Drinking Water Quality Strategy

Our long term plans

South West Water

Bournemouth Water

Isles of Scilly Water

BRISTOL WATER

Contents

About this document

Delivering clean safe drinking water that our consumers can trust is at the heart of our business. By continuing to put quality first we will ensure our customers and visitors to our regions can enjoy our drinking water now and in the future.

This document provides an update to our long term drinking water quality strategy to 2050. It shares details of our plans for the next investment period, 2025-2030 (AMP8), and sets out our long term approach to delivering high quality and resilient drinking water supplies through on-going water quality investment and maintenance programmes.

Executive summary

We understand the importance of consistently providing clean, safe drinking water to our 3.5 million customers and the 10 million visitors we welcome each year. This is why we have an ambitious strategy to ensure we deliver our services effectively and efficiently now and in the future

Water is essential for life. Water is vital for our health and wellbeing. This is why maintaining and improving water quality is our customers' number one priority – it always has been, it always will be.

Our customers expect that when they turn on their taps to fill a glass to drink, put the kettle on, brush their teeth, wash and prepare food, or make a tray of ice – the water we supply always meets the highest drinking water quality standards.

With the average person using 140 litres of water a day – which is nearly a tonne of water each week – it is a huge responsibility to make sure that every drop is of excellent quality and good to drink and we take our duties in this respect very seriously.

Customers today can have confidence that the water that comes out of the tap is safe and clean. We have made great progress and today our drinking water quality is among the best in the world.

Despite the investments and progress we have made we recognise that we must always look forward and prepare for new and emerging risks. The impacts of climate change on river and reservoir levels is impacting the quality and quantity of our source waters and requiring us to look beyond the traditional sources we have historically been able to rely on, focusing on how our treatment processes and networks need to be enhanced to mitigate population growth and changing nature of the water sources in our regions. The presence of legacy lead pipes in domestic properties and the impact of emerging contaminants in the water sources which we rely on so much for drinking water supplies are all areas we focus on now to ensure a safe and sustainable supply for generations to come.

We are delighted to share our long term drinking water quality strategy with you.

Our customers' number one priority is for a clean, safe, and dependable supply of water

Our strategy

Our strategy to 2050 is to improve drinking water quality and customer confidence by reducing water quality risks from source to tap.

We will focus on addressing issues in source waters to allow us to promote the most sustainable level of treatment in the future.

We will maintain our existing treatment capability and upgrade treatment processes where necessary. We will continue research into and deploy advanced and innovative technologies so that we do this efficiently and effectively.

We will address the risks of downstream water quality issues in our supply network. Continuing to keep our water supply networks clean and clear will ensure our customers consistently receive high quality water whilst we also work to replace the oldest and highest risk parts of our networks.

Investment in our networks will also reduce our levels of leakage alongside improving water quality.

We will continue to deliver an ambitious programme of inspection and maintenance of our drinking water storage tanks and reservoirs, as we know that without getting this right, water quality can be impacted.

Investing in the brilliant people that work across our regions and attracting the brightest talent to join them is also an essential enabler of our plans. Our people strategy for enhancing drinking water quality revolves around embedding a 'Quality First' culture. Quality First enables our people to structure their priorities in delivering wholesome drinking water which is acceptable to all.

Measuring success

We know how important it is to measure our performance and manage our risks, which is why we will track the effectiveness of our strategy through the following KPIs:

- **Water quality** – Compliance Risk Index (CRI), Event Risk Index (ERI) and water quality contacts from our customers (as an important measure of consumer trust) are utilised alongside a forward looking risk assessment risk index (RARI)
- **Asset performance** – the operational availability of water treatment works to produce drinking water and our ability to take assets out of service for maintenance when required
- **Going further for customers** – the number of lead pipes we replace, including communication and supply pipes

Against these performance measures, and as part of this strategy, our ambition is to:

- maintain leading performance levels for CRI and ERI, alongside increasing the acceptability of our supplies to consumers assuring the highest levels of **water quality** for our region
- maintain our upper quartile performance for unplanned outage and ensuring all assets can be removed from service (for maintenance) without hindering our ability to meet consumer demand for water, which drives high **asset performance** levels
- achieve a completely lead free supply network by 2050 which demonstrates our willingness to **go further for customers**

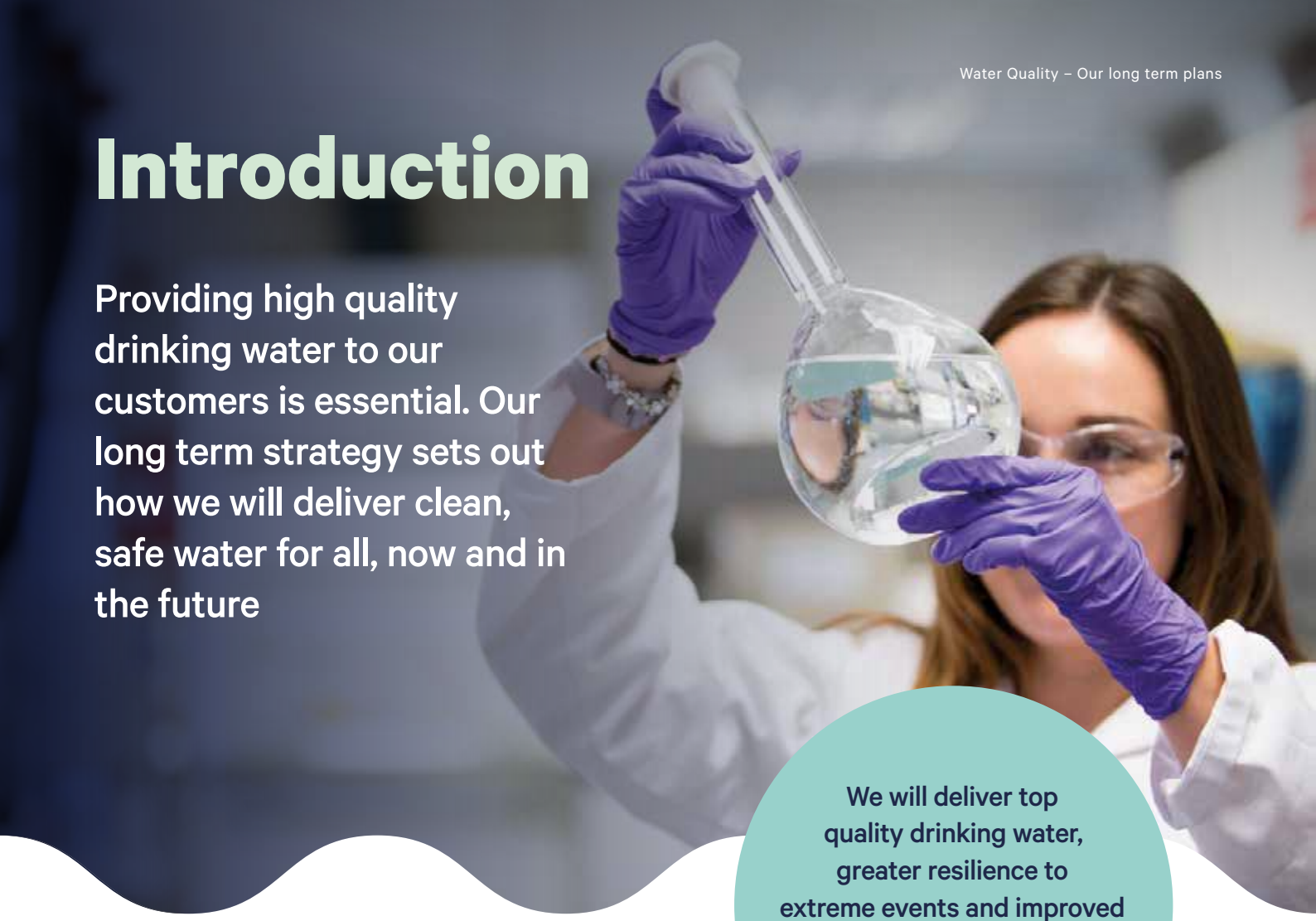
We recognise our level of ambition is high – and that achieving this ambition will require significant investment and collaborative working with our regulators, stakeholders and customers. We also know that our plan is the right thing to do. Drinking water is our customers' number one priority and it sits at the heart of supporting public health.

This challenge also sits against a backdrop of our company ambition to decarbonise our operations, becoming more efficient and reducing our overall energy use. This strategy has been considered in this context and we will prioritise resource efficient, low carbon and sustainable schemes where possible and invest in clean energy sources. More information about our net zero strategy can be found in our Promise to the Planet.

Lastly, the area that we provide water services to has grown since we developed our previous strategy. We have been working to ensure that we learn from best practices from across all our supply areas. We will embed a Quality First culture that puts water quality and the consumer at the core of businesses across our expanded operating regions in the greater South West; Devon and Cornwall, Bournemouth, Bristol and the Isles of Scilly.

Introduction

Providing high quality drinking water to our customers is essential. Our long term strategy sets out how we will deliver clean, safe water for all, now and in the future



We will deliver top quality drinking water, greater resilience to extreme events and improved knowledge to help us and our regulators proactively address emerging risks

This document sets out our long term approach to delivering high quality and resilient drinking water supplies through on-going water quality investment and maintenance programmes to 2050.

This document describes and documents our approach to long-term drinking water quality planning and summarises our planned investment programme for the next regulatory period. It supports the openness and transparency we value in our engagements with our regulators, stakeholders and consumers about our future risks and investment plans.

This document has been produced by considering the future water quality risk across all aspects of our water supply – from source to tap – and how these risks may impact our ability to deliver top quality drinking water:

- tackling raw water deterioration and the implications this has for the sustainability of water supplies
- improving consumer acceptability and managing disinfection by-products
- securing greater asset resilience to extreme events
- being forward looking in our approach to understanding the risks of 'forever chemicals' and emerging contaminants
- going further for customers and protecting their health in the removal of lead pipework.

Our priorities are aligned to those of the Drinking Water Inspectorate (DWI), who regulate the industry and hold us to account. They are tailored to the priorities of our customers and the primary challenges we face in the greater South West.

In setting our vision for water quality and documenting our future plans, we brought together all of the key stakeholders in our business to collaboratively shape the future of drinking water quality; technical experts responsible for water quality, asset management, the operation of our treatment facilities and pipe networks and the engineering and maintenance of our systems through to our Executive Directors and we secured the full backing of our Board. We have also proactively engaged with the DWI and our independent "voice of the customer" WaterShare+ Advisory Panel, who have helped to shape the investment priorities, scale of programme and the nature of solutions proposed.

We will continue to engage and listen to stakeholders as we recognise the importance of their views and that priorities may change.

Who we are – and the regions we serve

We provide drinking water to 3.5 million people across the South West of England. Our region has a unique topography and environment, attracting up to 10 million visitors each year. They all rely on top quality drinking water

South West Water provides drinking water across the whole of the greater South West and trades under three names:

- South West Water – for Devon, Cornwall and the Isles of Scilly
- Bournemouth Water
- Bristol Water

Continuing to maintain and improve water quality across these different regions is key to the customers, communities and businesses we serve. Every day, we abstract, treat and distribute 870 million litres of water through our network of 58 water treatment works (WTW). In doing so, we understand the critical role we have as a provider of clean, safe drinking water that consumers can trust and the importance of our supplies always looking and tasting great.

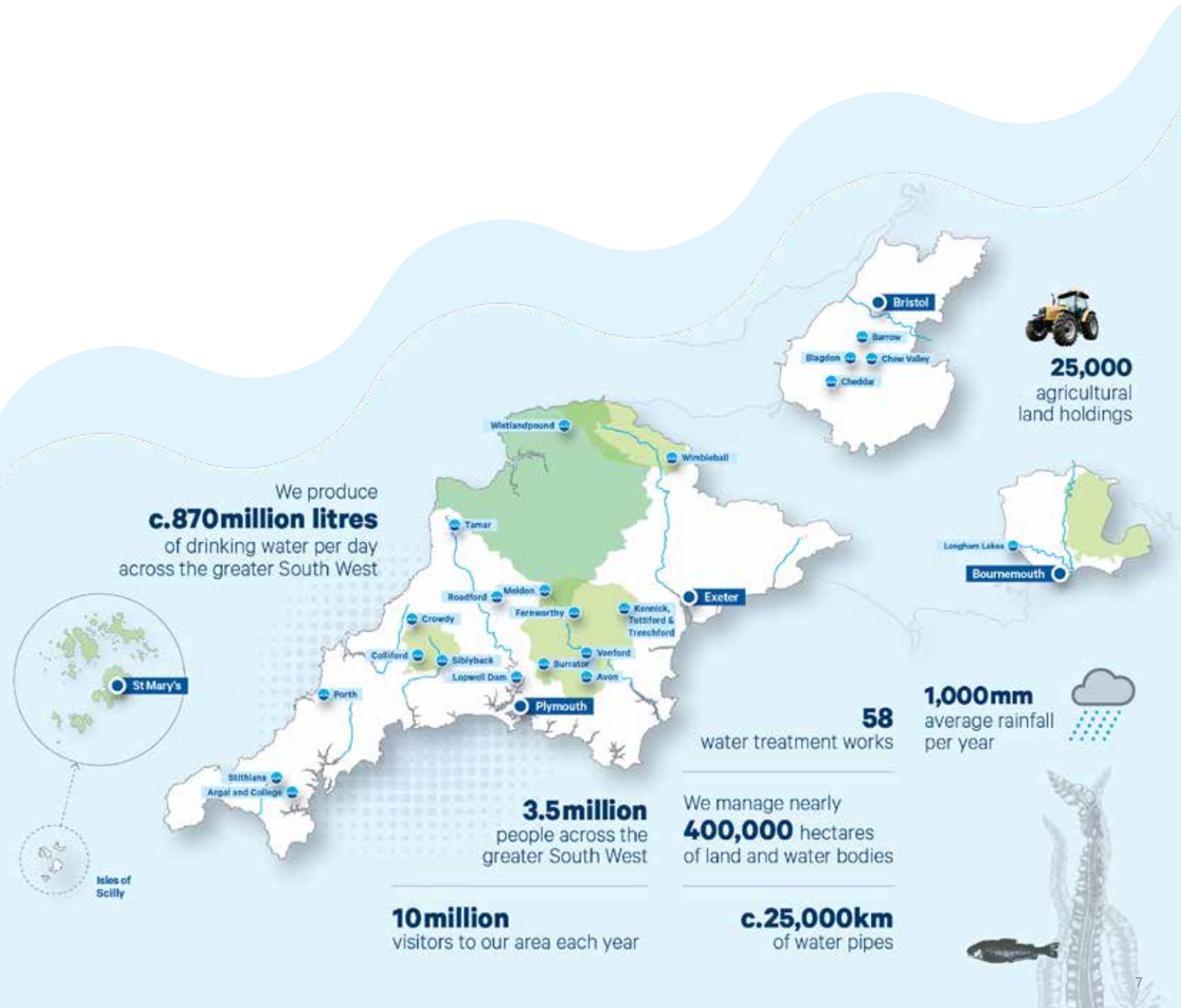
As we invest for the future, we recognise that our region is set apart from the rest of the UK. We have already built strong relationships with farmers, land managers and environmental organisations and we work together to protect our water quality in the south west. We recognise that we are a custodian of the drinking water supplies and the water environment, and we'll need to work with others on a long term basis to resolve the challenges we face.

South West Water

2015 Bournemouth Water

2020 Isles of Scilly Water

2022 Bristol Water



Our communities

Our population is set across a range of communities covering the Isles of Scilly, Cornwall, Devon, Bournemouth, Christchurch and Bristol. We provide water services to small island communities and remote coastal villages through to urban centres, such as Exeter, Plymouth and Bristol. Our population swells in the summer as we welcome over 10 million visitors, who are drawn to the beautiful coasts, rivers and lakes across the region.

Our sources of drinking water

Across our region over 90% of our water is sourced from surface water sources such as rivers and reservoirs, with around 10% sourced from groundwater (underground aquifers). Our reliance on surface water is three times greater than the industry average and this means that our water treatment works (WTWs) need to be resilient to changing weather patterns (more extremes of weather) that can affect rivers and reservoirs more immediately than where groundwater is available. The impacts of variable weather such as storms which can lead to rapid changes in raw water quality in our river systems, or drought which can lead to poor water quality due to low levels in our reservoirs and rivers.

Our treatment facillities

We operate and maintain 58 water treatment works (WTWs) distributed across our region. This includes 29 in Devon and Cornwall, 5 Bournemouth, 16 Bristol and 8 on the Isles of Scilly. With the majority of our water sourced from rivers, we have a higher reliance on complex multi-barrier treatment facillites to prepare our drinking water compared to areas whose supplies are largely from groundwater sources where lesser levels of treatment are generally required. As our water sources become more diverse and challenging, we need to invest in more advanced pre-treatment to address the risks present in the untreated water. This makes our operations more energy and chemically intensive so we look to innovation to minimise these impacts to ensure we deliver low carbon solutions and achieve our ambition of net zero emissions.

Our network of pipes

The regional topography is dominated by our national parks of Exmoor and Dartmoor and Bodmin Moor. Many of our source waters and treatment sites are located in these areas. The undulating nature of the topography is reflected in how we design and operate our supply network and successfully distribute water from our treatment facillities to our consumers. Our 25,000km of pipes run beneath rural and urban areas connecting the main centres of population, as well as to our smaller rural communities via a mix of strategic trunk and smaller distribution mains. Our region benefits from a high proportion of service reservoirs (where fully treated water is stored) and relies on a relatively high number of booster pumping stations due to the hilly nature of the region and the need to meet the large increase in demand during the tourist seasons. This long network combined with the predominance of surface water provide additional challenges in preventing discolouration and maintaining chlorine levels.

Did you know?

AMP periods relate to the five years of each regulatory price control. AMP7 is the current period 2020-2025, and AMP8 is the next regulatory period 2025-2030

Our culture and our people – ‘Quality First’

Our values shape the way we behave and we recognise that how we do things is just as important in maintaining water quality and consumer trust as the asset investments we make

Our **Quality First** culture compliments the asset investments we make by ensuring our people appreciate the vital service we provide and have the right training and support to effectively deliver our duties as a water supplier. Through this culture we ensure our teams are empowered to do the right thing – always.

Our purpose of ***Bringing water to life and supporting the lives of people and places they love for generations to come*** is our guiding principle and why we are here. Supporting this, we have four core values – **Trusted, Responsible, Collaborative and Progressive.**

Did you know?

Together with the University of Exeter, we’ve set up the Centre for Resilience in Environment, Water and Waste (CREWW), where we research the water quality and environmental issues we face

Image of the forthcoming state of the art CREWW research facility

See page 27 for more details

Our employees are **Trusted** and empowered to make good decisions. Quality First supports this by providing the right training and development for our employees.

We have dedicated training modules and our Quality First charter. Our charter focuses on how we will deliver Quality First for our customers, the environment, our colleagues and our stakeholders.

In order to be **Responsible**, we must be clear about our responsibilities to each other, to our customers, to our communities and to the places we love.

To help our employees put Quality First, we are clear on their roles and responsibilities, as well as making sure our teams are competent. We reinforce this need in key front line roles through our competent operator schemes.

Collaboratively working with each other and our stakeholders brings value to our business by improving the quality of our services we provide.

We recognise the need for openness, honesty and transparency when dealing with each other and our regulators and stakeholders, such that trusted relationships can be formed to the benefit of us all.

We demonstrate that we are a **Progressive** organisation by always putting quality first and looking for the most resource efficient processes in our day-to-day work.

For our employees and customers, we'll endeavour to develop innovative processes, products and solutions to help make life better. For our stakeholders and investors, we'll always strive for better performance. We are committed to developing innovative solutions to solve our most pressing challenges – our investment in CREWW is an example of this.

Quality First brings to life our wider core values, with a specific focus on water quality. Establishing, communicating and reinforcing our Quality First charter has been an important step in improving and refocusing our culture towards water quality, public health and consumer confidence. We started this in 2022 and we are progressing into our Bristol Water region before rolling out across our supply chain partners.

We recognise it is important that our Quality First culture goes beyond our front line staff, to cover everyone working across the business – when putting Quality First is everyone's shared responsibility to ensure customers benefit from top quality drinking water.

Managing our contractors and supply chain is also an important part of ensuring high water quality standards are met. We plan to do this by ensuring the same level of competency for our contractors as we do our own operators when working across our treatment works and networks. Our contractors use our method statements, design standards and procedures when working on our behalf, but we want to take this even further by rolling out our Quality First cultural training modules to our partners.

Where we are today

We use performance measures to help us to understand and communicate water quality risks – these cover the aspects of performance most important to customers and stakeholders.

We provide regular updates to our regulators, our WaterShare+ Advisory Panel and other stakeholders.

Following the recent merger with Bristol Water, we will continue to report water quality performance separately for Bristol Water and the rest of our region.

WaterShare+

WaterShare+ is an independent panel established to protect the interests of customers, allowing customers to join regular public meetings to find out how we are delivering on our commitments for the benefit of customers, communities and the environment

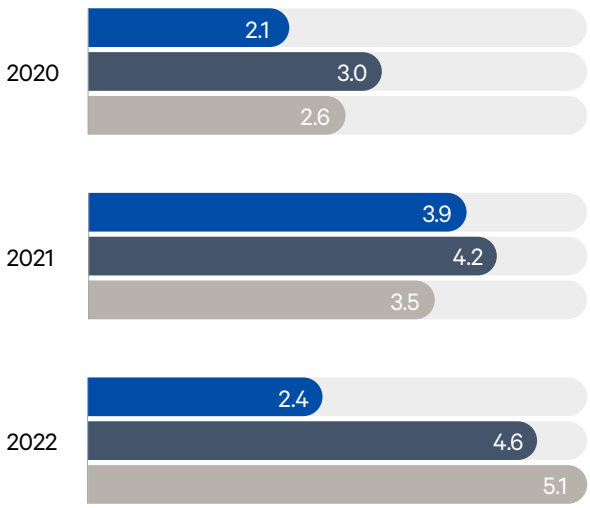
Water quality standards

The UK benefits from strong independent regulation and water quality performance is currently world leading with overall compliance with water quality standards consistently more than 99.97%.

Recognising the need to consider future risks to water quality, the Drinking Water Inspectorate (DWI) have developed the compliance risk index (CRI). This intelligent, risk-based measure of water quality was introduced by the DWI in the AMP6 (2015-2020) period and incorporated as a common measure in company performance reporting by Ofwat in AMP7. Part of the regulatory strategy for making this a comparative measure was to reduce risks to water quality performance across companies.

In the first two years of AMP7 South West Water's CRI performance was closely aligned to the national CRI score which represents the water quality performance achieved across all monitoring in England and Wales. Performance in the South West and Bournemouth region has been improving relative to the wider industry and we are now among the best performing companies in the most recent reporting year of 2022.

Performance in our Bristol region has remained stable relative to the national CRI position. We are currently assessing the range of risks in the Bristol region and are committed to making improvements to reduce risks.



CRI Performance

2022 industry figure is estimated pending DWI confirmation

Appearance and taste

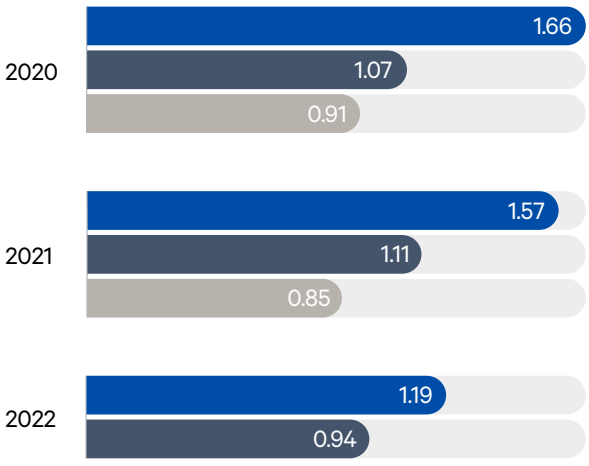
We recognise the importance of how water looks, tastes and smells is in judging its quality and want everyone to be able to enjoy their tap water all of the time. We believe that drinking water should not only be safe to drink, but be enjoyable too.

Our water quality performance, measured in terms of (1) appearance and (2) taste and smell, has steadily improved over the last 30 years, but we know that this is an area that our customers want to see continued improvement in performance and an area that we lag behind some of our peers in the sector.

The acceptability of our supplies to consumers is an area our improvement plan is focussed on to ensure every customer can trust their drinking water quality and can enjoy tap water that looks and tastes great.

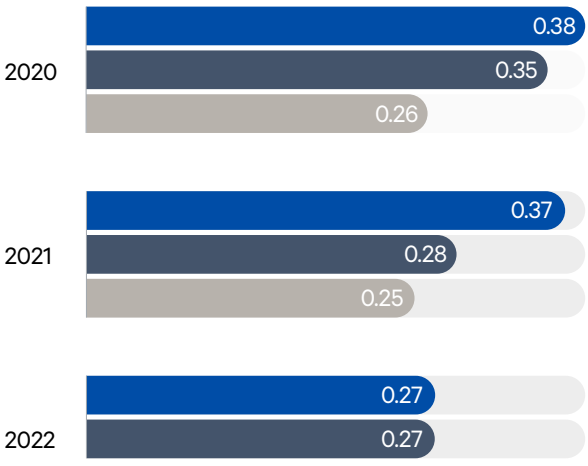
Appearance contacts

awaiting industry data for 2022/23



Taste and smell contact

awaiting industry data for 2022/23



South West & Bournemouth
Bristol
Industry average

Progress on the Isles of Scilly

From 1 April 2020 South West Water has been providing water and wastewater services on the Isles of Scilly.

We agreed with the government to take over the islands and support the necessary improvements in drinking water and wastewater services to ensure they are in line with standards on mainland UK. We committed that each island would have water asset improvements to deliver a clean, safe and reliable supply of drinking water.

Our first priority was to establish the water quality risks on the islands and to support this we have established a comprehensive water quality monitoring programme of all the source and treated water supplies used for drinking water. We have completed a risk assessment of each supply using the World Health Organisations (WHO) Drinking Water Safety Planning (DWSP) principles and prioritised the improvements required. We have already completed the inspection of all tanks used to store treated water on the islands. Repairs and several new tanks have been provided alongside a radon removal facility on St.Mary's. We are on track to complete our major investment programme through the rest of AMP7. Issues of elevated sodium, chloride, nitrates, pesticides and lead have all been identified for improvement by 2025.

An overview of **risks and our approach to mitigating them**

Customers value safe clean water above all else and we recognise the most effective way to secure this is to adopt a drinking water safety planning (DWSP) approach to managing water quality

The DWSP approach is endorsed by the World Health Organisation and Drinking Water Inspectorate. It provides a framework on which to assess all risk to water supply, validate the current mitigation and promote improvement where necessary. Without ongoing investment in appropriate monitoring, controls and improvements, we would be unable to identify risks, and the investment needed to mitigate them.

DWSP allows us to review and identify any hazards that could impact on drinking water quality, alongside the range of options that could be used to mitigate the risk – from source to tap. The preferred option considers the benefits of investment and the costs of action – to ensure evidence- and risk-based decision-making.

"The most effective way of consistently ensuring the safety of a drinking water supply is through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer."

World Health Organisation, on Drinking Water Safety Plans

Sources and treatment

We recognise that reducing risks in the source waters is an essential component in our long term management strategy. By reducing peak and average pollution water quality risks at source will ultimately lead to more sustainable levels of treatment. Further mitigation of raw water risks is and will always be needed through appropriate and effective treatment barriers.

Raw water deterioration may occur for many reasons, but most commonly it occurs from diffuse pollution which is often difficult to attribute to specific sources. Similarly, the noticeable more variable weather patterns such as extreme rainfall, increasing temperatures and prolonged drought, can all impact the rate of raw water deterioration and we must continue to invest in all stages of the water supply system to secure acceptable drinking water quality.

In our rural areas we experience this from both agriculture and rural land which can collectively cause pollution to waterbodies from runoff of pesticides, sediment and organic matter. The impact of urban areas is also important to a number of our catchments.

Investment in risk mitigation is fully supported by our customer base to ensure that we are able to meet their number one priority of a good, safe drinking water supply now and through to 2050.

Our investment decisions are based on the likelihood and the potential consequence of water quality failures, using an evidence-led analysis of investment options, which considers:

- The ability of the existing process to remove or reduce the specific risk to an acceptable level and meet our water quality goals
- The potential impact should the risk materialise in terms of effect and proportion of consumers' likely to be exposed
- The ability of one intervention to provide multiple benefits e.g. GAC reduces the risk of pesticides, reduces DBPs and certain T&O issues effectively
- The requirement for additional future processes to mitigate changes in our understanding of risk, e.g., GAC is initially provided as a barrier to micropollutant risks as if more intensive advanced oxidation processes are required in the future the downstream GAC requirement is already provided/in situ
- The likely impacts of climate change
- Our research, confidence and experience in the efficacy of the process
- Minimum whole life total expenditure as a measure of optimum resource efficiency

We are also aware of the importance of understanding emerging risks that are of global concern. We recognise that concerns can quickly develop and risk damaging consumer confidence in tap water locally if we are not well informed and able to re-assure our consumers or respond quickly to new regulatory requirements. We therefore promote appropriate knowledge and understanding of contaminants of concern including a range of PFAS (forever chemicals) in our strategy. In addition to site specific schemes, we also recognise the need to continue investing in advanced monitoring and new laboratory equipment that will enable us to carry out research and development to improve our knowledge and understanding of emerging contaminants.

Water supply networks - from treatment to tap

Most common risks in the network are associated with disruption caused by bursts but these are carefully managed by our operational teams and the supply chain. Whilst we recognise the short term interruption of supplies and changes to the appearance is inconvenient consumers can be assured that our management procedures are in line with industry best practice and carefully monitored. Our replacement of the oldest and most problematic mains alongside enhanced flushing and conditioning of strategic pipelines is complemented by several treatment upgrades in the next five years as we know we have more to do for customers in this area.

We also recognise the risks that arise from potential ingress into service reservoirs and other tanks used to store treated drinking water. We manage the risk associated with our tanks through regular inspections, cleaning and ensuring the opportunity to complete any remidial work is completed. This programme of activity is something we (alongside the rest of the industry) have recently increased in our South West Water region and something we are continuing to maintain and enhance across the Bristol operational area.

The geology of the South West region also impacts the risks associated within our network. Our source waters typically have low mineral concentrations and pH, making the water supplies generally more corrosive than in other regions. The pH correction employed at our treatment works goes some way to reducing the impact of this on our mains networks, but this cannot fully correct the corrosive nature of the water. The impact of this over many decades is significant corrosion of cast iron mains. In addition to the corrosion effect, these source waters contain elevated levels of manganese which can accumulate in our network and contribute to a long-term increase in risk of consumer discolouration contacts.

The topography, rural and touristic nature of our region also contributes to the challenge, with generally longer lengths of pipes per consumer and an increased level of capacity to meet the touristic demand. In many areas there is a significant change in demand depending on the season which we need to carefully manage and invest in to reduce the risks of remobilising accumulated material and causing additional discolouration.

Customers taps - Lead risk

We have set ourselves a challenging ambition to support a lead free supply by 2050. This means replacing all of the lead pipes across our network with a focus on the areas of proportionally high lead pipes, in the Bristol and South West areas. Our strategy does not stop at the pipes for which we are responsible and building on trials to date, we plan to support customers to replace their own lead supply pipes.

Our Plans to 2050

We understand the importance of applying a 'systems thinking' approach where we consider the whole water supply system, based on Drinking Water Safety Planning (DWSP) principles when planning our future investment programmes.

This enables us to meet customer expectations, deliver against our values, and meet all legal and regulatory obligations. In recognition of the importance of water quality to our customers and business, our strategy is to continually reduce risk, deliver industry leading performance, and exceed regulatory requirements.

We reduce risk by proactively identifying emerging investment needs and acting early to prevent impacts on our consumers and the risk of losing their confidence. The potential mitigations we can make are listed against our priority risks in the table below. These risks map closely to the planning guidance issued by the DWI and the symbols alongside each risk are used throughout this document to identify the risk type.

Options to mitigate risk

Potential Risks	Options to address risks
Discolouration	Improved catchment management practices WTW process upgrades Mains flushing and/or mains replacement
Taste & Odour	
Disinfection & By-Products	Improved catchment management practices WTW process upgrades
Microbiological	
Nitrates	
Pesticides & Emerging pollutants	Research into detection, monitoring and treatment of emerging contaminants
Capital Maintenance & Resilience	WTW maintenance WTW process upgrades
Lead	Orthophosphate dosing Lead pipe replacement

Each risk we face has a clear strategy on how we will address it. This includes timelines which show our planned investments over time. These are included in each of our strategies summarised later in this document.

Our plans are a mix of base maintenance combined with enhanced water quality investment to meet new risks and new challenges. Both are shown in our programmes and strategies, as we know that integrating base maintenance with future Water Quality enhancement investment delivers the best and most efficient outcomes for our customers. Our long-term resilience is reinforced by ensuring that we have enough headroom in the system to be able to maintain critical assets properly and without impact on the customer.

Our investments are designed to continue the journey of risk reduction through the application of our DWSP approach. With these investments we will continue to meet our consumer's number one priority and target industry leading performance in the delivery of exceptional drinking water quality.

We identify and assess longer-term investment needs to 2050 (AMP12)

Our forward looking plans reduce long-term risk across all our water supply systems

Our plans support our ambition to improve our performance against all water quality risks by delivering improvements which will manifest itself in improvements to the primary measures we are judged against: CRI and Water Quality contacts.

We have ambitions to lower these metrics to near zero but we recognise some of the externalities that make achieving zero unrealistic.

	2030	2050
CRI	<1	0
WQ contacts	0.9	0.5

VISION

In addition to the key measures we are judged on, we have developed strategies for other important areas of performance. These strategies describe where we are now and how we are going to improve.

In summary:

Improving appearance - continuing our journey of rapidly improving the appearance of our water through mains renewals, trunk main conditioning, flushing and smart networks.

Improving taste and smell - investing in WTW upgrades (primarily GAC) to improve the acceptability of water supplied to customers.

Improve disinfection and reduce DBP's - ensure supplies are free from harmful pathogens by focusing on ensuring adequate pre-treatment and disinfection.

Risk of pesticides and nitrates - remain vigilant to the risk of pesticides and nitrates by continuing to reduce risks at source through catchment management improvements.

Emerging contaminants - ensure that our research and analytical techniques lead the way in furthering the industries understanding of emerging risks and how to mitigate any negative effects.

Lead - reduce the risk of lead exposure by creating a lead free network for our customers by 2050.

Our future plans will continue the journey we have started for the next generation

We have clear processes in place to develop future plans

Key trends

We horizon scan, examining how emerging trends and developments could impact on policy, communities and our services and operations. This helps us take a longer term strategic view.

Challenges we face

We face challenges ahead. But these are interconnected challenges and through a shared understanding of these we can collaborate and work together to address the challenges.

Our future ambitions

Our ambitions reflect our purpose, key trends and challenges, and the views of customers and stakeholders. They are our strategic responses to these challenges we face.

Enablers for change

System, culture and behaviour change can facilitate our plans. We use our plans to respond to policy and regulatory changes, in order to deliver value for money plans. There are key enablers that can help build delivery of our plans in a joined-up way.

Delivery of our plans to date has set us on the right course for becoming the company that we need to be to deliver on our purpose of continuing to deliver public health, boost environmental value, support a green economic recovery, and create social benefit for all, today and for generations to come.

Water treatment and distribution **Top quality drinking water**

Why is this a priority for us?

Our customers rightly expect high quality drinking water to be there when they turn on the tap.

We will improve drinking water quality and maintain customer confidence by reducing water quality risks from source to tap.

We will focus on addressing issues in source waters and therefore allow us to promote the most sustainable level of treatment in the future.

We plan to continue to innovate in our water treatment processes to provide the best possible performance and fit with our low carbon future. We also plan to continue our programme to tackle lead pipes on our network and in customers' homes and work places to reduce the small risk to public health.

We plan to create smarter water networks which can remotely and continuously monitor water flows and quality, and diagnose emerging problems. Combined with smart metering at customers' properties, this will help to identify water quality issues quickly, and prevent small issues from escalating into problems which impact on our customers. They will also help us to reduce energy use by optimising flows around our network.

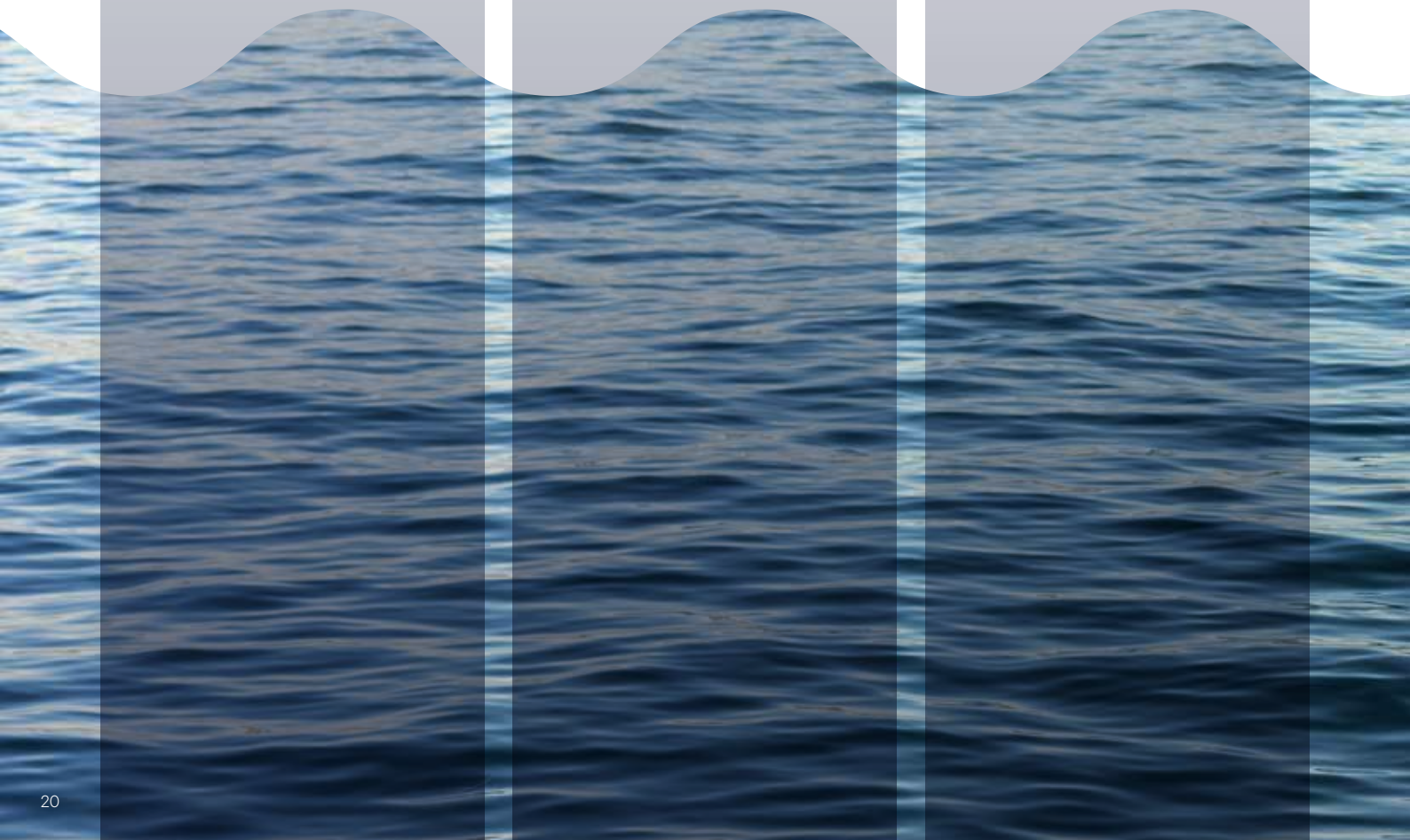
And we will continue to champion extending our networks to residents who are on private supplies - so they can have access to world class drinking water.

Our ambition to 2050

Innovative low carbon treatment processes provide high quality water which is delivered to homes and business through resilient networks which proactively identify and fix leaks, continuously monitor water quality and minimise supply interruptions.

Maintaining and improving water quality is our customers' number one priority - it always has been, it always will be

Ensure world class drinking water that meets stringent water quality standards.	Progressively address emerging risks	Create resilient, smart networks with real time tracking and management of water pressure, flow and quality
Upgrade works, work with local communities, and continue our innovation programmes - to ensure we can address contaminants in river sources that can threaten drinking water supplies	Keep our water supply networks clean and clear, whilst upgrading the oldest and highest risk parts of our networks to ensure customers consistently receive high quality water	Expand our network of water quality monitoring capability in order to identify changes in water quality before our consumers are inconvenienced
Deliver programmes of asset maintenance and renewal to maintain asset health and plant availability at water treatment works	Invest in network improvements and connectivity to increase resilience to extreme weather events and sustained power outages	Utilise emerging technologies to improve process automation, real-time remote control, and event forecasting
Extend our smarter healthier homes initiative to remove lead pipes to the customers' taps to reduce risk to public health.	Offer isolated communities the opportunity to connect to our network and receive world class drinking water for the first time.	Monitor and manage pressures in the network as part of 'network calming' to control bursts and leakage, prevent discolouration from ingress, and reduce disruption to customers.



Key targets

2020 - 2025

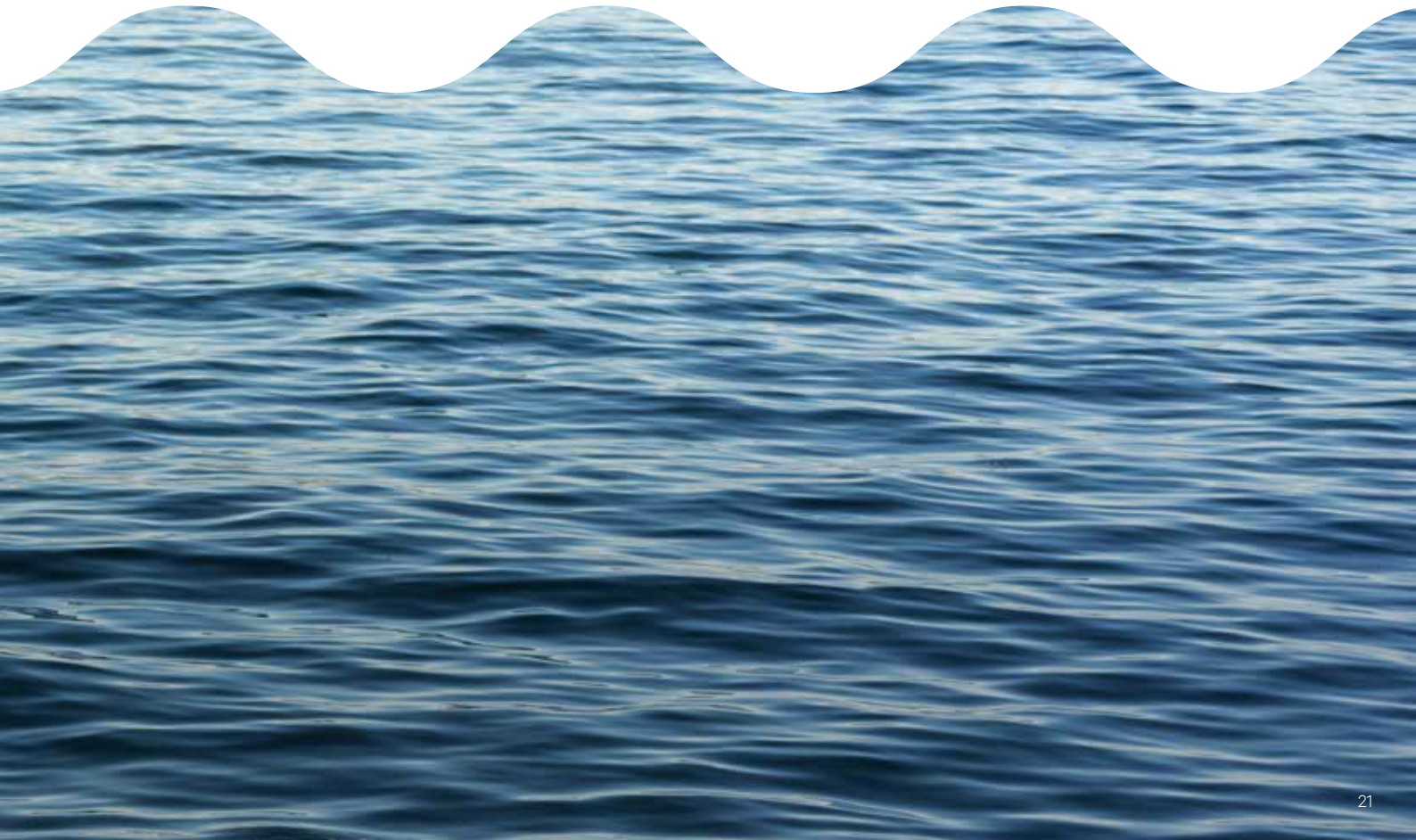
- Two new large water treatment works - resilient to potential deterioration of raw waters in rivers
- Replacement of over 7,000 lead supply pipes
- Water treatment processes installed on the Isles of Scilly

2025 - 2035

- Upgrade 16 water treatment works - so they continue to provide top quality water
- 50% of network utilising smart technology to manage performance - working in conjunction with smart meters
- Up to 50,000 lead pipes replaced
- Ensure no customer experiences persistent pressure issues, or supply interruptions longer than 12 hours

2035 - 2050

- Smart network technology operating throughout our networks
- All lead pipes replaced
- Isolated communities connected to our network



Identifying investment needs for AMP8

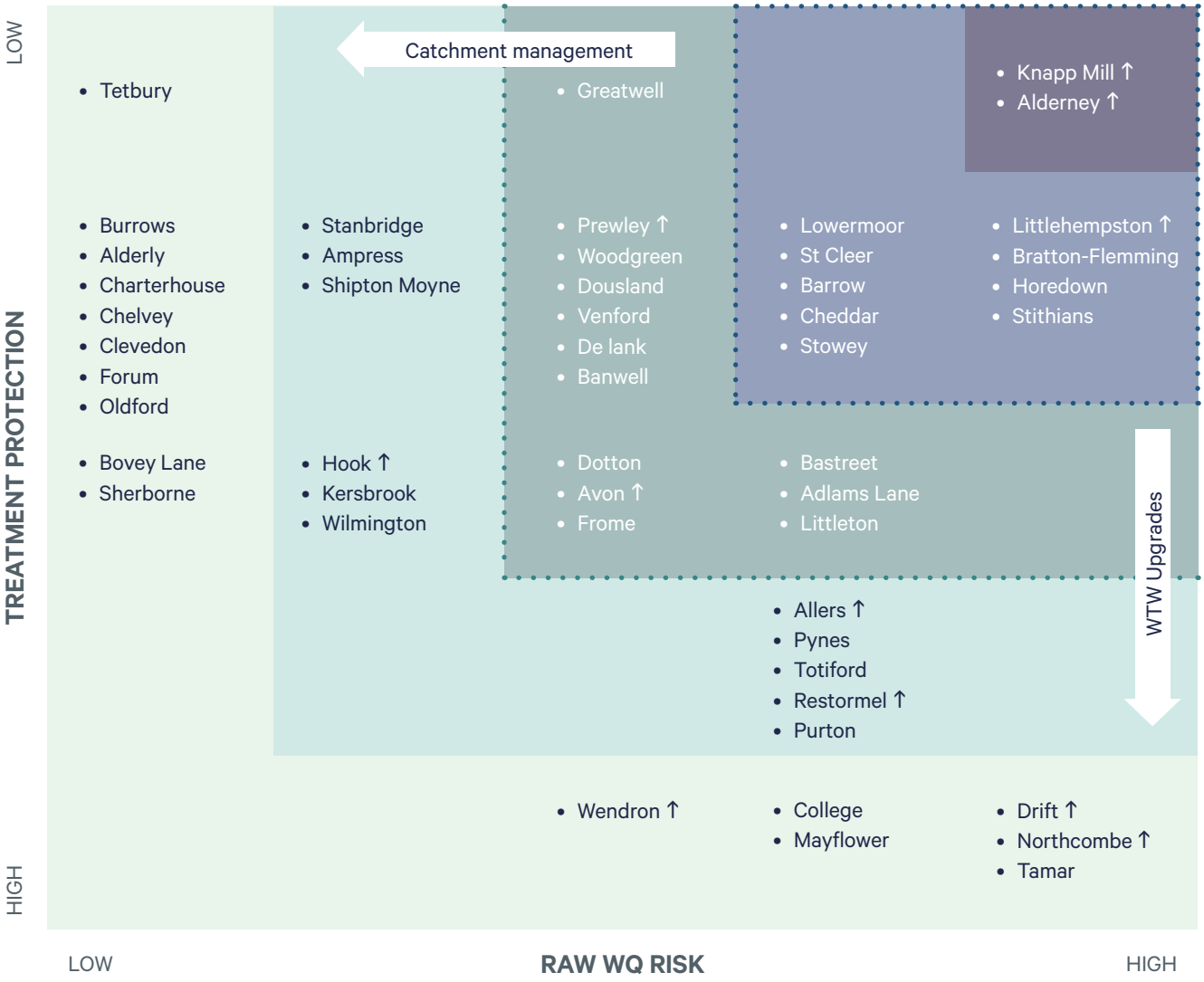
Our risk based processes ensure we prioritise the most important risks to water quality through our investments first. In line with our objective of continuing to improve water quality, we evaluate the raw water risks in our catchments that are presented at our WTW's.

We consider these risks against the treatment processes we currently have in place to mitigate them. Where unacceptable residual risks remain and improved mitigation is required, we promote a balanced and prioritised range of catchment, treatment, network and consumer interventions.

The current risks at our WTW's are visualised below and we have investments and improvement plans, covering both catchment management and WTW upgrades, to mitigate these risks in AMP7 and AMP8.

During 2030 we will address and mitigate the high and medium priority risks.

Upgrading water treatment processes improves treatment protection and catchment management will reduce water quality risk



High priority risks

Medium priority risks

↑ capital maintenance pressure

Knapp Mill and Alderney will be complete by 2025

For the 2025-2030 (AMP8) period, we have identified a targeted, efficient, and affordable water quality investment programme that mitigates drinking water quality risks for our customers. A summary of the main schemes and solution and the risk reductions they will deliver is given below.

The summary is split into:

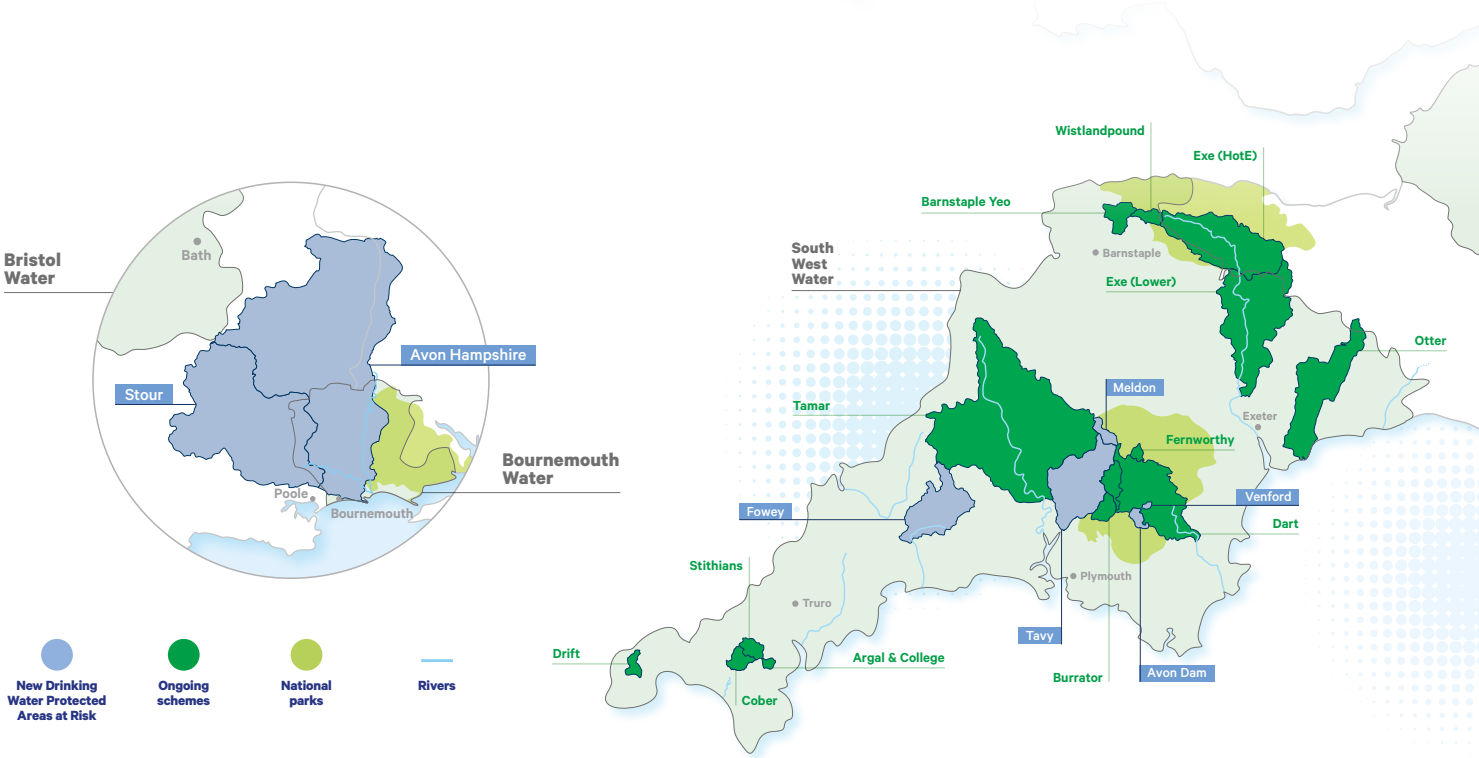
- **AMP8 Risk mitigations** where the investment provides risk mitigation in AMP8
- **Adaptive solutions and emerging risks** where the investment is part of a long-term solution/strategy, it is adaptive in nature, and/or the investment spans beyond AMP8

Our AMP8 investments – in summary

Investments in our sources

Sources

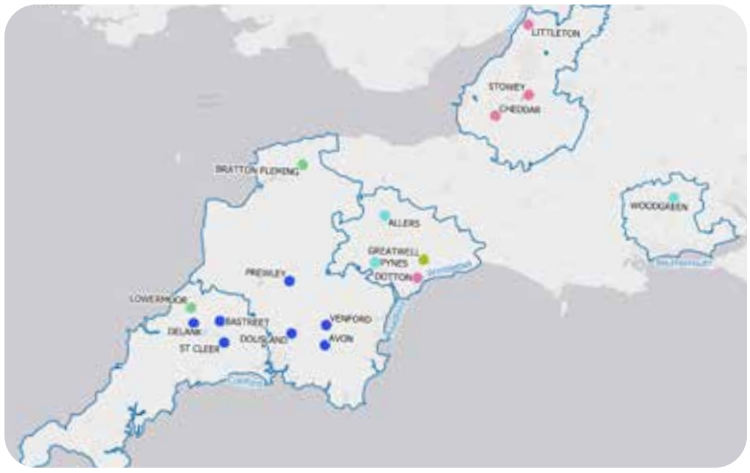
Location	Risk	Solution / mitigation	Outcome
Contaminants of emerging concern, e.g., PFAS	Future public health: Contaminants of emerging risk	Advanced monitoring, and new laboratory equipment to facilitate further R&D	Improved knowledge and understanding to support effective planning
Fowey	Catchment derived (drinking water protected area at risk) Manganese and Geosmin	Catchment management with partnership delivery to remove risk at source and reduce pathways to watercourses	Improved river and raw water quality, improved taste/smell and customer confidence. Reduced need for water treatment, reduced risk of regulatory failure, partnership and stakeholder support
Avon	Catchment derived (drinking water protected area at risk) Geosmin and MIB		
Meldon	Catchment derived (drinking water protected area at risk) Dissolved and Total organic Carbon (DOC, TOC), Manganese		
Upper Camel	Catchment derived (drinking water protected area at risk) Geosmin		
Stour, Avon	Catchment derived (drinking water protected area at risk) Colour and Turbidity		
Withy brook / Lynher, Venford, Tavy	Catchment derived (drinking water protected area at risk) DOC and Geosmin		
Otter, Tamar, Yeo, Dart, Wistlandpound, Argal and College, Drift, Stithians, Cober, Exe and Fernworthy	Multiple Catchment derived risks (on going non WINEP scheme) including pesticides, DOC, nutrients, etc		



Investments at our WTWs

WTWs

WTW	Risk	Solution / mitigation	Outcome
Dotton WTW	Deteriorating raw water quality and manganese	Dedicated manganese filters and de-chlorination	Reduced risk of microbiological contamination; improved appearance/customer confidence
Bratton Fleming WTW	Consumer acceptability	Upgraded processes at new site	Improved taste and smell; resilience and enabling of future supply system resilience and rationalisation
Lowermoor WTW	Consumer acceptability	New GAC process	Improved taste and smell/consumer confidence
Woodgreen WTW	Consumer acceptability: discolouration, iron, manganese and turbidity	Upgraded membrane treatment and secondary manganese filters	Improved appearance/customer confidence; reduced risk of microbiological contamination
Cheddar WTW	Deteriorating raw water quality: Disinfection and customer acceptability	pH correction, UV and further evaluation of effectiveness of covering of slow sand filters	Reduced risk of microbiological contamination; reduced risk of turbidity exceedance
Stowey WTW		Substantive rebuild with ceramic membranes and GAC post slow sand filters likely	Reduced risk of microbiological contamination/regrowth; improved appearance and customer confidence
Littleton WTW	Deteriorating raw water quality: DOC, biological regrowth and disinfection byproducts	Substantive rebuild with ceramic membrane technology most likely	Reduced risk of microbiological contamination
Greatwell WTW	Microbiological	Additional contact tank	Improved disinfection, reduced risk of microbiological contamination
Surface water works and downstream distribution systems	DOC, biological stability, THM and disinfection control and by-products	UV mitigations at Littleton and Cheddar and long-term risk review across WTW's in the Bristol Water area	Development of a sustainable long term water treatment investment plan
Venford, Avon, Dousland, Bastreet, St Cleer, De lank and Prewley WTW's	Consumer acceptability: taste and odour	Enabling works to accommodate mobile activated carbon dosing	Taste and odour risk mitigation
Allers & Pynes WTW	Consumer acceptability: discolouration	Chemical dosing upgrades	Improved water appearance & reduced customer contacts



- Consumer acceptability - discolouration
- Consumer acceptability - taste/smell
- Consumer acceptability (risk)
- Deteriorating raw water quality
- Microbiological

Investments across our networks and at customer taps

	Networks	Risk	Solution / mitigation	Outcome
Sources	Service reservoirs and treated water tanks	Microbiological; Iron and manganese	Engineering works to allow bypass for cleaning and inspection	Reduced risk of microbiological contamination
	Regional Lead	Lead exposure	Lead strategy / enhanced trials	Reduce consumer exposure to lead; avoid reliance on chemical dosing long term
	Discolouration strategy	Consumer acceptability: discolouration	Cast iron mains replacement	Reduced customer contacts relating to water appearance, improved consumer confidence
	Contaminants of emerging concern, e.g., PFAS	Future public health: Contaminants of emerging risk	Advanced monitoring, and new laboratory equipment to facilitate further R&D	Improved knowledge and understanding to support effective planning

The Future of Private Supplies

Our plans to 2050 do not have specific investments to move those on private supplies onto our networks. As concerns over water quality in private water supplies are increasing due to response to climate change, we are well placed to extend our networks so that all residents in our region have access to world class drinking water.

We are currently undertaking research and engagement with residents on private supplies to understand the steps that would be needed to bring these onto our networks in future.

The role of Innovation

We have a long history of deploying a range of innovative and traditional technical solutions for the robust treatment of our waters. Through research and development of options we can promote schemes that deliver multiple benefits for our customers

"This partnership will help find solutions to some of the most pressing issues our region faces and mitigate risks from challenges such as climate change. Through collaborative research and innovation, we will together play a leading role in protecting and enhancing our natural environment."

Susan Davy,
Chief Executive

CREWW

In 2023 our purpose built research centre will open on the University of Exeter's campus. The Centre for Resilience in Environment, Water and Waste (CREWW) will support the industries approach to the most challenging issues we face in a way that brings together regulators, utilities, the supply chain and academia.

The new transdisciplinary research centre will include laboratory facilities and collaborative space, where researchers from multiple disciplines can work with water industry colleagues to co-create engineering, nature, economic and behaviour-based solutions which deliver multiple benefits to the environment, society and the economy. This includes looking at how to manage natural resources to ensure there is sufficient water to cope with population growth, the pressures of climate change, and improving resilience to the effects of flood, drought and emerging pollutants.

Our innovative approach to managing risks at source - **Upstream Thinking**

We recognise that our water supply system needs to be sustainable now and into the future and that catchment managnement plays an essential role in our long-term strategy

Upstream Thinking

Devon Wildlife Trust

Cornwall Wildlife Trust

Catchment Sensitive Farming

swlakes

University of Exeter

South West peatland Partnership

Westcountry Rivers Trust

FWAG SouthWest

1,000 additional hectares of peatland restored through our Green Recovery Initiative

We will continue to invest in upstream catchments to deliver both Water Framework outcomes and the improvement of raw water supplies.

Our Upstream Thinking approach is to work with other stakeholders in catchments to develop a range of technical, practical and financial solutions that help mitigate deterioration and deliver improvements in the quantity and quality of the raw water we abstract. Additional biodiversity and amenity benefits are also realised and highly valued by our customers and visitors to our region.

Our catchment management focus is increasingly addressing a wider range of risks than when it was conceived in AMP 4, for example reducing peak pollution events through farm intervention. We have demonstrated this is achievable in AMP6 through several land management initiatives. For example, by improving the orientation/design of yards and storage/buffer strips, promoting less environmentally damaging farming practice with respect to pesticide and nutrient application and increasing base river flows.

Under our Green Recovery Plan we are delivering a package of nature recovery work across the Dartmoor National Park Area, an area important for water supply. The package of catchment management interventions includes peatland restoration, support to landowners to manage their land in ways which are good for water and biodiversity improvements on the land that we own at Burrator and Venford. In total, SWW will improve 10,000 hectares of land by 2025.

Other goals focus on reducing levels of DOC and the level of sedimentation loading into impounding reservoirs and our abstraction points. For reservoir sources we will continue to reduce eutrophication and investigate early signs of earthy/musty tastes and smells in our source waters.

Security of Network and Information Services (NIS)

South West Water have been certified against ISO27001, the Information Security standard since November 2009. The standard demands continual improvement in information security and is externally assessed every 6 months.

Our Information Security strategy combats rising cyber threat against corporate IT and Operational Technology (OT) whilst continuing to meet business objectives.

Globally, the number and sophistication of cyber security threats continues to rise. This is why we remain alert to the threats and we continue to take proactive actions to minimise the risk of them occurring.

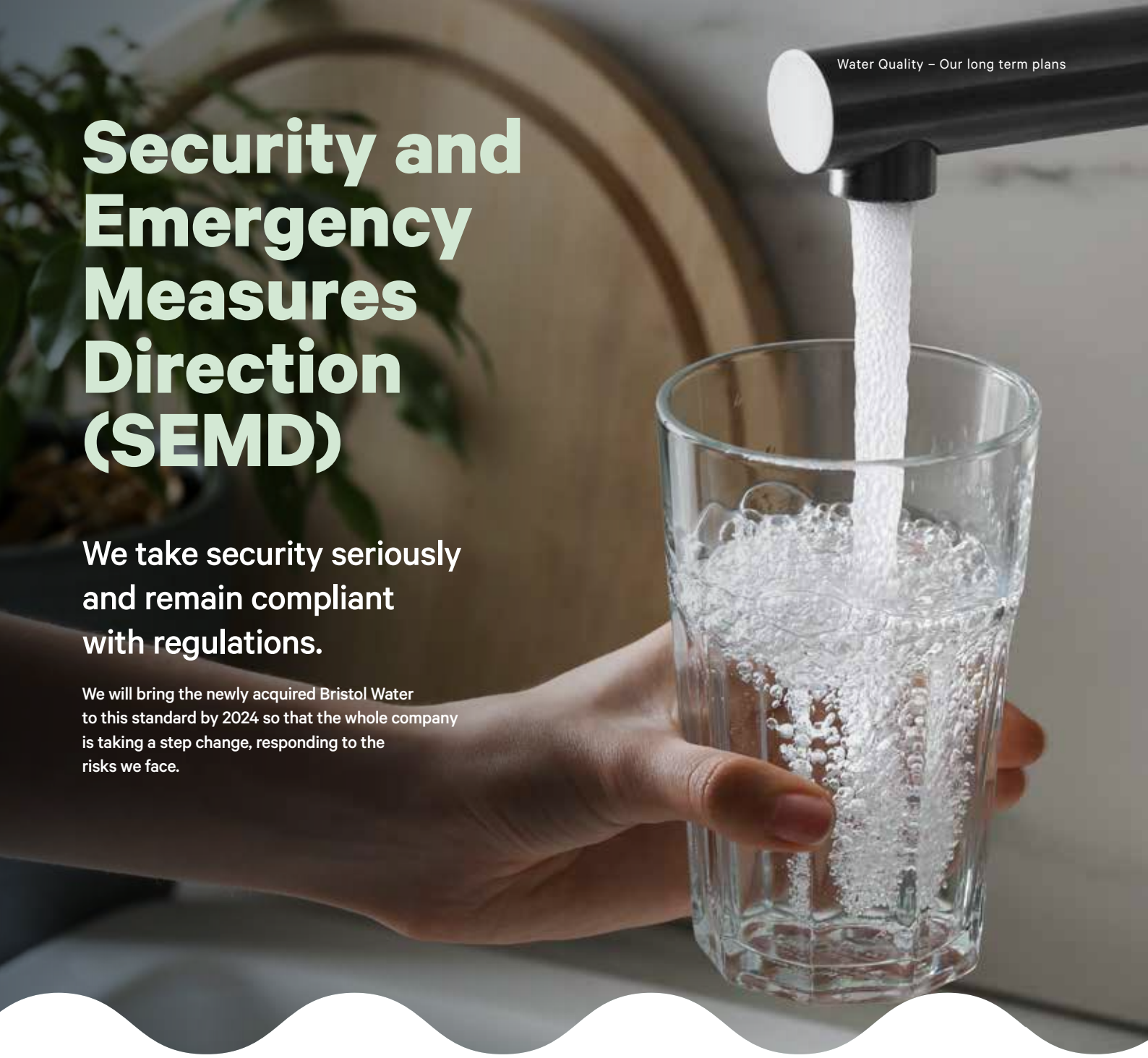
Our information security strategy supports the businesses vision and outcomes by ensuring that our critical services that depend on IT/OT are resilient and remain available. We do this by making sure we manage our security risks appropriately and ensure we remain compliant with legislation and regulations.

Security of Network and Information Services (NIS) Regulation 2018 Regulations aim to raise the levels of cyber security and resilience of key systems for all companies and organisations that operate essential services. As a provider of critical services, South West Water is obligated to comply with NIS Regulations, meeting standards of cyber security through regular assessment against the Cyber Assessment Framework, protecting our information by complying with all relevant legislation and framework. This is embedded in our employee induction and regular refresher training; as a business we have been certified against ISO270001 since 2009.

We also meet our customer security obligations. The National Cyber Security Centre has published 14 high-level security principles which must be implemented in the form of a cyber assessment framework. We use this framework to ensure we are correctly applying the principles.

NIS - Cyber Assessment Framework			
Managing Security Risk	Protecting against cyber attack	Detecting Cyber Security Events	Minimising Impact of Cyber Incidents
Governance	Policies and processes	Security Monitoring	Response and Recovery Planning
Risk Management	Identity and access control	Proactive Security Event Discovery	Lessons Learned
Asset Management	Data Security		
Supply Chain	System Security		
	Resilient Network and Systems		
	Awareness and Training		

Security and Emergency Measures Direction (SEMD)



We take security seriously and remain compliant with regulations.

We will bring the newly acquired Bristol Water to this standard by 2024 so that the whole company is taking a step change, responding to the risks we face.

The Security and Emergency Measures Direction 2022 requires undertakers and licensees to maintain a water supply and/or sewerage system in the interests of national security or to mitigate the effects of any civil emergency which may occur. The SEMD has four main areas which companies must comply with: Planning, resourcing, securing and responding.

Companies are also required to risk assess their assets and where necessary install physical security measures in line with industry standards.

Low level crime, such as vandalism and theft, are still some of the biggest threats to companies which can have operational impacts. By installing physical security measures at vulnerable assets companies are able to protect water supplies.

During times of water outages we are required to have plans in place that consider the provision of alternative water supplies which can be delivered either through alternative piped supplies, tankering water into an area or by setting up water collection stations to enable customers to collect water.

South West Water work with Local Resilience Partners and agencies to develop plans for response to emergencies within the community.

As a provider of critical services, South West Water is obligated to comply with the Security of Network and Information Services (NIS) Regulation 2018, meeting standards of cyber security through regular assessment against the Cyber Assessment Framework.

South West Water have also been certified against ISO27001, the Information Security standard since November 2009. The standard demands continual improvement in information security and is externally assessed every six months.

Summary

Our customers rightly expect high quality drinking water to be there when they turn on the tap.

We will improve drinking water quality and maintain customer confidence by reducing water quality risks from source to tap.

We will focus on addressing issues in source waters and therefore allow us to promote the most sustainable level of treatment in the future.

We are delighted to summarise our plans to address the current and future risks to water quality across our operating areas. Our plans in AMP8 will address all high priority risks and leave only a small number of WTW's in our medium risk category, but with appropriate mitigations and longer term plans to provide even more robust mitigations.

In recognition that these risks are not fixed we will continue to evolve this long-term plan in response to specific risks identified in our Drinking Water Safety Plans and in accordance with the guidance provided to the industry by the Drinking Water Inspectorate.

The development of our long term plan has been driven by our desire to;

- reduce all potential health risks
- improve the acceptability of our supplies
- maintain and enhance consumer confidence in tap water; and
- to achieve 100% water quality compliance in the most sustainable and affordable manner.

The remainder of the document provides more information about our specific investment strategies. It focuses on the challenges and the investment plans we have in place to overcome these challenges and it is structured against our key focus areas:

- Improving the appearance of our supplies
- Improving the taste and smell of drinking water
- Improving disinfection and reducing disinfection-by-products
- Understanding pesticide risks and reducing them at source
- Capital maintenance at our WTWs and long-life infrastructure
- Reducing our customers exposure to lead

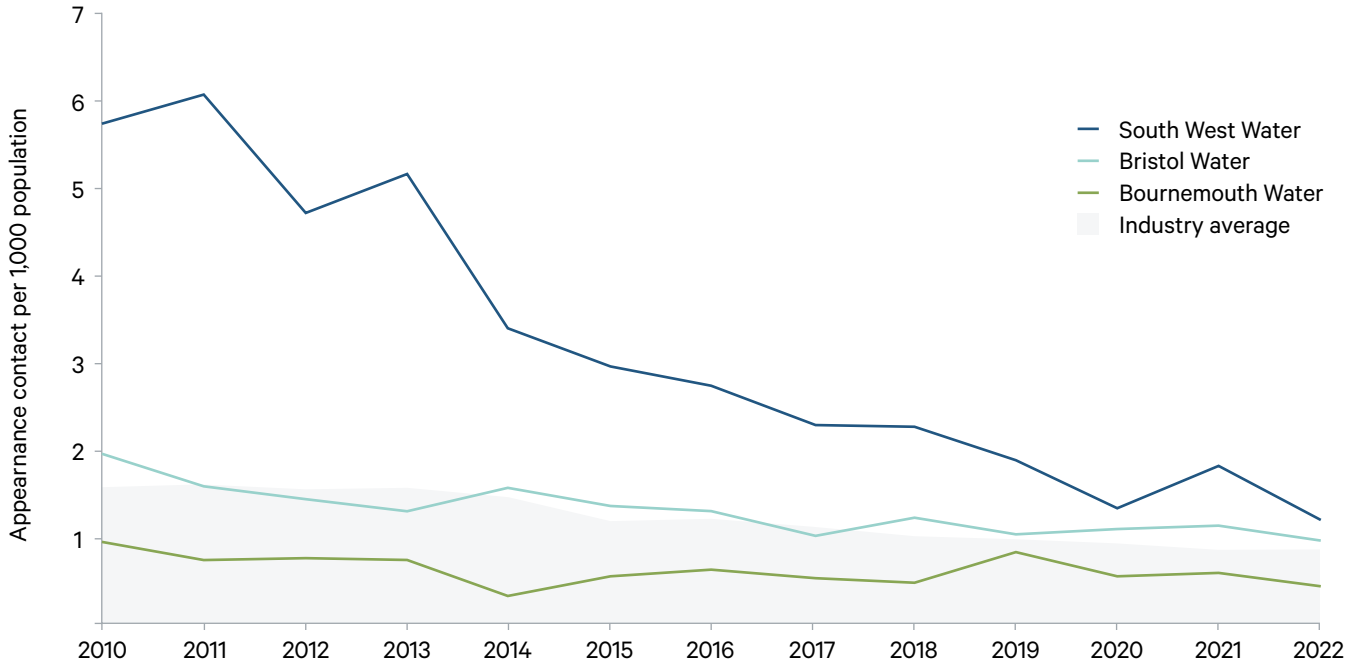
Drinking Water Quality

Our Strategies

Improving the appearance of our supplies

The appearance of our water supply is one of the most powerful indicators that consumers draw upon to determine the quality of their tap water

We have been improving this aspect of our service but remain an industry outlier in this important measure. The graph below shows performance in our respective operating regions and we know we must continue to address this to ensure consumer confidence in our supplies is maintained and to meet our statutory obligations.



Water quality contact (appearance) per 1,000 population since 2010

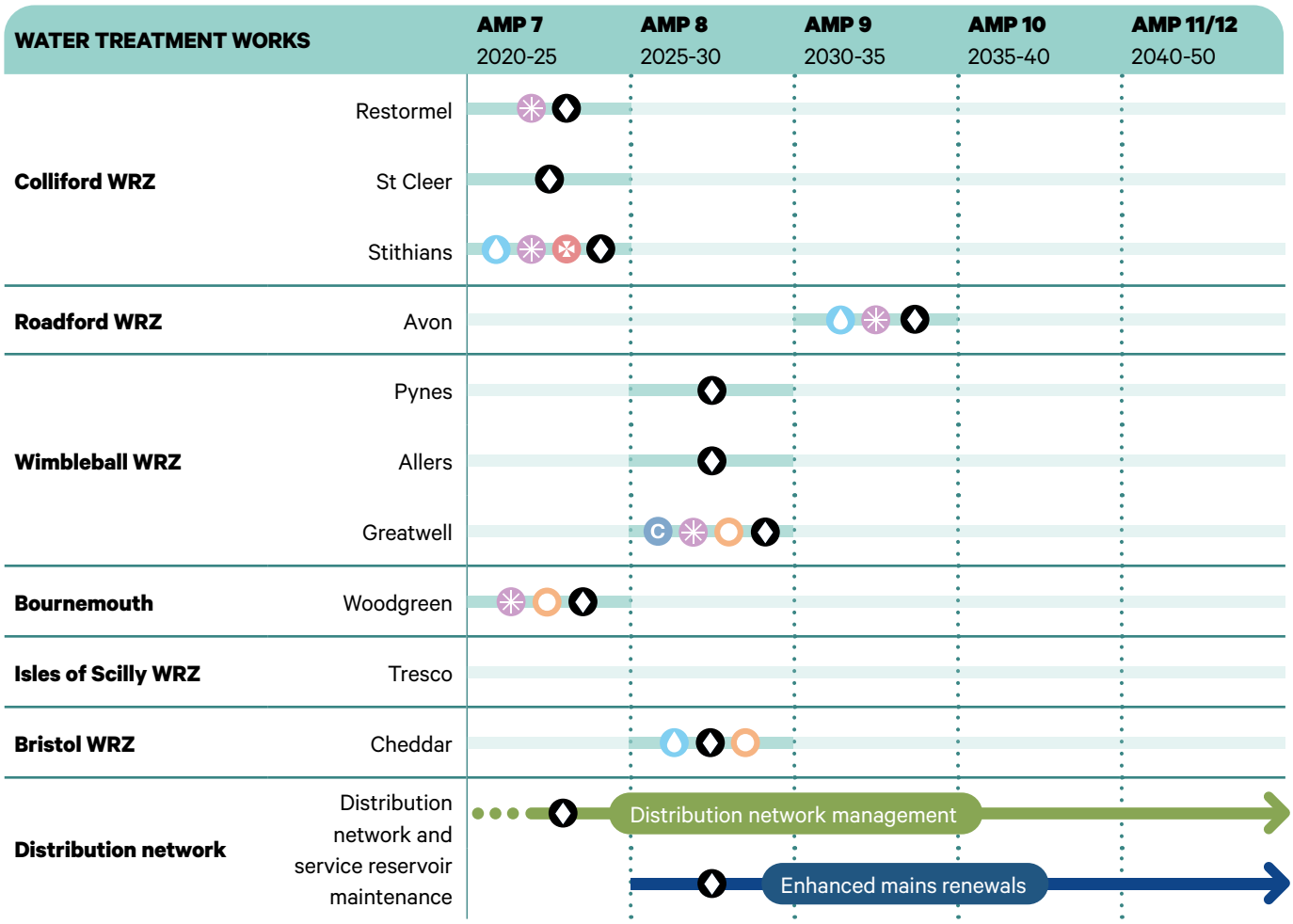
Our risk is in part due to the geology of the South West region which means our source waters typically have low mineral concentrations and pH, making the water supplies generally more corrosive than in other 'harder water' regions. The pH correction employed at our treatment works goes some way to reducing the impact but cannot fully correct for the corrosive nature of the source water. In addition to the natural corrosivity, our source waters also contain low levels of manganese that accumulate in our network over time and in combination these two factor contribute to a long-term increase in risk of consumer discolouration contacts which we have been working hard to minimise.

As well as the challenging source waters, the topography and demography of our region also contributes to the challenge, with generally longer pipes per consumer than in other regions. The regional influx of tourists adds to this further as in many areas there is a significant change in demand depending on the season. The hydraulic effect of this can be to rapidly increase flows, which risks remobilising any manganese that has accumulated in our extensive network.

To address discolouration we will continue to invest in treatment and distribution operations and investigate manganese control options within our catchments.

At our treatment works, we will continue to focus on the enhanced removal of manganese before it can accumulate in our pipe network. Our long-term target is to reduce manganese levels below 1ug/l in all of our final waters, which we know will be technically challenging and need to be phased.

We propose a phased approach in AMP8, where we will target investment to reduce manganese risks at Dotton, Pynes and Allers WTWs. We will also complete enabling works to allow cleaning of all treated water tanks and service reservoirs, which will also have benefits of reducing discolouration risk. Our programme of investment to improve the appearance of drinking water is shown on the next page.



We recognise that alongside our planned investment at our WTW's and service reservoirs, we will also need to further improve our network of pipes and fittings, our operational practices and the practices of third parties that legally or illegally operate our network.

We have developed a model that helps us to understand where customers are most likely to experience discoloured water and a training facility to support improved operational practices. We use the discolouration propensity modelling (DPM) approach to identify mains that have the most significant potential to cause customers to experience discoloured water and then target interventions at these across our water distribution network of more than 25,000km of water supply pipes.

There are a range of network interventions that we are taking to improve discoloured water; these are described overleaf.

Targeted mains renewals

We plan to substantially increase our mains renewal programme from AMP8 onwards, to upwards of 200km per AMP. Our mains renewal programme takes account of the high discolouration risk associated with such pipes as part of a balanced benefits evaluation when selecting the priority for mains renewal. Put simply we are targeting our oldest and most problem pipes first as they pose the greatest risk of causing disruption to our service and water quality.

Pressure management

Due to the hilly nature of our regions we need to very carefully manage the pressure in our distribution systems. This has a range of benefits to customers including a reduction in the risk of interruptions to supply by reducing the risk of mains bursting, and a reduction in leakage and reduced risk of supplies becoming discoloured (improved water quality). We are continuing to expand the degree to which our vast network is actively pressure managed throughout AMP8 to reduce these events from occurring.

Trunk main conditioning

Renewal or rehabilitation of large diameter trunk mains which carry large volumes of water from our treatment facilities to centres of population is both expensive and disruptive. Therefore, in addition to targeted replacement, we will extend the level to which we deploy trunk main conditioning. This will help manage the risk of discolouration events occuring through the regular and controlled increase in trunk main flows to levels that match high demand conditions using additional automated pressure and flow controllers.

Mains flushing

Flushing is undertaken reactively in response to an event to reduce the impact on consumers or pro-actively to reduce the risks before they impact on customers. We recognise the benefits of continuing to deliver more planned flushing as it is more efficient and reduces the disruption to consumers. Proactive planned flushing of distribution mains helps reduce the risk of discolouration by removing the accumulation of materials that cause discolouration on the inside of our pipes. By keeping the pipe walls clean, when hydraulic changes do occur (because of bursts or operational or 3rd party activity), the risk of discolouration is reduced.

Smarter Networks and our network operation training centre of excellence

Learning from the advanced capability in the Bristol Water operation we will expand our network of water quality monitoring capability. This monitoring will enable us to identify changes in water quality occurring in the network before our consumers are inconvenienced. Combining this data with our hydraulic models provides the basis of a ‘quality first smart network’.

Out network training centre in Exeter will continue to support our teams and 3rd parties (such as the fire brigade) who access our network to develop the necessary skills to assess the risks to water quality effectively and always operate valves calmly and in a quality first manner.

Improving the taste and smell of drinking water

Like appearance, taste and smell are powerful indicators that consumers draw upon to determine the quality of their tap water. They expect a water supply that is free from both taste and odours

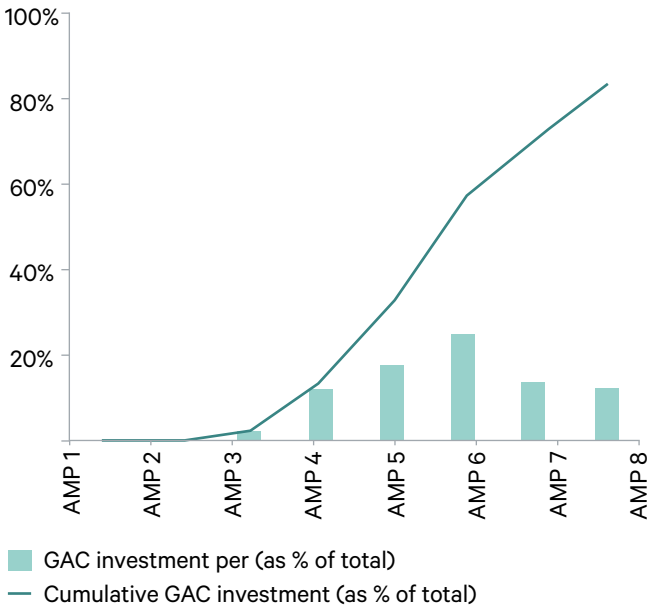
We will continue to invest in granular activated carbon (GAC) based solutions at our highest risk sources to improve the acceptability of our supplies. GAC removes the nusiance earthy musty tasting compounds that sometimes naturally develop in lakes and rivers. GAC also provides a general barrier against pesticides and other man made and naturally occurring pollutants that are sometimes found in our sources and reduces the risk of disinfection by-products (DBPs) forming.

Since 2006 (AMP4), SWW have invested significantly in GAC processes due to the multiple benefits to water quality it provides. Investments have been targeted at works supplied from high-risk river abstractions and algal laden impounding reservoir sources. This approach has delivered improvements in overall compliance, a reduction of DBP formation, a reduction in pesticide, oil and micropollutant risks and an improvement in customer acceptability (taste and smell).

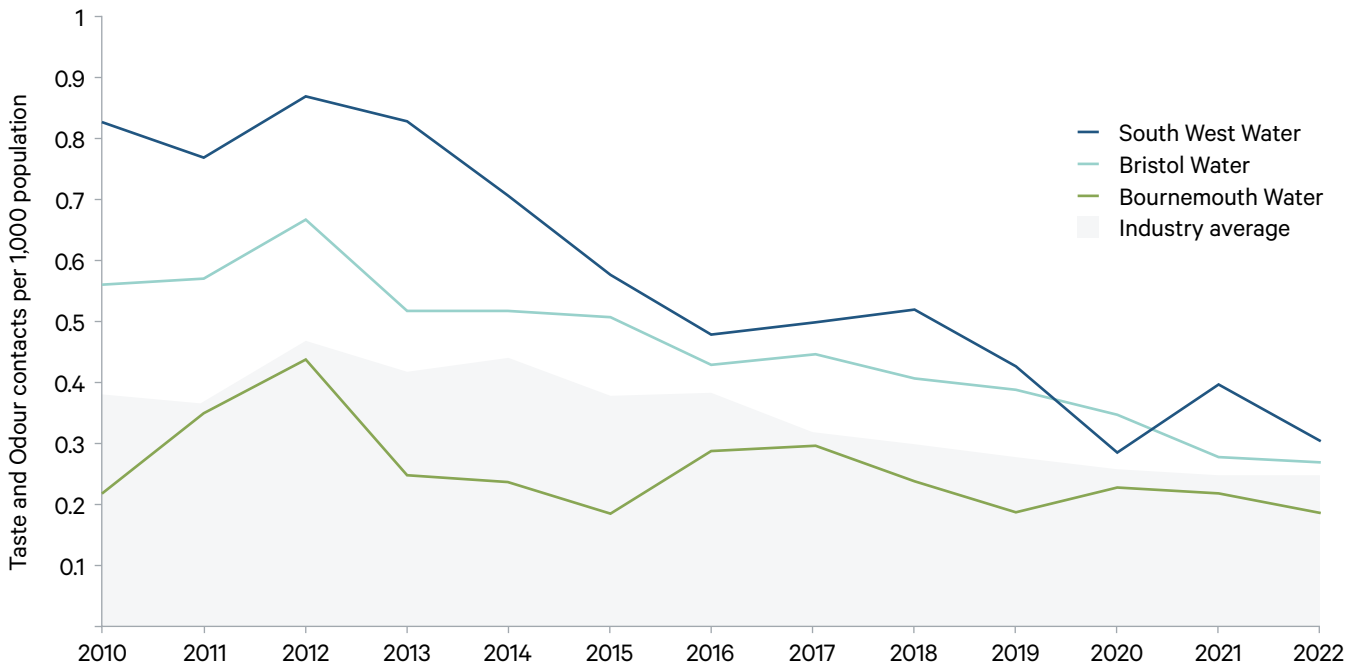
Our investment in taste and odour control in AMP5/6 led to a marked improvement, and in AMP7 we are currently improving the way we manage our reservoirs at higher risk sites without GAC. We have also learnt from a previous event that occurred in June 2018, where consumers reported unusual earthy/musty odours in their drinking water due to a deterioration of raw water quality in Wistlandpound reservoir. This has led to us accelerating the delivery of a number of improvement schemes in AMP8 that we to be completed in AMP9 in our previous long term strategy. We can see the risk of very disruptive events increasing due to the impacts of climate change and therefore need to act sooner than originally envisaged.

We are delivering GAC treatment at Horedown (advanced from AMP 9), Littlehempston, Stithians and Alderney before 2025 and further installations at Bratton Flemming, Lowermoor, Knapp Mill and Stowey between 2025 and 2030. Alongside this we are proposing enabling works to facilitate the rapid deployment of mobile treatment processes at all remaining sites whilst we phase further deployment.

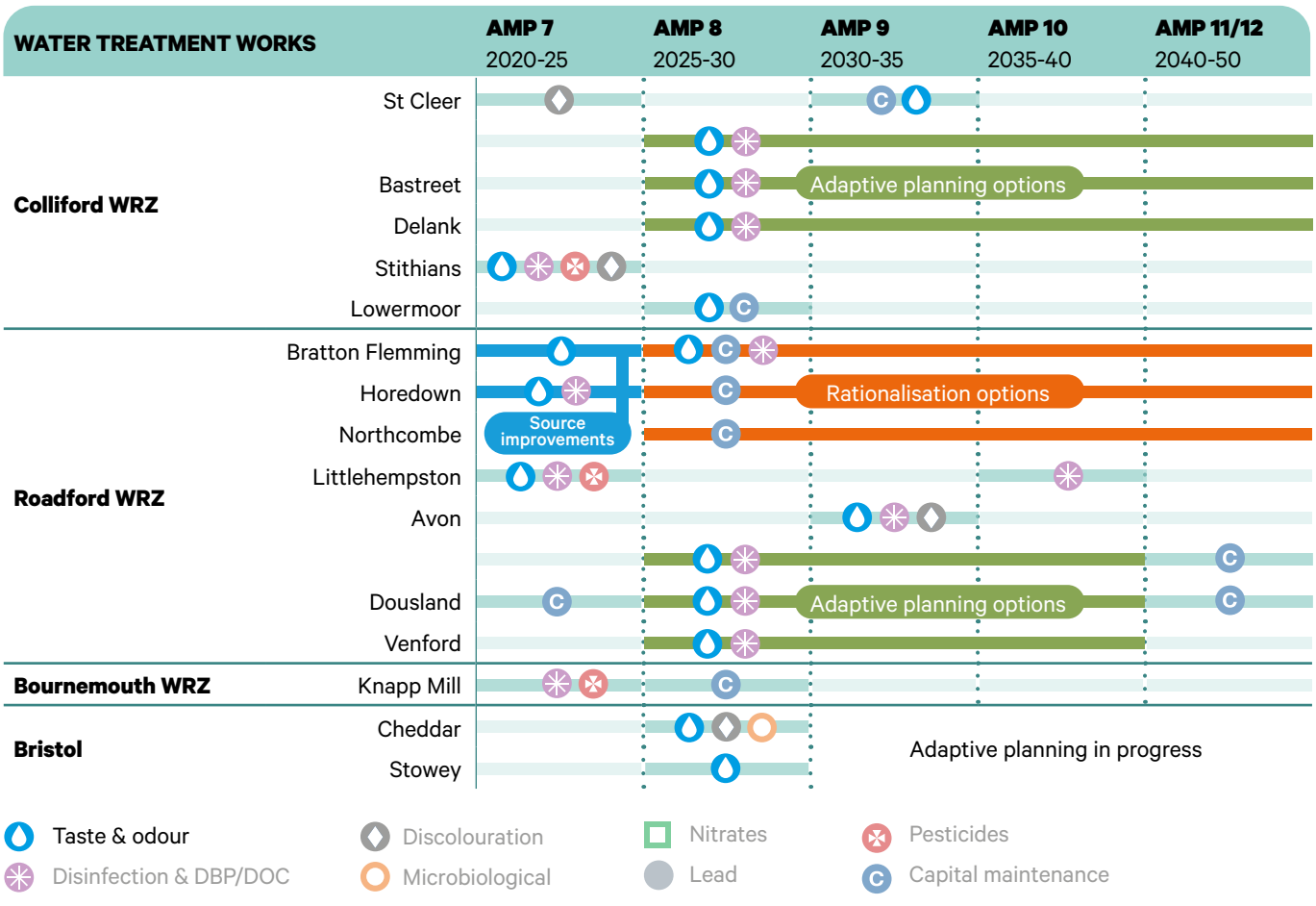
Enhanced GAC investment at South West and Bournemouth Water over time



Water quality contacts (taste and odour) per 1,000 population since 2010



In summary, an on-going risk based deployment of GAC at sites in the South West and Bristol regions over AMP9-12 is planned as an adaptive pathway in our long term water quality strategy. Our approach to 2050 is shown in the image below.



Improving disinfection and reducing disinfection by-products (DBP's)

Adequate pre-treatment and effective disinfection is vitally important to ensure that our supplies are free from harmful pathogens. This ensures consumers are not exposed to water borne illnesses or inconvenienced by precautionary restrictions such as boil water notices

In AMP6 and 7, we have focussed on disinfection upgrades at several of our works, including installation of UV and advanced membrane technologies.

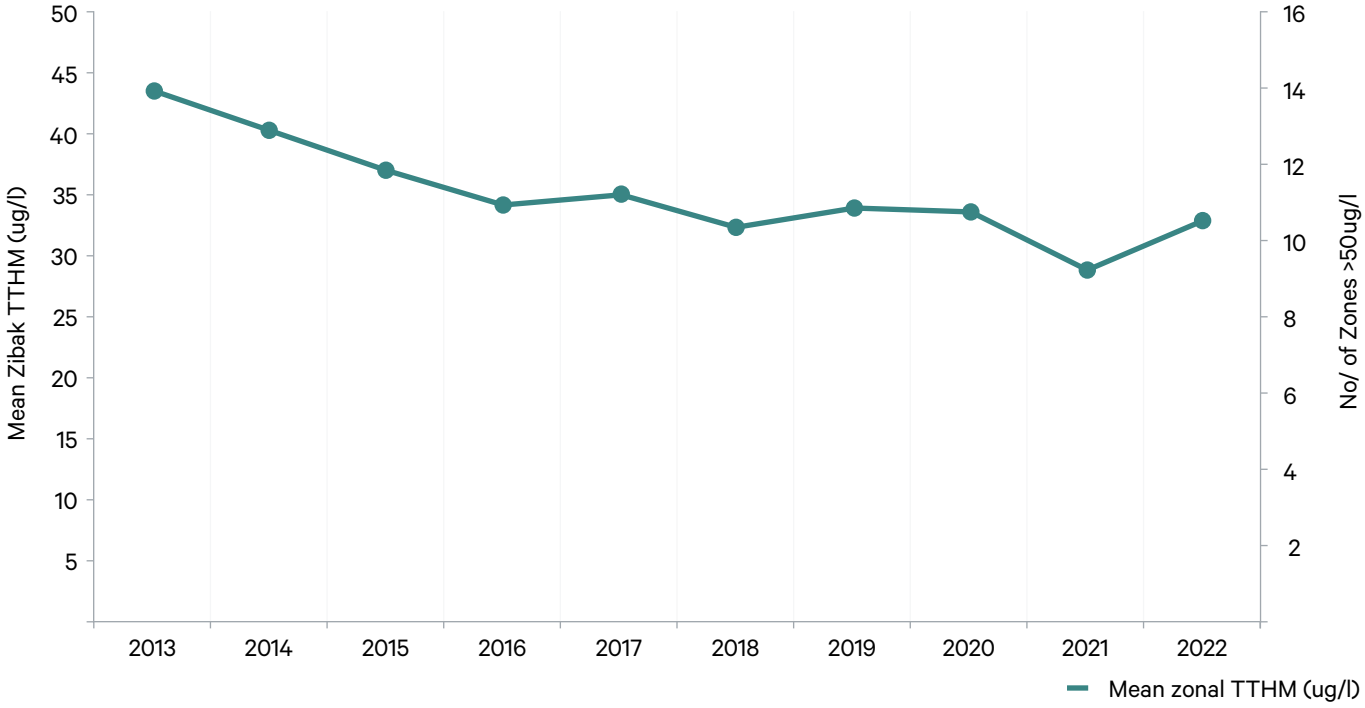
By the end of AMP7 we will have also completed work on all five islands of the Isles of Scilly to reduce the risk of disinfection failures or the production of disinfection by-products.

Consequently, there are a smaller number of sites requiring disinfection upgrades in AMP8 identified through our DWSP process. We recognise there is further improvement to be made in the longer term and are also evaluating where similar investments may be beneficial in the Bristol operating region.

In the Bristol Water Resource Zone (WRZ) we will initially be focussing our operational performance on improving the disinfection arrangements at a number of sites. We will also deliver a significant upgrade to the existing treatment works processes at Stowey WTWs building on the insights we have gained regarding innovative treatment in the South West and Bournemouth regions over AMP6 and 7. The source waters supplying Stowey WTW contain naturally high levels of dissolved organic carbon (DOC) and the works supplies a large rural network where levels of chlorine are typically more difficult to manage. To better manage these risks whilst delivering the revised treatment we will introduce secondary chlorination within this supply system to stabilise the water quality and reduce the likelihood of DBP formation in the distribution network.

Regional THM Performance since 2013

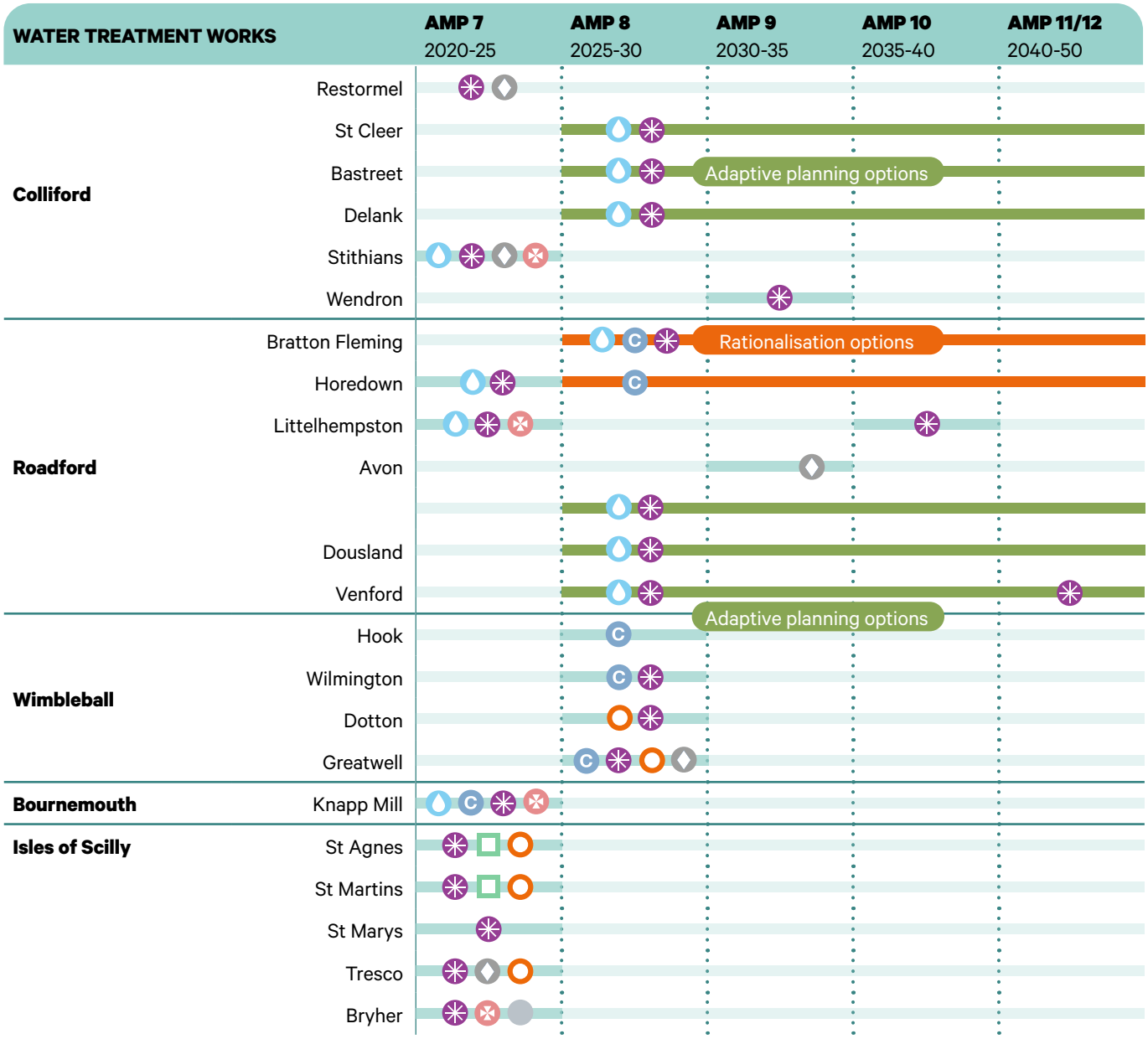
2022 was a challenging year due to the drought conditions affecting raw water quality and the need to change the configuration of our supply systems.



Our research into the formation of DBPs and delivery strategy remains focussed on reducing the two main factors in the formation of undesirable by-products, DOC and chlorine.

We have continued to see effects of climate change on raw water quality and in AMP8 we propose further enhanced treatment at a small number of sites alongside our catchment-based interventions. These schemes will build upon previous investment and further secure our supplies from the continued and increasing raw water challenges. For example, at Greatwell and Dotton WTW additional upgrades have been identified to ensure robust disinfection under all long-term scenarios.

These treatment investments to improve disinfection, reduce DBP and microbiological risks for AMP8 are summarised below.



Understanding pesticide risks and reducing them at source

Pesticide failures from our water treatment works are reassuringly rare but we remain very vigilant of the risks in our catchments

Our most significant risks are associated with lowland river abstractions but we also recognise an increased risk at the reservoirs we have within agricultural catchments. These reservoirs can also support significant algal blooms in our operating regions due to our warmer climate and our relatively shallow reservoirs. The lowland rivers and many of the supplies from such reservoirs have been effectively protected with Granular Activated Carbon (GAC).

Our AMP7 plans included investment at Littlehempston WTW which is supplied by three river systems, all of which have risks:

1. Dart – pesticides, micro-pollutants from upstream waste water discharges;
2. Tamar – elevated pesticides from agricultural activity; and
3. Tavy – naturally occurring taste and smell compounds.

Further investment at Stithians WTW is primarily focused on T&O and DBP risk reductions as well as providing additional protection from pesticides and micro-pollutants. At both sites disinfection with UV is also being provided.

Similarly, the strategic investment at Knapp Mill will also include micro-pollutant barriers alongside the main ceramic membrane upgrade.

In AMP8 and beyond we have not identified any sites that will require additional treatment specifically for pesticides. However, we will be installing additional GAC and PAC upgrades with the primary driver of reducing the risk of algal taste and odour causing compounds. This work will have the added benefit of reducing DBPs and pesticide risks.

We will continue to use our Upstream Thinking approach to manage these risks at source in the long-term.

Alongside other emerging contaminants, pesticides are risks we will continue to carefully monitor. We will utilise our upstream thinking catchment activities to minimise this risk alongside the roll out of further GAC processes. Where needed we will adapt our strategy to meet any emerging challenges in this area.

WATER TREATMENT WORKS		AMP 7 2020-25	AMP 8 2025-30	AMP 9 2030-35	AMP 10 2035-40	AMP 11/12 2040-50
Colliford	Stithians					
Roadford	Littlehempston					
Bournemouth	Knapp Mill	C				
Isles of Scilly	Bryher	C				

Taste & odour
Disinfection & DBP/DOC
Discolouration
Pesticides
Capital maintenance

Emerging Contaminants

Growing global interest and research into so called ‘emerging contaminants’ or ‘forever chemicals’ is an area the water industry needs to better. Improved knowledge of prevalence and fate of these contaminants in the water environment will enable us to assure ourselves and our consumers that drinking water supplies are not at future risk. Whilst our historical data provides some insight into the potential risks in our region, it is just the beginning of our understanding in this important and rapidly emerging field.

In AMP8 we propose to focus on improving our risk assessment regarding compounds of emerging concern and validate our controls. .

By undertaking the proposed research with global leaders in this field, developing novel analytical approaches utilising so called ‘effects based methods’, and piloting state of the art on-line water quality monitors and off-line analytical techniques, we will be better able to assure consumers about future risks and to effectively plan any investments needed.

Reducing and monitoring **nitrate risk**

Our collaborative work with land owners has secured a low risk of nitrates directly impact our drinking water quality.

Due to effective land management and the success of our Upstream Thinking initiatives risk of nitrate failures in our drinking water supplies across the mainland region is low and limited to a small number of sites. A very small programme is proposed at Bovey Lane and Ottery WTWs in the longer term (currently scheduled for AMP9). We will continue to monitor the performance and work closely with land owners in our catchments. Bovey Lane was originally planned for investment in AMP8, but encouragingly the predicted increases in nitrate have not occurred, so this will be postponed into AMP9, subject to our continual review of risk.

- Disinfection & DBP/DOC
- Discolouration
- Microbiological
- Nitrates
- Capital maintenance

WATER TREATMENT WORKS		AMP 7 2020-25	AMP 8 2025-30	AMP 9 2030-35	AMP 10 2035-40	AMP 11/12 2040-50
Roadford	Bovey Lane			■		
Wimbleball	Greatwell		C ✳ ○ ◆	■		
Isles of Scilly	St Agnes	✳ ■ ○				
	St Martins	✳ ■ ○				

Capital Maintenance at our treatment works

Maintenance of our assets is a vital part of ensuring a clean, safe and reliable water supply to our customers

At a strategic level, we assess maintenance requirements using comprehensive reliability models that help us to quantify the risks associated with asset failure. Our modelling helps assess the levels of investment required to maintain or improve service at best possible whole life cost.

Typically, we invest in approximately 3-4 significant water treatment capital maintenance driven refurbishment schemes per AMP. This ensures that our portfolio of WTWs, are refurbished or upgraded every 40-50 years. This supports a well profiled capital investment programme which largely smoothes any foreseen peaks in capital maintenance and ensures the fair recovery of investments from each generation of consumers.

An area of focus for our resilience and maintenance assessments are process control systems and cyber security, coupled with built in obsolescence in this short life cycle category of asset. We have a history of investing in the renewal of control systems at our water treatment works and we expect to invest at a more significant level in the future with the twin drivers of maintenance and resilience. As part of the renewal process we will continue to examine the robustness of our systems to ensure they meet required standards.

A strategic review of water treatment options at Bournemouth Water, as part of our PR19 business planning process, confirmed the need to invest in treatment upgrades in the coming AMP periods. Knapp Mill and Alderney WTW's were prioritised for investment in AMP7/8 with our Green Recovery plans bringing forward the AMP8 investment such that they are both largely completed by 2025/26.

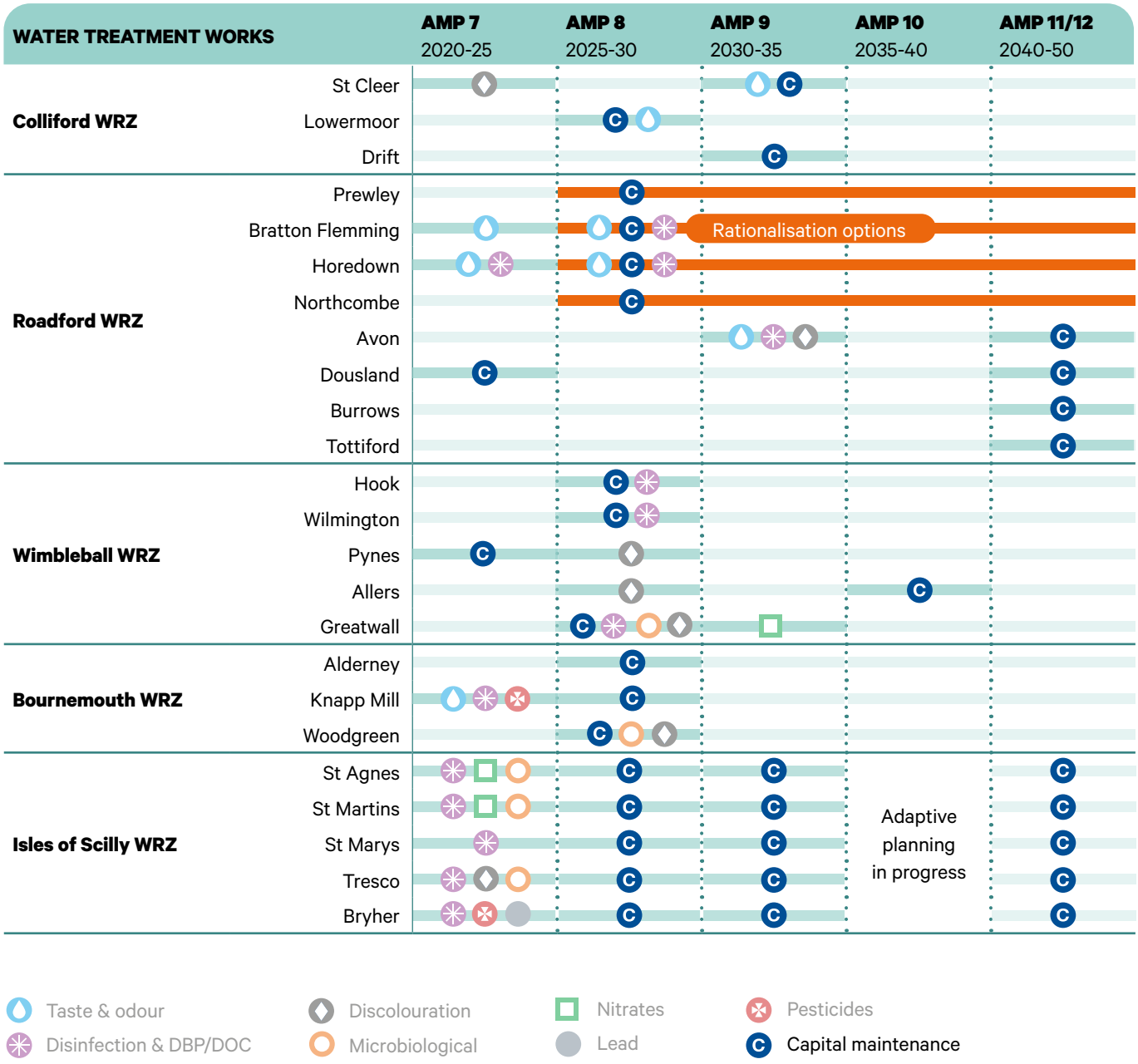
A similar initial review has built on our experience following the acquisition of Bristol Water and we have identified a significant upgrade of Stowey WTW to be brought forward in AMP8. Our maintenance plans for AMP8 are under development but it is likely we will prioritise the development of a water treatment master plan for the Bristol area while continuing our maintenance strategy of substantive investment towards one-to-two medium sized WTW's in Cornwall, one medium sized works in Devon, all of the smaller (remaining) WTW's in Bournemouth and improved sustainability for supplies on the Isles of Scilly.

Capital Maintenance Long-life Infrastructure

Service Reservoirs are unpressurised water storage structures in our network that provide a reserve of water to meet peak demand and ensure water is always available for fire fighting

Long-term whole-life cost and performance models have been developed for all our service reservoirs, similar to how we plan our WTW's investment. This ensures that our investment levels are optimised to manage risks, including sudden investment spikes, over a 50-year planning horizon. Each year, our long-term planning models are reviewed and updated to account for additional information captured during our routine inspections and maintenance.

In AMP7 we increased our investment in our 400+ Service Reservoirs by £5m in the South West Water supply area in response to events that occurred in other parts of the UK. With this additional investment we have increased our monitoring and inspection programme; undertaking proactive maintenance whilst our assets are taken out of service for cleaning/inspection. To secure the service of these tanks for the long term we have been proactively installing roof membranes where they are not installed or they are past their useful life to reduce the risk of ingress (microbiological contamination). This has meant we have not needed to issue any precautionary advice to consumers on the mainland associated ingress this AMP period.


WATER TREATMENT WORKS
AMP 7
2020-25
AMP 8
2025-30
AMP 9
2030-35
AMP 10
2035-40
AMP 11/12
2040-50
Colliford WRZ
St Cleer
Lowermoor
Drift
Roadford WRZ
Prewley
Bratton Flemming
Horedown
Northcombe
Avon
Dousland
Burrows
Tottiford
Rationalisation options
Wimbleball WRZ
Hook
Wilmington
Pynes
Allers
Greatwall
Bournemouth WRZ
Alderney
Knapp Mill
Woodgreen
Isles of Scilly WRZ
St Agnes
St Martins
St Marys
Tresco
Bryher
Adaptive planning in progress
Taste & odour
Disinfection & DBP/DOC
Discolouration
Microbiological
Nitrates
Lead
Pesticides
Capital maintenance

In addition to our base capital maintenance programme we have typically budgeted for substantial refurbishment or the construction of one new service reservoir and the disposal of one old service reservoir each AMP. Where appropriate, we have explored service reservoir rationalisation to improve water quality resilience and proactively replaced several tanks on the Isles of Scilly having identified the standards previously applied on the islands were lesser than those afforded on the mainland for some time.

In AMP8 we are increasing this investment level to allow for more extensive remedial works to be completed when tanks are taken out of service.

Through our planning this AMP we have identified a number of treated water storage and contact tanks that are difficult to remove from supply for a full clean and inspection. In AMP8 we will invest in engineering works to allow these tanks to be removed from supply for full clean and inspection more readily, which will reduce several risks including microbiological risks from potential ingress and discolouration risk by removing sediment which could contribute to future discolouration contacts.

Dams and impounding reservoirs are engineered structures used to store (impoud) and control the flow of large water bodies in the landscape above the natural level of the surrounding land. Ensuring that these structures are well managed and maintained is essential as they provide our customers with drinking water, power, social amenities and they would cause devastating effects in the event of catastrophic failure.

South West Water is responsible for 48 structures under the Reservoir Safety Act, 1975, with four of these located in our Bristol Water region. Each of these structures is inspected by a specialist at least every ten years. The actions arising following these inspections, known as “Measures in the Interests of Safety” are then completed within a specified timeframe by the inspector; usually less than eighteen months.

Our long-term strategy follows our continued compliance with the Reservoir Safety Act, including the capital investment necessary to mitigate any directions by the Reservoir Inspectors. We also strive to have zero enforcement actions from the Environment Agency and to maintain these very long lived infrastructure assets into the future.

We have recently invested to improve the overall condition of these structures which has removed all condition grade 5 (most severe) defects and reduced condition grade 4 defects by more than half. Currently, we do not foresee any significant investment needed above and beyond our routine inspection and maintenance programmes except for at one reservoir in our Bristol region where additional infrastructure is needed to improve the safety of routine maintenance being completed.

Reducing our customers exposure to lead

Our strategy is focussed on minimising our customers exposure to lead in drinking water by removing the lead pipes we are responsible for and supporting our customers to do the same

Whilst we are meeting lead standards today, we recognise the importance of acting now to protect current and future customers from the potential health effects of lead pipes – this is why we have a dedicated (and separate) lead strategy focused on tackling this issue for customers

This ambition is shaped by the World Health Organisation (WHO) and joint expert committee agreements that there is no lower threshold for adverse effects of lead on human health. Recently published DWI research also supports further action to reduce exposure to lead in order to secure improved health and economic outcomes for society.

Whilst the use of lead pipes was prohibited in 1969, we estimate that around 220,000 lead pipes remain in use supplying approximately 14% of our customers. Our ambition is to reduce this to zero by 2050.

In the meantime, we will continue taking measures to reduce the level of risk to customers which have resulted in failures of the current lead standards. We recognise the need to be proactive and ambitious in removing lead from the supply system.

By 2050 our intention is to remove the risks associated with lead from our network by relining or removing these assets. As this initiative rolls out we will explore options to safely reduce, and potentially stop the use of chemical plumbosolvency control dosing strategies currently deployed. We recognise that this strategy must be delivered over a long-term programme across our region to limit the impact on customer bills.

It is our intention in AMP8 to increase our targeted customer service pipe management. Learning from our AMP7 trials, we will go beyond regulatory requirements and expand replacement of lining of these assets as economically as possible to eliminate lead at our customers' taps.

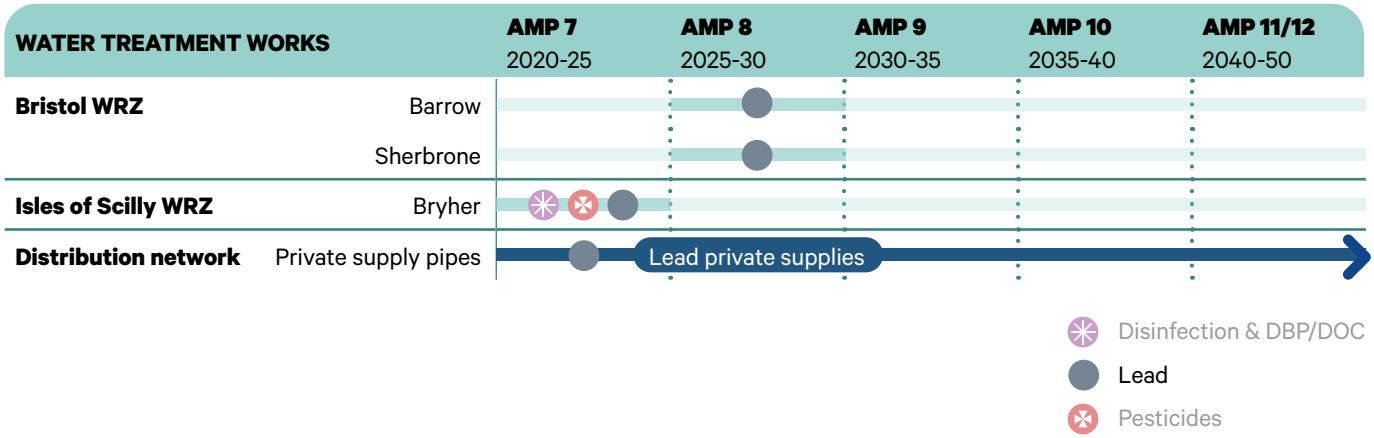
We will continue with our enhanced monitoring, consumer and stakeholder awareness campaigns focussing on vulnerable groups. Our proposed strategy is summarised in the table on the right.

Source to tap approach	Short term investment	Long-term plan
Lead in source waters We commit to monitoring and managing lead in our source waters, and ensuring appropriate downstream treatment for removal.	£1m investment in blending of raw waters and treatment of source at our Stowey WTW.	Continued monitoring of lead in our raw water sources to inform future investment needs and evaluation of options for longer term solutions.
Treatment and control We commit to monitoring and managing lead in our source waters, and ensuring appropriate downstream treatment for removal.	Innovative dosing trials to be carried out and the use of lead pilot dosing rigs at the University of Bath and our Barrow WTW's to model hypotheses and gather evidence using real lead piping and water samples to show what the optimum dose to control plumbosolvency will be for different waters and at different times of the year.	Optimised and reduced ortho-phosphoric acid dosing, as we strive to deliver a lead free supply system.
Network and distribution We commit to ensuring risks from legacy sources of lead within our network are minimised and these pipes are removed over time. We will work with our customers in this journey of identifying lead, minimising lead exposure and ultimately removing all lead pipes to the tap. We will ensure that customers receive the best possible advice and support during this process.	We have developed four focus areas for lead pipe replacement in AMP8: 1. Removing the small amount of lead pipe that remains in our distribution systems; 2. Proactively replacing lead pipes for customers on a support tariff; 3. Opportunistically replacing lead pipes where we are replacing distribution mains; and 4. Trialling wider proactive lead replacement programmes and approaches to inform our future plans. We aim to strike the right balance between free and subsidised replacement, whilst aiming to replace between 20,000 and 30,000 lead communication and supply pipes. The number replaced will depend on the mix of comms pipes and supply pipes replaced, the balance of free versus subsidised supply pipe replacements and the level of uptake from customers.	We commit to continuous removal of lead pipework to work towards a completely lead free supply by 2050. We do recognise however, that there is sometimes deep reluctance from property owners to replace their pipes due to the inherent disruption, and inconvenience even when we are able to help mitigate the associated costs. Therefore, we will shape our offering and advice accordingly.

To deliver our ambition by 2050 we recognise that there will be considerably more lead pipe replacement activity in the future 5-year investment cycles (AMPs). We estimate a total programme of c.£300m per AMP would be required if we were to replace all supply pipes all the way to the customers tap if we do not request a contribution from the customer. We believe that we should help those who cannot afford to replace pipes they are responsible for but also that those that can afford to should. We are currently working with consumers to establish an approach to financing pipe replacements fairly.

South West Water is not alone in tackling the challenge of replacing lead pipes. We are working closely with other companies who are stepping up their lead replacement programme for customers in AMP8. This will create more of an incentive for our supply chain to work with us in developing innovative technologies and approaches to replacing lead supplies, which in turn will drive down costs in future years.

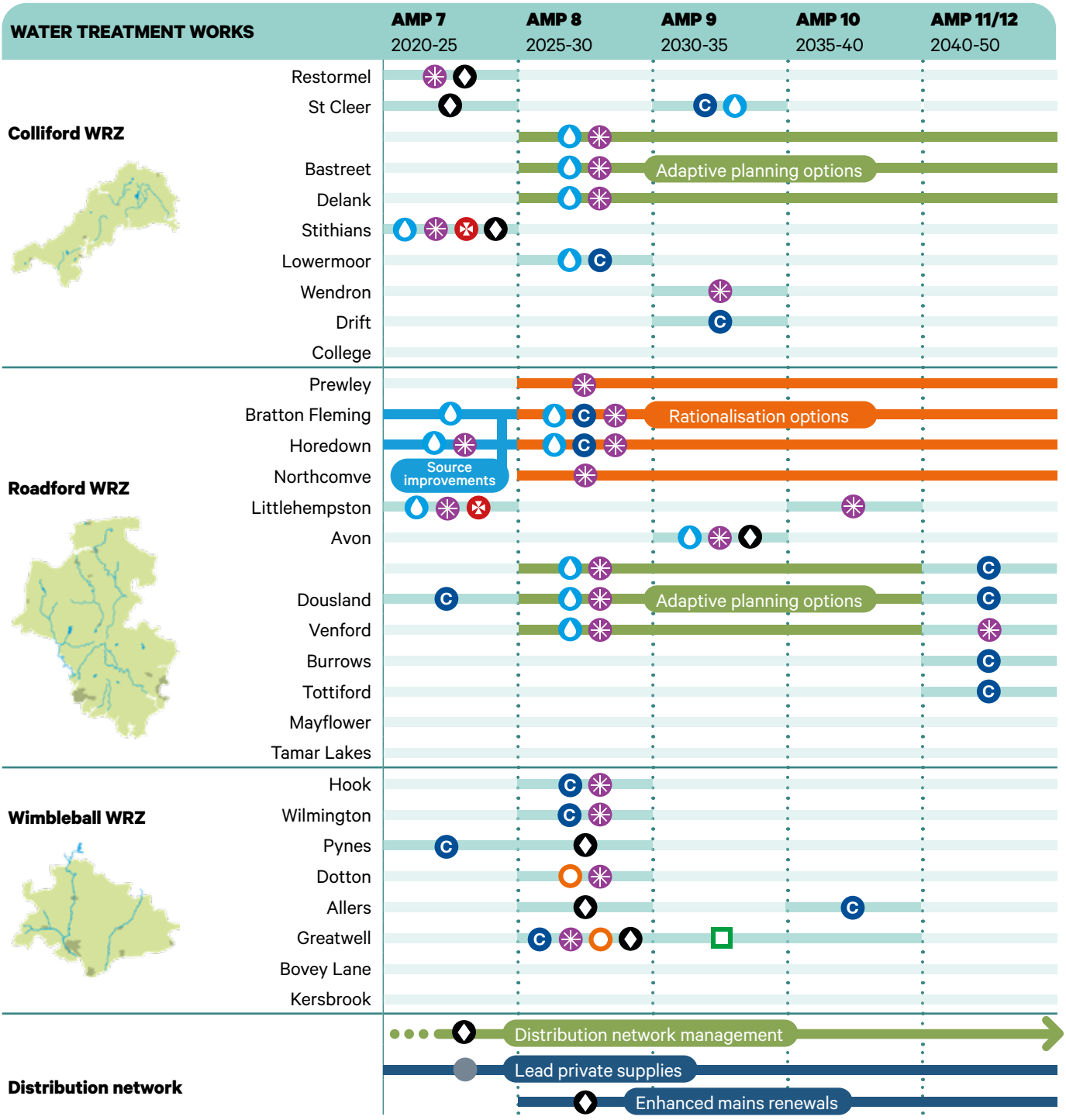
We also hope collective plans across the UK Water industry will generate more awareness and encourage our customers to act now and replace their own supplies if they can. We will track and update our strategy on this ambitious journey towards a 'lead free' water supply for all.



Summary of our plans

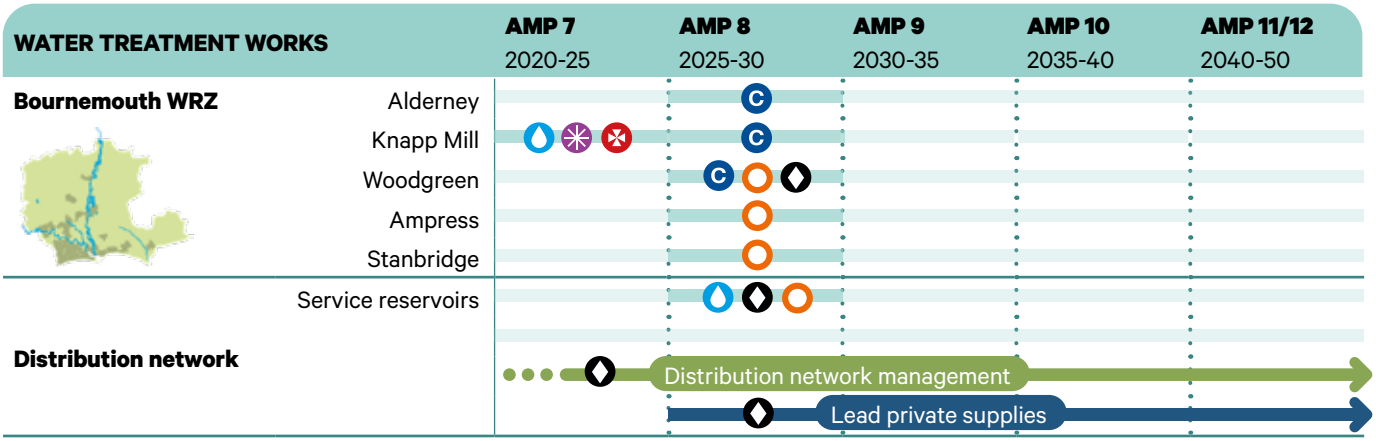
South West Water

key challenges and investments to 2050



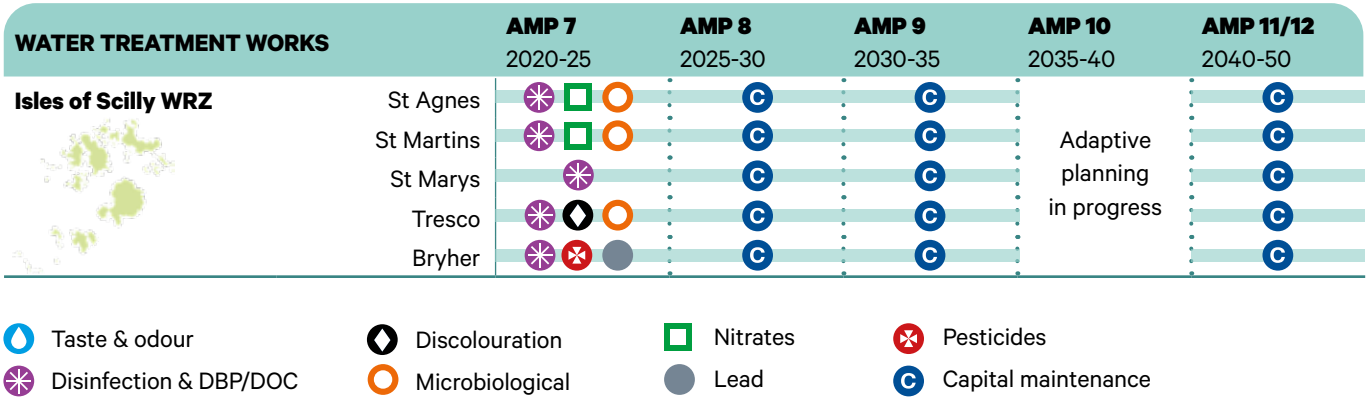
Bournemouth

key challenges and investments to 2050



Isles of Scilly

key challenges and investments to 2050



Bristol

key challenges and investments to 2050