



Wessex Water's
Innovation Report
2022

Why and how we innovate



Wessex Water
YTL GROUP

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Wessex Water's innovation report

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Our ambition stretches beyond water, to performing a wider role in society as a company that: is trusted to take care of the natural world we all depend on; sets the benchmark on environmental performance; and plays our part in rising to pan-sector challenges of unprecedented scale and urgency - the climate and nature emergencies, the need for carbon neutrality, rising public expectations of the environment, higher living costs and long term resilience.



Foreword

Innovation has always been important in the water sector, and it is so now more than ever. We all need access to clean water and the effective management of sewage and waste products, but the complexities and costs of doing so, while keeping customers' bills affordable have never been more challenging. Add to this the climate, nature and public health crises, and legitimate, growing concerns about the quality of our rivers, and we have a perfect storm. Now is the time to innovate, to do things better and to find new solutions.

This report explains how Wessex Water, a longstanding innovator, has stepped up the pace. We have a broad view of innovation, extending it to everyone in the company and across our entire field of work. Good ideas can come from anywhere, and we need to pick them up, develop and apply them wherever we can.

I hope you find this report stimulating. It is full of examples of where innovation is making a difference, whether in improving the environment, supporting customers or using technology to simplify and speed up repairs and maintenance. It is also a pledge to do better, to keep innovating, and to find new ways of fulfilling our mission of supporting our customers' health and wellbeing, enhancing the environment and the communities we serve.

Fiona Reynolds

Non Executive Director and Chair, Wessex Water Environment and Public Value Committee



*Our purpose is
'To support our
customers' health and
wellbeing, and enhance
the environment
and the diverse
communities
we serve.'*

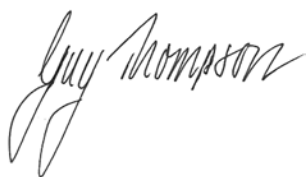
Introduction

Since 2019, when we published the most recent editions of our innovation and futures reports, the world has changed markedly. A global pandemic, followed by a pronounced cost of living crisis have turned everyone's expectation of what is normal upside down. At the same time, the combined threats posed by the climate and nature emergencies are becoming more and more apparent. Moreover, the UK water sector has faced high levels of scrutiny in the last year, especially about our management of sewers and water recycling centres.

In keeping with our track record in delivering major efficiency and service improvements and building customer service excellence, Wessex Water believes that we can respond positively. We are involved in every aspect of environmental improvement in our region, and have an extremely capable and committed workforce. We have also introduced many innovations, sometimes taking a broad idea to business as usual within a few years. We aim to build on these attributes, and deliver more and wider value to the people we serve and the environment we work within. As part of this, we have reviewed and reaffirmed our central purpose and the outcomes we want to bring about (on page 7), and placed these at the centre of our long-term strategic direction statement, which we also published this year.

Looking ahead, it is clear that tried and tested ways of working will not be enough for the 'new normal'. We will need to keep innovating to meet changing expectations and the new challenges and opportunities ahead of us. Some of this will come through new technology; some through new partnership approaches such as the Catchment Market demonstration projects that we are leading, or collaborations with other water companies and solution providers. And all this can be accelerated with a regulatory system that focuses on social and environmental outcomes, as described in the case study on Outcomes Based Environmental Regulation at the end of this report. The next two years will be crucial as we build these principles into our Business Plan for 2025-30.

For now, I hope you find this report an interesting read and look forward to hearing your views.



Guy Thompson
Group Director, Environmental Futures

We will need to keep innovating to meet changing expectations and the new challenges and opportunities ahead of us



What is innovation and why do we need to innovate?

For us, innovation is about things that are both new and worthwhile.

It can mean the use of new ways of working, new knowledge or new technology in order to improve the services we offer, reduce risk, save money, or improve our efficiency. This in turn leads to greater benefits for our customers and communities, the environment, and our investors.

A range of issues mean that we need to be continually looking for new and better ways to deliver our services.

Public value, trust and relationships: people's expectations of service providers, and the standards we must meet, are changing all the time. Consequently, we must continually demonstrate that we offer true value and benefit to the public that we serve. We want to show we can be a model for sustainable capitalism, balancing profits and purpose. Also, we must enhance our links with customers and communities, social charities, environmental interests, technology developers, farmers, regulators, and others.

Environmental protection: there are growing expectations and concerns about the water environment, including the impacts of storm overflows, ecological condition, nutrient levels, and the presence of emerging contaminants such as pharmaceuticals and microplastics. Alongside, there are opportunities to rethink and rework what we do using concepts such as net environmental gain, and through innovative delivery methods.

The climate emergency: like the wider global economy, we need to decarbonise quickly. As well as our operational carbon emissions we will need to do more on embodied emissions from the products and services we use. Meanwhile, we must ensure that we are resilient to the impacts of climate change, such as pressure on infrastructure and water resources from flooding, drought and heatwaves.

Economic and financial constraints: the challenge from society and our regulators regarding acceptable returns to our investors led to a challenging price settlement for 2020-25. There is a growing cost of living crisis for our customers and we

want to contribute positively to the post-Covid19 recovery while continuing to improve productivity.

Ageing physical assets: simply replacing all our physical assets as they get older would be very expensive, disruptive, and have a huge carbon footprint. So, we need to be able to more accurately predict where and when assets are likely to fail, and then focus maintenance or replacement accordingly.

Resilience in the round: we will undoubtedly experience a range of shocks and stresses whether they are economic, social, environmental or technological. We must be able cope with and recover from disruption and anticipate problems that may occur in future.

New technology and the use of data: exciting new technologies are rapidly becoming available. These include machine learning and artificial intelligence; the internet of things; predictive data analytics and modelling; virtual and augmented reality; and advances in aerial and underground survey. These could offer a significant change for asset management but are also set to enter the home in more meaningful ways, allowing opportunities for more responsive and personalised services to customers. We must learn how to apply these technologies effectively and responsibly.

Employees and employers: people's expectations of work and their employers are also changing. There are risks for water companies in terms of attracting people with the right skills, especially in science, technology, engineering and mathematics. We also need to be able to offer work that is flexible and fulfilling, and to ensure that our workplaces and the culture of our organisation are inclusive, so we better reflect the region we serve and benefit from a more diverse workforce.

Across all these areas, to continue being a leading company we will need to look constantly for better ways to do things and make use of the new opportunities that are coming our way. Thus, innovation is a key concept for us and the wider water sector.

We have a track record of customer service and environmental excellence; and we are committed to embedding these targets



Innovation at Wessex Water – overview

Our approach

We aim to continue to be an acknowledged leader and exemplar of innovation, in ways that benefit the people we serve and the environment around us. Accordingly, we will:

- work to understand challenges and opportunities that relate to our work
- be open to trialling new approaches
- build on our internal knowledge and skills and improve our processes as a result
- form partnerships with others where we don't have the knowledge or expertise ourselves.

We are keen to use new technology, data and digital platforms, but we also believe that innovations can be focused on people, behaviour and how we work together.

Being led by our social, environmental and economic purpose

We don't innovate for the sake of it – novelty is not enough on its own. Instead, any innovation must make a difference to the services we provide to customers, communities and the environment. For this reason, we focus on finding innovative solutions for the themes within our purpose, as set out on page 7.

A culture of innovation

For us, innovation is not something that is run by a large research and development department at the centre of the organisation. Instead, our approach follows our view that innovation can and should arise from anywhere within the organisation, by harnessing the ingenuity of our people and encouraging co-operation.

Collaboration

While we aim to build on our own skills and knowledge, our innovations would be limited if we relied solely on our own ingenuity. Instead, building productive partnerships is critical for making innovations happen and bringing about positive change.

So, we work with:

- other water companies
- solutions providers, technology developers and representative bodies in the supply chain
- academia and other researchers
- social and environmental interest groups
- regulators and local government
- land users
- communities.

Collaborative work happens through several routes.

Local partnerships: face-to-face engagement with people and organisations working in our region, creating opportunities to do things differently that can deliver local and often rapid benefits.

Wessex Water Marketplace: this is our way of inviting potential solution providers from anywhere in the world, to work with us on the specific challenges and opportunities that we face. It gives us exposure to people and ideas that we might not have been aware of otherwise, and through different buying and financing models can deliver better and more cost-effective outcomes for our customers and the environment. See page 19 for more information.

Technology trials: we work with other companies to trial new products and, occasionally, completely new technologies. This can occur through direct contacts and the Wessex Water Marketplace, or via intermediaries such as Isle Utilities, British Water, or the Future Water Association.

Environmental investigations: we carry out field-based environmental investigations to make sure subsequent improvement works are well targeted and proportionate. These investigations commonly involve relatively cutting-edge methods for environmental data gathering.



Innovation at Wessex Water – overview continued

Research: we collaborate with other water companies through UK Water Industry Research. There are also opportunities to work with academia and the wider research community, eg, through post-doctoral researchers or PhD students based in Centres for Doctoral Training on water-related themes. Our work with PhD students at the GW4 universities (Bath, Bristol, Cardiff and Exeter) is a good example of this.

UK water companies: we participated in the development of the national water innovation strategy and are working with other water companies on projects being submitted to, and funded from, Ofwat's water innovation competition.

Types of innovation

We have historically implemented a wide range of innovations.

As is the case for most industries, most innovation work involves routine innovation, mainly featuring improvements to our existing activities or the products and processes we use. Over the years there have been many modifications of water and waste water treatment processes and water mains and sewers that fit this category.

However, we also look to extend current skills and technologies to new activities, markets or business models, and to apply completely new skills and technologies to our core activities. The following are examples of more disruptive innovations from our recent past.

Trenchless technologies – pioneering work using very innovative underground technologies to improve condition surveys, repair of sewers and cleaning of water mains.

Social policy work – close work with social charities and a broad package of measures to help low-income households. Recognised as utility sector leading by national bodies.

GENeco – the creation of a distinct operating division which led to food waste digestion and processing biogas into biomethane for export to the gas grid and for use in vehicles; it also acted as a precursor to liberalisation of bioresources.

Catchment management – we were pioneers in using catchment management to deal with raw water quality at source. We have extended this approach with the introduction of catchment permitting and market tools such as EnTrade, which brings together buyers and suppliers of environmental improvements.



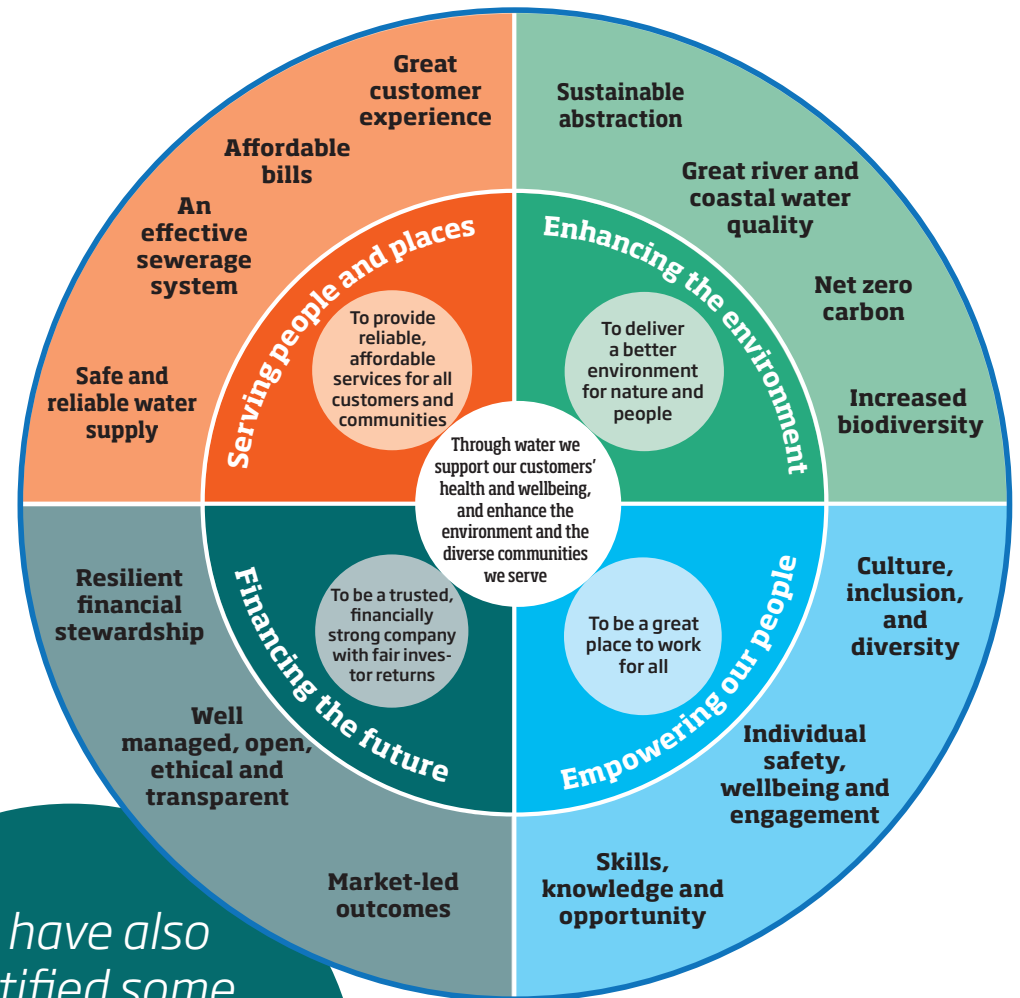
Our purpose

We have strong foundations, grounded in our record for operational, customer, financial and environmental performance. But, in light of the challenges ahead, they are not sufficient. We recognise we must earn the right to be considered by the public, generally sceptical of the industry, as a leader in environmental stewardship as well as customer service and efficiency through delivery of our strategic vision for 2050.

At the heart of our strategy are eight outcomes, co-created with stakeholders and focused on long-term ambition. They cover customer, community and environmental outcomes and are shown in the top half of the diagram to the right summarising our 25-year plan. We will need to work in partnership with our communities to deliver these aims and to embed resilience along the way.

We have also identified some internal enablers that we will need to secure to effectively deliver our eight outcomes, centred around strong financing and governance, and empowered people. These are shown in the bottom half of the diagram.

The following pages detail each outcome and one of the enablers, and how we will use innovative approaches to meet our aims and targets.



We have also identified some internal enablers that we will need to secure to effectively deliver our eight outcomes



Outcome: Great customer experience

Aim: To be a top 10 customer service provider in the UK

Context

Our customers are at the very heart of our business, and we are proud to be consistently rated as one of the top water and sewerage companies for service, efficiency, standards and environmental performance. For example, we are top of Ofwat's customer experience ranking for water and sewerage companies, delivering industry leading customer service and operational performance. We have also consistently registered the fewest complaints per 10,000 customers of any water and sewerage company.

We continue to hold the Customer Service Excellence award and achieved the Service Mark with distinction from the Institute of Customer Service - one of only 18 companies to hold the accreditation to this level. However, we plan to go beyond being an industry leader and will measure ourselves against the very top customer service providers in the UK. We have an excellent foundation to build from but being among the best of the best will require us to continue to improve our offering.

Recent innovations

Through our new feedback strategy, we are gathering more customer views on our service in real-time and encouraging them to put reviews on Trustpilot. Coupled with real-time feedback data dashboards, this helps us to rapidly spot any dissatisfaction and improve our policies, processes, training and systems. We have also improved communication with customers during service interruptions, sending messages to them via text, website banners and social media posts.

Our customers are also members of the communities we serve, and we are pursuing new ways to make a positive difference locally. To this end we have installed 23 water refill points since 2020 to enable easy high street access to fresh drinking water, while replacing the equivalent of 60,000 500ml single-use plastic bottles so far.

Our Wessex Water Foundation is helping build stronger communities across our region, distributing £500k of funding every year. Since April 2021 this has supported 90 local groups such as Citizens Advice Bureaux and key environmental partners with funding for environment and community projects.

We have also introduced a new customer community email newsletter to support our existing print magazine and reach new customers with a 'digital first' approach to communications for younger people.



Future innovation

If we are to be one of the top 10 UK service providers and reduce the costs of serving customers while maintaining high levels of satisfaction, we must continue to explore innovative ways of working. In an 'everything online' world, much of this involves greater use of digital systems and a range of relatively novel technologies.

For example:

- using video for more flexible or personal interaction with customers
- geo-location technologies such as What3Words to help with locating specific sites and addresses
- artificial intelligence for analysing customers' feedback
- smart metering to provide more detail for customers on their water use.

There is potential to use data more effectively, eg, to segment our customer base and make better decisions.

Combined, all these can improve customer experience by offering more information to customers on tasks and their use of our services, better access to assistance, and better insight for us on areas of satisfaction and dissatisfaction.

At the same time, technology must not diminish the personal touch. We will need to offer all the contact routes that customers want, some of which won't be hi-tech. We will continue to develop our Going the Extra Mile programme which encourages our staff to help customers where they see an opportunity, beyond the immediate task that they are carrying out. We will make greater use of behavioural approaches when communicating with our customers.

We also aim to transform how we engage with communities. One method will be bringing partners together to work on local environmental and social goals - by identifying shared priorities, increasing people's ability to act and encouraging new ways of working. We will be testing this approach over the next two years in Chippenham and Bridport.



Outcome: Affordable bills

Aim: Zero water poverty

Context

Water should always be affordable for all customers, whatever their circumstances. We commit to ending water poverty by ensuring no one spends more than 5% of their disposable income on our water and sewerage services. This ambition will be especially stretching as living costs rise and disposable income dwindles for many.

We were the first water company to introduce social tariffs back in 2007 and since then we have helped more than 53,000 households in financial difficulty to make their bills more affordable and get back on track if they were in debt.

We are absolutely committed to continuing to help our customers in this way, including by delivering an efficient service for all and going the extra mile to help those in extreme financial difficulty. Our tailored assistance programme (**tap**) offers customers support through a range of schemes and low-rate tariffs to help them afford their ongoing charges, repay their debt and reduce their water and energy use.

Our vulnerability strategy Every Customer Matters sets out a wide range of initiatives to raise awareness and increase uptake of our support for customers in vulnerable circumstances, financial and non-financial. We have set ourselves challenging targets to increase the number of customers we are reaching. Across the business we have specially trained vulnerability experts who provide ongoing expert guidance, support, and training to their colleagues. We hold the British Standard for Inclusive Service Provision and the Louder than Words charter mark. More than 2,000 staff are trained as Dementia Friends.

Recent innovations

We continue to look for new and innovative ways to improve the support we offer. In the last few years, these have included:

- changes to our discounted tariff to increase uptake among lower income pensioners
- a £50 rebate for NHS staff who were having to wash their uniforms more due to Covid-19, benefiting more than 14,500 customers
- changes to our main social tariff, Assist, whereby bill discounts of up to 90% are fast tracked for customers temporarily affected financially by the pandemic, without them needing to seek debt advice
- being among the first group of companies to sign up to up to the Inclusive Economy Partnership's code of best practice that ensures those in debt are supported fairly



- working with water and energy companies to introduce data sharing with Priority Services, leading to a successful data share arrangements in our area and subsequent increasing uptake by customers. Similarly, piloting data sharing with a local council that identifies customers as struggling financially and with their consent, shares data with us
- signposting customers on our Priority Services register to Fire Service Home Safety checks as part of efforts to support more customers in vulnerable circumstances
- supporting Utilities Against Scams by training staff to recognise scams and help potential victims
- supporting Avon and Somerset Police Missing Persons Dementia Safeguarding Scheme by funding free wearable tech that helps return the wearer to safety if they are found lost or in need of help
- working with Scope and members of the public who they support, to review our bills and ensure they are accessible for all.

Future innovation

Looking ahead, we will need to find new ways to improve our offering to customers in vulnerable circumstances and raise awareness and increasing take-up of the services we offer. There will be scope for behavioural approaches to encouraging customers to contact us when they experience affordability problems. We will draw on our own customer journey mapping, tailored customer satisfaction surveys, and increase how we use data day-to-day and strategically.

We will remain attentive to standard of living trends and continue to support the Consumer Council for Water (CCW), Defra and Welsh government in the implementation of the recommendations from the water affordability review and development of a new single national social tariff for 2025. We will continue to improve our work with existing partnerships, while forging new ones. In the coming years we will look to adopt the ISO standard (BS ISO 22458:2022) Consumer Vulnerability. Requirements and guidelines for the design and delivery of inclusive service.



Outcome: Safe and reliable water supply

Aim: 100% quality compliance, always Zero interruptions of longer than three hours

Context

Providing wholesome, safe, and reliable water is a basic requirement of any water company. We already reliably supply excellent quality water.

For the past three years, we have achieved industry leading compliance, with the few failures that do occur often attributable to customers' internal plumbing and activities. There have been no water restrictions in our supply area since 1976, and decades of commitment, innovation and investment have enabled us to halve the duration of supply interruptions in the last five years.

Our customers attach enormous value to knowing that every single drop, without exception, is of the highest quality and available whenever they want it. Our long-term commitment to our customers is that, for the next 25 years and beyond, their water will be 100% compliant with the demanding standards set down by the Water Quality Regulations. We are also setting an ambitious target for the duration of any supply interruption, however caused, to be at most three hours.

Recent innovations

Recently these have covered all aspects of water supply - protecting water sources, treating water and managing water mains.

- Delivery of a pesticide amnesty in the Upper Tone catchment working with Farming & Wildlife Action Group Southwest. This involves recovering unused and outdated pesticides from farmers for safe disposal by licensed contractors. It is the first time that we have carried out a pesticide amnesty in a catchment of this size.
- Investigation of 'carbon farming'; this would involve raising awareness, providing advice and payments to improve soil health and activities and measures to reduce loss of soil carbon within our water source protection zones. Expected spin-off benefits would include reduced nutrient and pesticide usage.
- More reliable optical monitors for measuring turbidity (cloudiness) and nitrate levels.
- Introducing a 'Zetasiser' device which helps us finetune the quantity of coagulant chemicals that we use to remove fine particles (such as silt) suspended in reservoir water. This should lead to the use of an algorithm, based on the surface charge of these particles, to fully automate the dosing of the coagulant chemicals.



- At Durleigh water treatment works: a more reliable, hydraulic system for removing sludge formed by dissolved air flotation; and an improved instrument for analysing levels of iron, aluminium, and manganese.
- The use of remotely operated vehicles that can carry out underwater condition surveys of tanks that store treated water (service reservoirs), and drones that can closely inspect the interior walls above the water level and tank ceilings.
- More rapid and accurate measurement at our laboratory of bacterial cells in water, using a technique called flow cytometry. This helps us more quickly identify issues in treatment processes or water mains, and pre-empt potential sources of failure.
- Expanding remote, real-time monitoring of the supply network. We are exploring ways to use the data we collect in the most intelligent way and respond more quickly and effectively to bursts and leaks.

Future innovation

Looking ahead, there are several areas where innovation will be needed. Some are related to resilience, such as ways to maintain continuous supplies during heatwaves or rapid freeze-thaw events, and improving the speed and quality of burst repairs, ideally without disconnecting supplies. In terms of water quality, there will be continual focus on catchment management to counter rising nitrates and pesticides in the raw water at our sources. New methods will be needed to detect, extract and replace lead service pipes as we move towards a lead-free network. There is likely to be growth in water reuse and recycling, and we will explore new ways to work with customers and stakeholders to improve and protect drinking water quality in the home and workplace, including schools and public buildings.



Outcome: An effective sewerage system

Aim: Halve the impact of sewer flooding

Context

Our extensive sewerage network is subject to various pressures including climate change, population growth and changing consumer behaviour. One negative result can be sewer flooding. The experience of sewer flooding can be devastating for customers, but it is already very rare thanks to long-term investment and maintenance. We are an industry leader in this area, having cut the number of internal incidents in homes and businesses by 25% between 2015 and 2020. Reducing these occurrences still further remains one of our key objectives, and we are committing to going even further by halving the impact of both internal and external sewage flooding – based on intrusiveness for customers and the impact on the environment.

Meanwhile, more and more attention is being paid to the operation of storm overflows. There is widespread concern about their potential effects on public health and the environment. We aim to respond positively to what is a complex issue and innovation is needed to minimise storm overflow impacts.

Recent innovations

We have carried out widespread installation of sensors and monitors in sewers at storm overflows. One result has been a large increase in data, and turning this into useful information that can lead to corrective action has been a challenge. Consequently, we have trialled a system devised by StormHarvester that uses artificial intelligence (AI) to help monitor storm overflows. Following the success of the trial we will rollout StormHarvester more widely in the next few years. The case study on the following page provides more information.

Sewer flooding is usually the result of blockages caused by flushing wet wipes or pouring fat down sinks. So, as well as carrying out sewer monitoring and maintenance, our efforts are increasingly focused on addressing the causes. Alongside pushing for action on misleading advertising of so-called flushable products, which cause most blockages, we have significantly increased our engagement with customers on sewer blockage prevention. Using a personalised approach in blockage hotspot areas, we have undertaken more than 6,800 home doorstep visits and run targeted social media messaging. In 2021 we launched a free blockage prevention waste pack which has been requested by over 7,000 households, and ran a wider campaign in four towns that had been experiencing repeat blockages (Bridgwater, Yate, Melksham and Gillingham).



Meanwhile, our sector leading sewer rehabilitation team has been adding further innovative tools for surveying and repairing sewers and tunnels. These include a robot and stent system that can restore the circular profile of sewers that have partially collapsed, and a semi-autonomous raft that carries hi-tech devices for assessing the condition of tunnels and large diameter pipes. See the following case study for more information.

Future innovation

We expect to see more and more in-sewer monitoring, to help us keep track of the performance of our system in real time and predict, prevent or minimise the impacts of problems in sewers. We also expect sustained public engagement on this issue. People will expect more transparency from us and evidence of progress in reducing storm overflow spills. We will continue to explain the risks caused by sewer misuse and support environmental officers on the ground who are detecting sewer misuse and misconnections of foul water to surface drainage.

The new Drainage and Wastewater Management plan will show pressures on our system now and in the future due to climate change and growth, and indicate how innovative solutions can help deliver more sustainable drainage systems. As well as features such as swales, ponds and permeable paving, this will include tackling flooding and storm overflows where they harm the environment. In the longer term there would need to be legislation preventing housing developers and property owners connecting surface water to sewers that carry foul water, as well as more separation of rainwater drainage from the sewerage network.

We will continue to build on our sector leading work on advanced 'no dig' methods for survey and repair of sewers. This will include participation in a project funded by the Ofwat Water Breakthrough Challenge using Pipebots innovative technology to inspect rising mains.

Case study: intelligent sewers and smarter repairs

Reducing river pollution from sewer storm overflows is an important issue for water and sewerage companies and the public. Storm overflows are designed so that when a sewer has filled up with rainwater or groundwater, highly diluted sewage will discharge from the overflow. However, serious pollution can occur when undiluted sewage spills out of a storm overflow during dry weather due to a problem further down the sewer, such as a blockage.

In recent years we have installed many event duration monitors (EDMs) at storm overflows. These tell us if a sewer is full or not, trigger an alarm when they are discharging, and measure the duration of the overflow. Around 80% of overflows are now monitored, which means many more alarms coming from our sewers. We have found that alarms triggered by a significant problem (such as a dry weather spill) can be obscured by those caused by expected spills during wet weather.

So, we need to use the new alarm data more intelligently. Which alarms indicate unexpected flows, given the weather conditions at the time, and are indicating a genuine problem? Can EDM data give early warnings of blockages, enabling us to act early to prevent pollution?

We knew of several smart algorithm products that might help to answer these questions, but there was limited implementation in the UK. So, we set up a challenge on Wessex Water Marketplace which offered the chance to reach a large number of potential solution providers and test a range of options using real data, and to identify the best fit for us. We launched the challenge in autumn 2019, inviting interested parties to demonstrate their abilities by processing our data in their systems. Sixteen companies took up the challenge and we selected three for the next stage: a live proof of concept trial in the Bath sewerage catchment during summer 2020.

Following the trial and the subsequent tender process, we selected StormHarvester who use very local rainfall forecasting to accurately predict flooding events from sewerage, up to six hours ahead. Their advanced data analysis methods can be seen as a specific type of artificial intelligence and the results have been very encouraging.

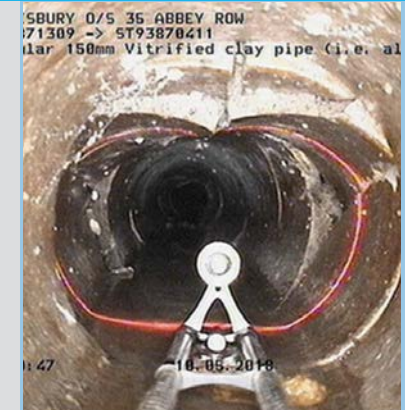
StormHarvester's system has identified partial blockages early on, leading to our operators clearing problems before they caused sewage spillages. Our use of StormHarvester also gained the Most Innovative Technology of the Year award at the 2021 WWT water industry awards. StormHarvester will now support us to 2025 by monitoring up to 1,700 devices across our network. This will help us manage our sewer network in a more proactive way, reducing the likelihood and impact of pollution as a result.

Meanwhile, our sewer rehabilitation team has introduced numerous innovations in the past for surveying and repairing sewers in ways that are quicker, safer, less disruptive, lower cost and have a smaller carbon footprint. They have had some notable successes.

The Re-rounder is a robotic machine developed by the team which, inspired by human heart surgery, can re-shape sewer pipes that have become deformed or have started to collapse. The robot's plates force the pipe back to its original circular profile and then leaves behind a metal stent - similar to those used to keep arteries open - to secure the pipe's shape. We then re-line the inside of the pipe over the stent. Following two years of development and testing, the Re-rounder is now in use throughout our sewer network.

The team also monitors sewer tunnels to assess their condition. Problems can include changes in their shape after ground movement caused by building work or demolition, or thinning of the tunnel walls due to corrosion. To aid their survey work, the team has brought in the world's first LiDAR survey platform for long distance autonomous tunnel and sewer inspections. Telesto is a raft-based system, developed by Headlight AI, that can travel five kilometres from a single access point. As it floats along, it gathers the data needed to create an accurate 3D digital model of the inside of a tunnel and highlight any problems. The models can also be used for future building projects to avoid foundation piling affecting the tunnel.

These projects have led to several awards, including the Utility Pipeline Technology award (Pipeline Industries Guild 2020) and the Best Application of Digital Technology and Best Innovation (UK Society for Trenchless Technology, 2021).





Outcome: Sustainable abstraction

Aim: Never harm the health of the water environment through our abstraction

Context

For decades we have balanced the need to supply water to our customers with the need to maintain a healthy water environment. In the last decade alone, we have invested more than £230 million to reduce the amount of water we take by 25 million litres per day, to preserve the unique ecology and fragile habitat of local chalk streams. But balancing the needs of our customers with the needs of the environment is becoming increasingly difficult. Not only is the population of our region forecast to grow by 13% by 2050, but climate change is expected to result in drier summers and more extreme weather events. Acknowledging this challenging backdrop, we pledge to ensure our abstraction remains sustainable now and in the future, as we continue to provide for the needs of our communities.

Recent innovations

Environmentally sustainable levels of abstraction require various approaches involving water sources, leakage reduction and customer demand. The following are recent examples of how we are gathering new knowledge and developing novel techniques for this purpose.

During 2020-25 we are investigating the effects of water abstraction on river flows, groundwater and aquatic wildlife. Near Chippenham we have carried out exploratory drilling to better understand local geology and its effect on groundwater flow and storage. With the British Geological Survey, we have identified previously unmapped geological faults using a new approach to geophysical investigation. Deep water samples are being analysed to determine the age of the water, how long it sits in the aquifers and how fast they fill.

With Bristol Water and South West Water, we formed the West Country Water Resources Group (WCWRG) in 2017. The south west region as a whole has a supply deficit which will increase substantially over the next 30 years if we do nothing. WCWRG is developing a plan that will outline the measures to reduce demand and bring in new supply options to address this.

Leaks are usually found by detecting the specific sound made by leaking water pipes, typically with portable devices. Increasingly we are using fixed devices, such as acoustic loggers that communicate via the Narrowband Internet of Things (NB-IoT), which help ensure that we receive data on detected leaks as quickly as possible.



We are also trialling a device that identifies potential leaks on larger trunk mains, based on technology used in the oil and gas sectors. We are working with its developer, Atmos, on two trunk main systems in the north of our region, to identify 'points of interest' in the data that indicate possible leaks. While there has been less innovation in leak repairs, we are involved in joint research via UKWIR on methods that use less excavation and learning lessons from the gas industry.

Our online water calculator, GetWaterFit, helps customers understand how they use water at home, identify simple ways to save water and energy, and order free water saving products. We are using novel ways to better understand customers' water use. Recent examples include motion-sensitive cameras to observe garden water use and a study of customer attitudes on smart metering and water efficiency.

Future innovation

Climate change and population growth will put more pressure on our precious water sources, and innovation will have a role in reducing abstraction, especially where there is concern about impacts on streams and rivers. Large strategic water resource options that could be shared within the south west region include a second reservoir at Cheddar, effluent re-use at Poole, and re-purposing quarries in the Mendips for public water supply use.

Regulators and customers will expect us to play our part by reducing leakage further, including innovative technological solutions for detecting, pinpointing and fixing leaks in ways that are less disruptive and more cost-effective. Longer term, we expect to see moves towards leak-free networks where new water mains are being installed. As with other aspects of our work we expect to see more sensors producing more data, which in turn needs advanced techniques for turning data into useful information that can be acted on. We will also need better ways to encourage lower water use in the home and garden and make water saving messages more compelling and memorable via a range of communication methods and signals. We will also work with housing developers to reduce the water consumption of new build homes potentially through smart devices - which also have the potential to assist with leak detection - and upstream flow controls.



Outcome: Great river and coastal water quality

Aim: To restore the quality of our rivers and coastal waters

Context

We have always been passionate about protecting and enhancing the water environment. We have regularly led the water industry in the Environment Agency's Environmental Performance Assessment and have a track record of delivering outstanding environmental investigations to target exactly where our investment should be.

We were the first to embrace catchment management and through EnTrade we have pioneered catchment markets, collaborating with landowners to reduce nutrient load at source for a fraction of the price of traditional treatment solutions. With the Environment Act in place, it is now clear that as well as taking this long-term approach to water quality improvement, water companies must also reduce short sharp shocks to rivers in the form of sewage pollutions from storm overflows.

Recent innovations

As noted in the section on an effective sewerage system' we have invested heavily in sewer network monitoring, to help protect rivers while reducing sewer flooding. Alongside new sewerage infrastructure, we have been proactive and transparent on the subject of storm overflows, including an interactive map on our website that gives information for each one, eg, number of discharges, and whether they are a reason for a river not meeting good ecological status. This helps our dialogue with government, regulators and campaigners on the issues involved in tackling this long-standing problem.

Warleigh Weir near Bath on the Bristol Avon is a popular location for bathing and other recreational activities, although it is not designated as a bathing water nor subject to regular water quality monitoring. People using this stretch of river have expressed concern about its condition, and in spring 2021 we started to investigate the main influences on water quality to inform any future measures to address them. For this we are working with a company specialising in the use of artificial intelligence (AI). It involves using mathematical algorithms to establish the relationships between things that can be measured in real time, such as river water temperature, pH, conductivity and dissolved oxygen - and the microbial indicators used for bathing water compliance that take longer to assess as they require laboratory analysis. Continuous water quality monitoring sensors taking real-time measurements are now in place at the weir and two sites upstream, and we are taking regular water samples for comparison using



laboratory analysis. The aim is that as more data is collected, the AI system will learn how to judge when the river water is either safe or poor quality, so that recreational users can be informed in real-time.

We are also using the observational abilities of people, as well as hi-tech sensors. We recently joined forces with the wildlife trusts in Somerset, Dorset and Wiltshire to form Water Guardians - local volunteers who are trained to monitor watercourses and identify possible pollution incidents and report them for further investigation.

Future innovation

Significant effort and investment will be needed to meet changing regulatory requirements and public expectations for the water environment, and innovation will have a part to play. In some cases, this may mean new types of sewage treatment. This has been the default method to date, but it will also include a wider set of interventions. For example:

- longer-term catchment scale interventions alongside end-of-pipe solutions at water recycling centres to improve river water quality
- extending catchment-wide permitting as a more flexible and effective way to set standards for treatment at water recycling centres
- wider and more varied use of land-based measures, assisted by tools such as EnTrade
- providing more information about storm overflows, and using new technology to assess the condition of rivers and bathing waters in real time
- updated river water quality and catchment modelling to ensure that improvement work is based on the best available scientific evidence and is focused on the right locations and activities
- more research into emerging pollutants with other water companies and universities, and further work with the healthcare sector on projects which improve people's wellbeing while reducing pharmaceutical use
- awareness raising on how to keep beaches clean and exploring new ways to encourage people to participate in efforts for rivers and streams in their neighbourhood
- working with others on diverse ways to control pollutants and the causes of pollution incidents at source
- we are developing innovative nature based treatment options to deal with storm overflows, especially those that are affected by groundwater inundation, and also to reduce inputs of nutrients into rivers from water recycling centres and farming.

Case study: constructed wetlands and catchment markets

Cromhall constructed wetland

Since the mid-2000s, many of our water recycling centres have been upgraded with the addition of phosphorus removal. Phosphorus enters rivers from treated effluent, as well as from agriculture and urban run-off, and can lead to algal blooms in the water. This reduces oxygen levels, adversely affecting invertebrates and fish. While the typical method for removing phosphorus is to add specific treatment chemicals such as ferric sulphate, we have tested a range of alternative methods in the past.

At Cromhall in South Gloucestershire, we chose to create a wetland as a more natural method of removing phosphorus. Constructed on an area that was previously a mix of arable land, poor quality neutral grassland and scrub, the wetland comprises 12 ponds covering an area of 0.8ha. It acts as a filter by using plants in cells which will preferentially use phosphorus in their growth.

It also delivers wider environmental benefits, such as habitat for birds, amphibians, invertebrates and other wildlife. The project involved the Wildfowl and Wetlands Trust, Environment Agency, Tortworth Estate and Bristol Avon Rivers Trust. It is being monitored by researchers from four nearby universities (Bristol, Bath, Cardiff and Exeter), looking at what happens to pathogens, microplastics and pharmaceutical residues in the wetland, as well as the availability of carbon, nitrogen and phosphorus.

The wetland was highly commended in the Royal Town Planning Institute (RTPI) awards for Planning Excellence, and we are looking to install similar wetlands and plant woodlands as part of the government's green recovery initiative.

EnTrade

Developed in 2016, EnTrade was created to provide an innovative way to improve the water environment. Through EnTrade's online platform, we connect farmers and others who can deliver environmental work on the ground with those who are willing to pay for that activity, such as water companies. EnTrade hosts the online bidding process, bringing together the respective providers and buyers of environmental improvement. The EnTrade team works collaboratively with farmers, landowners, communities, regulators, councils and others, leading to cost-effective nature-based solutions to environmental issues, providing an alternative to conventional investment in physical assets. EnTrade was pioneered in the Poole Harbour catchment, working with more than 100 farmers to prevent over 250 tonnes of nitrogen entering the water, and spending £460,000 with them between 2015 and 2020.

Since then, EnTrade has expanded from its initial concept as a platform for nitrogen trading. It now provides market development, trading, contracting, payment and verification services to buy and sell environmental services across England. This



helps to protect drinking water supplies, reduce the costs of waste water treatment, demonstrate nutrient neutrality for new housing, store carbon, reduce flood risk and protect biodiversity. Innovative uses of EnTrade in the last few years have included the following.

- The first multi-benefit auction in Poole Harbour in collaboration with the Environment Agency and Defra under its Environment Land Management Scheme test and trials programme. Farmers were paid for a wider range of benefits, including biodiversity measures, nitrogen off-setting, reduction in flooding through natural flood management measures, carbon sequestration and habitat connectivity.
- Combining reverse auctions and mapping to optimise locations and prices of new newt ponds. This will help protect great crested newts across seven counties where they are subject to development pressures.
- Running a marketplace with farmers in the Pewsey Vale for land use change that leads to lower phosphorus emissions - offsetting additional phosphorus pollution linked to population growth and new housing.
- Developing the Somerset Catchment Market as a way of stimulating creation of woodland and wetland and other measures that can reduce flows of nutrients into watercourses, while providing other environmental benefits. Similarly, working with Avon and the Wiltshire Wildlife Trusts to deliver the Bristol Avon Catchment Market, which will deliver local, high-impact and verified projects to restore nature, increase biodiversity, reduce carbon and provide natural flood management.



Outcome: Net zero carbon

Aim: Be a net zero carbon business by 2040

Context

Along with the wider UK water industry, we have already pledged to move early in mitigating the climate emergency by achieving net zero carbon emissions from our operations as early as 2030. In addition, we are targeting net zero embodied carbon associated with the materials, products and services we use by 2040 – 10 years ahead of the national goal.

This requires a significant change in how we deliver our outcomes and how we, the water industry and the wider economy works. Energy intensive assets such as large treatment works have helped us achieve the high water and waste water quality standards we have today. But as we look to make further improvements, we must ensure we harness a wider asset base, including nature-based and partnership solutions. These will help us deliver our carbon ambitions and the national net zero strategy, as well as wider benefits for customers, society and the environment. We will build on a long track record of action, which has included pioneering work to generate energy from sewage sludge and food waste, and to avoid emissions through catchment management, nature-based solutions and innovative repair of sewers and other physical assets.

Recent innovations

In 2020, the water companies in England produced a route map to achieving net zero operational carbon emissions by 2030 – the first sector route map of its kind in the world. Then in summer 2021 we published our own route map to net zero carbon. This explains what decarbonisation means for Wessex Water and sets out what we plan to do during the next 10 years and beyond. Our assessment is that background reductions in the UK's carbon footprint, such as the growth in renewable energy generation, will mean that our energy and transport emissions will fall by around one third from our current position. We therefore need to take concerted action between now and 2030. In our route map we identify a range of readily available options including:

- emissions avoidance measures such as reducing water use and leakage
- increasing the use of lower carbon transport
- promoting nature-based solutions
- optimisation measures such as energy efficiency work
- renewable energy from anaerobic digestion
- pursuing opportunities for wind and solar power.



Work in recent years has mainly focused on making the most of our existing activities related to energy efficiency and renewable energy generation. We have also been trialling the use of electric vehicles and are starting to explore how to monitor and control nitrous oxide emissions from sewage treatment, as this greenhouse gas is going to account for an increasing proportion of our overall carbon footprint in the years ahead.

However, technologies that are already available for use will not get us to our goal of net zero carbon. So, we are investigating more innovative options involving emerging science and technology, such as turning sewage sludge into biochar, as well as promoting nature-based solutions. While these methods are not yet well-established, we are assessing their maturity and availability and will take part in trials where appropriate.

As a first step towards our more wide-ranging goal of net zero total emissions by 2040, we are incorporating detailed assessment of emissions associated with construction materials and capital investment. Our routine use of greenhouse gas databases will not be just for quantifying the embodied carbon of our capital programme, but will increasingly be factored into upfront decisions on the best solution to be used.

Future innovation

Newer methods for cutting our carbon footprint will involve a combination of technology, wider environmental management and human behaviour. We will be able to optimise our treatment process with advances in sensors and the use of machine learning to interpret and manage large amounts of data. We will keep a close eye on the development of advanced thermal technologies that lock organic carbon into biochar, as well as potential generation and use of green hydrogen. We will also need to do more to link decarbonisation and our work on land and catchment management – whether it involves agriculture, tree-planting, wetland creation or other wildlife habitat work.

Whole-life, total carbon thinking must become central to our decision-making processes and that of our regulators to enable a truly low carbon water sector. Looking ahead, this will necessarily mean challenging assumptions about the best ways to carry out investment for customers, communities, and the water environment. Either way, our plan will certainly evolve through partnership with others and as our learning grows.



Outcome: Increased biodiversity

Aim: Double our biodiversity improvement

Context

Human activity has continually shaped and reshaped our rural and urban environment, and the biodiversity crisis is as concerning as the climate emergency, with the two intrinsically linked. Biodiversity in the UK is well below the global average with only 53% of our biodiversity left, placing us in the bottom 10% of the world. In the last few decades, human activity has continually shaped and reshaped our rural and urban environment. Two thirds of the UK is still used for agriculture and another 8% has been built on - leaving little room for nature.

The natural environment is essential for our wellbeing as well as being a vital component of our business. In 1998, we became the first water company to publish a Biodiversity Action Plan (BAP) that targeted efforts to conserve and enhance wildlife across our region. Over the next 25 years, we will further enhance our region's biodiversity, doubling our improvement impact.

Recent innovations

To more fully understand our biodiversity impacts and potential improvements, we have assessed the natural capital value of our land. Leading up to 2020 we surveyed all our landholding and subsequently used the Natural England Biodiversity Metric 3.0. to identify the habitats we host with the greatest biodiversity. These are neutral grasslands, followed by reservoirs and lowland mixed deciduous woodland. We are using these findings to assess the natural capital and biodiversity values of non-priority habitat sites to help us evaluate and target biodiversity gains from positive conservation management.

Other innovations include:

- assisting the natural recolonisation of beavers at Otterhead water supply reservoir, for ecological and hydrological benefits. From our monitoring of their impacts on the reservoir and the River Otter, we have seen that they have coppiced trees, created wetland with diverse physical characteristics that will benefit different species of fish, and built dams which act as natural sediment traps and protect downstream locations from both flash flooding and severe drought
- collecting greater broomrape seeds from Clatworthy reservoir, to be deposited at the Millennium Seed Bank. Greater broomrape is classified as 'vulnerable' on the England Red List and we were able to supply 38,000 seeds



- at Blashford Lakes, trialling the use of a biological control - in the form of a gall-forming mite - to help control Australian swamp stonecrop which is an invasive plant species.
- taking fine-detail, aerial footage of Charmy Down (near Bath), Bleadon Levels (near Weston super Mare) and Durleigh Reservoir (near Bridgwater) to enable accurate mapping of their current habitats and assist the creation of priority habitats such as mixed deciduous woodland, lowland calcareous grassland, ponds, lowland meadows and saltmarsh
- as set out on page 15, creating a wetland at Cromhall whose primary function is to 'polish' treated effluent, but doubles-up as a wildlife habitat
- using DNA analysis to identify bat species from their droppings and the presence of great crested newt in ponds from water samples
- using infrared cameras to assess whether bats are using our buildings and trees as roosts. By observing their behaviour we can avoid or minimise any impacts on them arising from scheduled buildings maintenance.

Future innovation

Innovations for biodiversity will need to address a range of topics, including:

- enhancements of our landholding and the catchments where we work
- reducing risks from invasive non-native species and enhancing biosecurity
- working with catchment partners on solutions that offer multiple benefits, potentially with the help of environmental markets
- involving community interests
- methods for measuring net environmental gain.

Technology will have a role to play, for example, we will look at whether a network of fixed sensors can help detect and assess mobile species such as birds, bats and others. This could be a way to efficiently gain information on how species use our thousands of sites with varying levels of biodiversity interest. More widely, we plan to integrate natural capital and biodiversity metrics within our decision making at a site and programme level. This will be combined with information on carbon and other factors to provide more holistic, nature based solutions for the environmental issues we are addressing.



Outcome: Empowering our people

Aim: Whether at work or among the communities in which they live, our people are key to the successful delivery of our outcomes for customers and the environment. We treasure and champion them.

Context

Culture, inclusion, and diversity - experience and skills among our people are essential to capture new viewpoints and ideas, and to innovate. We are committed to further developing a culture where everyone belongs and thrives, inclusive of every gender, ethnicity, race, age, ability, sexual orientation and social background. We value differences at Wessex Water and firmly believe a diverse workforce brings different perspectives, ideas and solutions and we intend our workforce to reflect the region we serve.

Individual safety, wellbeing, and engagement - we want our people to enjoy working for Wessex Water; to be safe, proud and fulfilled in their jobs; and to be advocates for the role we play in our communities.

Skills, knowledge, and opportunity - we are investing in our people and will ensure they are empowered to deliver outstanding customer and environmental services in line with our outcome ambitions. We will continue to develop and support our teams over the long term and ensure we have the right mix of people and skills for the future.

Recent innovations

We have been focusing on ways to better reflect the diversity of the community, through

- promoting all forms of diversity and inclusion at all levels
- careers education, with schools, colleges and community groups
- apprenticeships, graduates and early careers
- promoting and encouraging flexible working.

The Armed Forces Covenant offers support to armed services personnel including reservists, veterans and military families, especially in recruitment. We guarantee an interview for armed forces personnel who meet the job specification criteria and recognise military skills and qualifications in our recruitment selection process. We have recruited several key posts recently through this initiative.

The Disability Confident Employer scheme encourages employers to think differently about disability and to improve how they attract, retain and develop disabled people. We have achieved level two status as a disability confident employer since the start of 2022. We guarantee interviews for candidates declaring a disability if they meet the job specification criteria and provide guidelines to managers around awareness of disabilities and adjustments for interviews.

We joined the Autism at Work programme supported by the National Autistic Society. The programme includes a review of our job advertising, interview requirements, training and advice to hiring managers when autistic candidates start employment; and job coaches for hired candidates during the first six months of employment.

We have launched a new e-learning platform that can be accessed on mobiles, tablets and laptops. It gives employees access to their training records plus classroom courses, up-skilling training, 'learning bites' and a searchable catalogue - all to support and build our learning culture.

Future innovation

We aim to build on our learning culture in the next year by launching a coaching framework, and a new self-serve mentoring programme. We want to transforming the way our people access learning resources by empowering them to access content and manage their own learning and development. New content is continuously sourced to ensure we drive innovation, leadership and accountability for our people.

Meanwhile, the intense competition among employers for able individuals will be an increasing challenge. People's expectations are ever changing; there is growing desire to be home based, a need for more flexible working; and employers must demonstrate their commitment to diversity and inclusion, and their environmental goals. We must rise to these challenges by becoming more innovative and flexible in our approach to talent attraction and retention. We can no longer simply place an advert and expect candidates to want to work for us, nor assume that our people are happy in their jobs and want to stay. We must continue to look at our business through the lens of our people.



Case study: Wessex Water Marketplace

In recent years, the performance levels we must meet have been tightening, while significant challenges have been made to our costs. In some cases, the tried-and-tested approach will not be able to keep up with the expectation that we can do more, with less money. Instead, we need to actively seek out alternatives that may provide better financial value, solve two problems at once, or provide additional benefits.

Wessex Water Marketplace is one response to this, and one of the main ways that we pair up the challenges that we face with potential solutions, and the innovators that provide them. The starting point is the Marketplace website where we advertise challenges. This has given rise to some successful trials, such as the intelligent sewers case study described on page 12. Other recent challenges include the following.

Ion exchange brine

We want to find a more sustainable approach to deal with the brine waste from the ion exchange plant at one of our water treatment works. One possible solution is software for monitoring and optimising the treatment plant's operation, which we plan to trial at Blandford, our largest treatment works with nitrate reduction.

Sewer misuse awareness

Each year we tackle more than 13,000 blockages in our sewers, approximately 80% of which are caused by incorrect disposal of items down the toilet (such as non-flushable wipes) or down the sink (eg, cooking fat). Using Marketplace, we invited students to come up with new messages, imagery and engagement methods to attract attention and encourage people to make links between their own personal behaviour and the problem of sewer blockages.

Water quality customer contacts

This challenge focused on novel ways to reduce the numbers of customer contacts about water quality, while still maintaining a high level of customer service. The suggestions were mainly centred on smart networks, which we are actively considering, plus approaches that we are already using day to day.

Rapid chemical mixing for sewage phosphorus removal

Our conventional approach for phosphorus removal is to dose coagulants, often into crude sewage at the start of the treatment process, where rapid mixing of the coagulant is crucial. This challenge called for alternative mixing methods for sites where standard mixing options are not suitable. We are currently exploring the possibility of trialling some of the solutions put forward.

2024 Water Resources Management Plan

We are currently putting together our Water Resources Management Plan for 2025-2075. Our initial modelling suggests that without any interventions, water supply demand deficits of 50-150MI/d could occur at various points during this period. As we are open to ideas of ways to improve our supply-demand balance, we have used Marketplace to invite new suggestions.

Alternatives to plastic bead media

A small number of our water recycling centres use buoyant plastic bead media for wastewater treatment. For the sites involved we used Marketplace to seek consider alternative filter media, or a different treatment process entirely, using existing structures where possible. We are also interested in uses for recycled material from used media. While we didn't have any formal submissions, we will continue to increase our understanding and supporting data by undertaking more sampling and analysis of media degradation, while considering further research avenues.

Foam production at water recycling centre outfalls

Foaming sometimes occurs where the final treated effluent from water recycling centres enters rivers. While water samples and ecological surveys indicate no environmental damage, there can be a loss of public amenity value and they can be classified as pollution events. So, we are interested in possible methods for reducing foam production. We received wide-ranging responses including data science, engineering solutions, and upscaled fishpond equipment. As we are keen to tackle the root cause we are exploring an approach focusing on sewage treatment process data.

All the Marketplace challenges can be viewed at <https://marketplace.wessexwater.co.uk/challenges/>

Case study: Rethinking how our sector can benefit the environment

While the water companies in England and Wales and water regulators prepare their strategies for the 2024 price review, we've been developing an idea that would revolutionise how we can make greater environmental improvements without burdening billpayers. We have named this concept Outcome Based Environmental Regulation (OBER); it is an innovative way to bring about a range of greater benefits for the environment.

The global climate and biodiversity emergencies require urgent action and the government's 25 Year Environment Plan provides an ambitious framework to help tackle these challenges. We want to use our knowledge and resources to play our part and help in the achievement of the UK's environmental goals but our hands are tied by the current prescriptive approach to environmental regulation.

Our experience in and around Poole Harbour is a good example of this. The harbour suffers from over-enrichment by nitrates, from various sources, that lead to the formation of algae which can overwhelm its ecosystems. We have greatly reduced the quantity of nitrate in the effluent leaving Poole water recycling centre and have also been working with farmers nearby to reduce their own contribution from fertiliser use. Nowadays, the majority of nitrate entering the harbour comes from farming. However, in recent years we were asked by regulators to invest in nitrate removal at Wareham water recycling centre, necessitating a carbon-intensive treatment process that is also expensive, costing around £31,000 for every tonne of nitrogen we remove.

We were able to show that we could achieve the same outcome by delivering nature-based solutions in partnership with farmers, at a cost of just £9,000 per tonne of nitrogen removed. Despite this being 71% cheaper - with lower carbon emissions and able to provide biodiversity benefits - we were still obliged to invest in the costlier carbon-intensive asset solution in order to comply with the requirements of current environmental regulation.

This is not an isolated case. Environmental regulation for UK water catchments is fragmented across different sectors instead of being based on systems thinking; it is also prescriptive about methods to be used, and overly focused on specific actions instead of the end-goal. Consequently, we often do not see the most efficient solution being chosen for each environmental issue, nor incentives for innovative solutions. Our wider concern is that the 25 Year Environment Plan overall will not be delivered in efficient or innovative ways.

In the light of situations like this, we have developed OBER. In a nutshell, it would involve setting targets based on environmental outcomes. For example, these might be the ecological condition of a waterbody, or the level of chemicals such as phosphates in

a river - rather than targets based on outputs such as the concentration of phosphate in the effluent from a water recycling centre. Companies would then consider a range of options and be expected to choose solutions that deliver the biggest environmental benefits - for water, biodiversity and climate - at the lowest costs.

This approach would provide very significant opportunities for water companies to improve the environment through positive land use change, particularly in collaboration with the farming and land management industry, as well as local planning authorities and housing developers.

We think that incentivising the water industry differently from 2024 onwards through OBER would enable bigger and more diverse environmental improvements at lower cost to society. It would also promote more cross-sector collaboration, attract more private investment in environmental improvements, and result in the water sector playing a much more positive role in delivering the government's wider environmental goals.

In turn, this could unlock a lot of learning on environmental regulation for other sectors and meet the goals of the 25 Year Environment Plan in far more efficient ways. In effect, the water sector could be a sounding board for delivering the 25 Year Environment Plan through the private sector.

To explain our thinking and introduce OBER, we worked with economic consultancy experts Frontier Economics to produce a high-level report titled OBER: Enabling the water sector to make its contribution to the 25 Year Environment Plan. The report outlines the problems with the current regulatory approach and how OBER can provide a more effective solution on multiple levels. It also outlines how we believe OBER can be extended beyond the water sector and applied more widely across the UK economy. The report can be found at <https://www.wessexwater.co.uk/corporate/strategy-and-reports/performance/ober-report>.





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