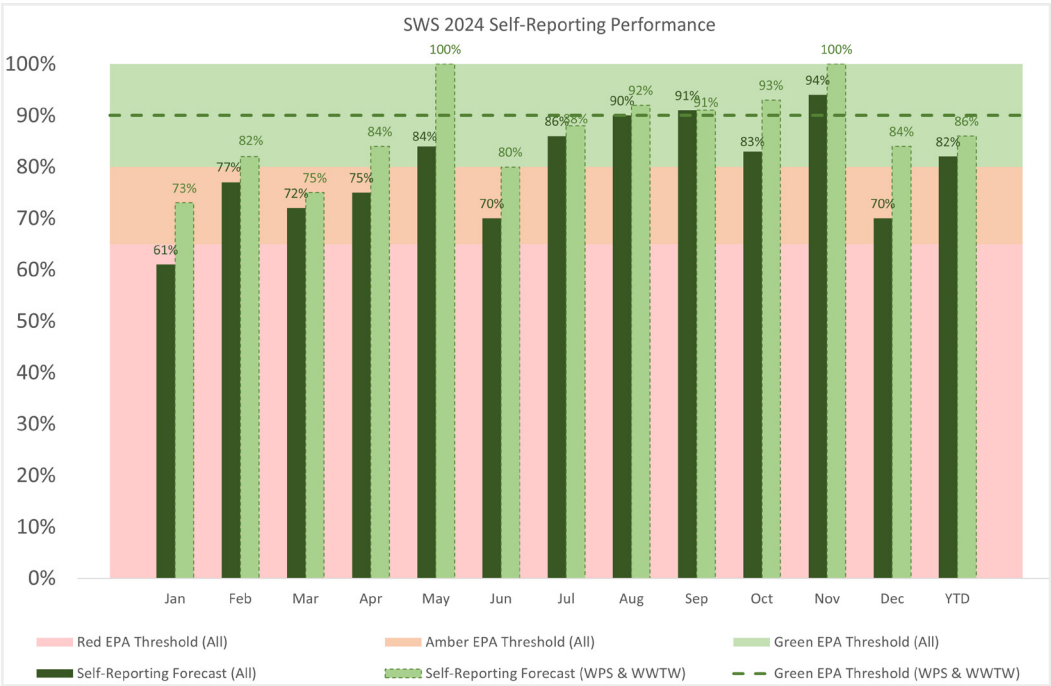


Figure 21: Self-reporting performance 2024 and Amber/Green EPA Targets

Case Study: Burst rising main detection

Bursts on rising mains – these are pressurised sewage mains – can sometimes cause damage to the environment. They may also be very disruptive and costly to fix.

Over the last year we have been investigating the potential benefits of using data as the basis of an analytical platform, which learns what the normal operation is and then provides alerts when something isn't right. We have partnered with two companies, one of which also installs pressure monitors, to help us spot leaks or bursts before they become a big problem. Alongside improvements to pressure management, pump running times can also be used to estimate where a burst may have occurred.

We have had some good successes this year and we have also learnt a lot about how to improve the capability further. One good example was a burst we identified in October. The issue we found was at a rural wastewater pumping station in Woodnesborough, Kent. We were able to act on it, preventing a major job.

Our Burst Detection Tool identified that pump outflows had slowly risen over a period of time, indicating that there was less pressure in the pipe for the pumps to work against. This developed to a point where the data spiked, trending above the threshold level without any significant increase in inflows. Although there had been substantial rain, what was being observed was not a normal reaction for this site during rainfall.

Crews were mobilised to investigate, and although a burst was not immediately evident along the 750m rising main, they were able to find a patch of sewage on the ground in a field (see figure 23). Finding this burst early, we were able to prevent any sewage reaching a river or stream.



Figure 22: Burst rising main detection

Foul sewer pollution incidents

The findings of our 2024 deep dive into foul sewer pollution incidents completed in November 2024 are divided into blockages, hydraulic overload, sewer collapses and rising main bursts.

Blockages

Although there was a slight decrease in pollutions from blockages in foul sewers, newcomer pollutions remain high at 93%, with 0.23% of total blockages in the foul sewer network resulting in 55 pollutions. Proactively targeting foul sewer blockages is however making an impact, with significant benefits tracked and delivered. The pollution reset in May 2024 resulted in additional funding of £4.8 million for the installation of 34,000 sewer level monitors, which will result in 8% of manholes having a monitor in place by March 2025.

Hydraulic overload

The number of pollution incidents associated with hydraulic overload and groundwater were high in the first quarter of 2024. The focus on addressing groundwater over the summer, is showing some early benefit in Q1 of 2025.

Sewer collapses

At the time of review, there were four incidents categorised as pollution incidents caused by sewer collapse. Three of these were pending audit review.

Rising bursts

The rising main rapid response team, targeted calming initiatives and sewer lining has resulted in an overall reduction in bursts. A continued focus on visibility, using burst rising main detection in the Operational Control Centre should enable pollution focussed interventions.

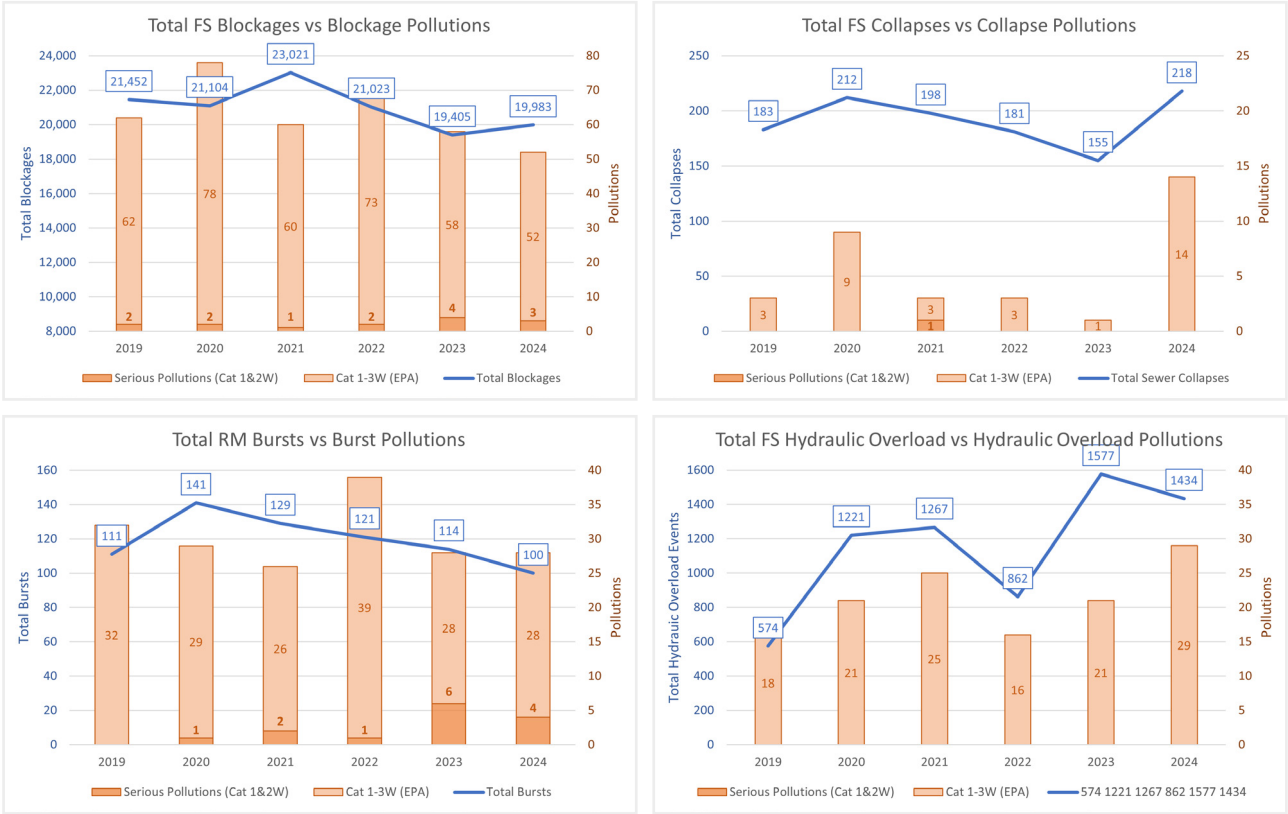


Figure 23: 2019 to 2024* Root cause vs pollutions
*All 2024 potential serious pollutions included. **The collapse and burst number will change, as data April-December 2024 is subject to review and change until the end of the financial reporting year.

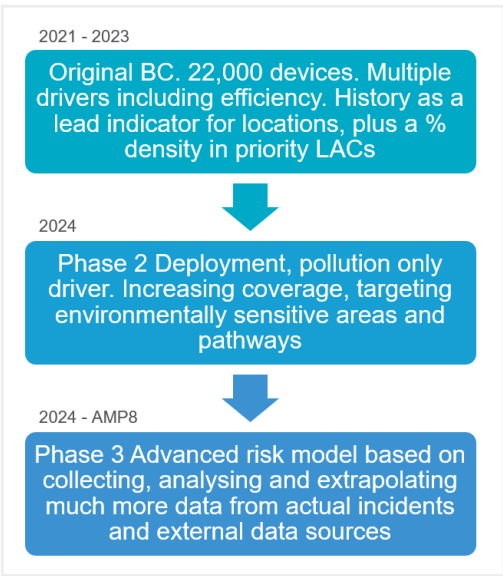


Figure 24: Sewer level monitor deployment

A critical review of sewer level monitor deployment

While we have seen improvement in sewer pollution incidents caused by blockages, there is an opportunity to further reduce risk, using lessons learned.

What we've achieved so far:

- By May 2025, we will have installed 32,000 sewer level monitors across our network, giving us 8% coverage.
- We raised 4,236 jobs over the last 12 months and proactively cleared 1,719 blockages.
- Using sewer level monitors has prevented 11 category 3 pollution incidents, 27 internal floods and 278 external floods in 2024.

What we've learned:

- Pollution incidents from the sewer network rarely happen in the same place twice.
- There is a greater risk of impact from a serious pollution incident in sensitive areas, such as Sites of Special Scientific Interest (SSSI) and wetlands of international importance (RAMSAR sites).
- Surface water sewers can act as a conduit/pathway to pollution.
- The technical selection made, and communications methods used are critical factors to ensure the monitors are always working and alerting.
- Where we put the sewer level monitors makes a difference – general density in some areas is less valuable than higher density in environmentally sensitive locations.

What we need to do now:

- Complete the deployment of additional sewer level monitors to increase coverage.
- Review the current sewer level monitor technology to ensure we have optimised data frequency in sensitive areas, reducing the risk of serious pollution incidents.
- Confirm funding and the strategy for long-term maintenance and remediation of all sewer level monitors.
- Work with innovative models and technologies to maximise insights from existing coverage.
- Embed condition-based monitoring in key risk areas.

Targeting environmental characteristics

The impact of a pollution incident in an area with an environmental designation e.g. a Site of Special Scientific Interest (SSSI), can be far greater. Watercourses are a key concern, so understanding the performance of our networks in these areas is critical.

Phase 2 sewer level monitor deployment targeted:

- Sites of Special Scientific Interest (SSSI)
- Special Areas of Conservation
- Special Protection Areas
- Chalk rivers
- Bathing water.

Conditions for selection within these areas can be configured to achieve a balance of risk vs investment, targeting 100% density in the following areas:

- Within 30m of a watercourse with a modelled pathway to the watercourse
- Within a RAMSAR, SAC, SPA or SSSI
- Within 5m of a chalk river
- Within 5m of bathing water.

We have developed a model to analyse all 600,000 manholes to determine where they are in relation to the selected environmental characteristics. For example, we know that we have 812 foul manholes inside a SSSI boundary and 2,000 within 50m of a chalk river. Using this model, we can adjust the desired density of coverage for specific ranges of distance from these features, to gain maximum mitigation of risk.

Manhole Pollution Criticality Factor	Version	Minimum Distance Threshold (Node distance from criticality factor)	Maximum Distance Threshold (Node distance from criticality factor)	Threshold Distance Unit	Target Density	Number of Nodes (Foul, Operational, Manholes) within Specified Threshold	Number of Nodes within Specified Threshold, SLM Currently Installed	% of Nodes currently installed within Specified Thresholds	Number of Nodes (Foul, Operational, Manholes) within Specified Threshold, No SLM Currently Installed	Number of Nodes (Foul, Operational, Manholes) within Specified Threshold, No SLM Currently Installed, With install density
Distance from watercourse & Impact == T	1	0	20	m	100%	7229	2146	30%	5083	5083
	2	20	30	m	75%	3435	522	15%	2913	2185
	3	30	50	m	50%	6585	1014	15%	5571	2786
Distance from Surface Water System	1	0	2	m	0%	5945	311	5%	5634	0
	2	1	5	m	0%	45010	2542	6%	42468	0
	3	5	10	m	0%	24327	1430	6%	22897	0
Distance from RAMSAR	1	0	1	m	100%	306	34	11%	272	272
	2	1	5	m	75%	208	19	9%	189	142
	3	5	10	m	25%	252	23	9%	229	57
Distance from SAC	1	0	1	m	100%	374	33	9%	341	341
	2	1	5	m	75%	213	19	9%	194	146
	3	5	10	m	25%	236	18	8%	218	55
Distance from SSSI	1	0	1	m	100%	812	61	8%	751	751
	2	1	5	m	75%	479	50	10%	429	322
	3	5	10	m	25%	577	43	7%	534	134
Distance from Chalk River	1	0	5	m	100%	166	39	23%	127	127
	2	5	10	m	75%	155	34	22%	121	91
	3	10	20	m	25%	342	72	21%	270	68
Distance from SPA	1	0	1	m	100%	363	33	9%	330	330
	2	1	5	m	75%	228	21	9%	207	155
	3	5	10	m	25%	258	24	9%	234	59
Distance from Bathing Water	1	0	5	m	100%	3	0	0%	3	3
	2	5	10	m	75%	4	1	25%	3	2
	3	10	20	m	25%	28	1	4%	27	7
Total		-	-	-		97535	8490	9%	89045	13113

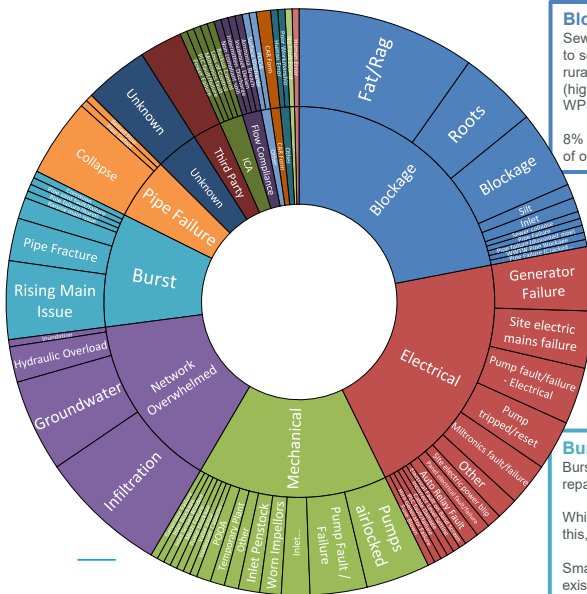
Table 9: Model analysis of manholes

An analysis of root causes and how this shapes our future plans

2024 Cat 1 to 3 Pollution Root Cause Review – Prevention Failure Mode Splits and Description

A significant spike in network overwhelmed root cause in Q1 2024

*The below percentages are the proportion of pollutions Cat-1-3W listed on the Pollutions Database ahead of possible alignment changes, 276 total.



Blockages: 22%* (+1% vs 2023)

Sewer blockages result in leaks from Foul Sewers due to Fats, Oils & Grease (FOG) and RAG build up due to sewer abuse & customer behaviour. Blockage can also result from debris from sewer collapse. In remote rural locations these are likely to have an impact on the environment with significant risk of serious pollutions (high risk of sewage fungus). WPS and WWTW blockages include inlet screen and pump blockages.

8% of our manholes currently contain Sewer Level Monitors, with next steps focusing on increasing coverage of our sensitive networks, which run alongside watercourses or through sensitive environments.

Electrical: 21%* (+9% vs 2023) & Mechanical 15% (+10% vs 2023)

Failure of plant on site leading to a spill or insufficient treatment. Examples include airlocked pumps, screens failing, assets deteriorating or incorrect commissioning.

PIRP 2024 saw additional targeted interventions on our highest risk sites and assets, alongside a shift towards increased proactive maintenance facilitated by upgraded asset condition monitoring

Network Overwhelmed 14%*

In extreme wet conditions, the volume of flow entering the network can overwhelm capacity. This can result in spills from sewers, wet wells and inlets.

77% of these pollutions occurred in Q1, suggesting the wet start to 2024 and high groundwater levels significantly impacted our pollution performance in 2024.

Burst: 9%* (-3% vs 2023)

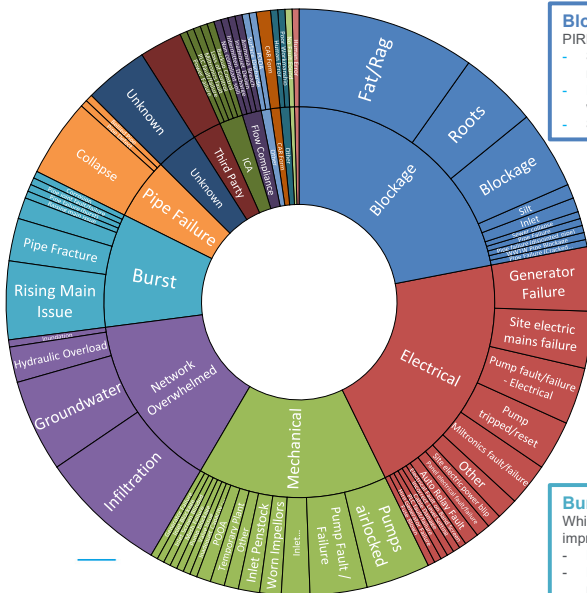
Burst rising Mains have significant potential to become serious pollutions & are high cost to mitigate and repair.

While our highest risk rising mains are easy to identify and our new situational awareness tools will improve this, 50% of RM pollutions are from newcomer sites each year that did not previously burst.

Smarter ways to detect and tackle rising main issues in 2024 included utilising technology to analysing existing signals to calm and highlight problem mains.

2024 Cat 1 to 3 Pollution Root Cause Review – Prevention Failure Mode 2025 PIRP Initiatives

Significant work undertaken over the summer of 2024 to reduce risk of pollutions from Ground water infiltration will continue as the I&I models are utilised as BAU



Blockages

PIRP 2025 projects include:

- **Specialist Pollution Compliance** – Improved operational grip through newly contracted sewer maintenance resource & risk-based maintenance plans
- **Dual Manholes** – Improving the condition of dual manholes in problem catchments to seal off surface water pathways
- **Survey and Clean Problem Syphons** - Utilising specialist resource to remediate high risk assets

Electrical & Mechanical

This will be addressed through improving resilience of our assets with the following projects:

- **Generator & ACB Resilience** – testing & remediating issues on our generators to improve our resilience to power cuts and blips
- **VisNet Hubs** – Phase monitoring technology will allow us to identify and remediate electrical issues on our sites
- **Mitronics Upgrade** – Upgrading our older level monitors to ensure well levels are accurate, ensuring pumps are called to start and stop correctly
- **G2G Phase 3** – targeted interventions on our Treatment Works assets
- **Asset Reliability Engineers** – Dedicated resource for proactive asset improvements
- **Videos for SOPs** – Visual instruction to facilitate asset-specific maintenance
- **WWTW Criticality Model** – Enabling modelling and prioritisation of risks on treatment works

Network Overwhelmed

We must ensure we are operating at full capacity to improve our resilience to high flows, through:

- **Restore High Risk WPS Pumps to PFR** – Test and ensure pumps are meeting their required pump rates
- **I&I Tactical Interventions** – utilize network modelling to identify and remediate flow restrictions

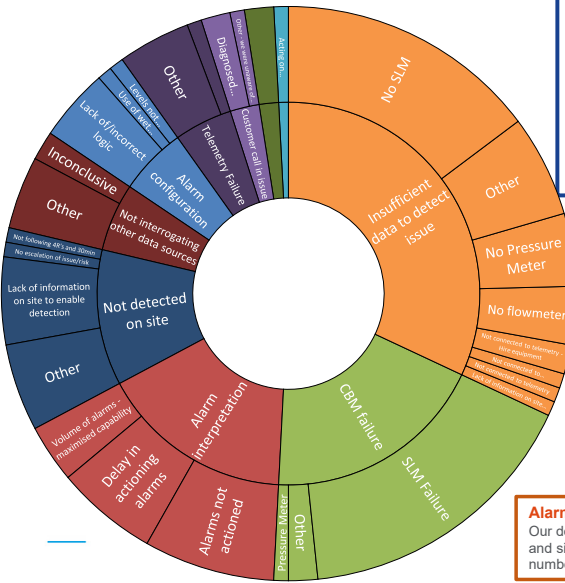
Burst

While steps have been made in 2024 to reduce pollutions from our rising mains, we will look to build on these improvements through:

- **Rising Main Rehab** – prioritisation of Rising Main lining / replacement schemes with a pollution focus
- **Resilient Rising Mains to Burst** – Utilisation of smart air valves to reduce pressure in pipes and help prevent bursts.

2024 Cat 1 to 3 Pollution Root Cause Review – Detection Failure Mode Splits and Description
Pollution incidents are reviewed to determine whether the incident could have been detected more swiftly. Opportunities to improve pollution detection were identified in 48% of pollutions in 2024.

*The below percentages are the proportion of pollutions Cat-1-3W listed on the Pollutions Database ahead of possible alignment changes, 276 total.



Detection Issues – 48%*
Earlier detection of issues allows us to respond swiftly, preventing or limiting the impact of a pollution.

PIRP 2024 included the implementation of RAID which supports a reduction in detection issues.

Embedment of process improvements and structural changes within the Control Center, in combination with Human Factors learning practices, has been a focus in the latter half of the year.

Insufficient Data to Detect Issue– 15%*

Issues that could not be detected due to lack of telemetry or technology available, or issues not visible on site to a first responder due to lack of site information eg plans, diagrams, local SCADA alarms.

Increasing sensors on our network in 2024 is allowing us to target high risk areas such as those close to watercourses.

CBM Failure – 9%*

Existing sensors or telemetry that were not working as expected, leading to delays in detecting an issue proactively or reactively.

SLM Remediation is ongoing to improve visibility of our network.

Alarm Interpretation – 8%*

Our detection and response capability is dependent on our control center identifying and actioning alarms and signals from our sites appropriately. This can be compromised by situations where there is a high number of alarms, knowledge gaps, or confusing / unclear systems and processes.

2024 Cat 1 to 3 Pollution Root Cause Review – Detection Failure Mode 2025 PIRP Initiatives
Opportunities to improve pollution detection were identified in 48% of pollutions in 2024. Our strategy remains to increase & mature our capability for CBM and proactive detection to inform targeted and proactive pollution reduction interventions across the entire asset base.



Insufficient Data to Detect Issue– 15%

An increase in our visibility across all asset types will be facilitated by PIRP 2025:

- **Rising Main Detection Additional Sensors** – increase pressure monitoring and sensor technology around our rising mains to allow us to identify potential issues sooner
- **Samotics SAM4 (CBM) Phase 3** – Further roll out of SAM4 into our high risk pumping stations and treatment works allowing us to pro-actively identify asset deterioration and utilise a condition-based maintenance strategy
- **CBM to Silver** – upgrading our capability to identify issues at our smaller pumping stations through installation of additional sensors and alarms
- **BOD Monitoring** – Improved monitoring of our treated final effluent to enable early detection of treatment issues

CBM Failure – 9%

SLM Remediation is ongoing to improve visibility of our network, alongside installation of newer SLMs with improved signalling capability. In addition, PIRP 2025 will introduce the following:

- **E2E MOT** – End to end testing of signals on our high risk sites with a focus on serious pollutions
- **CBM Engineers** – Dedicated resource to maintain our increased sensor capacity

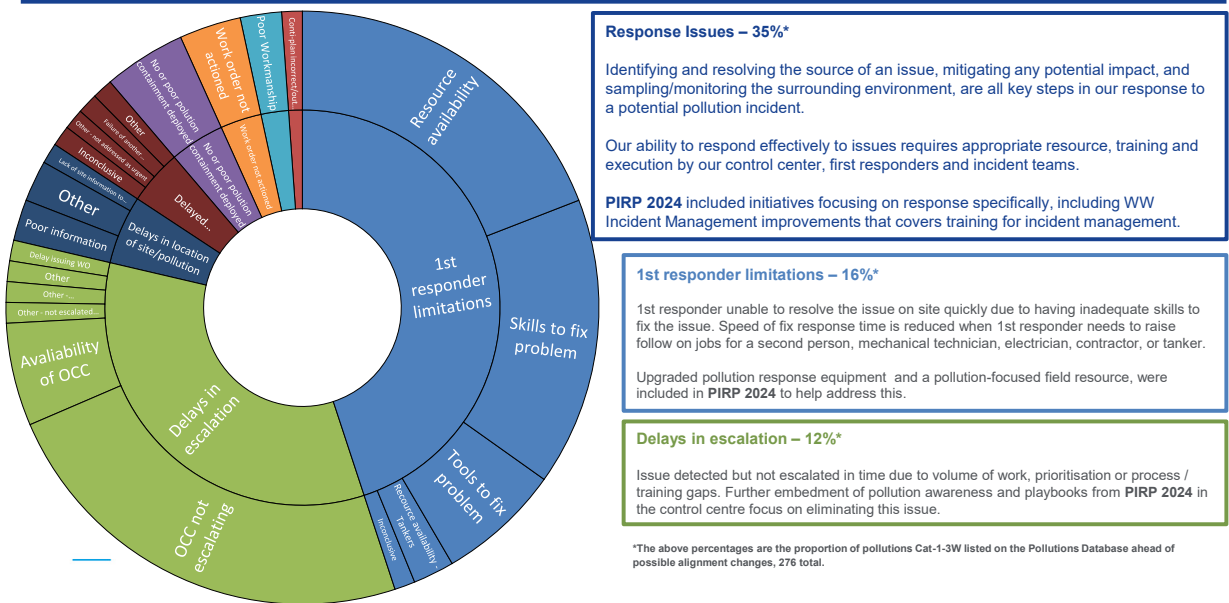
Alarm Interpretation – 8%

PIRP 2025 includes a focus on improved training and systems to enable the control center to operate optimally:

- **Single Proactive Analytics Platform** – Consolidating multiple platforms to provide the control center with clear, concise information on risks and escalations
- **Maximo Permit Compliance** – Utilising Maximo to survey and identify permit issues

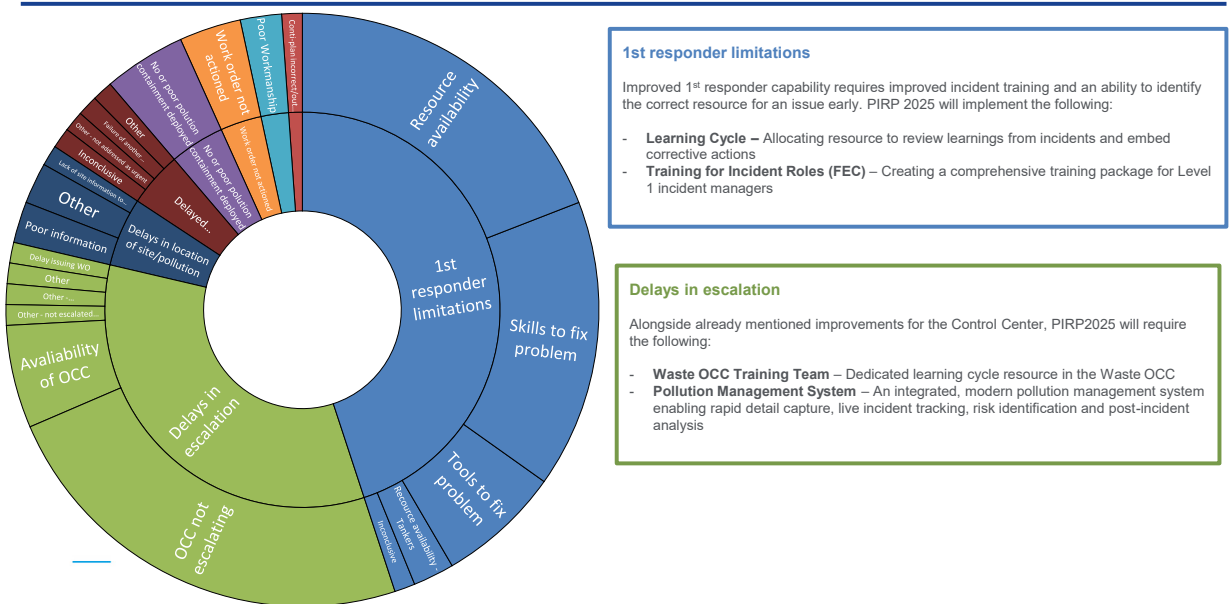
2024 Cat 1 to 3 Pollution Root Cause Review – Response Failure Mode Splits & Description

Pollution incidents are reviewed to evaluate the speed and impact of our incident response and determine whether this was factor in the severity of the pollution. Opportunities to improve pollution response were identified in 35% of pollutions in 2024.



2024 Cat 1 to 3 Pollution Root Cause Review – Response Failure Mode 2025 PIRP Initiatives

2025 PIRP includes proposals to improve on the training for all roles involved with pollution response



Interventions to achieve goals under the 2025 PIRP and beyond

The Pollution Incident Reduction Plans (PIRPs) will be statutory from 2026, with a stipulation that AMP8 [cycle 2] PIRPs should align with the PR24 business plan glidepaths and performance commitments for serious and total pollutions. These should remain fixed throughout cycle 2 (2026 to 2031).

Our key objectives are to:

- have as a goal to achieve 0 category 1 to 2 pollution incidents by 2030
- develop a five-year roadmap (AMP 8) for pollution reduction
- continue to publish Annual Pollution Incident Reduction Plans (PIRPs) – this will be a regulatory requirement from 2026.

We want to put in place a strategy and way of implementation which will:

- use a centralised approach, managed by a dedicated Pollution Reduction Team and Head of Pollution Performance
- ensure cross-departmental alignment by focussing on aligning resources, objectives, projects and governance across the organisation
- work towards the anticipated outcomes of collaborative delivery of pollution reduction programmes and improved governance and accountability.

The case for change is based on our current performance and the targets we need to meet to protect the environment as well as external factors.

Current performance and targets:

- **2020-2024:** Category 1 to 3 pollution incidents reduced from **400 to 269**.
- **Business Plan 2025–30 (AMP 8) target:** Achieve less than 96 category 1 to 3 incidents and 0 category 1 to 2 incidents by 2030.
- **Environmental Performance Assessment (EPA) 2025:** The target for Amber status is less than 139 category 1 to 3 incidents and less than one category 1 to category 2 incident.

Pressure from stakeholders: Customer and regulatory pressure will tighten thresholds and demand continuous improvement.

Southern Water's objective, therefore, is to build a PIRP strategy under the next Business Plan (2025–30) to strengthen our performance on pollution incident reduction using the following approach:

- **Holistic pollution reduction** – create a comprehensive business-wide plan to reduce pollution and support the zero category 1 to 2 target by 2030.
- **Centralised leadership** – establish a pollution task force with a Head of Pollution Performance for governance, funding, and oversight.
- **Integrated approach** – engage heads of departments to align goals, focus areas, resources, and KPIs across the business, and conduct brainstorming workshops to ensure targeted planning.
- **Accountability and performance tracking** – set up an interactive dashboard to track progress, goals and continuous improvement.
- **Develop a clear Roadmap and agile financial investment** – develop a five-year roadmap with clear targets, deliverables, and resources for pollution reduction projects and secure long-term financial investment for agile funding based on changing needs and focus areas.
- **Support for annual PIRP plans** – assist in the development and execution of annual PIRP plans to reduce pollution incidents.

Investment in the 2025 PIRP

We are proposing to invest as much in pollution reduction in 2025, as during the whole of the 2020–25 Business Plan.

The 2025 PIRP is an integrated plan with multiple funding routes including PIRP, Capital Maintenance and operational spend.

A key recommendation from the external review of Southern Water's PIRP, completed in September 2024 by McKinsey, was for an integrated plan driven by a multi-directorate task force. A Head of Pollution Performance has been appointed to lead the task force, to drive and provide focus on pollution reduction activities. They will report to the wastewater Managing Director.

The 2025 PIRP includes initiatives funded from multiple funding routes that will all be tracked. There are five key workstreams consisting of 28 initiatives. These will be tracked by WAVE as part of Transformation Office governance. The PIRP enabler workstream spans the whole programme, and as such, does not have direct pollution benefits allocated. These enablers will be a critical dependency to achieving plan outcomes.

We have a new sewer contract starting in April 2025, which together with improved governance and a high specification fleet will provide more benefits to the sewer network.

The effectiveness of future interventions under the 2025 PIRP and the strategy for the next Business Plan (AMP8)

There are 28 programmes that will contribute to pollution reduction, with the majority of projects brought towards the start of our 2025–30 Business Plan (AMP 8) to facilitate early pollution reduction.

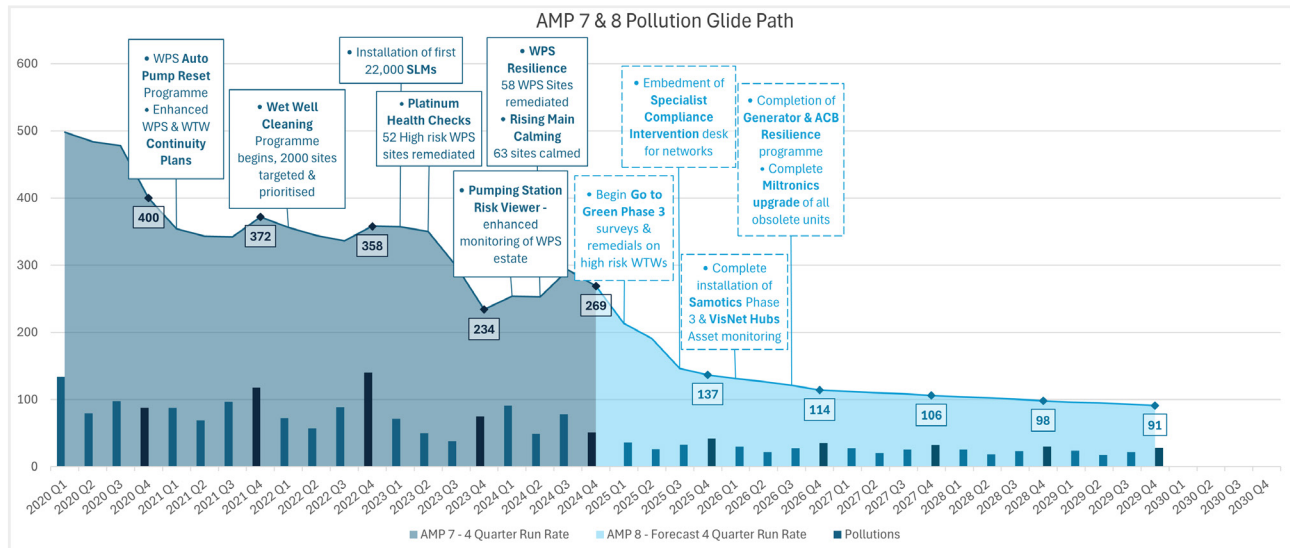


Figure 25: Pollution reduction 2020–2030 (actual and forecast)

Moving from the 2024 run rate to the 2025 target run rate

This model has been put together by working backwards from 2025. It shows that while most failure modes are comprehensively addressed by the 2025 PIRP, we need to do more to target pollution incidents from networks.

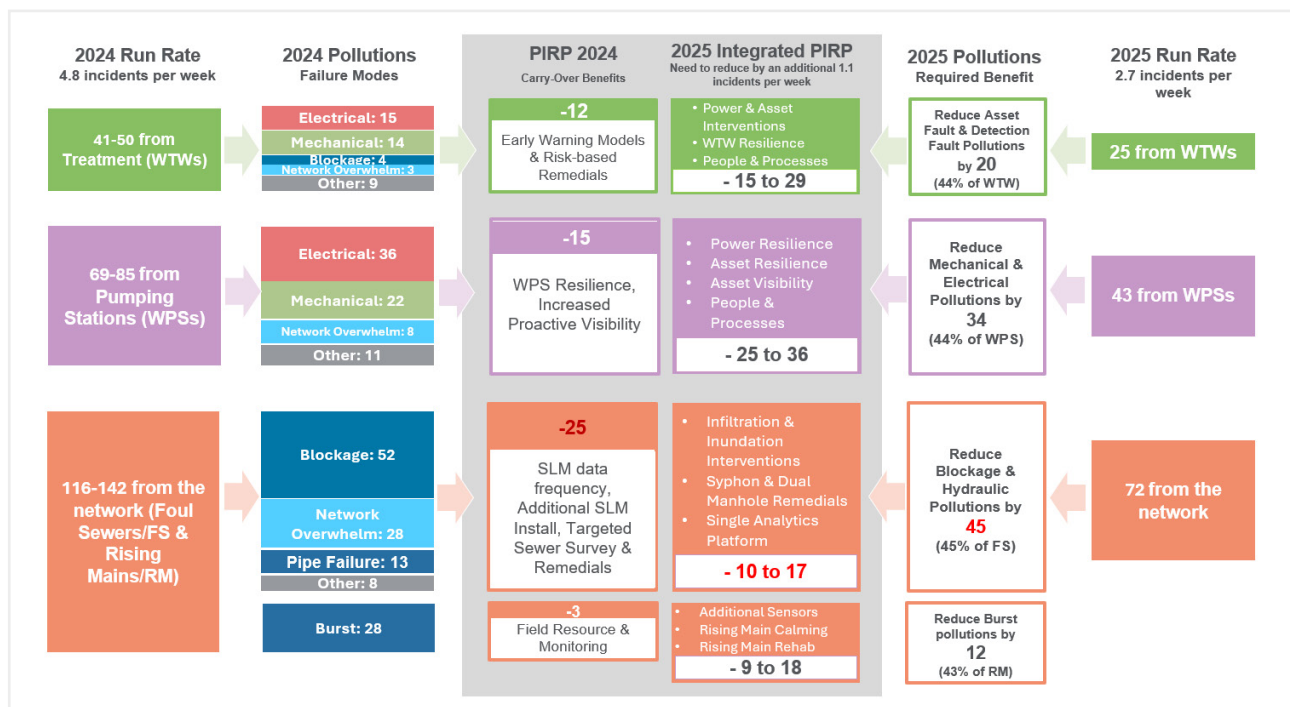


Figure 26: Reverse engineered solution – 2024 run rate to 2025 target run rate

Linking 2024 insights to the PIRP 2025 initiatives

PIRP 2025 links to failure modes identified from pollution investigations into 269 category 3 and category 3 near misses.

[illegible]

Key
Root cause is addressed by project
Root cause is not addressed by project

Figure 27: PIRP 2025 links to failure modes

The 2025 PIRP – targeting a benefits range of 75 to 90 pollution incidents

The 2025 PIRP has been built using pareto – the idea that approximately 80% of outcomes come from 20% of causes – to target failure modes seen in 2024. Key Directorates contributing to the successful delivery of the PIRP are Operations, Digital including Data and IT/OT, Training and Development, People and Corporate Relations.

Work Stream	Work Stream Area	Project Description	Cost (£k)	Benefit	Asset	Funding Route	Supporting Directorate
Network	Sewer	I&I Tactical Interventions	£292	4	FS	PIRP	Digital
		Specialist Compliance Interventions	£491	1	FS	OPEX	Commercial
		Dual Manholes	£1,500	1	FS	PIRP	Operations
		Survey and Clean problem syphons	£2,000	2	FS	OPEX	Operations
	Rising Mains	Rising Main Detection - additional sensors	£2,000	4	RM	PIRP	Operations
		Rising Main Rehab	£7,000	3	RM	Planned	Capital Delivery
		Resilient Rising Mains to Burst	£1,000	6	RM	PIRP	Operations
	Network	Workstream Totals	£14,283	21			
Electrical & Mechanical	Power Resilience	Generator & ACB Resilience	£2,590	6	WPS & WTW	PIRP	Operations
		DMC Power Resilience	£3,600	1	WPS & WTW	DMC	Operations
		VisNet Hubs	£1,875	8	WPS & WTW	PIRP	Digital
	Asset Resilience	Miltonic's upgrade on obsolete units	£1,250	5	WPS & WTW	DMC	Digital
		Restore high risk WPS pumps to PFR	£425	1	WPS	Planned	Operations
		E2E MOT	£300	3	WPS		Digital - OT
	Asset Visibility	SAMOTICS SAM4 (CBM) Phase 3	£5,000	15	WPS & WTW	PIRP	Digital - OT
		CBM to silver	£3,500	2	WPS	PIRP	Operations
	Electrical and Mechanical	Workstream Totals	£18,540	41			
WTW Resilience	WTW Resilience	BOD Monitoring	£1,000	2	WTW	PIRP	Digital - OT
		G2G Phase 3: Survey and Remedials	£1,000	3	WTW	PIRP	Operations
		Flow Breach Process Review	£100	1	WTW	PIRP	Operations
	WTW Resilience	Workstream Totals	£2,100	6			
People, Processes and Systems	People & Processes	Learning Cycle	£355	2	All	OPEX	People - T&D
		Waste OCC Embedment Team		1	All	OPEX	People - T&D
		Videos for SOPs	£355	1	All	PIRP	People - T&D
		Asset Reliability Engineers		2	WPS & WTW	OPEX	People
		CBM Engineers		3	WPS & WTW	OPEX	People
	Systems	Connected Network Proactive Analytics	£560	8	WPS&FS	PIRP	Digital - IT/ OT
	People, Processes and Systems	Workstream Totals	£1,270	17			
Enablers	Enablers	Training for Incident Roles (FEC)	£100		WPS & WTW	OPEX	Training & Development
		Maximo Permit Compliance	£150		WPS & WTW	CAPEX - OAM	Digital - IT
		Pollution Management System	£1,500		All	PIRP	Digital - IT
		WWTW Asset & Process Criticality Model	£100		WTW	DIGITAL	Digital - Data
	Enablers	Workstream Totals	£1,850				
PIRP 2025	PIRP 2025	PIRP 2025 Total	£ 38,043	85			
	PIRP 2025	PIRP 2025 PIRP Funded Total	£ 22,272				

Figure 28: 2025 PIRP – targeting a benefits range of 75 to 90 Pollution incidents

2025 Pollution Incident Reduction Plan progress

The 2025 PIRP has agreed funding with some early start work, but main programmes are to start in April in line with the funding release.

Focusing on serious pollution incidents

Serious pollution incidents 2024 – insights and a deep dive

Improvement activities under the next Business Plan 2025–30 (AMP8), must consider Serious Pollution Reduction as a key focus.

Serious pollution numbers are off track in 2024, with 14 category 2W and one category 1W for 2024. This gives a total of 15 serious pollutions. This puts us at a Red status on the Environmental Performance Assessment's RAG (Red Amber Green) status. In 2025, we have a target of just one serious pollution to achieve Amber status.

Proximity to sensitive watercourses is a major risk factor for serious pollutions. As previously mentioned, we currently sample a receiving watercourse until background readings are reached, to assess the actual impact of the discharge. This means that a total of 13 out of 14 of our category 2 pollution incidents have been assessed based on the impact of ammonia/sewage fungus over 50 metres downstream.

Our plan of action

The PIRP 2025 includes:

- A focus on visibility of the condition of our assets and the true root cause of any issues, through the installation of motor and phase monitoring technologies across our high-risk sites. This will inform condition-based maintenance and pro-active interventions.
- A Power Resilience programme of work that will look to survey, remediate and replace problem generators, helping to eliminate electrical root causes.
- The Rising Main capital programme which has been planned in across the AMP and should be prioritized based on pollution risk alongside other factors.
- New Sewer Maintenance contracts and the use of a risk-based model for routine maintenance and remediation which is due to start under the 2025–30 Business Plan, allowing us to be more targeted towards environmentally sensitive areas.
- The need for the pollution taskforce to work with other areas of the business to ensure serious pollution risk is factored into all improvement strategies.
- Improved People, Processes and Systems outlined in the 2025 PIRP, which put in place the required learning and capacity to maximise the impact of improvement activities.

We must continue to work with our regulators to ensure we meet regulatory expectations.

Insight:

The analysis of 17 serious and near miss serious pollutions for 2024 show that blockages, bursts and electrical issues were the most significant failure modes, with the network accounting for nine of the incidents, of which five were from foul sewers and four from rising mains.

Existing 2024 PIRP plans are on track and delivering benefit, and address many of the failure modes seen in the last year. However, many of our asset resilience projects have prioritised remediation of sites based on recent category 1-3 pollution history, rather than on proximity and risk.

In 2025, planned improvement activity needs to make sure long-term serious pollution history and other risk factors are prioritised. We are at greater risk of serious pollutions in the summer months, and we should adjust our detection and response strategy accordingly.

Likely outturn:

With the implementation of the 2025 PIRP, capital programmes under the Business Plan 2025–30 (AMP8) and new sewer maintenance contracts and governance, we will see:

- increased pro-active maintenance reducing serious pollution risk across our region
- a shift toward strategic planned maintenance based on environmental risk
- incident management using risk-based intelligence, integrated systems, and further training, to better identify, prevent and learn from potential serious incidents.

Serious pollution insights 2019 to 2024 – an analysis of risk

A statistical review of all serious pollutions from 2019 to 2024, carried out in December 2024, shows the most significant risk factor is the time of year, with other key trends shown for the time of day and day of the week:

- Time of day – while most serious pollutions are recorded in hours, wastewater pumping station serious pollution incidents show that a significant number are detected out of hours. This is likely due to the extent of Condition-Based Monitoring installed on water pumping station sites, enabling 24-hour detection.
- Day of the week – over the past five years, serious pollution incidents have more commonly occurred from Monday to Thursday, in fact 2024 saw a proportionally higher number on a Thursday, but these incidents don't appear to have any correlation to worsened detection or response issues. Further data analysis failed to identify a specific cause for this particular day.
- Month of the year – although pollution incidents are generally more frequent in wetter periods, serious pollution incidents are more likely to occur over the summer/dryer months; this can be attributed to reduced dilution and lower river levels, diminishing the resilience of watercourses and increasing the environmental impact of spills. In addition, dry, baked soils don't absorb spills into the ground, enabling faster run-off to ditches, and watercourses.

The analysis of 17 serious and near miss serious pollutions for 2024 can be found below:

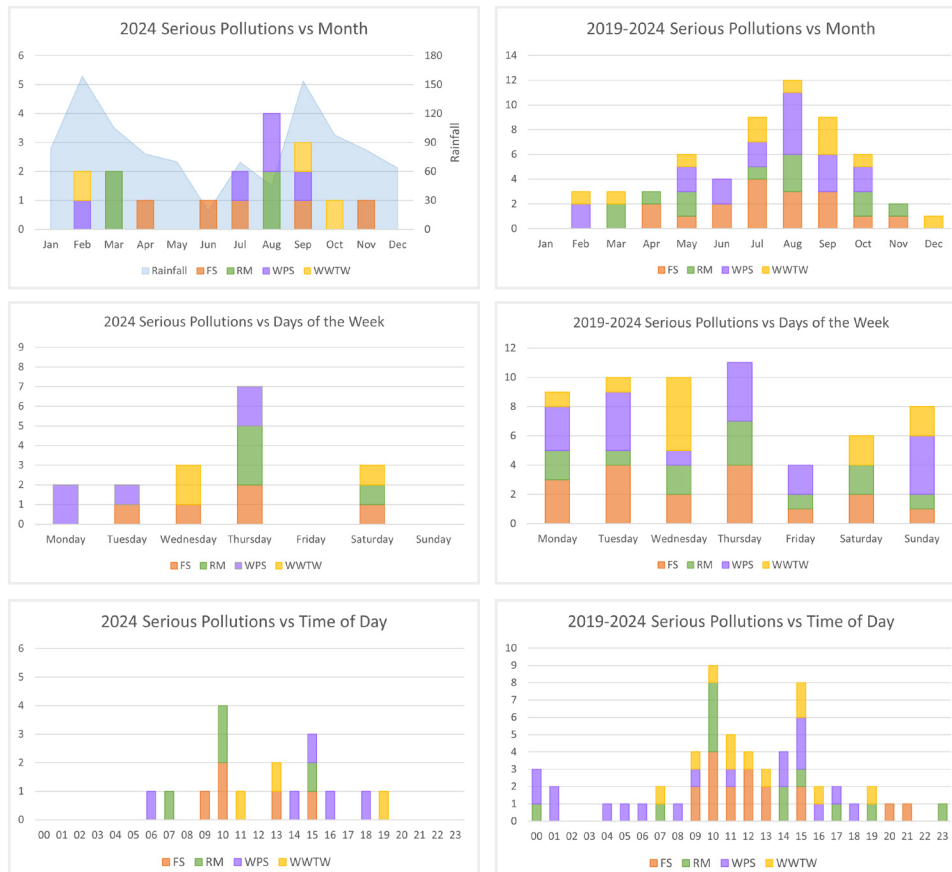


Figure 29: 2019 – 2024* Serious Pollution Risk Analysis

*All 2024 potential serious pollutions included

Serious pollution insights 2024

Analysis shows that blockages, bursts and electrical issues continue to dominate our serious pollution root causes.

In 2023 there was only one serious pollution associated with electrical issues, however this has risen again in 2024.

Our network continues to contribute significantly, due to the difficult nature of detecting issues early and the potentially catastrophic impact of high pressure rising main bursts.

Detection issues were noted in 11 cases, including five incidents that were **Not Detected on Site**.

Response issues were noted in six cases; the most common being **Delays in Escalation** due to failure to escalate alarms and respond effectively within the Service Level Agreement.

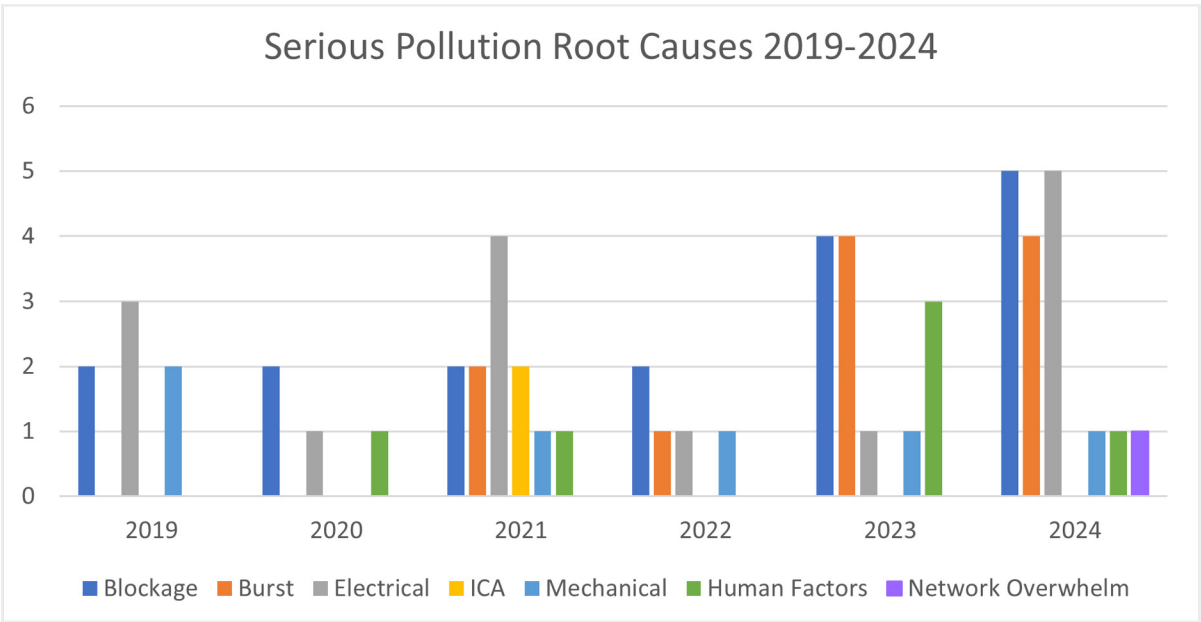


Figure 30: Serious and near miss serious pollution root causes 2019-2024



Figure 31: 2024 Serious pollution root cause analysis and failure modes

***All 2024 potential serious pollutions included**

Serious pollutions - linking 2024 serious pollution insights to PIRP 2025 actions

PIRP 2025 initiatives in conjunction with business as usual – BAU – activities address 100% of 2024 serious pollution failure modes.

To combat the most common themes associated with serious pollution incidents, the 2025 PIRP addresses issues with the prevention and detection of frequent blockages and bursts in our network, alongside the development and integration of improved systems, processes and training frameworks. This ensures appropriate response to incidents, minimising environmental impact.

		Work Stream	Network					Electrical & Mechanical					WTW Resilience	People, Processes and Systems				
		Work Stream Area	Sewer		Rising Mains			Power Resilience			Asset Resilience	Asset Visibility		WTW Resilience	People & Processes			Systems
		Project Description	I&I Tactical Interventions	Survey and Clean problem synphons	Rising Main Detection additional sensors	Rising Main Rehab	Resilient Rising Mains to Burst	Generator & ACB Resilience	DMC Power Resilience	VisNet Hubs	Milton's upgrade on obsolete units	SAMOTIC SAM4 (CBM) Phase 3	CBM to silver	G2G Phase 3: Survey & Remedial	Learning Cycle	Waste OCC Embedded Team	Videos for SOPs	Connected Network Proactive Analytics
Incident	Failure Mode	Root Cause																
Incident 1	3rd Party	Poor Workmanship														✓	✓	
Incident 2	Blockage	Incorrect/Inadequate maintenance		✓												✓	✓	
Incident 3	Electrical	Pump fault/failure - electrical								✓			✓			✓		✓
Incident 4	Blockage	Pipe Failure (Cracked or Fractured)										✓		✓		✓	✓	
Incident 5	Electrical	Electrical Fault on Band Screen									✓			✓		✓		✓
Incident 6	Electrical	Mitronics fault/failure										✓				✓	✓	
Incident 7	Burst	Rising Main Issue				✓		✓		✓						✓	✓	
Incident 8	Electrical	Generator Failure							✓		✓					✓	✓	
Incident 9	Burst	Rising Main Issue				✓		✓								✓	✓	
Incident 10	Blockage	Fat/Rag														✓	✓	
Incident 11	Mechanical	Pump Fault / Failure														✓	✓	
Incident 12	Blockage	Roots		✓								✓		✓		✓		✓
Incident 13	Blockage	Roots		✓												✓		✓
Incident 14	Burst	Rising Main Issue					✓	✓		✓						✓	✓	
Incident 15	Burst	Rising Main Issue					✓	✓								✓	✓	
Incident 16	Ntwrk Ovrwhd	Groundwater		✓										✓		✓	✓	
Incident 17	Electrical	Generator Failure							✓		✓					✓	✓	

Figure 32: 2024 Serious & Near Miss Serious pollution root cause analysis and failure modes

Glossary

AMP7	The seventh asset management period planned by the UK water industry and running from April 2020 to March 2025
AMP8	The eighth asset management period planned by the UK water industry and running from April 2025 to March 2030
APR	Auto Pump Reset
ARS	Auto Reset System
Cat 1	CICS Category 1 pollution incident – major, serious, persistent and/or extensive impact or effect on the environment, people and/or property
Cat 2	CICS Category 2 pollution incident – significant impact or effect on the environment, people and/or property
Cat 3	CICS Category 3 pollution incident – minor or minimal impact or effect on the environment, people and/or property
Cat 4	CICS Category 4 pollution incident – no impact on the environment
CBC	Condition-based cleaning of the sewer network
CBM	Condition- based monitoring (by Sentrix & Samotics SAM4 systems)
CICS	Common Incident Classification Scheme
CPAC	Compliance Process Assessment & Controls
CSO	Combined Sewer Overflow
EA	Environment Agency
EPA	EA Environmental Performance Assessment - WaSC performance
FOG	Fats, Oil and Grease – from domestic and commercial cooking
FS	Foul Sewer
FYLD	Proprietary name for the pollution response app
GtG	Go to Green – The name of the WTW improvement programme
HEC	High Environmental Consequence

HIT	High Impact Team
HRM	High Risk Manhole
ICA	Instrumentation, Control and Automation
MED	Southern Water Mechanical and Electrical Design standard
MH	Manhole
NFF	No Fault Found on proactive attendances
NRV	Non-Return Valve
OFWAT	OF ice of WAT er - The Water Services Regulation Authority
PHC	Platinum Health Check
PIRP	Pollution Incident Reduction Plan
PIRS	Pollution Investigation Report System
PR19	Ofwat's Price Review 2019 for AMP7
PR24	Ofwat's Price Review 2024 for AMP8
PSRV	Pumping station risk viewer (now replaced by SW's Sentrix system)
RAID	Reactive Analytics Insights Desk in the Control Room
RCA	Fats, Oil and Grease – from domestic and commercial cooking
Rising Main	Foul Sewer
SCO	Proprietary name for the pollution response app
SLM	Go to Green – The name of the WTW improvement programme
SR	High Environmental Consequence

Unflushables	Items which should be disposed of in the bin, NOT the toilet.
W (after category)	Pollution to a water course (i.e. not pollution to land)
WaSC	Water and Sewerage Companies
WSW	Water Supply Works
WPS	Wastewater Pumping Station
WTW	Wastewater Treatment Works