Drinking Water Quality in Scotland 2024

DWQR Annual Report Public Supplies

DRINKING WATER QUALITY REGULATOR FOR SCOTLAND

SAFEGUARDING YOUR DRINKING WATER

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FOREWORD

This is the twenty-third annual report from the Drinking Water Quality Regulator for Scotland (DWQR), and it marks my first as Regulator. This report provides an independent assessment of the quality of public drinking water supplies in 2024.

Over the last two decades, Scottish Water has made huge progress in safeguarding Scotland's drinking water quality. In my short time as Regulator, I have seen the benefits of these advances first-hand and have been impressed by a strong culture of continuous improvement throughout Scottish Water. As in previous years, this report confirms that compliance with regulatory standards remains extremely high, offering considerable reassurance about the safety of drinking water. It is the dedication, professionalism, and openness of the people I've met across Scottish Water that gives me the greatest confidence that our drinking water is in good hands.

That said, significant risks and challenges remain. Particularly, I am concerned by the frequency of short-lived, yet largely avoidable, incidents that my team has needed to investigate this year. These have mostly occurred at water treatment works, where there is often an over-reliance on operators to respond rapidly to issues, rather than there being robust failsafe systems in place. Problems will inevitably arise, and Scottish Water must meet this challenge by investing in more resilient infrastructure that reduces dependence on human intervention and prevents the supply of inadequately treated water to consumers.

I am also disappointed that several preventable incidents resulted in the supply of discoloured water to large numbers of consumers. While Scottish Water's response to these events was generally good, they should not have occurred and highlight the need for further work to address the underlying causes. Ensuring the appropriate maintenance and operation of distribution systems, combined with training of staff and contractors, is essential to prevent recurrence.

A particularly important step in protecting water quality was the issuing of an Enforcement Notice in 2023, requiring improvements in the maintenance of treated water storage tanks. This is a substantial undertaking for Scottish Water, but it is

critical in safeguarding public health. I am pleased to report that significant progress has been made in delivering an inspection and repair programme, although much remains to be done and I will continue to monitor progress closely to ensure this longstanding risk is satisfactorily addressed.

To summarise, drinking water quality remains amongst the best in the world, but the number of avoidable issues encountered during 2024 serves as a reminder that there is no room for complacency. It is essential that Scottish Water continues to strengthen its risk assessment processes, fully embedding a drinking water safety plan approach, to ensure that potential issues are proactively identified and mitigated before they impact water quality. This is even more important given the challenges posed by aging assets and the growing impacts of climate change on water sources.

David Reynolds

Drinking Water Quality Regulator for Scotland
September 2025

EXECUTIVE SUMMARY

In Scotland, Scottish Water provides the public water supply. All other supplies are known as private water supplies and are managed by owners and/or users. The Drinking Water Quality Regulator for Scotland (DWQR) regulates the quality of water supplied by Scottish Water, ensuring that drinking water supplies meet the requirements of The Public Water Supplies (Scotland) Regulations 2014 as amended ("the Regulations"). A copy can be found at the following link to the DWQR website.

This report describes the quality of the public supply provided by Scottish Water and the regulatory actions that DWQR has undertaken in 2024. DWQR publishes a separate report on private water supplies which can be viewed on our website at DWQR Annual Reports.

Scottish Water takes and analyses its own samples to demonstrate that the water supplied complies with regulatory requirements. Samples are taken from drinking water as it leaves water treatment works (WTWs), service reservoirs or storage points (SRs) and from randomly selected consumers' taps. This sampling and analysis is independently accredited and is consistent with water industry practice in the rest of the UK. DWQR also assesses Scottish Water's monitoring programme and test results.

In 2024, Scottish Water carried out sufficient sampling as required by the Regulations and the results demonstrate a high level of compliance. Overall, 316,256 regulatory tests were conducted with 205 failures recorded. This corresponds to a compliance rate of 99.94%. Further details are provided in Table 1.

Table 1 Compliance in each of the sampling areas, in addition to overall compliance.

Sample Point	No. Tests	No. of Tests failing	Compliance
WTW	62,352	23	99.96%
SR	97,090	58	99.94%
Consumer Tap	156,814	124	99.92%
Total	316,256	205	99.94%

Of the 156,814 tests on samples taken to represent water at consumers taps, 99.92% complied with the standards. This is an improvement compared to 2023 where a compliance of 99.88% was achieved. A direct comparison is difficult to make due to an increase in the number of tests conducted during 2024 as a result of the introduction of risk-based sampling.

An additional 62,352 tests were conducted on water supplied from treatment works. Of these, twenty-three failed to meet the required standards, representing a slight decline in performance compared to the previous year.

A total of 97,090 tests were conducted on samples taken from service reservoirs, where treated water is stored. Of these, fifty-eight did not meet the required standards. Whilst this reflects a slight improvement in compliance compared to 2023, further progress is required. Scottish Water has, however, increased its activity to inspect and maintain its storage points following a DWQR enforcement notice served in 2023 and DWQR will continue to monitor progress closely to ensure this risk is satisfactorily addressed.

Scottish Water reports the number of contacts received from consumers concerned about the quality of their drinking water. There were 16,779 contacts during 2024, which is very similar to the previous two years. The discolouration of supplies continues to be the greatest cause of consumer concern, however, there has been an increase in the number of complaints relating to earthy / musty tastes and odours. Other categories showed limited changes from 2023.

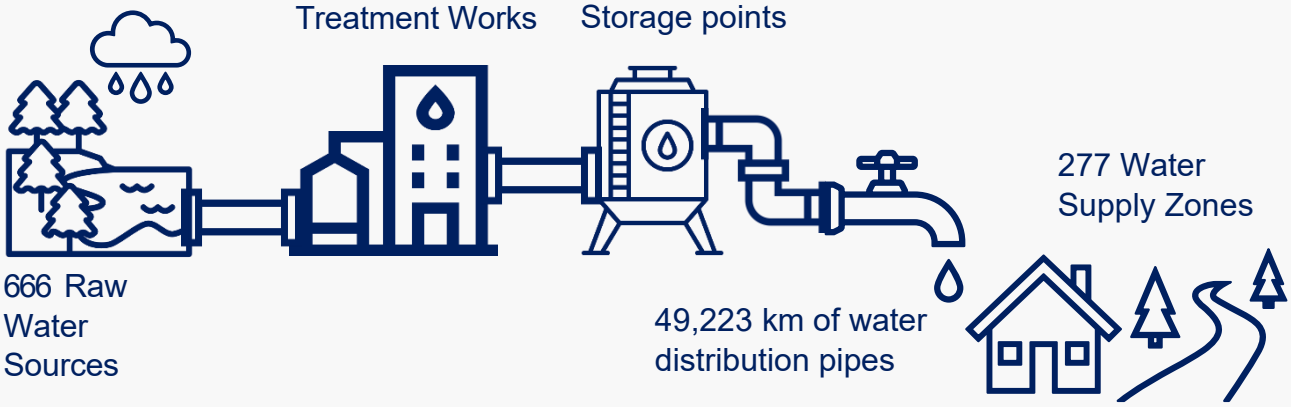
DWQR carries out formal complaint investigations if consumers are not satisfied with Scottish Water's own investigation. DWQR carried out two investigations during 2024: one relating to particles in water, which was not upheld; and the other about the quality of water supplied directly from a raw water main, which was upheld as the water was not compliant with drinking water standards. Several recommendations were made to Scottish Water in both cases.

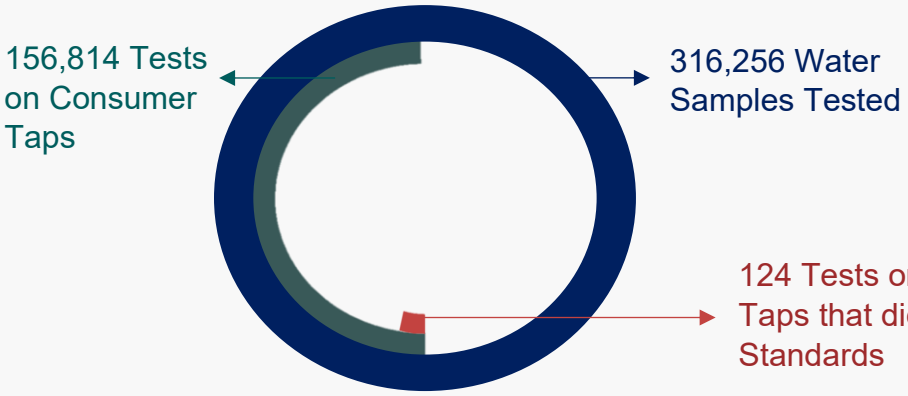
Further information on Scottish Water's monitoring programme, results and consumer contacts can be found in Section 1 of this report.

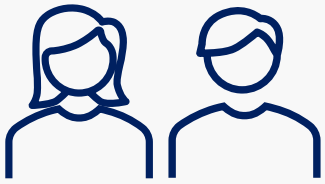
Scottish Water is required to tell DWQR about any event that could affect water quality or cause consumer concerns. The number of water quality events reported in 2024 was 866. This is slightly less than the 920 events in 2023. Events of a more serious nature are categorised as water quality incidents. In 2024, thirty-four events were declared to be incidents and investigated by DWQR, which was an increase on 2023. As in previous years, the significant loss of control of the water treatment process was the most common cause. The number of incidents concerning the disinfection of water increased, representing a worrying trend. Section 2 of this report gives more details on some of the incidents that we investigated during 2024.

Audit and inspection are a key part of DWQR's role. DWQR inspects a range of Scottish Water activities and assets that could affect the quality of drinking water every year, auditing against regulatory requirements and industry best practice. Sites are selected for inspection using a risk-based process that considers sample failures and water quality events and incidents. During 2024, audits took place at fifteen water treatment works across Scotland, with fourteen investigatory visits also made. DWQR also inspected six activities on the distribution system and an audit on how Scottish Water uses samples to check that water quality has been restored following the repair of a burst main. We also audited both of Scottish Water's laboratories where water samples are tested. Further information on our audit and inspection work is given in Section 3 of this report.

2024 IN REVIEW: PUBLIC SUPPLIES IN SCOTLAND

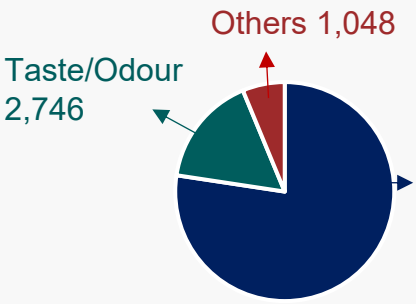




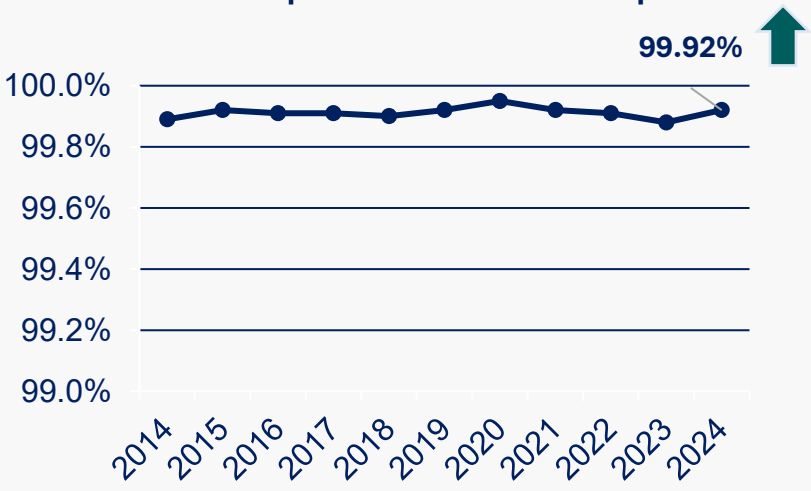


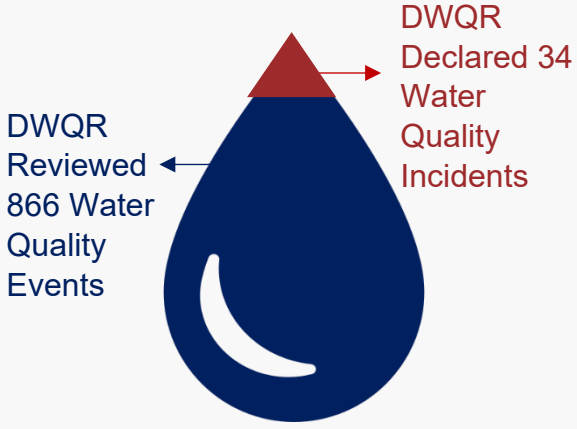
DWQR Received 112 Consumer Contacts

Scottish Water Contacts



% Overall Compliance at Customer Taps





Pond image supplied by Pond link Storage tank was supplied by Water Storage Point All other icons supplied by Freepik

1 PUBLIC DRINKING WATER SUPPLIES IN SCOTLAND 2024

1.1 Water Treatment Works

Scottish Water has 225 water treatment works (WTW) that treat water to ensure it is safe to drink and complies with the standards set out in the Regulations.

Treatment works in Scotland range from large supplies serving whole cities, to very small works that supply small communities consisting of a handful of properties. Regardless of their size, DWQR expects Scottish Water ensure that its WTWs are capable of treating the raw water to achieve drinking water standards. In total, 62,352 tests were conducted from samples collected from treatment works and of these twenty-three (0.04%) failed to meet the required standard.

Figure 1 A large WTW in South Lanarkshire.

Figure 2 A smaller WTW in the Western Isles.

1.1.1 Microbiological Quality at Water Treatment Works

E. coli and other coliform bacteria are measured in water leaving WTWs to check that disinfection of the supply has been successful. Coliforms are groups of bacteria widely found in the environment, with *E. coli* being an indicator of faecal contamination. The presence of either parameter shows that the disinfection process may not have been effective at removing or killing potentially harmful bacteria. The standard for both coliform bacteria and *E. coli* is zero and all sample failures must be fully investigated by Scottish Water and reported to DWQR, the local NHS board and the relevant local authority.

When investigating sample failures at WTWs, Scottish Water conducts a detailed investigation to determine the likely cause that considers many potential factors, such as changes in the quality of the incoming raw water, issues with the treatment

process, sampling conditions, and other evidence from samples collected at the treatment works and in the distribution system. Further sampling can help establish whether there is a genuine problem. Data from on-line monitoring and manual testing of water at WTWs for other parameters can also yield useful information.

Samples taken at WTWs during 2024 continued to show that supplies in Scotland were of a very high microbiological standard and of the 25,933 tests conducted, none failed the *E. coli* standard. However, twenty tests (0.08%) failed the coliform standard with Turriff WTW, Muirdykes WTW, Rosebery WTW and Greenock WTW each having more than one failure.

At Turriff WTW in Aberdeenshire, ingress into the disinfected water storage point was the root cause of three separate low level coliform detections (1 CFU/100ml in March 2024, 1 CFU/100ml and 2 CFU/100ml in April 2024). In response, Scottish Water installed a temporary membrane to cover the tank and commenced a refurbishment project.

At Muirdykes WTW in Renfrewshire, the integrity of tank hatch seals on both the clear water tank and chlorine contact tank was attributed to three separate low level coliform detections (1 CFU/100ml in January 2024, 2 CFU/100ml in April 2024 and 1 CFU/100ml in May 2024). Actions were taken to make repairs and seal potential ingress points.

At Rosebery WTW in Midlothian two failures occurred. The first (1 CFU/100ml in February 2024), was caused by poor performance of the coagulation/clarification process and this coincided with low level *Cryptosporidium* detections during January and February 2024. In response, additional temporary chemical dosing was introduced to improve performance as well as supplementing the filter media. The second failure (1 CFU/100ml in April 2024) was concluded to be due to the location of chemical dosing points which prevented optimal disinfection. Actions were identified to adjust chlorine dose control, and a project was initiated to relocate the pH correction and orthophosphoric dosing systems to a more appropriate location.

At Greenock WTW, a 1 CFU/100ml detection in September 2024 was due to flow fluctuations during the backwashing of filters and following this detection appropriate action was taken to improve process control. No cause was found for the second detection in December 2024 (1 CFU/100ml), however, as a precaution the chlorine dose used in the disinfection process was increased and an inspection of the treated water storage tank was carried out along with additional investigatory sampling.

1.1.2 *Cryptosporidium* Monitoring at Water Treatment Works

Cryptosporidium are microscopic protozoan parasites that can live in the gut of humans and warm-blooded animals. *Cryptosporidium* oocysts can enter a water supply if faecal material is washed into the raw water entering a WTW and the oocysts are not removed by the treatment process. *Cryptosporidium* oocysts are not killed by chlorine at the levels used in water treatment, so water treatment processes need to be optimised and well monitored to ensure they are physically removed. Scottish Water tests water supplies for *Cryptosporidium* to verify that these processes are removing oocysts. Ultraviolet (UV) light can be effective at inactivating oocysts. Scottish Water uses this process at a small number of sites where physical removal of oocysts by the original treatment process is not consistently achieved.

Although *Cryptosporidium* is not a regulatory monitoring parameter, its public health significance necessitates risk-based sampling and analysis. In 2024, Scottish Water collected 5,899 pre-scheduled samples for *Cryptosporidium* with many additional samples collected for operational reasons. In total, low levels of oocysts were detected in twenty-one of these samples (8 from pre-scheduled and 13 operational). Rosebery WTW, Alexandria WTW, and Marchbank WTW, each recorded two detections with Dervaig WTW recording eight detections.

Rosebery WTW in Midlothian recorded *Cryptosporidium* detections in January 2024 and February 2024 and these were attributed to suboptimal performance of the coagulation and clarification processes. These detections reflect a continued trend of poor performance, with oocysts identified in eight of the last ten years sampled. While DWQR welcomes the development of a scheme to upgrade the treatment process, it is disappointing that the installation of this additional treatment has been

delayed, with commissioning now expected in late 2025.

Alexandria WTW in West Dunbartonshire had one detection in January 2024 with a further detection during April 2024. It has previously had *Cryptosporidium* detections in 2023, 2022, 2020 and 2018. In response and following a DWQR audit of this site, improvements to filter backwash efficiency were made in addition to installation of UV treatment.

Samples collected from Marchbank WTW were found to contain *Cryptosporidium* oocysts during October and December 2024. The first detection was associated with excessive flow changes as the works output was increased, in preparation for an outage the following day. The second detection followed a power outage which resulted in suboptimal treatment due to a temporary but prolonged loss of chemical dosing. Following investigation, DWQR made 5 recommendations for improvement.

Eight *Cryptosporidium* detections were recorded from Dervaig water treatment works from July to September 2024. Investigations concluded that these were due to the failure of membrane filtration units despite replacement units being installed. Following DWQR assessment, 8 recommendations were made to prevent recurrence including the installation of additional online monitoring to more rapidly identify treatment process deficiencies.

1.1.3 Chemical Quality at Water Treatment Works

The Regulations require that water is tested for two chemical parameters, turbidity and nitrite, in samples taken from treatment works. Nitrite is a compound of nitrogen that can occur in supplies where ammonia is added to chlorine in a process called chloramination. This process needs to be carefully managed and the presence of nitrite in significant quantities can indicate that it is not as controlled as it should be. There were no exceedances of the nitrite standard at treatment works during 2024.

Turbidity is a measure of the extent to which particulate matter in the water scatters light (how cloudy the water appears). There is a risk that turbid waters cannot be properly disinfected, so a treatment standard of 1.0 nephelometric turbidity units

(NTU) has been set in the Regulations. Of the 7,141 turbidity tests conducted in 2024, three exceeded the regulatory standard. However, no associated microbiological failures were identified in connection with these failures.

At Glenelg WTW, a turbidity of 1.8 NTU was recorded from a sample taken in February 2024. This was due to the build-up of manganese deposits in the limestone contact tank. The tank has since been cleaned and is now scheduled to be cleaned every 3 months.

At Loch Calder WTW in Caithness, increased flow rates disturbed lime deposits during an automatic restart of the plant, with a turbidity of 1.4 NTU recorded from a scheduled sample taken in October 2024. Following the failure, the mixing channel was inspected and found a build-up of lime deposits on the channel floor. In response an action was raised to clean this channel, which had last been carried out in 2023.

A turbidity failure of 1.2 NTU was recorded from a sample taken at Perth WTW in October 2024. A detailed investigation did not identify a specific cause with assessment of online monitoring data showing no turbidity issues at the time of sampling and all treatment processes were operating as expected. There was also no other evidence indicating a deterioration in treated water quality.

1.1.4 Operational Monitoring at Treatment Works

The 2022 amendment of The Public Water Supply (Scotland) Regulations 2014 introduced additional operational monitoring requirements. This is to ensure that Scottish Water uses appropriate monitoring to check source water quality and the performance of the treatment process. Two parameters were introduced: Somatic coliphages, a virus that can be found in faecal material, and; turbidity, at a lower threshold than current regulatory standards. Neither are an absolute standard in their own right, but a trigger for enhanced investigation to ensure that the treatment process is operating optimally.

Somatic coliphage monitoring takes place where Scottish Water considers there to be a risk of it being found in raw waters. If the parameter is found in excess of 50 Plaque Forming Units (PFU)/100ml of raw water, investigation and sampling through the treatment process must take place. In 2024, 1,582 samples of raw water from 278 sources were analysed for somatic coliphages. Of these, 125 samples reached the threshold for investigation at sixty-six different sources and additional investigation was carried out. A single somatic coliphage was found in one investigatory final water sample, but there were no issues identified with the treatment process and the detection has not recurred. Furthermore, all treated water samples collected for other microbiological indicators were negative.

Scottish Water analysed online turbidity data at 186 treatment works to identify any sites that breached the trigger for additional investigation. DWQR has noted that this assessment is not currently possible at all sites and that Scottish Water is working to ensure all sites are reviewed in future. A breach of the threshold was identified at sixteen sites, with ten investigations being undertaken. These mainly revealed issues with the monitor, with no significant process issues identified.

DWQR will continue to discuss the agreed process for operational monitoring with Scottish Water and refine it to ensure that it provides operationally useful information that can be used to bring about process improvements as intended.

1.2 Service Reservoirs

Service reservoirs (SRs), also known as treated water storage points, are strategically located within the distribution network to balance daily fluctuations in consumer demand and supply. They also provide a degree of operational resilience by storing water in the event of upstream supply disruptions. While SRs play a critical role in maintaining water sufficiency, they can pose risks to water quality if not subject to rigorous inspection, maintenance, and operational controls.

To mitigate these risks, DWQR conducts annual inspections of a selection of SRs to ensure they are managed in a manner that minimises the potential for contamination.

Under regulatory requirements, SRs in use are sampled weekly for coliform bacteria including *E. coli.* These samples must be taken from points that accurately represent the water entering distribution from the SR. During 2024, no regulatory samples were collected from Rashfield SR near Dunoon. This was due to a burst main in late 2023, which rendered the designated regulatory sample tap inoperable. In the interim, Scottish Water conducted due diligence sampling from a downstream location representative of water from Rashfield SR with all tests meeting regulatory standards. While DWQR accepted this as a temporary measure to provide assurance regarding water quality, Scottish Water was required to reinstate a compliant regulatory sampling point at the reservoir which was commissioned in July 2025.

Microbiological compliance at SRs improved in 2024 for the first time since 2020, as illustrated in Figure 3. Of the 48,545 tests conducted for each parameter, fifty-six failed to meet the standard for coliform bacteria, with two SRs recording more than one failure. This marks a significant improvement compared to 2023, when fourteen reservoirs experienced multiple failures.

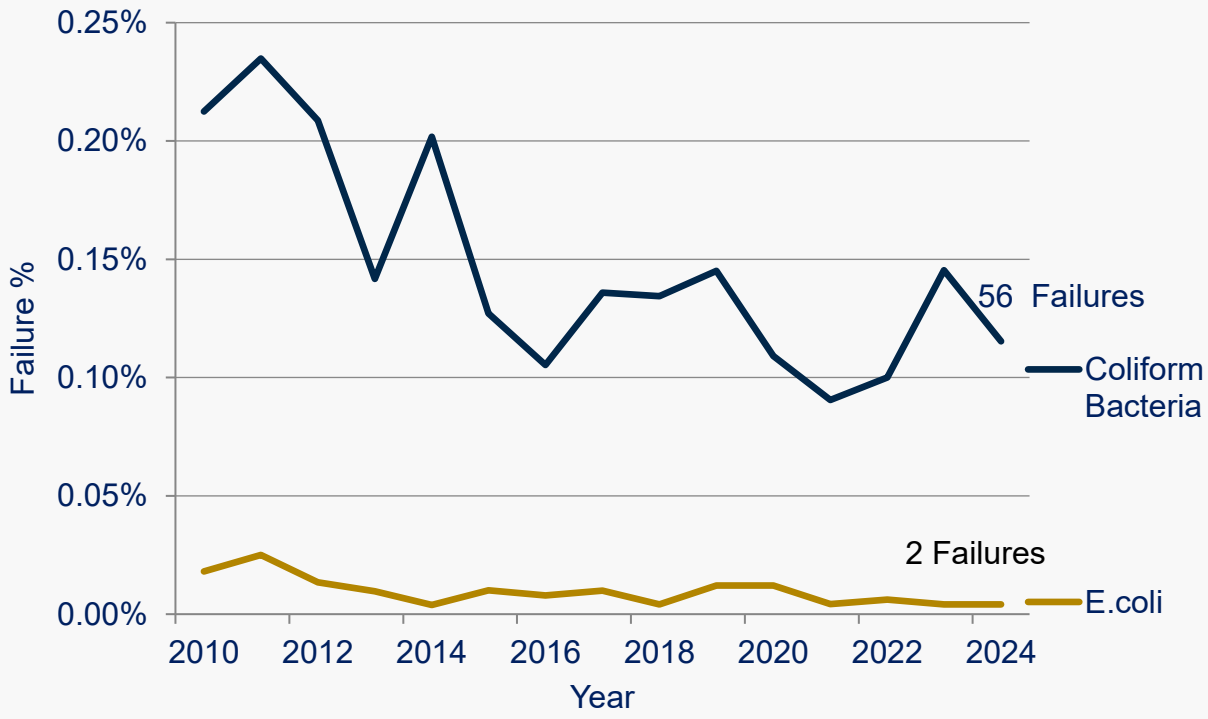


Figure 3 Microbiology failure rate at service reservoirs.

Two samples did not comply with the *E. coli* standard, one from New Aberdour Service Reservoir and one from Clarklyhill CWT. Notably, Clarklyhill CWT also recorded two further failures for coliform bacteria during the year.

E.coli was detected in a sample collected from New Aberdour SR in Aberdeenshire during June 2024. In response, the reservoir was removed from supply and investigations concluded the most likely cause of the failure being ingress around hatch covers which needed repair. Downstream samples from consumer properties were also collected, which were all clear of Coliform and *E. coli* bacteria.

Clarklyhill CWT was re-introduced to supply during July 2024 following refurbishment with a regulatory sample collected during September 2024 failing for coliform bacteria including *E.coli*. Additional samples were taken from nearby SRs and consumer taps, all of which complied with regulatory standards. Investigations concluded that the cause of this failure was due to the pipework supplying the sample tap which was subsequently replaced. Further failures for coliform bacteria, however, were recorded in November and December 2024 and the tank was taken out of service, inspected, cleaned and wall joints repaired. The inspection also identified the potential for ingress through air vents. DWQR is disappointed that an internal inspection of this asset did not take place until three regulatory sample failures had been encountered and reminds Scottish Water that prompt action is always required upon detection of *E.coli* to safeguard public health.

During the year, Scottish Water fulfilled the requirements of an Enforcement Notice issued by the DWQR in 2023 in relation to the maintenance and inspection of SRs.

These actions included:

- The development of a programme to ensure all service reservoirs are inspected and cleaned in accordance with Water UK Technical Guidance. Principles of water supply hygiene | Water UK
- The review and update of operational procedures
- Development and implementation of a quarterly programme for delivering

remedial works following inspection.

Figure 4 A service reservoir audited by DWQR.

Figure 5 Scottish Water staff inspecting a service reservoir hatch.

1.3 Water Quality at Consumers' Taps

Scottish Water's supply area is divided into 277 water supply zones which each supplying up to 100,000 people.

Historically, Scottish Water's drinking water testing was based on fixed frequencies linked to the population of each supply zone, allowing for consistent year-on-year performance comparisons. Following the 2022 regulatory amendments, a risk-based monitoring approach was introduced targeting more tests where parameters are more likely to fail. While this improves scrutiny of higher risk zones, it complicates direct performance comparisons over time. To address this issue (which commenced in 2025) Scottish Water have pre-designated a proportion of tests as "baseline" (based on fixed frequencies in the regulations) with the remainder classified as "risk-based". This approach shall permit direct comparison of baseline compliance in the future.

In 2024, 156,814 tests were completed to measure water quality at consumers' taps. Of these, 124 tests failed to meet the standard set out in the Regulations resulting in compliance with standards at the consumer tap of 99.92%. This compares favourably with 2023 where compliance was 99.88% with 134 failures from 113,454 tests conducted.

Table 2 shows a summary of all tests completed on samples collected from consumers' taps, including all regulatory failures. The reasons for these failures are presented below. The number of samples taken for each parameter that Scottish Water is required to test for is shown in the Performance Tables which accompany this report and can be found on our website using the following link: DWQR Annual Reports.

In addition to these regulatory samples, Scottish Water also takes samples for further investigation where the consumer reports an issue to ensure any issues are resolved.

Table 2 Summary of tests on regulatory samples from consumers' taps in 2023 and 2024

Parameter	Total No. of Tests	No. Failed Tests	No. Zones with Failures	% Compliance in 2024	% Compliance in 2023
Key Parameters					
Bacteria					
Coliform Bacteria	14,945	38	29	99.75%	99.75%
E. coli	14,944	0	0	100.00%	99.97%
Enterococci	4,842	0	0	100.00%	99.98%
Clostridium perfringens	4,842	0	0	100.00%	99.98%
Total bacteria	**39,573**	**38**	**29**	**99.90%**	**99.89%**
Metals					
Aluminium	4,772	2	2	99.96%	99.94%
Copper	747	0	0	100.00%	100.00%
Iron	4,836	25	17	99.48%	99.54%
Lead	1,046	5	4	99.52%	99.66%
Manganese	4,839	9	9	99.81%	99.79%
Nickel	747	1	1	99.87%	100.00%
Total metals	**16,987**	**42**	**29**	**99.75%**	**99.77%**
Other key parameters					
Colour	4,840	0	0	100.00%	100.00%
Hydrogen ion (pH)	4,840	2	2	99.96%	99.98%
Nitrite	1,984	3	2	99.85%	99.80%
Odour	4,842	15	11	99.69%	99.82%
Radon[2]	62	0	0	100.00%	100.00%
Taste	4,840	1	1	99.98%	99.94%

Total Trihalomethanes	4,567	0	0	100.00%	100.00%
Turbidity	4,840	0	0	100.00%	99.94%
Total Other key parameters	**30,815**	**21**	**15**	**99.93%**	**99.59%**
Other Parameters					
1,2 Dichloroethane	4,567	0	0	100.00%	100.00%
All Other Individual Pesticides	1,561	0	0	100.00%	100.00%
Ammonium	1,984	0	0	100.00%	100.00%
Antimony	747	0	0	100.00%	100.00%
Arsenic	747	0	0	100.00%	100.00%
Benzene	4,567	0	0	100.00%	100.00%
Benzo 3,4 Pyrene	754	0	0	100.00%	100.00%
Bisphenol A[2]	752	0	0	100.00%	100.00%
Boron	747	0	0	100.00%	100.00%
Bromate	2,899	0	0	100.00%	100.00%
Cadmium	747	0	0	100.00%	100.00%
Chlorate[2]	2,899	11	6	99.62%	99.53%
Chloride	4,842	0	0	100.00%	100.00%
Chlorite[2]	2,899	0	0	100.00%	100.00%
Chromium	747	0	0	100.00%	100.00%
Conductivity	4,840	0	0	100.00%	100.00%
Cyanide	4,566	0	0	100.00%	100.00%
Fluoride	745	0	0	100.00%	100.00%
Haloacetic Acids 5 (HAA5)[2]	4,548	12	7	99.74%	98.26%

Mercury	746	0	0	100.00%	100.00%
Microcystin -LR[2]	2,861	0	0	100.00%	100.00%
Nitrate	578	0	0	100.00%	100.00%
Nitrite/Nitrate formula	574	0	0	100.00%	100.00%
PAH - Sum of 4 Substances	754	0	0	100.00%	100.00%
Pesticides - Total Substances	357	0	0	100.00%	100.00%
Selenium	747	0	0	100.00%	100.00%
Sodium	580	0	0	100.00%	100.00%
Sulphate	755	0	0	100.00%	100.00%
Sum of PFAS[2]	5,615	0	0	100.00%	100.00%
Tetrachloroethene/ Trichloroethene	4,567	0	0	100.00%	100.00%
Tetrachloromethane	4,567	0	0	100.00%	100.00%
Uranium	580	0	0	100.00%	100.00%
Sum Total other parameters	**69,439**	**23**	**12**	**99.97%**	**99.89%**
Scotland total	**156,814**	**124**	**71**	**99.92%**	**99.88%**

[2] in the table are parameters added in the regulations in 2022 and implemented in 2023 following the amendment of The Public Water Supplies (Scotland) Regulations 2014.

1.3.1 Microbiological Quality at Consumers' Taps

Coliform bacteria

Coliform bacteria were detected in thirty-eight samples in 2024, with seven zones reporting two failures and one zone reporting three failures. All these failures were attributed to either tap hygiene or no clear cause when all other factors were considered. None of the failures were due to confirmed network contamination. When coliform bacteria failures occur, Scottish Water take further samples from the

premises and from neighbours' taps to determine if there is a local property issue or a wider supply system concern. Scottish Water then notify the consumer of the findings and provide the appropriate advice in each case.

E. coli

No samples failed for *E. coli* in 2024. *E. coli* is an extremely important parameter because it is an indicator of faecal contamination and the microbiological safety of the water. The detection of *E. coli* in a water sample may be an indication that either the supply in that area or the tap from which the sample was taken have become contaminated. Some *E. coli* bacteria can cause illness. Scottish Water must investigate each failure thoroughly to try to determine the cause and respond appropriately.

Enterococci

No samples failed for *Enterococci* in 2024. *Enterococci* are also used as indicator of faecal contamination and the microbiological safety of the water. The numbers of *Enterococci* bacteria found in human and animal faeces are generally an order of magnitude lower than *E. coli*, but they tend to survive for longer in the water environment and are more resistant to chlorination than *E. coli*.

Clostridium perfringens

No samples failed for *Clostridium perfringens* in 2024. *Clostridium perfringens* is a secondary indicator of faecal pollution. *Clostridium* spores can survive in water much longer than organisms of the coliform group and will resist disinfection by chlorine. Their presence in disinfected waters may indicate deficiencies in treatment. In distribution systems and at consumer taps, they can be an indicator that historic contamination may have occurred.

1.3.2 Chemical Quality at Consumers' Taps

Aluminium

Aluminium occurs naturally in some water supplies but should be removed by the treatment process. It is also used as a flocculant at many WTWs in Scotland. Two samples failed to meet the standard for aluminium in 2024. One sample was from

Glencorse D zone in Edinburgh taken in September 2024. It was attributed to a transient network disturbance, although the exact cause of this was not confirmed as there was no known network activity taking place and all resamples were found to meet regulatory requirements. A localised flush of the network was carried out as a precaution. The other sample, taken from Glendevon A zone (Kinross-shire) in November 2024, was linked to a treatment failure at Glendevon WTW. Actions have been taken to improve treatment control at the WTW to prevent recurrence.

Iron

A total of twenty-five tests failed to meet the standard for iron in 2024, compared with twenty-two failures in 2023. Iron also occurs naturally in some water supplies but should be removed by the treatment process. It is used as an alternative flocculant to aluminium at several WTWs in Scotland. The most common cause of failures of the iron standard at consumers' taps is corroding cast iron water mains, which can cause sediment to build up in distribution systems. High concentrations of iron can cause discoloured water supplies, inconveniencing consumers. Scottish Water continues with a programme of renovation and cleaning of the water mains that cause the most significant water quality issues. This should have the effect of reducing the number of complaints about discoloured water in the future and is also reflected in the reduction of iron failures over time.

Lead

Lead is a toxic metal that can accumulate in the body. In Scotland, lead does not occur naturally in significant concentrations in our water supplies. The problem arises when drinking water comes into contact with lead supply pipes, lead tanks, lead solder joints on copper pipes, or inferior quality brass fittings and taps, particularly for longer periods (e.g. overnight/weekends/holiday periods). This can result in high lead levels in the drinking water supply.

Although most lead piping is privately owned and therefore outside Scottish Water's direct control, the company does have a responsibility under the Regulations to minimise the risk from dissolved lead. It does this by treating the water with orthophosphate to reduce the risk of lead dissolving from pipes.

The Scottish Government is reviewing the policy in relation to the reduction of exposure to lead in drinking water, especially in light of the recast Drinking Water Directive which sets a future regulatory standard of 5µg/l. The project aims to raise awareness of consumers to the concerns about lead in drinking water and to promote the removal of lead service pipes and plumbing. Scottish Water has an objective to move toward a Lead-Free Scotland with a target date of 2045 for the complete removal of lead from the public water network.

In 2024, there were five lead failures detected from regulatory samples compared with two in 2023. The number of samples taken for lead increased to 1,046 compared with 585 taken in 2023 as part of the risk-based sampling programme. Scottish Water take many more samples for operational reasons such as consumer request or survey work. A greater proportion of these samples fail the standard as they are generally taken from properties known to have lead pipes.

Manganese

Manganese occurs naturally in some raw waters, especially in the west of Scotland. If it is not removed effectively by the treatment process it can accumulate as fine black sediment in distribution system pipework and cause the discolouration of water supplies and great inconvenience for consumers. Even a relatively low concentration of manganese in water from a treatment works can build up in pipes and cause problems in distribution pipework, requiring a programme of cleaning to remove it. Nine tests failed to meet the standard for manganese in 2024, compared with ten failures in 2023.

Nickel

Nickel is not found in high concentrations in Scotland’s waters. However, it is used in the production of stainless steel and other metal products. Its presence in drinking water can arise from contact with plumbing fittings, such as nickel or chromium-plated taps, or certain types of kettles. One nickel failure occurred in December 2024, and no cause was confirmed, with further samples meeting regulatory requirements.

Hydrogen Ion (pH)

The pH of a substance is the measure of how acidic or alkaline the water is. Most waters in Scotland are naturally soft and have a low pH. Such water can be corrosive to metals used in plumbing; therefore Scottish Water needs to bring the pH into the required range to prevent this. High pH values can occur where water is in prolonged contact with water mains containing cement. Water with a very high pH can have a taste that consumers can find unpleasant.

There were two failures of the pH standard in 2024 across two supply zones. One of these failures, in Balmore G zone, was from a sample taken in error from a private network and was not representative of the public supply. The other failure from the Bonar Bridge zone was due to the condition of the asbestos cement main which was removed from supply and replaced with a PVC main.

Nitrite

Nitrite forms when nitrifying bacteria react with the ammonia that is added to chlorine in a process known as chloramination. If the process is not carefully controlled and nitrifying bacteria are allowed to persist in the distribution system, nitrite can build up and cause failures in the standard. Bacteria can persist due to water lying in pipes for prolonged periods, especially in warmer weather.

There were three failures of this parameter in 2024 across two supply zones. Two of the failures occurred in October and November 2024 from the Afton zone in Ayrshire. One of these was linked to a property close to a dead-end water main. Scottish Water did an extended flush of the pipework and a resample from the property was satisfactory. A cause could not be found for the failure in November 2024; however, the network was flushed to remove any build-up of nitrifying bacteria, with a satisfactory resample collected.

A failure in the Roberton zone in the Scottish Borders in August 2024 was linked to elevated nitrification within the network. The network close to the affected properties was flushed and the resample was found to be satisfactory. In 2019 the Roberton network was chlorinated to reduce nitrification. Further network chlorination in early

2025 was arranged to reduce the bacteria in the network and prevent a build-up over the warmer summer months.

Taste and Odour

There was one taste failure in 2024 compared with three failures in 2023. The failure occurred from a sample taken from the Badentinan zone in Moray and was attributed to low levels of naturally occurring anisole compounds, which can be detected at very low concentrations as an ‘earthy’ taste by some individuals. The levels detected were not at a concentration that were a risk to the health of the consumers and resamples taken were satisfactory.

Fifteen samples failed for odour across eleven supply zones in 2024 compared with nine failures in 2023. Five of these failures, which occurred in the Turriff zone and Badentinan zone were related to anisole compounds.

The remaining ten failures in the north of Scotland were subsequently thought to be due to the testing methodology used rather than a deterioration in drinking water quality. In response Scottish Water have modified their procedures to prevent recurrence.

Chlorate

The change to the Regulations during 2022 introduced a limit for chlorate at 0.25mg/l. Chlorate can form when sodium hypochlorite, used to disinfect drinking water at many of Scottish Water’s treatment works, decomposes. This is more likely if sodium hypochlorite is stored for too long or at warm temperatures.

During 2024 a significant improvement was observed in compliance to this standard with eleven failing tests compared with twenty-three failures in 2023. The area with the highest number of chlorate failures was the Camphill zone, with five failures. At affected sites, Scottish Water has made efforts to manage chlorate formation through reducing the temperature in the chemical storage room at the treatment works, monitoring temperatures, reducing the quantities and chemical strength of sodium hypochlorite that is stored on site, and cleaning sodium hypochlorite storage tanks.

Bisphenol A

Bisphenol A is a chemical additive used in the production of plastic pipes, and the maximum allowable concentration at consumers' taps is 2.5µg/l. In 2024 there were no failures of this standard.

Haloacetic Acids (HAAs)

The Regulations set a standard for a sum of 5 Haloacetic Acids (HAAs) of 60µg/l at customer taps. HAAs are disinfection by-products which are formed when chlorine-based disinfectants react with naturally occurring organic substances in water. The formation of HAAs can be higher where treatment processes do not remove sufficient organic matter.

In 2024, twelve samples failed for HAAs compared to ten failures in 2023. Nevertheless, this does represent improved compliance as far more tests were completed in 2024 (4548 tests) compared to 2023 (576 tests). The Glenlatterach zone in Moray and Burncrooks zone in West Dunbartonshire each had four failures of the standard due to the supplying treatment works removing insufficient organic material. At Glenlatterach WTW, investment projects are underway to improve pH control, as well as installing automated coagulation control, which are expected to help improve organics removal and consequently reduce the risk of HAA formation. Burncrooks WTW was decommissioned in spring 2025.

Microcystin LR

Microcystin-LR is a toxin produced by blue-green algae, also known as cyanobacteria. Cyanobacteria can form algal blooms in reservoirs, but not all algal blooms contain the kinds of cyanobacteria that produce microcystin-LR. There are many types of microcystin, with microcystin-LR being one of the more relevant from a health perspective. Currently the Regulations set a PCV at 0.1µg/l at consumer taps. In 2024, Scottish Water tested 574 samples and none breached the PCV.

Per- and Polyfluoroalkyl substances (PFAS)

Per- and Polyfluoroalkyl substances (PFAS), commonly referred to as ‘forever chemicals’, are man-made substances that are heat, stain and waterproof, and have many and varied uses including fire-fighting foams, food packaging, cosmetics and sunscreen. There is a regulatory standard in Scotland of 0.1µg/l for the sum of 20 individually named PFAS compounds. In 2024, Scottish Water analysed 5,615 samples for the Sum of PFAS and none failed the standard. In addition to the 20 named PFAS compounds, Scottish Water also monitors for a further 29 PFAS compounds, none of which, either in isolation or in combination with other PFAS compounds, have exceeded the 0.1µg/l value.

1.4 Consumer Contacts

1.4.1 Consumer Contacts to Scottish Water

When consumers contact Scottish Water about the quality of their water supply, the interactions are recorded and categorised based on the issue. In 2024, Scottish Water received 16,779 contacts regarding water quality, resulting in a contact rate of 3.1 per 1,000 people served. This represents a slight increase from 2023, when 16,552 contacts were recorded.

Discolouration remains the primary reason for consumer contacts across all the zones shown, with 11,461 contacts in 2024, a slight increase from 11,437 in 2023. This rise may be attributed to a significant discolouration incident caused by manganese in the Daer A supply zone in October 2024, which resulted in 870 contacts related to discoloured water from 23rd-31st October 2024. Daer A Zone also received the highest number of contacts in 2024. More information on this incident can be found in the Events and Incidents section of this report and as a result, the DWQR is conducting a comprehensive audit of Daer WTW and its associated supply zones.

Table 3 Shows a breakdown of Scottish Water's customer contacts from 2020 to 2024.

Contact Category	Number of Contacts				
	2024	2023	2022	2021	2020
Appearance					
Discoloured Water	11,461	11,437	12,251	17,887	12,989
Aerated (Milky) Water	1,524	1,532	1,563	1,662	1,660
Particles in Water	535	487	469	543	553
Organisms in Water	48	39	32	30	40
Taste and Odour					
Chlorine	722	693	522	731	985
Metallic	419	426	347	602	356
Solvent/Fuel Taste/Smell	60	32	13	14	31
Musty/Earthy	1,132	946	725	1,058	621
TCP/Chemical Taste/Smell	413	608	381	505	525
Other contact about Water Quality					
Illness due to Water	464	352	315	733	286
Other Contact	1	0	0	5	96
Total Contacts about Water Quality	**16,779**	16,552	16,618	23,770	18,142

The number of reported petrochemical-related taste and odour contacts in Scotland has increased significantly, rising from thirty-two cases in 2023 to sixty in 2024. These incidents were distributed across multiple supply zones. They were due to private fuel spills within customer property boundaries, relating to kerosene/ oil heating tank spills and leaks.

The areas with the most consumer-reported water quality issues are illustrated in Figure 6. There were ten zones with over 300 contacts, consistent with the previous year. The chart below ranks supply zones by consumer contact rate.

Discolouration remains the most reported issue across all zones, with Daer A Zone in Lanarkshire, discolouration contacts in 2024.

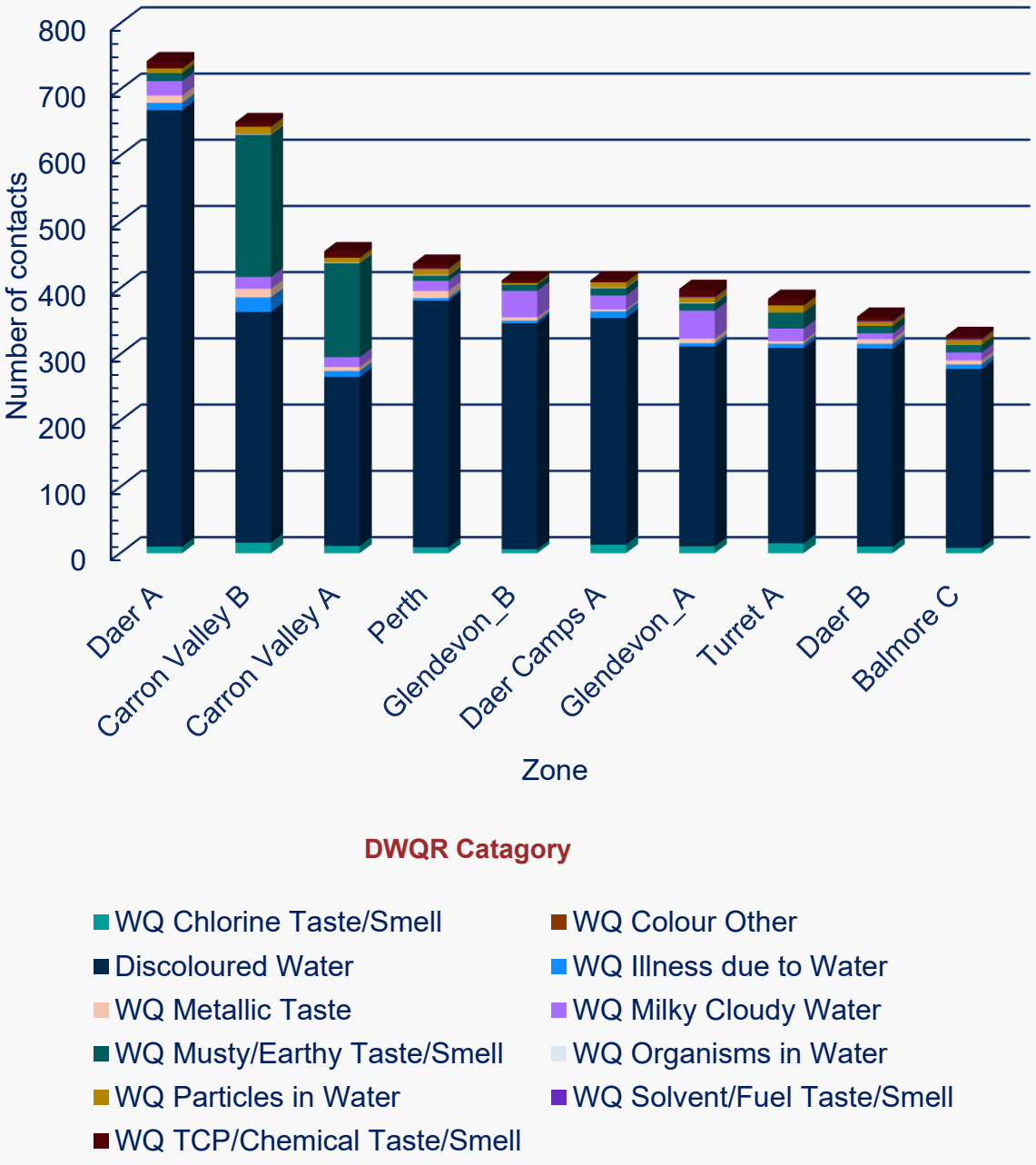


Figure 6 Water supply zones with over 300 Consumer Contacts in 2024.

Carron Valley zones (around Falkirk) received the second highest number of contacts. Discolouration was the highest category with 348 contacts received in Carron Valley B zone and 255 in Carron Valley A zone.

There has been a significant increase in contacts regarding an earthy/musty taste or odour, rising from 946 contacts in 2023 to 1,132 in 2024. A large proportion of these contacts originated from Carron Valley zones, as shown in Figure 6. The main reason for this is the presence of geosmin and 2-methylisoborneol (MIB), naturally occurring compounds found in algae and soils. Carron Valley has historically high geosmin levels during summer months. Scottish Water has put in new controls at its treatment works and reservoirs to reduce these taste and odour compounds, including a bubble curtain at the reservoir intake to act as a physical barrier for deflecting floating algae, Powdered Activated Carbon (PAC) dosing to remove taste and odour compounds, and enhanced summer monitoring. Efforts to address this issue remain ongoing, with continued investment expected to drive further improvement.

1.4.2 DWQR Consumer Contacts

In 2024, DWQR received a total of 112 contacts. Of these, twenty-three were related to the quality of the public water supply, and fifty concerned private water supplies. DWQR provided scientific advice where appropriate. In some cases, consumers were referred to Scottish Water for further investigation if the issue was involving a public supply. If it involved a private supply, they were directed to their local authority.

Additionally, there were nineteen general enquiries and twenty requests for information. Some of these requests were for data which DWQR provided where possible. Others were on topics including Drinking Water Protected Areas, PFAS and DWQR website queries. Email remains the preferred method of contact, although DWQR also received three phone calls and one postal contact.

DWQR managed eleven Environmental Information/Freedom of Information Requests in 2024. Among these, two were related to water quality, two concerned private water supplies, one addressed cyber security attacks, and another concerned

the landlord repairing standard, which can be found on this link: (Repairing Standard: statutory guidance for private landlords - gov.scot). The remaining requests related to DWQR's resources.

Table 4 Consumer Contacts Received by DWQR in from 2020 to 2024.

Contact Category	Number of Contacts				
	2024	2023	2022	2021	2020
Appearance					
Discoloured Water	2	5	5	15	5
Aerated (Milky) Water	0	0	0	0	0
Particles in Water	2	0	1	0	1
Organisms in Water	2	0	0	0	2
Taste and Odour					
Chlorine	1	0	4	2	11
Metallic	1	0	1	0	1
Solvent/Fuel	0	1	1	0	0
Musty/Earthy	1	1	1	1	0
TCP/Chemical	0	0	1	1	0
Other contact about Water Quality					
Illness due to Water	3	4	2	2	5
Other Contact	11	11	4	7	5
Total Public Water Supply Water Quality contacts	**23**	**22**	**20**	**28**	**30**
Public water supply requests for information	20	5	17	5	10
Private water supply issues	50	44	55	50	66
General Enquiries to DWQR	19	47	26	24	25
Total Consumer Contacts to DWQR	**112**	**118**	**138**	**107**	**131**

1.4.3 Tier Two Investigations of Scottish Water Consumer Complaints

When a consumer has exhausted the Scottish Water complaints process and remains dissatisfied, they can request a formal investigation by DWQR. DWQR will review the case and evidence from both sides before determining whether the complaint is upheld. DWQR may also recommend actions for Scottish Water to take.

In 2024, DWQR conducted formal investigations into two complaints against Scottish Water. Below is a summary of these complaints, with full determinations available on

the DWQR website using the following link: Consumer Complaint Determinations (dwqr.scot).

Case 1: A consumer contacted DWQR in March 2024, reporting red rusty pieces in their glass kettle when boiling water. Scottish Water conducted appropriate sampling, and test results indicated that the water entering the property met regulatory standards. The likely cause of the rust-like deposits was a build-up of deposits concentrated through repeated boiling. The transparent kettle made these deposits more visible. Since the water met required standards with no other significant issues were reported in the local area, the complaint was not upheld. However, DWQR recommended that Scottish Water review its response to complaints about rusty and discoloured particles in kettles and other appliances and update its information leaflets accordingly.

Case 2: A consumer contacted DWQR March 2024, having had concerns for around a year about the quality and pressure of their water supply, which, along with neighbouring properties, was taken from an untreated raw water aqueduct. They were worried about the health risks of consuming untreated, visibly discoloured water and the significant stress and financial impact on their family.

The local authority collected water samples, which were analysed at Scottish Water laboratories, and found *E. coli* and colour at levels exceeding the standards.

DWQR began its investigation in early May 2024 after receiving all relevant information from both Scottish Water and the consumer. DWQR found that the water quality had not been sufficiently tested to determine its safety and wholesomeness. Under Regulation 17(1), Scottish Water must immediately investigate and take action if there is reason to believe that water supplied for human consumption is failing or is likely to fail to meet regulatory standards. DWQR was also disappointed with the lack of communication with the consumer during the lengthy complaint process. As a result, the complaint was upheld.

DWQR made five recommendations, and Scottish Water has initiated a project to review and improve such water supplies across Scotland to ensure compliance with legislation.

2 EVENTS AND INCIDENTS

Scottish Water is required to notify the DWQR of all events that have affected, or have the potential to affect water quality, or cause concern to consumers. These events include:

- All regulatory sample failures
- Significant or unexpected operational sample failures
- Failures of treatment processes
- High volumes of consumer contacts
- Issues attracting substantial media attention.

Each reported event is reviewed and classified by DWQR into one of five categories: *not significant*, *minor*, *significant*, *serious*, or *major*. Events falling into the latter three categories are designated as incidents, which trigger a more detailed investigation.

Where additional information is required, DWQR may request a full incident report from Scottish Water. It is important to note that the absence of such a request does not imply that the incident is less serious; it simply indicates that sufficient information has already been provided.

Incidents are thoroughly investigated by DWQR Drinking Water Specialists, who produce a written assessment and, where appropriate, make formal recommendations. These investigations often involve site visits to Scottish Water facilities, discussions with operational staff, and examination of equipment or process failures. In the case of the most serious incidents, enforcement action or prosecution may be considered.

In 2024, a total of 866 events were reported to DWQR. The majority were not classified as significant or above (i.e. not classified as incidents). Table 5 provides a

breakdown of water quality incidents by Scottish Water operating area. This is a slight decrease from 920 events reported during 2023.

Table 5 Summary of Drinking Water Quality Incidents in 2024.

Region	Significant	Serious	Major
EAST	7	1	0
NORTH	6	2	0
SOUTH	6	1	1
WEST	9	1	0
SCOTLAND	**28**	**5**	**1**

In 2024, a total of thirty-four events were classified by DWQR as incidents. DWQR is concerned that this is an increase of five compared to 2023 and a continuing trend of deterioration since 2022 when twenty-six incidents were declared. The reasons for incident classification are illustrated in Table 6.

The most frequent reason for declaring an incident was a significant loss of control in the treatment process, accounting for twelve incidents, most of which were categorised as “Significant”. A concerning trend emerged in late 2024, with a number of incidents linked to failures of disinfection processes at treatment works. This is particularly disappointing considering the criticality of this process in safeguarding public health and given that only one such incident was recorded in 2023.

A number of the incidents that were categorised as “Serious” or “Major” had significant impacts on consumers and resulted in complaints about taste, odour or discoloured water issues, with many of these being avoidable. In total, seven incidents were declared due to significant consumer concern or media attention. Of these, six incidents were related to burst water mains and their associated repairs, which led to discoloured or milky/white water being supplied to consumers, whilst three incidents resulted in taste and odour complaints; one due to a loss of ammonia dosing at a service reservoir; one due to elevated levels of phenolic compounds and

geosmin in raw water; and the other due to stagnant water in pipes connected to an abandoned service reservoir.

DWQR also observed an increase in incidents associated with planned operational activities. In response, DWQR has scheduled an audit during 2025 to review the management and execution of planned works. It is crucial that Scottish Water works to reduce the number of events and incidents associated to these activities.

Table 6 Reason for declaration of an incident in 2024.

Reason for Incident Declaration	Number of Incidents
Alternative supplies	0
Failure of asset	0
Failure of management process	0
Contamination of treated water	1
Compliance not restored promptly	2
Serious or recurring quality issue	3
Consumer concern / media interest	7
Disinfection failure	9
Loss of process control	12
Total	34

A summary of each incident assessment can be viewed on the DWQR website using the following link: 2024 Incidents. Some of these are described below as they present important learning points for Scottish Water.

Daer A Regulatory Supply Zone

Incident Classification: Major – Significant Consumer Concern (October 2024)

In October 2024, 870 consumer contacts were made to Scottish Water across the Daer network in Lanarkshire for discoloured water, with forty-six samples failing the manganese standard. The complaints followed an operation where Scottish Water opened a partially closed valve on a water main without risk assessment or authorisation, with the increased flows scouring manganese from the internal surface of the water main.

Scottish Water identified six corrective actions, and DWQR issued one additional recommendation. Although Scottish Water's response to the issue was good, this incident and the significant impact on consumers was avoidable, had appropriate risk assessment, flushing, and monitoring of water quality been carried out throughout the valve operation.

This was the third incident involving manganese in the network supplied from Daer WTW since 2021, and these three incidents have resulted in a total of almost thirteen thousand complaints from consumers. As a result, DWQR has embarked on a series of audits, focusing on the management of manganese in the Daer catchment, treatment works and supplied networks. These audits, along with a formal evaluation of the risk assessment methodology used for manganese within Scottish Water's Water Risk Assessment Platform (WRAP) will be subjected to scrutiny from DWQR, to determine whether regulatory intervention from DWQR is needed to make improvements.

Glendevon A Regulatory Supply Zone

Incident Classification: Serious – Significant Consumer Concern (October 2024)

Scottish Water received 518 consumer contacts, including 238 reports of discoloured water in October 2024 from Powmill, Fife and the surrounding area. This was caused by sediment and materials within the water mains being mobilised due to changes in flows and pressures following a burst pipe and Scottish Water's activities to carry out the repair.

Ten samples taken in the affected area failed the manganese standard. Scottish Water responded promptly to the issues and initiated flushing and sampling. DWQR was concerned about the delay in taking a post-repair sample and that manganese analysis was not included in the samples taken following the repair. As a result, DWQR conducted an audit of post-mains repair sampling practices and issued recommendations, detailed in the Audits and Inspections section of this report. It is crucial that Scottish Water takes timely and appropriate samples following water main repairs to demonstrate the adequacy of repair activity to protect public health.

Inverness Water Treatment Works

Incident Classification: Serious – Significant Consumer Concern (August 2024)

In August 2024, Scottish Water received fifty-two consumer contacts from the Inverness area, including: forty-six reports of discoloured water; four reports of illness; one report of taste/odour issues; and one report of particles in the water. The cause of the discoloured water was a loss of chemical dosing at Inverness WTW due to a fault on the monitor that controlled the dosing.

DWQR was critical that there was a significant delay in Scottish Water's response due to miscommunication and misunderstanding of alarms received. It is important that Scottish Water clearly identify priority alarms to ensure an appropriate and timely response to issues.

Scottish Water identified six corrective actions and DWQR conducted a full technical audit of the site which resulted in eight additional recommendations.

Alligin Water Treatment Works

Incident Classification: Serious – Loss of Disinfection (August 2024)

In August 2024, a loss of disinfection occurred at Alligin WTW near Torridon, when the dosing pumps failed to deliver sodium hypochlorite to the water leaving the treatment works. Although there were no customer complaints, chlorine residuals in the water leaving the treatment works fell below the target levels and DWQR was critical that samples from customer taps were not taken in a timely manner.

DWQR also expressed serious concern over the multiple failures in risk control measures, many of which were attributed to human factors. It is crucial that Scottish Water ensures there is a robust process to ensure that alarm and automatic shutdown trigger levels are set appropriately and that procedures for responding to alarms are followed.

Scottish Water identified eight corrective actions, and DWQR issued five additional recommendations.

Carron Valley B Regulatory Supply Zone

Incident Classification: Serious – Taste and Odour Complaints (June–August 2024)

Between 1st June and 18th August 2024, Scottish Water received 263 consumer contacts from the Carron Valley Water Operational Area (WOA) around Falkirk and an additional forty-six contacts from other WOAs supplied by Carron Valley WTW, all related to earthy or musty taste and odour. This was due to the levels of geosmin, a naturally occurring compound produced by algae in source water, increasing in the water leaving the water treatment works. Although geosmin is not harmful to health, it can impart an earthy or musty taste and odour to drinking water at concentrations as low as 5ng/l. 112 samples were taken throughout this event, all higher than 5ng/l.

Although chemical dosing has been installed at Carron Valley WTW in recent years to help remove geosmin through the treatment works, DWQR was critical of Scottish Water's failure to detect that a blockage in the powdered activated carbon dosing system was preventing adequate dosing in one stream, thereby reducing geosmin removal. Scottish Water must ensure, through its design and commissioning process, that there are sufficient controls in place to ensure chemical dosing is operating correctly.

DWQR also expressed concern about the need for enhanced treatment and catchment management at Carron Valley WTW to address this recurring issue and welcomes the commissioning of a pilot treatment plant (ozone and granular activated carbon). Results from this trial shall be used to inform future investment plans.

Scottish Water identified four actions, and DWQR issued seven additional recommendations.

Marchbank A Regulatory Supply Zone

Incident Classification: Serious – Significant Consumer Concern (May 2024)

In May 2024, Scottish Water received thirty-nine consumer complaints from Kirknewton near Edinburgh, reporting taste and odour issues with the water. Thirty samples taken from the affected area also failed the *Clostridium perfringens* standard due to contamination of Scottish Water's network. A "boil water notice" was served to twenty-two properties on 1st June 2024. This was upgraded to a "do not use" notice on the 7th June while Scottish Water super-chlorinated the distribution system. This restriction of use was removed on 9th June 2024.

Scottish Water identified the source of contamination to be an abandoned storage tank, which had been removed from service approximately 25 years earlier but was still connected to the live network via a closed valve.

Although Scottish Water's investigation was thorough and identified the source of the contamination, it is disappointing that an abandoned asset was left connected to the live network. Scottish Water must ensure that abandoned pipework is completely disconnected from the live network and that its GIS maps are accurately updated to reflect existing and abandoned assets.

Scottish Water identified three actions, and DWQR issued one additional recommendation.

Loch Calder Water Treatment Works

Incident Classification: Significant – Loss of Disinfection (January 2024)

In January 2024, a loss of disinfection occurred at Loch Calder WTW supplying Caithness, whilst a third-party contractor undertook planned work on one of the chlorine dosing units. This incident was caused by a failure to understand the operating configuration of the chlorine dosing skids, resulting in an incorrect Risk Assessment Method Statement (RAMS) being approved.

Although there was ultimately no impact to water quality identified, DWQR was critical over the management of the RAMS process; that work was carried out without the required approval; that the RAMS was not followed during the works; and that there was poor communication and monitoring throughout.

DWQR wrote to Scottish Water following this event due to concerns that eight incidents in the previous eighteen months were associated with planned activities undertaken by Scottish Water or their supply chain partners. Scottish Water provided reassurance over the steps being taken to address concerns raised around planned activities, which DWQR will continue to monitor along with undertaking an audit of the planned activities process. It is vital that Scottish Water and their suppliers understand the importance of the RAMS process and having sufficient control measures in place.

Glendevon Water Treatment Works

Incident Classification: Significant – Significant Loss of control in Treatment Process (October 2024)

In October 2024, control of the coagulation process at Glendevon WTW serving Fife, Clackmannanshire and Kinross-shire was lost for over ten hours. DWQR identified that although the event was instigated by a deterioration in raw water quality due to a storm, the root cause was a fundamental lack of ability for the works to adapt to changing water quality. This is disappointing as asset capability issues at this site have been known for some time, with DWQR incident assessments and audits consistently highlighting issues and a need for improvement. DWQR was also concerned that Scottish Water did not respond appropriately given highly turbid water was entering disinfection. It is crucial that, where disinfection is likely to be compromised, Scottish Water undertake the appropriate escalation, public health risk assessment and sampling which is representative of affected water.

Scottish Water identified four actions, whilst DWQR raised five additional recommendations.

Figure 7 An outside filter at a WTW in Perth and Kinross

Figure 8 Raw water inlet at a WTW.

Figure 9 A filter backwash at a WTW.

3 AUDIT AND INSPECTION

3.1 Water Treatment Works and Distribution Systems

A core element of the DWQR's scrutiny role is the audit and inspection of Scottish Water's activities that may impact drinking water quality. DWQR has the authority to inspect any aspect of Scottish Water's operations, with inspections commonly focusing on:

- Water Treatment Works
- Service reservoirs
- Distribution system activities
- Responses to consumer water quality concerns
- Analytical and laboratory services
- Delivery and completion of investment projects.

Audits are conducted against the requirements of the Regulations, as well as recognised industry best practices.

The inspection process delivers several key benefits:

- Regulatory assurance: verifies compliance with statutory requirements across Scottish Water sites
- Best practice identification: highlights innovative practices and operational excellence
- Engagement: provides opportunities for DWQR staff to engage directly with site-based Scottish Water personnel
- Awareness raising: enhances understanding of DWQR's role and the regulatory framework among operational staff
- Investment verification: confirms the delivery and effectiveness of capital investment projects
- Risk insight: builds a national picture of recurring risks, deficiencies, and trends to inform future policy and guidance.

A risk-based approach is used to select sites, considering factors such as sample failures, water quality events, and previous incidents. DWQR may also conduct random inspections or respond to specific concerns. All inspections follow a standardised process using templates to ensure consistency. DWQR also participates in benchmarking audits with other UK and international regulators to promote consistency and share best practices.

Where issues are identified, they are recorded as formal recommendations and tracked to completion. Common themes are escalated centrally to senior Scottish

Water management, while examples of best practice are also highlighted. Scottish Water is given the opportunity to comment on draft reports and consistently cooperates fully with the inspection process.

Inspection reports are shared with Scottish Water, and a table of audits conducted is available on the DWQR website using the link: DWQR Audit and Inspection.

3.1.1 Water Treatment Works

In 2024, DWQR conducted fifteen technical audits at WTWs, including follow-up audits to assess the completion of previously raised actions. DWQR continues to be impressed by the knowledge, dedication, and professionalism of Scottish Water staff operating treatment works across the country.

Key findings included:

- The need for ongoing maintenance and upgrades to ageing infrastructure to safeguard water quality
- Inconsistencies in data recorded within Scottish Water's Water Risk Assessment Platform (WRAP)
- Errors in process flow diagrams and emergency action level documentation.

Figure 10 A member of the DWQR team with Scottish Water staff auditing nanofiltration treatment on Mull.

Table 7 DWQR WTW audits in 2024.

Location	Area	Date	Reason for audit	Number of recommendations
Benbecula	North	January	Incident Investigation	9
Picketlaw	West	February	Treatment	10
Alexandria	West	April	Event Investigation	10
Glendevon	East	May	Risk Based	7
Dhu Loch	West	May	Treatment	9
Ardrishaig	North	May	Risk Based	13
Kilberry	North	May	Risk Based	20
Rosebery	South	May	Risk Based	10
Penwhapple	West	August	Risk Based	14
Lintrathen & Clatto (Audit of Actions)	East	August	Risk Based	9
Tobermory	North	October	Risk Based	16
Inverness	North	November	Incident Investigation	
Whitehillocks	East	November	Risk Based	6
Clatto	East	November	Risk Based	6
Marchbank	South	December	Incident Investigation	8

In addition to full technical audits, fourteen other visits were conducted to assist with our investigations into events and incidents: to interview staff and increase our understanding of the situations that have arisen. Visits were also made to inspect the progress of investment activities and to investigate water quality incidents. These are recorded in Table 8.

Table 8 DWQR site visits for incident assessment, investment and performance monitoring during 2024.

Location	Area	Date	Reason for Visit
Stoneybridge	North	January	Investment
Badentinan	East	February	Incident Investigation
Dalwhinnie	North	February	Investment
Turriff	East	March	Incident Investigation
Tighnabruach	West	May	Incident Investigation
Londornoch	North	July	Investment
Assynt	North	July	Incident Investigation
Forehill	East	August	Incident Investigation
Carron Valley	West	August	Incident Investigation
Bradan	West	October	Incident Investigation
Dervaig	North	October	Incident Investigation
Loch Calder	North	November	Incident Investigation
Alligin	North	December	Incident Investigation
ICC	n/a	December	Incident Investigation

3.1.2 Distribution Systems

In 2024, DWQR conducted six audits of Scottish Water's activities and assets within the distribution system (refer to Table 8). Several of these audits covered multiple assets during a single inspection. Key findings included:

- Inadequate management of secondary chemical dosing
- Poor ground maintenance at service reservoirs
- Inaccurate GIS records following capital improvement works

These issues highlight the importance of robust asset management and accurate record-keeping to ensure the integrity of the distribution network.

Figure 11 A member of the DWQR team auditing a WTW in Angus.

Table 9 Distribution system audits in 2024.

Location	Area	Date	Number of recommendations
DWQR Distribution Audit - Benbecula Market SR and Market Stance TWS	North	January	1
Benbecula -Benbecula Mains Rehabilitation	North	February	0
Avoch SR	North	July	1
Fife SRs with secondary disinfection – Balgeddie, Formonthills, Finmont, Hill of Tarvit, Garliebank Old & New SRs	East	August	5
Tobermory Distribution Audit - Depot, Balintore Pumping Station, Gualan Dhubh SR, Craignure Tankering Point, Craignure SR	North	October	9
Mains Repair Sampling	N/A	November	4

As part of the audit programme, DWQR also conducted a targeted audit on mains repair sampling to assess whether risk-based sampling was being implemented effectively to confirm that repaired mains were free from contamination. This audit was conducted in line with the principles outlined in Water UK's *Technical Guidance Notes*.

Key findings from the audit included:

- 27% of post-repair samples did not indicate whether the main had been repaired under positive pressure.
- Nearly 20% of repairs conducted with the water supply isolated had no sample taken, representing non-compliance with company procedures.
- In many cases, samples were taken long after the repair and therefore not appropriately verifying the adequacy of repair activity.
- Sampling was limited to microbiological parameters and chlorine residuals, with no broader analysis.

Scottish Water fully accepted DWQR's findings and is taking steps to address all shortcomings.

Figure 12 DWQR with Scottish Water staff auditing a water source in Aberdeenshire.

Figure 13 DWQR staff member and Scottish Water auditing secondary disinfection in Fife

3.2 Laboratory Services Audits

Scottish Water operates two UK Accreditation Service (UKAS) accredited laboratories, located in Edinburgh and Inverness. These facilities are responsible for conducting all sample examinations and analysis in accordance with the Drinking Water Testing Specification (DWTS) accreditation. In addition to supporting Scottish Water's operations, the laboratories also provide sampling and analytical services to thirty-two local authorities and some private contractors.

To ensure ongoing compliance, DWQR conducts independent audits of Scottish Water's two UKAS-accredited laboratory facilities. These audits complement the regular assessments carried out by UKAS. The most recent DWQR audits took place in November and December 2024, reaffirming that both laboratories remain well-managed, with strong housekeeping practices and highly competent, knowledgeable staff. A total of six findings were recorded at the Edinburgh site and five at Inverness.

Scottish Water's Scientific Services continue to demonstrate a commitment to continuous improvement. In response to regulatory changes introduced in 2023, the laboratories adapted their processes to accommodate new analytical parameters. Notably, 20 PFAS compounds were added to the Regulations. Scottish Water's organics team undertook the complex task of developing a method to detect these compounds in both potable and raw water. In July 2024, UKAS granted accreditation for the detection of all 20 compounds regulated in Scotland, as well as additional PFAS compounds listed by the EU. This method was subsequently audited by DWQR in November 2024, the first time it had been reviewed outside of UKAS assessment, resulting in four findings and six recommendations.In addition, Scottish Water has invested in advanced microbiological technology with the deployment of MALDI-TOF (Matrix-Assisted Laser Desorption/Ionization Time-of-Flight) systems at both laboratory sites. This technology enhances the accuracy of microorganism identification in water samples. DWQR audited the MALDI-TOF implementation at both sites and found no issues or recommendations, underscoring the effectiveness and quality of the deployment.

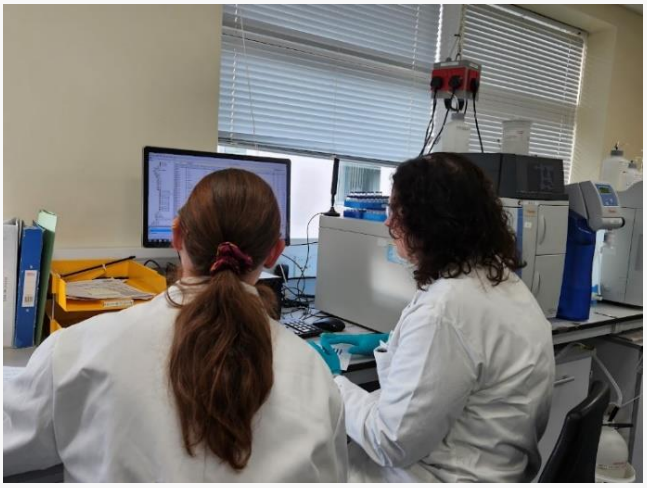


Figure 14 A member of the DWQR team auditing Scottish Water's Organic Chemistry team.

Figure 15 A member of the Scottish Water Microbiology Team assessing a Somatic Coliphage plate.

Figure 16 A Scottish Water microbiologist filtering a water sample.

3.3 Benchmarking Audits

DWQR continues to maintain strong relationships with other drinking water quality regulators across the UK and Europe, fostering the exchange of knowledge, expertise, and best practices. These collaborations provide valuable benchmarking opportunities that serve two key purposes of ensuring that DWQR inspectors audit to a consistently high standard, and verifying that Scottish Water's operational procedures and performance are aligned with, or exceed, those of other water providers.

In 2024, DWQR Drinking Water Specialists participated in joint audits with inspectors from England and Wales. These audits took place both in Scotland and in England, offering a platform for mutual learning and the sharing of technical insights.

Looking ahead, DWQR plans to continue and expand these benchmarking initiatives. Invitations have been extended to colleagues from England, Wales, Northern Ireland, and Ireland to participate in further joint audits in Scotland during 2025.

4 OTHER REGULATORY ACTIVITIES

4.1 Working with Stakeholders

DWQR maintains regular engagement with key stakeholders in the water industry, including the Water Industry Commission for Scotland (WICS), the Scottish Environment Protection Agency (SEPA), and Consumer Scotland. These interactions occur both jointly and individually, with a particular focus on matters relating to investment.

In addition, DWQR holds ongoing discussions on water quality issues with public health stakeholders such as Public Health Scotland, NHS Health Boards, and local authority environmental health departments. These stakeholders are routinely invited to provide input on incident assessments to ensure a comprehensive and informed evaluation process.

DWQR maintains a strong working relationship with counterpart regulators across the UK, including the Drinking Water Inspectorates in England and Northern Ireland. This collaboration includes biannual meetings and participation in benchmarking audits. Regular liaison also takes place on a wide range of topics such as private water supplies, the Network and Information Systems (NIS) regulations, product approvals, lead removal, and research initiatives.

In parallel, DWQR has been actively supporting the Scottish Government's legislative review of water, wastewater, and drainage services. DWQR contributes to all relevant working groups, particularly those focused on drinking water quality, water scarcity, risk management, and catchment management. This work is ongoing, and DWQR will continue to provide expert technical advice throughout the policy development and drafting process.

4.2 Innovation, Research and Learning

The DWQR team are active in promoting our public health agenda. Members of the DWQR team have presented at Cranfield University, Institute of Water events and the Welsh Task & Finish Group. They have also been instrumental in driving innovation and research on lead, cyanobacteria and PFAS across the industry and within government.

Figure 17 Members of the DWQR team at the Institute of Water Conference in Lincoln.

Figure 18 A member of the DWQR team at a Drinking Water Conference

Team members also delivered presentations on DWQR's role in the water sector and water treatment to students at University of Edinburgh, University of West of Scotland, and Clyde College. Several members of the DWQR team also attended the Annual Conference held by the Institute of Water in Lincoln.

4.3 Engaging the Next Generation in Water Quality Awareness

Ensuring that future generations understand the importance of water quality and the efforts required to maintain it is essential. During 2024, members of the DWQR team participated in STEM (Science, Technology, Engineering and Mathematics) initiatives at Wallyford Learning Campus and Dunbar Grammar School in East Lothian. During these initiatives, students were challenged to design and construct a water filter. Students then tested their filters using 'fake' contaminated water and evaluated the effectiveness of their designs. In addition to the hands-on activity, students explored the characteristics of an effective water filter and considered additional factors necessary to ensure water safety.

Figure 19 A water filter designed by a student.

Figure 20 The STEAM Centre at Wallyford Learning Campus.

5 NETWORK AND INFORMATION SYSTEMS DIRECTIVE

The Network and Information Systems (NIS) Directive was introduced to improve the levels of cyber security and resilience of essential services across the EU. It provided the basis of the Network and Information Systems Regulations that were introduced in 2018. These regulations provide legal measures to protect essential services by improving the security of the network and information systems that support the delivery of these services. In line with the NIS Regulations, Scottish Water is identified as an 'Operator of Essential Services' as it supplies water to more than 200,000 people. The DWQR is identified as the relevant Competent Authority in Scotland. The National Cyber Security Centre (NCSC) are the technical authority supporting both Operators of Essential Services and their competent authorities with cyber security advice and guidance. Further information is available using the following link: National Cyber Security Centre - NCSC.GOV.UK.

In September 2024, DWQR received the Cyber Assessment Framework (CAF) return, which Scottish Water must submit on a three-yearly cycle. The CAF provides a systematic and comprehensive approach to assessing the extent to which cyber risks to essential functions are being managed by Scottish Water. The CAF is audited by the DWQR, with the next audit due to take place in the third quarter of 2025. Recommendations from these audits will feed into discussions on its next CAF and the ongoing improvement plans which are reviewed alongside the CAF on a more regular basis to track progress toward targets.

6 ANNEXES

Annex A

6.1 Information Letters issued during 2024

Two Information Letters were issued by DWQR in 2024. One on The requirements of reporting a NIS incident and one on Uncertainty of measurement for colour. Both of these can be viewed on the DWQR website using the following link: 2024 Information Letters.

Annex B

6.2 Current Letters of Commitment and Enforcement Notices

One letter of commitment was received from Scottish Water in October 2024, relating to Haloacetic Acids. A copy of this can be found on our website using the following link: Letters of Commitment

No enforcement notices were issued in 2024, however, three enforcement notices remain active, relating to Turriff WTW, Mannofield WTW and service reservoirs across Scotland. Further information on enforcement notices can be found on the DWQR website using the following link : Enforcement.

Annex C

Abbreviations and Glossary

BH - Borehole

Bq/l - Becquerels per litre, a measure of radioactivity

CAF - Cyber Assessment Framework

CWT - Clear Water Tank

DCMS - Department for Digital, Culture, Media and Sport

DOMS - Distribution Operation and Maintenance Strategy

DWSP - Drinking Water Safety Plan

DWQR - Drinking Water Quality Regulator for Scotland

EAL - Emergency Action Levels

IAF - Impact Assessment Form

ISO - International Standards Organisation

mg/l - Milligrams per litre

NCSC - National Cyber Security Centre

Ng/l – Nanograms per litre

NHS - National Health Service

NIS - Network and Information Systems

NRV - Non-Return Valve

NSO - Network Service Operator

NTU - Nephelometric Turbidity Unit

PAC - Powdered Activated Carbon

PCV - Prescribed Concentration or Value

PFU – Plaque Forming Units

PHT - Scottish Water's Public Health Team

PLC - Programmable Logic Controller

RSZ - Regulated Supply Zone

SCADA - Supervisory Control and Data Acquisition

SEPA - Scottish Environment Protection Agency

SR - Service Reservoir

THM- Trihalomethanes

TL- Team Leader

TOMS- Treatment Operation and Maintenance Strategy

TWS- Treated Water Storage

µg/l - Microgrammes per litre

UV - Ultraviolet Light

WOA – Water Operational Area

WTW - Water Treatment Works

7 SUPPORTING INFORMATION

7.1 Water Performance Tables

Table 10 Summary of Scottish Water assets.

Asset Type	Count
Water Abstraction Point	666
Length of Water Mains (km)	49,223
Reservoirs	950
Water Supply Zones	277
Water Treatment Works	225

Table 11 Summary of water quality at WTW.

Parameter	Prescribed Concentration or Value (PCV)	Total No. of tests	No. of tests failing	% of tests failing	No. of works failing
Coliform Bacteria	0 number/100ml	25,933	20	0.08%	14
Colony Counts After 3 Days At 22°C	No abnormal change	25,952	N/A	N/A	N/A
Cryptosporidium oocysts (per 10L)	N/A - no regulatory standard	5,899	8	0.14%	7
E. coli	0 number/100ml	25,933	0	0.00%	0
Nitrite	0.1mg NO_2/l	3,345	0	0.00%	0
Residual Disinfectant – Free	N/A - no regulatory standard	25,966	N/A	N/A	N/A
Residual Disinfectant – Total	N/A - no regulatory standard	25,964	N/A	N/A	N/A
Turbidity	1NTU	7,141	3	0.04%	3

Table 12 Summary of water quality at storage points.

Parameter	Prescribed Concentration or Value (PCV)	Total No. of tests	No. of tests failing	% of tests failing	No. of SRs with sample failures	No. of SR failures
Coliform Bacteria	0 number/100ml	48,545	56	0.12%	53	1
Colony Counts After 3 Days At 22°C	No abnormal change	48,565	N/A	N/A	N/A	N/A
E. coli	0 number/100ml	48,545	2	0.00%	2	N/A
Residual Disinfectant – Free	N/A - no regulatory standard	48,530	N/A	N/A	N/A	N/A
Residual Disinfectant – Total	N/A - no regulatory standard	48,525	N/A	N/A	N/A	N/A

Table 13 Water quality at consumers' taps.

Parameter	Total No. of Tests	No. Failed Tests	No. Zones with Failures	% Compliance in 2024	% Compliance in 2023
Key Parameters					
Bacteria					
Coliform Bacteria	14,945	38	29	99.75%	99.75%
E. coli	14,944	0	0	100.00%	99.97%
Enterococci	4,842	0	0	100.00%	99.98%
Clostridium perfringens	4,842	0	0	100.00%	99.98%
Total bacteria	**39,573**	**38**	**29**	**99.90%**	**99.89%**
Metals					
Aluminium	4,772	2	2	99.96%	99.94%
Copper	747	0	0	100.00%	100.00%
Iron	4,836	25	17	99.48%	99.54%
Lead	1,046	5	4	99.52%	99.66%

Manganese	4,839	9	9	99.81%	99.79%
Nickel	747	1	1	99.87%	100.00%
Total metals	**16,987**	**42**	**29**	**99.75%**	**99.77%**
Other key parameters					
Colour	4,840	0	0	100.00%	100.00%
Hydrogen ion (pH)	4,840	2	2	99.96%	99.98%
Nitrite	1,984	3	2	99.85%	99.80%
Odour	4,842	15	11	99.69%	99.82%
Radon[2]	62	0	0	100.00%	100.00%
Taste	4,840	1	1	99.98%	99.94%
Total Trihalomethanes	4,567	0	0	100.00%	100.00%
Turbidity	4,840	0	0	100.00%	99.94%
Total Other key parameters	**30,815**	**21**	**15**	**99.93%**	**99.59%**
Other Parameters					
1,2 Dichloroethane	4,567	0	0	100.00%	100.00%
All Other Individual Pesticides	1,561	0	0	100.00%	100.00%
Ammonium	1,984	0	0	100.00%	100.00%
Antimony	747	0	0	100.00%	100.00%
Arsenic	747	0	0	100.00%	100.00%
Benzene	4,567	0	0	100.00%	100.00%
Benzo 3,4 Pyrene	754	0	0	100.00%	100.00%
Bisphenol A[2]	752	0	0	100.00%	100.00%
Boron	747	0	0	100.00%	100.00%
Bromate	2,899	0	0	100.00%	100.00%

Cadmium	747	0	0	100.00%	100.00%
Chlorate[2]	2,899	11	6	99.62%	99.53%
Chloride	4,842	0	0	100.00%	100.00%
Chlorite[2]	2,899	0	0	100.00%	100.00%
Chromium	747	0	0	100.00%	100.00%
Conductivity	4,840	0	0	100.00%	100.00%
Cyanide	4,566	0	0	100.00%	100.00%
Fluoride	745	0	0	100.00%	100.00%
Haloacetic Acids 5 (HAA5)[2]	4,548	12	7	99.74%	98.26%
Mercury	746	0	0	100.00%	100.00%
Microcystin -LR[2]	2,861	0	0	100.00%	100.00%
Nitrate	578	0	0	100.00%	100.00%
Nitrite/Nitrate formula	574	0	0	100.00%	100.00%
PAH - Sum of 4 Substances	754	0	0	100.00%	100.00%
Pesticides - Total Substances	357	0	0	100.00%	100.00%
Selenium	747	0	0	100.00%	100.00%
Sodium	580	0	0	100.00%	100.00%
Sulphate	755	0	0	100.00%	100.00%
Sum of PFAS[2]	5,615	0	0	100.00%	100.00%
Tetrachloroethene/ Trichloroethene	4,567	0	0	100.00%	100.00%
Tetrachloromethane	4,567	0	0	100.00%	100.00%
Uranium	580	0	0	100.00%	100.00%

Sum Total other parameters	**69,439**	**23**	**12**	**99.97%**	**99.89%**
Scotland total	**156,814**	**124**	**71**	**99.92%**	**99.88%**

[2] in the table are parameters added in the regulations in 2022 and implemented in 2023 following the amendment of The Public Water Supplies (Scotland) Regulations 2014.

Table 14 Water quality consumer contacts received by Scottish Water.

Contact Category	Number of Contacts				
	2024	2023	2022	2021	2020
Appearance					
Discoloured Water	11,461	11,437	12,251	17,887	12,989
Aerated (Milky) Water	1,524	1,532	1,563	1,662	1,660
Particles in Water	535	487	469	543	553
Organisms in Water	48	39	32	30	40
Taste and Odour					
Chlorine	722	693	522	731	985
Metallic	419	426	347	602	356
Solvent/Fuel Taste/Smell	60	32	13	14	31
Musty/Earthy	1,132	946	725	1,058	621
TCP/Chemical Taste/Smell	413	608	381	505	525
Other contact about Water Quality					
Illness due to Water	464	352	315	733	286
Other Contact	1	0	0	5	96
Total Contacts about Water Quality	**16,779**	16,552	16,618	23,770	18,142

7.2 Summary of events and incidents 2024

Table 15 Classification of incidents.

	Significant	Serious	Major	Total Number of Incidents
EAST	7	1	0	8
NORTH	6	2	0	8
SOUTH	6	1	1	8
WEST	9	1	0	10
SCOTLAND	**28**	**5**	**1**	**34**

Table 16 Summary of 2024 incidents.

Month	Area	Class	Population Affected	Site Name	Hazard	Root Cause
Jan	North	Significant	27,250	Loch Calder WTW	Microbiology	Disinfection Dosing Failure
Feb	West	Significant	657	Tighnabruaich WTW	Turbidity	Flow Disturbance (Scottish Water)
Feb	West	Significant	21,198	Milngavie RSZ	Discolouration	Flow Disturbance (Scottish Water)
Mar	East	Significant	25,172	Whitehillocks WTW	pH	pH Adjust Dosing Fail - Pump
Apr	East	Significant	71,967	Turriff WTW	Microbiology	Asset Integrity
Apr	West	Significant	95,839	Greenock WTW	pH	Instrument
Apr	West	Significant	218,213	Bradan WTW	Microbiology	Disinfection Dosing Failure
May	South	Significant	1,544	Daer Camps A	Discolouration	Burst Main
May	East	Significant	0	Forehill WTW	Microbiology	Disinfection Dosing Failure
May	South	Significant	3,304	Coulter RSZ	Discolouration	Burst Main
May	South	Serious	81	Marchbank A	Microbiology	Back Syphonage/Ingress
Jul	West	Serious	144,353	Carron Valley B	Taste/Odour	Inadequate Treatment
Jul	North	Significant	184	Dervaig WTW	Microbiology	Membrane Integrity Lost
Aug	North	Serious	88,789	Inverness WTW	Colour	Coagulant Dosing Failure
Aug	South	Significant	82,800	Marchbank B RSZ	Discolouration	Process Optimisation
Aug	North	Serious	55	Alligin WTW	Microbiology	Disinfection Dosing Failure
Aug	South	Significant	35,660	Balmore G	Taste/Odour	Secondary Chlorination Dose Failure
Sept	West	Significant	111,222	Blairlinnans WTW	Microbiology	Chemical Tank Low/Empty
Sept	West	Significant	119	Crianlarich WTW	Manganese	Burst Main
Oct	West	Significant	35,229	Afton WTW	Microbiology	Disinfection Dosing Failure

Oct	North	Significant	312	Tomich WTW	Microbiology	Instrument failure
Oct	West	Significant	37,614	Amlaird WTW	Microbiology	Water Not Adequately Prepared for Disinfection
Oct	South	Major	53,215	Daer A RSZ	Manganese	Flow Disturbance (Scottish Water)
Oct	East	Serious	148,170	Glendevon A	Manganese	Pipeline Deposits
Oct	East	Significant	152	Tomnavoulin WTW	Microbiology	Disinfection Dosing Failure
Oct	East	Significant	268,428	Glendevon WTW	Microbiology	pH Adjustment Batch Fail
Oct	East	Significant	268,428	Glendevon WTW	Turbidity	Failure to Respond to Change in Water Quality
Nov	East	Significant	268,428	Glendevon WTW	Aluminium	Coagulant Batch Fail
Nov	North	Significant	226	Ardfern WTW	Microbiology	Disinfection Dosing Failure
Nov	West	Significant	12,805	Loch Eck WTW	Microbiology	Disinfection Dosing Failure
Dec	South	Significant	167,256	Marchbank WTW	Microbiology	Coagulant (Poly) Dosing Failure
Dec	South	Significant	69,250	Castle Moffat	Aluminium	Instrument failure
Dec	North	Significant	27,201	Loch Calder WTW	pH	Instrument failure
Dec	North	Significant	35,700	Assynt WTW	Aluminium	pH Dosing Line Blockage

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