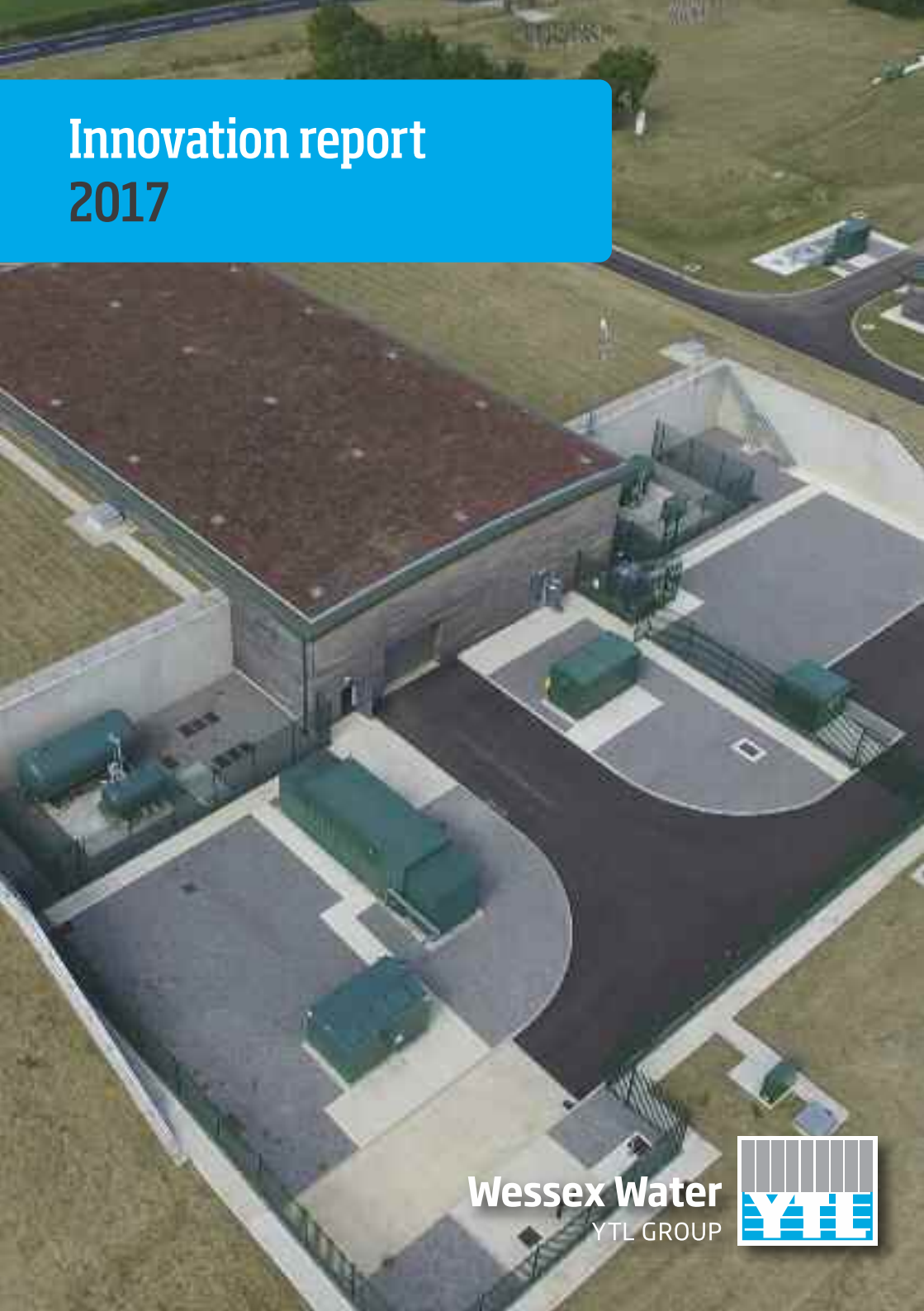


Innovation report 2017



Wessex Water
YTL GROUP



Introduction



Welcome to Wessex Water's 2017 innovation report

Water companies are a long way from where they were in the late 1980s, just before privatisation. Investment to improve the quality, reliability and resilience of services has exceeded £130bn over three decades. Service failures are rare now and customers' satisfaction with services continues to improve. Indeed, their rating of the services we provide compares favourably with some of the world's leading companies.

Meanwhile change is happening rapidly around us. This is especially obvious with technology - an average smartphone today has far more processing power than the leading supercomputers of the 1980s, and is used for making calls far less than its other functions. People's expectations of the companies and organisations that serve them is changing, with a desire for instant responses, everything being online, and the ability to personalise. As people's demands and enabling factors change, new challenger companies are entering more traditional sectors such as utilities. To respond adequately, we must innovate.

Historically, nearly all water innovation was about new technology to make things work efficiently and the gaining of new knowledge through research and environmental investigations. This has helped us to invest cost effectively in physical assets in ways that meet social and environmental goals. This type of innovation will continue to be very important in what we do.

However, water innovation is diversifying beyond optimisation of existing activities through clever technology. We are starting to see markets being used for social and environmental benefit - such as our own online auction platform, EnTrade. Innovation increasingly means partnerships; teaming up with regulators, NGOs, councils, and other businesses in creative ways. We are extending our skills and the range of services we can offer, as well as seeking new customers for the things we are good at already. All this means a culture of innovation in our workplaces and equipping our staff.

Either way, it is clear that our customers and other interests expect to see water companies innovating - it's not an optional bolt-on. This has been reinforced by Ofwat who consider that innovation underpins their three other main priorities for the next Price Review - affordable bills for all, great customer service and resilience in the round.

At Wessex Water, we want to build on recent successes, such as winning the 2017 Institute of Water national innovation award for our integrated approach to catchment management. This report sets out some of the ways in which innovation will help us meet and even exceed our stakeholders' expectations during 2020-25, and some of our work beyond our core, regulated activities.

I hope you find it an interesting read and look forward to hearing your views.

David Elliott
Group Director of Strategy and New Markets

Foreword



Innovation can seem like drinking a glass of water - uncontentious and demonstrably good for you.

At Wessex Water we have no problems with such innovation and for years now have been striving to do a wide range of sensible and obvious things ever better, more cheaply and more effectively. So for example, technology has provided us with ways to address pipe failures without digging up long sections of roads and paths - such as the Ferret probe which tells us where leaks are on customer's pipes, and clever repair systems that mend pipes from the inside out.

Similarly we have become better and better at harnessing smart technology to help us deal ever more quickly with customer queries and complaints, feeding back to them in real time via text messages, and completing jobs ahead of schedule.

We take real pride in the way we have harnessed innovation to reduce leaks, provide clean water and run our business in ways that deliver best service to our customers. And this year we proudly opened our integrated water supply grid to help ensure our region has a secure and safe water supply system.

But sometimes innovation is about more than doing existing things better. It's about developing completely new ideas, new ways of doing things and offering services customers might not even know they want until they are offered them.

So this year we report on some ground-breaking innovation in new fields.

Examples include trials for new ways of removing phosphorus from sewage; the application of a new technology - piezometers - to better understand groundwater flows; and releasing water in spate flows from reservoirs to remobilise phytoplankton naturally. And we continue to push at the margins of upstream solutions to provide answers to some of our most pressing problems, including flooding and nitrates, to minimise these at source.

EnTrade, an innovative online reverse auction designed to reduce diffuse nitrogen pollution, is going from strength to strength. Moreover, we are now producing biomethane for the grid from our anaerobic digester at Bristol sewage treatment works, which also rids Bristol of otherwise unusable food waste.

Each year our story moves on and we can report new forms of innovation. That's exactly as it should be, and we will remain proudly both cutting edge and deeply pragmatic as we strive for ever better solutions.

Fiona Reynolds DBE

Board member

Innovation at Wessex Water - an overview

For us, innovation is the introduction of new technologies, products or ways of working that offer a clear benefit - a better service to customers, a healthier environment, lower costs or reduced risk.

The things we introduce can range from fairly small modifications to a completely different way of addressing an issue, and there are a number of different starting points. These include the following.

Employees' ideas

Our employee suggestion scheme, Eureka, helps implement original ideas and suggestions and then offers a reward depending on their success.

Improvements can potentially be scaled up to help reduce operating costs or improve our performance.

We have also begun a programme of specific challenges, set by our directors, to which anyone in the company can respond.

Technology trials

We are often approached by external companies to trial new products and occasionally completely new technologies at one or more of our operational sites.

This can occur through direct contact or via third parties such as Isle Utilities' technology approvals group and representative bodies such as British Water and the Future Water Association.

Placements

As part of our links with universities we host students on placement, principally from the University of Bath.

Their fresh perspective and focused attention on specific areas of our work offer us clear benefits while also helping develop the skills of individuals. In some instances the students have become full-time employees.

Specific projects

Some innovations have arisen simply because it is clear that a new way of working or incorporation of a new technology is needed to best deal with a problem or an opportunity.

Internal collaboration

Individuals from different departments working together or sharing experience is central to our innovation work. An example of this is our innovation and technology forum which guides technology trials and keeps track of other projects.



Environmental investigations

We carry out field based environmental investigations to make sure subsequent improvement works are well targeted and proportional.

Between 2015 and 2020 we are conducting 40 environmental investigations covering a range of issues.

These include:

- the occurrence and removal of hazardous and emerging substances from sewage effluent
- new, sustainable treatment solutions for phosphorus removal
- the ecological impact of our reservoirs and abstractions
- the influence of our sewage treatment works on nutrient levels within rivers, compared to other sources, at a catchment scale.

The investigations include a number of leading edge projects:

- two UK-first trials of new methods for removing phosphorus from sewage as part of a water industry-wide research project:
 - BioMag, which employs magnetite to improve sedimentation
 - a high-rate algal pond with the University of Bath
- vibrating wire piezometers to give better detail about groundwater flows
- controlled release of spate flows from Durleigh reservoir to remobilise phytoplankton and improve ecological conditions downstream (see page 20).

UK Water Industry Research (UKWIR)

This is the main vehicle for collaborative research between water companies. The programme comprises projects addressing common interests and concerns, providing a sector wide perspective and enabling larger scale research to take place than would otherwise be achieved.

Links with universities

We work directly with academia where there are clear benefits for our activities as well as new insights for researchers. We have an established partnership with the University of Bath, led by academic staff, a dedicated water innovation and research centre, as well as postgraduate research and undergraduates working with us on one-year industrial placements.



We carry out field based environmental investigations to make sure subsequent improvement works are well targeted and proportional

Innovation and the 2019 periodic review

We are preparing our business plans for investment and service improvements during the period 2020-25. Known as PR19, this process culminates in Ofwat's final determination at the end of 2019, and follows extensive consultation with customers, regulators and other interested parties on the improvements that they expect to see and the bill changes that they would consider acceptable.

Earlier this year, Ofwat confirmed that innovation would be one of the key themes in PR19, underpinning three others: great customer service, affordable bills for all, and resilience in the round. While we have included more innovative solutions in previous business plans, it is good that innovation has come to the fore in this way.

We were pleased to welcome John Russell, Ofwat's senior director of strategy and planning, as a keynote speaker at our recent innovation day. His summary of Ofwat's view of innovation offered a series of clear points:

- water companies have invested heavily since privatisation, resulting in good improvements to water and sewerage infrastructure and the service that customers receive on a

daily basis. There are also good examples of innovative solutions being developed by the water sector, often in partnership with others

- there are clear challenges for the water sector as a whole. It lags behind some other providers of goods and services for customer satisfaction; population growth will exert pressure, especially in drier parts of the UK; one in five consider their bill to be unaffordable
- at PR19, innovation will differentiate outstanding companies from the rest, and those that offer exceptionally ambitious and innovative business plans that shift the frontier for service and cost efficiency, will be rewarded
- Ofwat expects water companies to offer innovative performance commitments that reflect customers' preferences.

Innovation will differentiate outstanding companies from the rest



Our business plan will show how we are responding to all these points and we agree that innovation will help address the other three key themes.

There will be increasing opportunities to use technology in more imaginative ways to help those we serve and improve customer service, and to better understand their needs and wants through the data we hold. To improve affordability we can build on the arrangements we offer to low income households, while using innovative approaches across our work to help keep bills manageable for all.

There are clear opportunities for partnership working (with strategic flood authorities and non-

governmental organisations) to improve resilience and achieve common objectives. And to communicate with customers in imaginative ways where this helps the integrity of water supplies, sewers and other assets that we manage.

The following pages go into more detail, explaining how innovation already plays a part in each of the themes that our customers and other stakeholders consider a high priority, and what we expect to do in each theme during 2020-25 that will be innovative both for us and, potentially, the water sector as a whole.



Customers' 10 high priority areas





Affordable bills

Outcome

Affordable bills for all our customers along with wiser and more efficient use of our services.

Context

For the great majority of customers our bills are affordable, representing less than 1.5% of average household expenditure. However, Ofwat's analysis of national data shows that the majority of those in the lowest income decile spend more than 5% of their income on water and sewerage bills.

Innovations to date

In the last five to 10 years we have introduced new ways to help lower income and more vulnerable households that have since become mainstream. Examples include the first social tariff in the sector (Assist) and partnerships with debt advice charities.

More recently, we have supported projects offering training in household money management and others that work with harder-to-reach groups in our local communities.

We are trialling new ways to reach more people who may be eligible for social tariffs or have other needs. These include the use of mapping tools and other analytical methods that plot areas of deprivation, targeted mailshots to pensioners in such areas, and doorstep signups to social tariffs and payment plans.



We are also developing an online portal for use by partner organisations that provide advice to those in need. And we are visiting customers who have previously paid bills reliably but recently fallen behind, to find out whether assistance is needed.

Future innovation

We will continue to diversify the methods we use for assisting those who struggle to pay bills. We will also learn from other sectors and behavioural science to help reduce bad debt, especially with regard to those who we believe are able to readily pay their bills.



Excellent service for customers

Outcome

An exceptional service experience which is inclusive and accessible to all customers.

Context

Excellent customer service is fundamental to the success of our business, so we put customers at the heart of everything we do. We aim for the highest levels of customer satisfaction and day-to-day feedback shows customers are generally very satisfied with our service and see it as good value for money.

Indeed, we have consistently been rated by our regulator as offering the best customer service of the water and sewerage companies. But we can always do more, so we continue to improve and to improve and compare ourselves with the best service providers across all sectors.

Recent and current innovations

Introducing new and smarter ways to serve customers is necessary to keep satisfaction levels high. Recent innovations include:

- the provision of different ways for customers to give feedback in real time
- an online interactive map showing all the live jobs that we are carrying out in our region
- an employee scheme called Go the extra mile which encourages them to find ways to wow the customers they encounter
- a cash back meter option guarantee devised with our Young People's Panel.



We are trialling a range of other novel approaches which include:

- increased training for call centre staff during periods of high demand according to specific triggers
- development of real-time feedback dashboards
- sharing data with energy providers where it helps the most vulnerable customers
- an improved online portal through which customers can pay bills and see their consumption data in relation to similar households as well as in its own right.

Future innovation

Looking ahead, innovations will be needed to make sure our communication channels are accessible for customers of all ages and backgrounds.

For example, we will look to vastly expand the capacity for online customer interactions and aim to introduce an online tracker of operational jobs affecting customers - another idea being developed with our Young People's Panel.



Tackle leakage/efficient water use

Outcome

Water leakage reduced in a sustainable way so it becomes an unimportant issue for customers and the environment.

Context

This year we conducted innovative research about leakage in which we asked customers to create the promises we should make about leakage and using water wisely. We found that our customers understand there is a balance to be struck between reducing leakage and the impact on bills. Given the choice, most customers would prefer lower bills to reduced leakage, provided there is no risk to water supplies or the environment. Customers also want us to find innovative ways to cut leakage in the long term in ways that do not impact on their bills. They were also attracted to ways we could empower customers to reduce their own water leaks through education and subsidies.

Recent and current innovations

As leakage is an important area for innovation we have been reviewing the many technologies available, and those in development, with the aim of selecting those that can help with further reductions.

Alongside a fast reactive service we are introducing new technologies that help to detect the location of leaks or their existence before they are noticeable.

Examples include the Ferret probe which helps us pinpoint the exact location of leaks from the pipes joining customers'

homes and the water mains, and hydrophones which detect pressure waves and the specific sound signature of a leaking pipe.

Our metered bills are being changed to include graphical water use information which will help customers compare their use over time, and potentially identify leaks from their pipes. This is being complemented by an online 'smart engagement portal' which will also help customers pay bills more easily and compare their water usage to others and will be launched this year.

Future innovation

We will continue to seek means of reducing leakage in less disruptive and more cost-effective ways, through new equipment and technology that improves the speed of leak detection and delivers cost effective repairs.

Options for improving water efficiency more widely in innovative ways include:

- greater use of insights from behavioural science
- customer rewards for meeting savings targets
- extending the scope of the smart engagement portal, with potential links to other parts of the Wessex Water group, eg, Flipper
- going further with home water audits.



Excellent quality drinking water

Outcome

Safe, wholesome and pleasant drinking water which complies with mandatory standards and supports the wellbeing of our customers and communities.

Context

Compliance with drinking water quality standards is very high as a result of extensive investment and management systems such as water safety plans.

We believe in protecting water sources by working with other partners and the environment itself. This is a more sustainable and economic approach than relying solely on engineered end-of-pipe treatment solutions which often use a lot of energy and chemicals.

Recent and current innovations

Safeguarding drinking water sources was the original reason for starting our catchment management work. Now well established, our approach was considered highly innovative when it began 12 years ago, especially as it involved working with farmers and landowners beyond our own landholding.

Through technical advice and subsidies for more benign land management methods we have successfully postponed additional

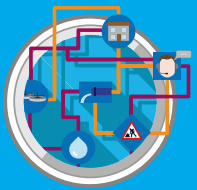
water treatment in several locations.

Additionally, we are trialling reservoir mixing systems to reduce problems caused by manganese. And, at Durleigh reservoir, in 2018 we are installing both a constructed wetland, located upstream to reduce inputs of sediment and nutrients, and a silt curtain – a permeable suspended sheet that contains cloudy, silted water in one area. We have also been trialling flow cytometry, a method of more rapidly and accurately assessing the microbiological content of water.

Future innovation

In the next five to 10 years we plan to use the latest technology to help maintain our water treatment works and distribution system. This will include:

- potential implementation of the use of ultraviolet disinfection instead of chlorine
- looking at ways of controlling types of water that have more corrosive effects on pipework
- trialling online water quality monitors for the supply network.



Resilient services

Outcome

High quality, reliable and secure services for customers and the environment in the face of acute shocks and gradual stresses.

Context

Resilience is about our ability to cope with gradual stresses (such as ageing infrastructure and climate change) and acute shocks (such as extreme weather events). While careful planning, investment and resource management have put us in a good position, other methods for improving resilience are important.

Catchment management can help protect water quality and reduce flooding risk, and public engagement can result in customers being better able to help in the face of events such as droughts. A rounded approach to business resilience also incorporates organisational arrangements and financial stability.

Recent and current innovations

We have improved the resilience of physical assets through modelling work to predict hotspots of deteriorating water mains based on known information about the age of pipes, soil types and other factors.

We have participated in a multi-agency project - Sponge 2020 - to better manage surface water and reduce flooding risk in Somerset, while in Weston-super-Mare we assisted in developing a superpond for the same purpose.

We have also assessed the resilience of our asset management in accordance with British Standard guidance on organisational resilience (BS65000).

Other current projects include:

- a new system for optimising the operation of our water supply grid
- involvement in an environmental resilience project covering the Bristol Avon catchment
- co-ordination with Wiltshire County Council and the Environment Agency to provide a consistent response to planning applications with regard to surface water management.

Future innovation

Heavy rainfall is likely to continue posing the biggest threat to our operational resilience in the future. So we will look for innovations that help increase adaptability, eg, greater adoption of sustainable drainage, new methods to stop groundwater entering sewers and more use of flood models to inform investment.

As well as managing our own physical assets we will welcome innovation from other approaches including:

- working with partner organisations, with nature and in catchments to manage flood risks, and promoting natural flood management techniques, where appropriate
- water resource trading with neighbouring water companies
- continued work with customers on water efficiency and avoiding blockages in our sewers
- measures to improve cyber security.

Innovation day

In October this year we held our first innovation day at our operations centre in Bath. With the strapline 'Now, next and beyond', it involved a series of 18 sessions led by Wessex Water staff and external organisations.

These included speakers from PwC, Vodafone, Microsoft UK, the University of Bath, and Isle Utilities (see below for the full list).

In addition to those participating at our operations centre, the sessions were broadcast live, enabling staff to view them via computers, tablets and smartphones in any location in the region. The talks remain downloadable for those unable to attend or log in on the day.

The sessions included insight into the future of the water industry, discussions of the latest technology available and updates on our partnerships with other organisations. There were also stands with contributions from our in-house drone team, Flipper, and GENeco among others, and interactive sessions.

On the day there were more than 600 individual session attendances and online views and overall it was a highly successful event.

We have followed up with a series of breakfast roadshows, taking excerpts from the innovation day to five other company sites around our region. And we are building an online innovation community using Microsoft's Yammer social media platform.

Sessions led by Wessex Water and companies in our group

- Our innovation strategy
- Customer excellence
- People Programme - a sustainable workforce for the future
- Innovation in catchments
- Operational innovations
- How to conduct your own Google Ventures design sprint
- Futures - ways of looking forward and disruptive technologies
- The Bio-Bee truck powered by the food waste it collects (GENeco)
- Experiences of a start-up in the utilities sector (Flipper)

Sessions led by guest speakers

University of Bath and Wessex Water's collaboration - **University of Bath**

Innovations in water - **University of Bath**

What will be the technologies that change the water industry? - **Microsoft UK**

What will our future customers want? **PwC**

Innovation through collaboration **Isle Utilities Limited**

Always on communication anywhere **Vodafone**

Using geospatial data analytics **Rezatec Ltd**

Big data in turbulent waters **Quidos Limited**



Minimise sewage flooding

Outcome

The risk of sewage flooding kept to a minimum.

Context

Sewage flooding is caused when sewers become overloaded as a result of severe weather, equipment failure, blockages (typically due to others misuse of our sewers) or sewer collapses. While it is a rare occurrence, its consequences can be devastating, so tackling it remains a key task.

More widely, the responsibility for flooding is often complex and we work with local authorities as they produce plans and strategies regarding surface water and flood management.

Recent and current innovations

Countering the pressures imposed on the sewerage network, such as climate change, population growth and changing consumer behaviour, requires different approaches to the past.

We now undertake more active campaigning on typical causes of blockages, eg, wet wipes being flushed away and problems with fat, oil and grease from cooking.

We have also worked on the Somerset Sponge 2020 projects and the Weston-super-Mare superpond, both of which aim to reduce flood risk, with other agencies involved in surface water management.

We are installing monitors in sewers at flooding hotspots and looking at ways to encourage greater citizenship that can benefit sewerage infrastructure.

Future innovation

Looking ahead, we are likely to see a bigger in-sewer monitoring programme.

However, further innovations are just as likely to occur through behavioural aspects and we envisage:

- staff proactively engaging customers and more investment in messaging about sewer misuse
- support for environmental officers in local authorities to focus on sewer misuse.

We will continue to take a campaigning stance toward policy makers, and manufacturers and retailers of products that do not conform to flushable standards.



Protect rivers, lakes and estuaries

Outcome

Watercourses in good condition, with our abstractions, discharges and runoff maintained within sustainable environmental levels.

Context

Our region has many of the country's finest rivers and streams.

In response to concerns about the risk of low river flows, we have widely upgraded sewage treatment and reduced water abstraction in partnership with regulators, farmers, the public and other interested bodies.

We have reduced the number of pollution incidents from our sewers and are tackling rural and urban diffuse pollution.

Meanwhile, European regulation is being extended to deal with persistent chemical compounds and there are newer emerging challenges such as microplastics and antimicrobial resistance.

Recent and current innovations

The past five years have seen more community-based activities in relation to water abstraction and reducing blockages in sewers. Multi-organisation catchment partnerships have also become more established - we lead partnerships for Poole Harbour, the Dorset Stour and the Bristol Avon.

To improve water quality we have also combined catchment management with the concept of environmental markets through the creation of EnTrade, an online reverse auction originally created to reduce diffuse nitrogen pollution.

We are trialling three novel approaches for

reducing phosphorus in sewage effluent:

- Bio-mag, a material that uses magnetite (an oxide of iron) to improve settlement in sewage treatment
- an algal pond designed by the University of Bath
- a new system for setting effluent standards for a group of treatment works within a catchment, devised in partnership with the Environment Agency.

We are also working with local public health practitioners on ways to encourage people to take more exercise and have more contact with the environment. This could in turn alter medicine prescribing and reduce the risk of pollution from pharmaceutical residues.

Future innovation

In the next five to 10 years we will favour innovative, low carbon methods to improve the water environment. We aim to introduce more monitors within the sewerage system, tracking pressure in rising mains and conditions at pollution hotspots.

We work to improve efficiency and obtain more from existing treatment processes, and build on more flexible ways to set treatment works' permits combined with catchment management, using tools such as EnTrade.

And we aim to expand work with Clinical Commissioning Groups and healthcare providers, to identify novel ways to fund environmental and social projects which improve people's health and wellbeing while reducing pharmaceutical use.



Bathing waters

Outcome

High standards of bathing water quality that all can enjoy.

Context

Several factors can affect bathing water quality, including heavy rain, industrial discharges and agricultural runoff. To reduce our own impacts we have invested heavily to improve combined sewer overflows and effluent from sewage treatment works.

Following reclassification and tightening of the European Union Bathing Water Directive's standards, we are upgrading sewerage near Burnham Jetty, the only bathing water in our region with a high risk of not achieving a 'satisfactory' grading.

Recent and current innovations

Several years ago we introduced Coastwatch, a map-based view of bathing waters in our region with almost real-time data on the operation of sewer overflows that might affect water quality. The first of its kind in the sector, it responded to public demand for better information about bathing waters.

As this is an important topic for the public, we have been involved with community engagement projects such as Litter Free Coast and Sea which promote behaviour that benefits beaches and their immediate surroundings.

We have also been carrying out innovative scientific investigations to better measure our impacts. Most recently, involving a tracer survey using a short lived bacteriophage dosed at Taunton sewage treatment works that will determine the time treated effluent takes to travel to Burnham Jetty bathing water via the River Tone.

At Highbridge sewage treatment works we have installed ultraviolet disinfection of the overflow from storm tanks for the first time.

Future innovation

Between 2020 and 2025 we aim to build on our work to date, with upgrades to Coastwatch and the provision on the internet of more information about overflows from the sewerage system.

Development of behavioural activities will also take place, such as awareness raising among beach users about how to keep beaches clean and modelling of river catchments to establish where action to reduce pollution risks would be best placed.



Reduced carbon footprint

Outcome

Achieving carbon neutrality in the long term and generating more of our own renewable energy.

Context

One of our long-term sustainability goals is to be carbon neutral in our operations. While electricity use increased between 1990 and 2010, mainly due to tighter sewage treatment standards, we have now halted this trend, largely through concerted energy efficiency work.

This is supported by detailed consumption data that identifies sites using too much electricity and in turn helps focus corrective measures. We are also generating more renewable electricity and gas from digested sewage and food waste and have increased solar and hydro electricity generation.

Recent and current innovations

Earlier investment in advanced anaerobic digestion at Bristol sewage treatment works has allowed us to incorporate food waste digestion (a first for a UK sewage treatment works) and, by refining the extra biogas being produced, to start exporting biomethane to the gas grid.

We continue to introduce new methods for improving energy efficiency, such as the optimiser system for our new water supply grid, because they continue to provide a strong return on investment and significant emission reduction. We have introduced dynamic demand technology that helps balance supply and demand on the local electricity supply network.

Innovations in catchment management, such as our EnTrade online auction and the Bristol Avon catchment permitting trial, will also have benefits through avoidance of energy use and further carbon dioxide emissions.

Future innovation

We expect innovation within this theme to involve a combination of technology, environmental management and human behaviour.

Technology solutions are perhaps the most obvious, eg, advances in sensors and the ability to manage big data in real time should give further impetus to energy efficiency work over multiple sites.

There are possibilities for heat recovery from various parts of our asset base and for further integration of wind and solar as their capital costs fall. We will keep a close eye on trials of advanced thermal technologies that can gain extra energy from sludge and lock organic carbon into virtually inert forms.

As we develop as a service company, we will also look at how we can encourage efficient use of hot water – the most energy intensive part of our product lifecycle.



Engaged communities

Outcome

Individuals, households and community groups engaged with their local water environment and actively supporting the delivery of our aims, while we support those of the wider community.

Context

Dialogue with the public and other outside interests (including suppliers and contractors, technology developers, researchers, politicians, investors, NGOs and opinion formers) runs across all our work.

We communicate widely on water efficiency and the causes of sewer blockages, have an active education programme for children, students and community groups, and meet local people living near our capital schemes.

Our advisory panels scrutinise our work for customers and the environment, and look at emerging trends in society.

All this is crucial for ensuring that we understand stakeholders' priorities, are able to communicate our own work and are aware of new risks and opportunities.

Innovations to date

In the past five years we have actively introduced new methods for engaging with communities and outside interests. These can involve specific topics and locations (eg, in Mere, regarding water abstraction) or a range of inter-connected issues across a wide area (eg, the catchment partnerships we lead or participate in).

Current trials of more innovative methods of engagement include work with public health practitioners related

to 'green' and social prescribing (see also 'rivers, lakes and estuaries'); publishing more information about how our sewerage network is performing; and the addition of devices to our home water efficiency packs to help protect sewers, such as 'gunkpots' for collecting cooking fat.

Our expanded use of social media and digital communications has included trials of various behavioural messages to see which resonate best with customers, for example to encourage take-up of water meters.

Future innovation

We will continue to explore newer, better ways to encourage individuals, households and community groups to participate in efforts for their local water environment. This might, for example, include encouraging customers to become flood wardens, as well as supporting our own employees to become involved in their own communities through volunteering opportunities.

Meanwhile, we will continue to adopt new digital technologies that help us form virtual communities interested in the water cycle. We will build on tools we are developing such as our new customer engagement portal and our partner hub, as well as offering even more information online about the performance of our physical assets.

Beyond the core business

So far, this report has focused on the various innovations in our core services – treating and supplying drinking water, managing sewerage networks and treating sewage. These are the basic activities that everyone expects of us, and for which we are closely regulated.

Over the years, new technology and novel ways of working – on top of significant investment – have allowed us to do these things smarter, more efficiently and to reliably meet tighter standards. In a rapidly changing world, this work will continue. With new ways to engage customers, more effective use of data, fruitful collaboration with external bodies and further technological advances, we can do even more for our core water and sewerage services.

However, we believe there is potential to go further, without damaging the crucial public health and environmental services we provide. Indeed, we believe we must.

Why?

The standard model for water and sewerage companies in the UK is coming under pressure. Our economic regulator is likely to set harder efficiency challenges at PR19, alongside a sterner view on the cost of capital and a tougher position on returns to investors. This likelihood is partly borne out of questions about the legitimacy of the UK water sector being voiced by politicians and commentators: does it offer value for money? is it fit for purpose in its current form?

We have already seen the introduction of retail competition to all non-domestic customers, who can now choose from a range of water and sewerage service

providers. Ofwat argues that this is already bringing about innovation in how water infrastructure is managed and the services provided to customers. We expect to see further break up of what has historically been a vertically integrated sector, as Ofwat seeks to introduce more competition in pursuit of greater cost efficiency and fresh thinking about service provision.

Certainly, Ofwat sees market measures as suitable for aspects such as water trading, using treated sludge (bioresources) and direct procurement for large capital schemes, arguing that markets stimulate innovation and new technology.

In the face of these changes, there are two main options:

- to focus on being a good wholesaler that operates just the physical assets that are sometimes described as the 'natural monopoly' – treatment systems, pumps and pipes
- to extend and diversify, building on the skills and capabilities gained over several decades.

We lean towards the second of these options and believe that we can thrive in a changed water sector. Our track record is strong in terms of industry leading customer service and environmental performance, a readiness to create good relationships with others, the trust we have built with policymakers and regulators, and a reputation for innovation.

Brexit could bring about big changes to the management of the wider water environment, land and catchments. As a company that already works at the interface of water and farming, we can



be at the forefront of change post 2020.

So how might we respond and use these advantages?

Largely through innovation, especially through 'adjacent innovation'. This is the domain that lies between 'core innovation', which is about finessing what we do already, and 'disruptive innovation', which is about introducing completely new products and services, as well as addressing and developing new markets. Adjacent innovation might include:

- introducing things that are new to the UK water sector
- offering new products to our customers
- extending our current capabilities and offerings to new customers.

In all cases, we look for a good fit with what we do already, eg, providing services to homes and businesses, working with the natural environment and the water cycle, and creating value from society's waste.

We have been making steady progress along these lines in recent years. Our subsidiary company GENeco has been helping to reinvent large sewage and sludge treatment centres as

biorefineries, diversifying and creating value from the materials both brought in to such sites and exported from them.

Our catchment delivery team is an exemplar for promoting water friendly farming, and with the creation of EnTrade we have a new way to promote multi-benefit land use among farmers. We have a controlling stake in Albion Water which provides sustainable water solutions to housing and commercial developers.

With the purchase of energy switching start-up Flipper, and the help of new technology, we are able to better understand customer behaviour and decision making, as well as what it takes to excel in a competitive market.

In the years ahead, we will continue to need core innovation in our essential services. However, we strongly believe that our day-to-day provision for water and sewerage customers will benefit from our other complementary activities. They will reveal smarter, more efficient ways to do things, benefiting customers and the environment, and hopefully underline that we have a strong licence to operate in the 21st century.

Recent innovation work

Stream ecology downstream of reservoirs

Downstream of Durleigh reservoir (near Bridgwater) is a brook that has altered flow, silt levels, water quality and invertebrate ecology due to the reservoir. For the past three years we have been investigating what happens if we initiate spate flows from the reservoir, simulating what would happen in a more natural stream after summer rain storms. In particular, by flushing out sediment from the watercourse, we hope to alter the invertebrate community to one that is similar to those found upstream of the reservoir. Following trials in 2015 and 2016 that indicated the required velocity of the simulated spate flows, we set up monthly spate episodes during summer 2017 and are now analysing the resulting data.

Meanwhile, downstream of Sutton Bingham reservoir (near Yeovil) we have replaced 50 tonnes of gravel which had not been replenished since the reservoir was built, again to improve the ecology of the stream. We are monitoring the movement of gravel using radio frequency identification tags and visual audits to see what happens after significant flow events.

Fine bubble aeration - Potterne sewage treatment works

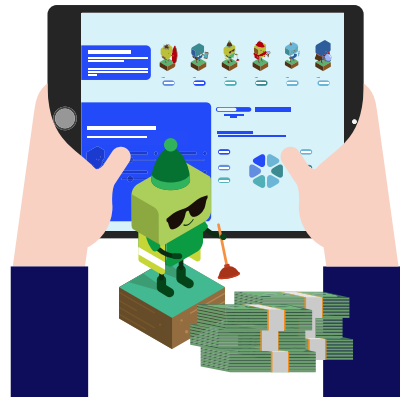
Potterne STW has two racetrack-shaped ditches in which sewage is aerated, reducing ammonia to acceptable levels as well as treating the sewage in other ways. Faced with a range of challenges in relation to power supplies, dissolved oxygen and flow rates, the usual solution - replacing conventional aerators - would be expensive. Instead,

our optimisation team chose to install two novel drop-in units with perforated steel tubes in a square grid that deliver fine bubbles to aerate the sewage, plus a booster to improve flows around the ditch. This allowed older, more energy intensive equipment to be turned off, and improved dissolved oxygen and ammonia levels in the treated effluent. The new configuration may also help us avoid using electricity at the most expensive times. Overall, the project cost less than £40,000 to implement and is expected to save nearly £20,000 per year.

Online game

Our 'Your Say, Your Future' campaign aims to gain insight from customers on what they'd like to see us do in the future. It is part of our biggest ever customer consultation in the run-up to the 2019 business plan submission.

Complementing surveys, focus groups and interviews with customers is an interactive game - part of a wider plan to reach as many customers as possible in a different way. The game is designed as a fun way for customers to decide exactly how they think their water and sewerage bills should be spent, based around animated characters that represent different aspects of our service.



Afterword

At Wessex Water we want to build on our good reputation and exemplify what a forward looking water company can be, which at times will mean breaking the mould and demonstrating new ways to do things.

At our innovation day in October this year we heard about many different ways in which our industry is already doing things differently, and how the world is changing in our workplaces, our homes and the environment around us. The purpose of the innovations that we have already introduced is to ensure that we keep up with the rapid pace of change we are seeing already.

They are also putting us in a better position to respond to change in the next 10 to 20 years, some of which we can foresee, while some will be beyond what most of us can imagine or predict. There will be exciting opportunities; new technologies will bring new possibilities, but also new challenges, adding to a complex and uncertain world.

One example is the 'internet of things'. This involves the creation of a network of appliances, electronic devices, vehicles, and other objects that are connected to the internet. Through sensors, software and online connections, these items can exchange data and be controlled remotely. On the face of it, this is a very interesting prospect for a company such as ours, serving millions of people and operating over hundreds of sites, some in remote locations. Having real time information on all our assets and processes, and the water and sewage flowing through our systems, would mean that we could operate as efficiently as possible and respond rapidly to unexpected events. It could also give us a better understanding of those we serve - their needs and wants and how they use our service.

However, we recognise the potential downsides. For example, an over-reliance on 'smart' devices could lead to a loss of human intuition, which can be crucial when things go wrong. Also, there will naturally be concerns about privacy in a world where information gathering sensors are found everywhere. Companies such as ours will have to continually demonstrate that we can be trusted with the data we hold.

The internet of things is one of many potentially disruptive technologies that we profile in our futures report, a sister publication to this innovation report. We welcome your feedback on both and your help in creating a water sector that is truly fit for the future.

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