

Protecting our water and world

Our Climate Change Adaptation Summary Report
for 2015-2020



About this report

In this summary report, we talk about the challenges of climate change and what we're doing to minimise its impact on delivering life's essential service - not only today, but for generations to come.

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Introduction from Sarah Bentley, our CEO



Across Thames Water, we have an important responsibility to make sure there's always enough clean water for our customers, communities and the environment to thrive - both today and in the future. The impact of climate change and increasing population size puts huge strain on our precious water resources.

Our world is rapidly changing. New climate records are continually being set and the devastating effects are evident. The ten warmest years on record have all occurred since 2002 and for the first year in recorded history 2020 had temperature, rain, and sunshine rankings in the top ten. More recently, we've seen the heart-breaking effects of extreme rainfall leading to homes and livelihoods being flooded in

parts of London and the Thames Valley.

We're currently underway with our business turnaround plan and one of our core areas of focus is to shape the future, as I care about leaving a positive legacy for future generations. We're developing our Vision for 2050, including being prepared and resilient when it comes to climate change.

We look at climate change in two ways – firstly what we can do to prevent it and secondly how we can adapt to its effects, so we can continue to deliver life's essential service.

Mitigating

Reducing the impact of climate change is not new to our business. It's been an area of focus in our operations since the 1930s when we started creating our own power from poo. Since 1990, we've reduced our operational carbon emissions by nearly 70%. Our next stop is net carbon zero and we've committed to getting there by 2030.

We have a real opportunity to change the way energy is created and used in the UK too, making us an important player in energy transition.

Adapting

We're already seeing the effects of climate change and need to increase our resilience for the future. To do this, we're focused on activities such as reducing our leakage and working with customers to reduce the amount of water they use.

We're also committed to working in close partnership with the lead local flood authorities, Environment Agency, Highways Agency and others to take a joint approach to flood risk management.

Making a difference

You can find out more on what we're doing to tackle climate change and how we're responding to the threat of increasingly turbulent weather patterns throughout this report.

Reducing the impact of climate change is one of my core focus areas. I'm looking forward to working together with customers, stakeholders and key organisations to ensure we are driving positive change in this critical area.

Sarah Bentley
Chief Executive Officer

“We look at climate change in two ways – firstly what we can do to prevent it and secondly how we can adapt to its effects, so we can continue to deliver life's essential service.”

Setting the scene

Our Purpose is to deliver life’s essential service, so our customers, communities and the environment can thrive. This is championed by our Board, and our directors actively consider how any decision will impact society and the environment. More frequent and intense weather events across the globe will impact our business and the service we provide to our customers in the South East of England over the coming years.

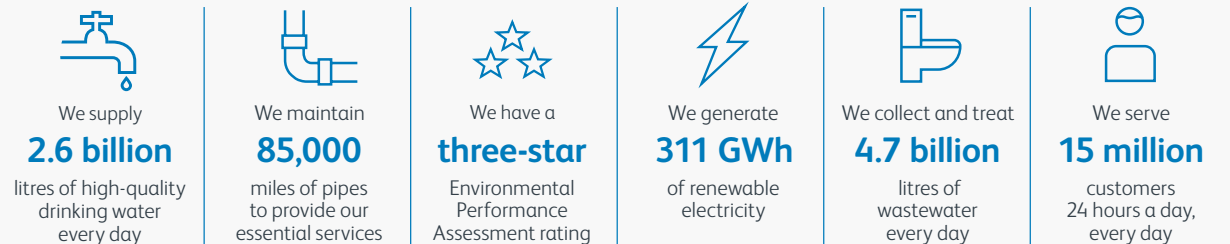
Climate change is one of the biggest challenges we face. Although it remains uncertain how severe the impacts of climate change will be, our approach to tackling it is clear. We’re adapting our business to meet challenges and play our part in mitigating them. This approach is a cornerstone of our commitment to becoming more sustainable.

The turbulent weather patterns we’ve experienced over recent years have tested the resilience of our services. Over the past 10 years we have experienced a wide range of extreme weather events including drought, flood, heatwaves and the Beast from East cold weather – see our [world in weather infographic](#). It’s one of our biggest challenges but it offers a great opportunity to do things differently.

It’s important to highlight that climate change is not just a challenge for us. It will impact the whole of society and the economy. We therefore need to understand where there are interdependencies with other sectors and develop plans to together, to tackle the risks associated with climate change. You can find more information on our progress here [‘Protecting our water and world - Our Climate Change Adaptation Report for 2015-2020’](#).



Thames Water in numbers



Our world in weather

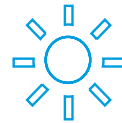
2010

April: Start of two-year drought

November to December: Severe winter weather with very low temperatures and significant snowfalls

2011

April: Unusually warm spring and a persistent lack of rainfall



2012

March: End of the equal driest two-year period on record since 1910

April to July: Wettest spring/summer on record since 1766

November: One of the wettest weeks in the last 50 years

2013

March to April: Severe winter weather with very low temperatures and significant snowfalls

July: Temperatures exceed 28°C on eight days

2014

January to February: 12 major storms cause widespread damage



2015

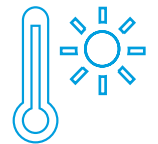
July: One-day heatwave with high temperatures across South East England (36.7°C at Heathrow)

2016

September: Heatwave, torrential downpours and flash flooding in South East England, with UK's hottest September temperature (34.4°C) since 1911

2017

June: Temperatures exceed 28°C across parts of England (34.5°C at Heathrow)



2018

February to March: Severe winter weather with very low temperatures and significant snowfalls (Beast from the East)

June to August: Warmest summer since 2006, driest since 2003 and sunniest since 1995

2019

July: Hottest temperature on record (38.7°C in Cambridge)

38.7°C

2020

February: Wettest on record since 1862

August: Heatwave in South East England

October: UK wettest day on record (Storm Alex)

Our approach

Developing a forward-thinking plan

Our customers trust us to plan for the challenges that could affect their water and wastewater services in the future, whether that's changing weather patterns or increasing demand. So, we've put climate change at the heart of our planning, not just for the next five years but to the end of the century. This commitment is a vital part of delivering life's essential service.

While reviewing the potential impact of climate change on our business, we've identified three key challenges: too much, too little or the wrong kind of water. To address this, we're refreshing our 25-year-plus plans for both water resource management and drainage and wastewater management that explicitly take climate change and its uncertainty into account.

To protect our world and water supply for the future, we need to transform the way we create and use energy. And, as we face the challenges of a growing population and unpredictable weather, we're encouraging our customers to save water and educating future generations about the importance of the water cycle.

During the planning stage for our 2020-2025 Business Plan, we gathered insights from over one million customers to understand their expectations of our water and wastewater services. We've used this feedback to shape a plan that puts customers and communities at the heart of everything we do. We'll soon begin consulting again on our future plans, and we actively encourage all our customers to participate to help shape how we continue to deliver life's essential service.

In this short update we'll describe:

- 1) Our challenges as well as how we're responding to them
- 2) Progress toward becoming a client resilient business
- 2) Progress toward becoming a client resilient business that could harm their fragile environments. Taking action now will help our waterways adapt to the impact of climate change.



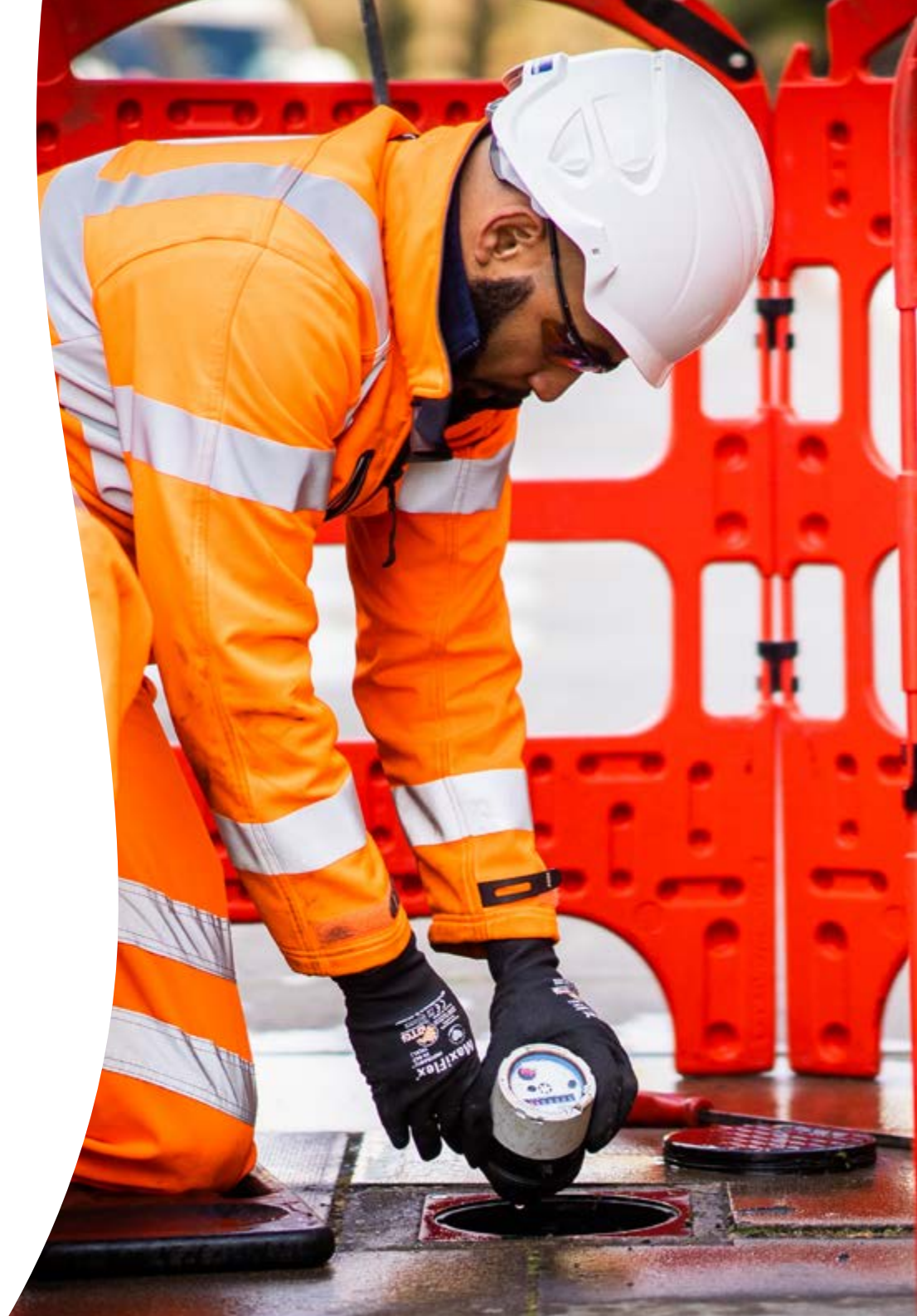
What we've already done

- We produce **23%** of the electricity we consume renewably
- Installed over **400,000 smart meters**
- **Reduced leakage** by 47 MI/d to 595 MI/d
- Provided 6,841 **free customers leak repairs**
- Disconnected 21 Ha of land from mains drainage using **sustainable drainage systems**
- Water sites providing 755 Mld of service made **more resilient to extreme rainfall events**
- Wastewater sites serving a 1,569,343 population equivalent made more **resilient to extreme rainfall events**
- Assessed our resilience to a 1 in 1,000 pluvial flooding event
- Developed **26 local drainage strategies** and completed 5 sewage catchment studies
- Maintained our Security of Supply Index (SOSI) at **100%**
- Working with Water Resources South East to develop **regional water resource understanding**
- Created over 150,000 m² of **wetland**
- Engaged more than 1 million customers in the development of our 2020-25 business plan



What we're planning

- Reach **net zero carbon** emissions from our operations by 2030
- **Reduce leakage** by 101 MI/d to a level of 493 MI/d
- Install almost **700,000 smart meters** in London
- Disconnect 65 Ha more land from mains drainage using **sustainable drainage systems**
- Complete our **Drainage and Wastewater Management Plan** to replace current drainage strategy frameworks
- Maintain our Security of Supply Index (SOSI) at **100%**
- Improve our **resilience to a 1 in 200-year** drought by 2030
- Update our **Drought Plan** with new information, challenges, and targets, including resilience to a 1 in 200 years drought event
- Produce Water Resource Management Plan including working with Water Resources South East on **regional water resource plan**
- **Proactively engage with customers** and stakeholders on our plans for PR24 and our vision for 2050



Becoming more resilient

There's always more we can do to improve our operational resilience. At a minimum, we must maintain an acceptable level of service for customers and protect the environment. But to go above and beyond and evolve for the future, we need an effective response and recovery plan for when things go wrong. We also need to be able to apply any lessons learnt from previous extreme weather events.

In the ten years since our first Adaptation Reporting Power (ARP) update to the Government, a multi-year drought, record-breaking temperatures, extreme wet weather and the Beast from the East have all challenged our ability to serve customers. While not weather-related, the Covid-19 pandemic has also challenged our resilience.

We're developing a robust incident management process and structure that operates 24 hours a day, 365 days a year. It identifies potential incidents, including those caused by severe weather associated with climate change, we can respond quickly and intervene as soon as possible to mitigate risks and minimise disruption to our customers.

We review every incident to understand its root cause and consider any operational and strategic learnings as part of our continuous improvement process. If longer-term strategic interventions are required, we feed this into our other business planning processes, such as water resource and drainage management planning.



Understanding our risks

We've updated our climate change risk assessment to better inform our corporate risk management framework. This insight is helping internal stakeholders understand our climate change risks and the impact they could have on our operations. We're actively consulting key stakeholders as we embed this across the business.

Our aim is to manage risk effectively and in line with our risk appetite, which reflects the fact it's not always possible to reduce risk to zero. We make every effort to maximise potential opportunities, minimise the adverse effects of risk and increase our ability to effectively deliver value to our customers, people, communities, environment, stakeholders and shareholders.

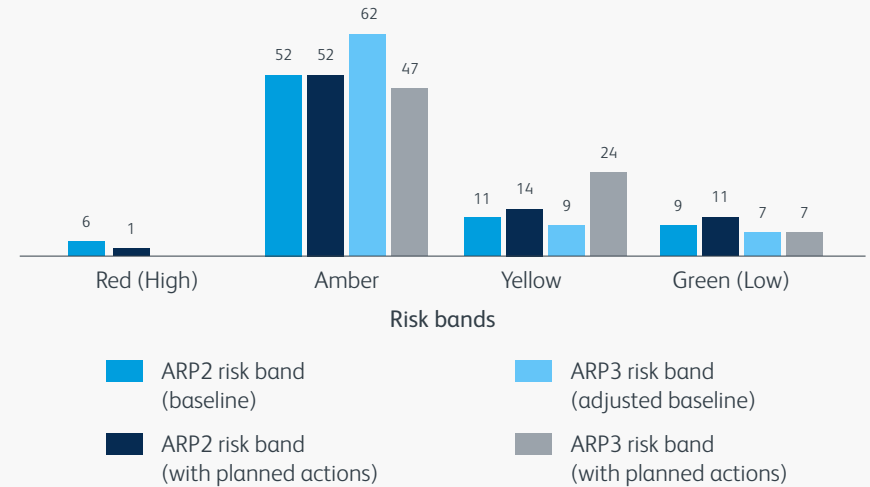
Our corporate risk management process is aligned with the Risk Management International Standard ISO 31000. Our framework covers all types of risks that could impact the achievement of our Purpose and strategic objectives, including (but not limited to) climate change.

For more information see [our 2020-21 Annual Report and Sustainability report](#).

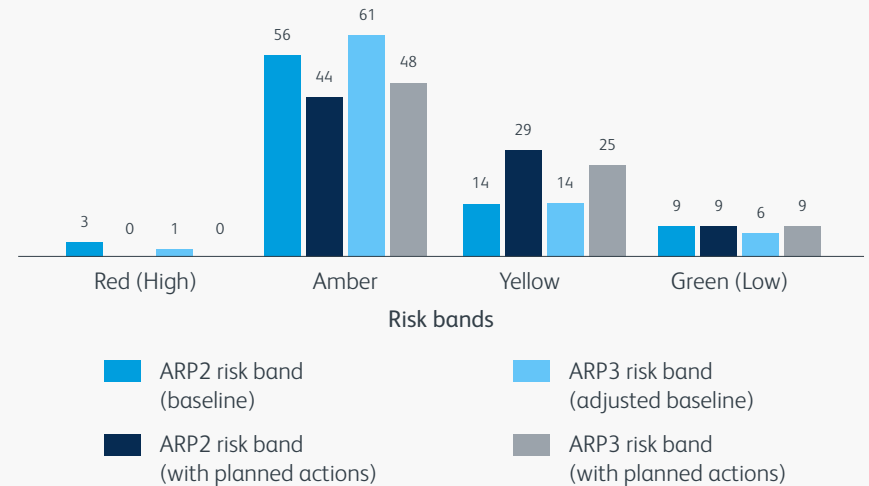
We've reviewed and updated our climate change risk assessment for the ARP third reporting period (ARP3). It was originally prepared for the first reporting period in 2011 (ARP1) and revised for the second reporting period in 2016 (ARP2). The graphs on the right illustrate that we are reducing risk and the extent that actions contribute further to their reduction.

We will use the information from our climate change risk assessment to inform our understanding of actions we could take to tackle the amber (medium) risks. We're also committed to using our 'watching brief' approach for green and yellow risks. We'll monitor these periodically and promote or relegate them if their risk profile changes.

Number of water risks by priority band



Number of wastewater risks by priority band



Water – understanding our challenges

Our changing weather patterns will reduce available supplies in London by around 180 million litres a day by 2085. While we need to take water from rivers and groundwater aquifers to provide high-quality drinking water to our customers, we also need to leave enough in the environment to protect the health of our rivers and wildlife.

Demand for water is likely to rise even further as our climate changes and population grows. Unless we act now, we forecast a substantial shortfall between the amount of water we have and the amount we need for the future.

Our Water Resources Management Plan

Since publishing our ARP2 in 2016, we've developed our Water Resources Management Plan 2020-2100 (WRMP19), utilising the later climate projections, was approved by the Secretary of State for Environment, Food and Rural Affairs in March 2020.

This sets out the actions we'll take to deliver a secure, sustainable supply of water for our customers in London and the Thames Valley over the next 80 years – an essential service for everyday life, the wellbeing of the environment and economic growth. It goes beyond the 25-year minimum statutory planning period to provide resilience for current and future generations, meeting our customers' needs until the end of the century. This approach reflects the expectations of customers and stakeholders.

We review our WRMP every five years to make sure we deliver for our customers, protect the world around us and explicitly take the projected impact of climate change into account. [Read or download our WRMP19.](#)

We forecast there'll be almost 2 million more people in our area by 2045 – the equivalent of Birmingham moving in. This will increase to approximately 3.6 million more people by 2100.





Making sure there's enough water

The consequences of not planning ahead for climate change are huge – for society, the economy and the environment. To take proactive steps to make sure there's enough water for future generations ([read our managing supply and demand case study in our main report](#)), we decided to look at a wide range of options to fill the shortfall:

Making the most of what we have by reducing the amount of water lost through leaks in our pipes, promoting water efficiency and installing smart meters in customers' homes. [Read our detecting leaks case study in our main report.](#)

Finding new ways to boost our supplies such as sourcing groundwater, reusing treated wastewater from our treatment works, transferring water from other areas and storing more water.

Through the Water Resources South East (WRSE) group, we're working with water companies across the South East of England to look for opportunities to share water and plan resilient water supplies for the whole region. [Read our WRSE case study in our main report.](#)

We know things will change over the next 80 years, so we've considered a range of possible futures, some more challenging than others – like more people living in our area than we predicted. This approach, called adaptive planning, means we're flexible and ready for a broad range of potential outcomes in the future. By looking ahead to 2100, we can lay the best foundations for future generations. You can find out more about this in [Appendix U of our WRMP19.](#)

The infographic on the next page illustrates some of the actions we are taking between now and 2025.

Our Water Resources Management Plan – what we're planning

Our plan addresses the challenges we face, including climate change, and provides the best value for our customers and the environment.



Improving pipes

We'll invest in our network of over 31,000km of pipes, some of which are more than 100 years old. We currently lose around 23% of water through leaks and so between 2020 and 2025, we'll use smart technology to replace over 700km of water mains – enough to go around the M25 almost four times – and reduce leakage by 20%. By 2050, we plan to reduce leakage by at least 50% in comparison to the level in 2018.



Installing smart meters

By 2025, we'll install almost 700,000 more smart water meters. These will give us essential information about where water goes, helping our teams tackle leakage and our customers reduce how much water they use. By 2035, we're aiming to install smart meters on the connections to all properties in our region.



Reducing water use

We'll help our customers reduce their water use by providing free water-saving devices and tailored advice. By 2025, we'll complete a further 125,000 Smarter Home and Smarter Business Visits, providing advice and practical support to encourage the efficient use of water. We'll continue to work with schools, local communities, businesses and councils to reduce water use sustainably.



Boosting water supplies

By 2030, we'll introduce several innovative schemes, including a new aquifer storage and recovery scheme, wastewater reuse and a water transfer scheme. After 2030, we'll continue to develop new water sources, such as transferring more water into our region from the Midlands and the North West and increasing water storage through developing a new reservoir.



Protecting the environment

We'll reduce the amount of water we're allowed to take from rivers and underground sources. By 2025, we'll reduce our licensed abstraction by 18 million litres per day from the River Cray and River Chess catchments. And we're aiming to stop all abstractions that adversely affect vulnerable chalk streams and other watercourses by 2050.



Boosting drought resilience

Delivering on our WRMP19 will provide a 1-in-200-year resilience to drought. This is a significant improvement from the 1-in-100-year level of protection in our statutory Drought Plan, which sets out the actions we'd take to maintain essential supplies of water and protect the environment in a drought situation.

Taking care of water

The background

Most people think of the UK as a rainy place, but the South East of England is actually one of our driest regions. London gets less annual rainfall than either Rome, Dallas and even Sydney!

While we need to take water from rivers and groundwater aquifers to supply high-quality drinking water to our customers, we also need to leave enough in the environment to protect the health of our waterways and wildlife.

However, we can care for the water we already have by working together to save it where we can.



In 2021 we reached the milestone of installing our 500,000th smart meter as part of the biggest smart water meter programme in the UK.

The challenge

It's estimated that an extra 2.1 million people are due to move into our region over the next 25 years. This, combined with climate change, means that, without action, we face a potential shortfall of 350 million litres of water a day, between the amount available and the amount needed, by 2045.

Smart meters and Smarter Home Visits

Some of the ways we're addressing this potential shortfall is through our progressive metering and Smarter Home Visit (SHV) programmes. Smart meters and SHVs give our customers greater control over their water use and bills. They also enable us to understand where there's high consumption, so we can help those customers with water efficiency tips. They also help us find leaks.

Smart meter data and thousands of home visits each month have shown that a small number of big water users were disproportionately influencing average consumption data. After an SHV where we retrofitted water saving devices and fixed leaks for free, these high-consuming customers saved significantly more water than they did with our previous water efficiency approaches.

The WEE App

We've developed an industry leading Water Efficiency Engagement app – the 'WEE app'. It enables our in-home advisers to not only give personalised water savings reports, but also help customers in vulnerable circumstances sign up to our Priority Services Register, receive independent affordability assistance and the industry's first Greenredeem incentive scheme, which rewards customers for saving water, in real time.

Smart data

As the first UK water company to roll out a large-scale smart meter programme, we've now developed new analytics capabilities, enhanced performance commitments and converted data to insight – then into on-the-ground action.

Smart data lets us quickly and accurately identify high-use households and external and internal leaks. And we've developed visual dashboards, which monitor water savings delivered by our SHVs and allow us to track usage and leakage savings benefits. The recent addition of high-use alert emails helps flag customers with above-average water consumption and gives them immediate practical advice, helping them save water and money.

What might previously have taken up to a year can now be fixed in days.

Covid-19 and 'virtual visits'

In addition, the data from the meters has been central in helping us identify exactly where water's being used, reduce leakage and meet the unprecedented demand for water during the Covid-19 pandemic. Despite the challenges of the pandemic, we've continued to support our customers by setting up the sector's first and largest virtual water efficiency 'visit', using video/phone calls with customers.

Seeing the benefit

Benefits of our smarter water efficiency approach have included:

- Increasing the average savings per household from 36 litres per day to >80 litres per day – a 122% increase
- Delivering nearly 5,000 SHVs and 7,905 new virtual water efficiency visits during lockdowns, saving an average of 58 litres per day per household
- Helping to mitigate the increase in household water use associated with significantly higher household consumption during the pandemic

Protecting chalk streams

The background

Clean, clear and rich in minerals, chalk streams offer the perfect environment for wildlife to thrive. The Chilterns is home to nine of these rare rivers – but the area's demand for water is also some of the highest in the country. This is just one of the reasons why the UK's chalk streams are currently under threat.

In October 2020, we and three other water companies announced our plans to invest millions of pounds in protecting chalk streams all over the UK. We've committed to reducing the amount of water we take from these vulnerable watercourses as well as reducing the risk of pollution that could harm their fragile environments. Taking action now will help our waterways adapt to the impact of climate change.

Our chalk streams are home to some of the UK's most threatened plants and animals, including the water vole and brown trout.

Our commitment

Restoring and protecting chalk streams is a huge team effort, which is why we're working with the Government, regulators, public bodies, environmental non-governmental organisations, and local communities to make change happen. We've already made good progress and have ambitious plans for the future, including:

- Achieving a 39% increase in capacity at Chesham sewage works by 2023 so that we can store and treat more wastewater and reduce the need for discharges to the River Chess
- Increasing the capacity at Berkhamsted sewage works
- Reducing phosphorous levels at Chesham and Berkhamsted sewage works
- Preventing groundwater infiltration and surface water infiltration in our sewer network to reduce the likelihood of the network being overwhelmed or excess flows entering waterways from Combined Sewer Overflows
- Stopping all abstraction from Hawridge on the River Chess by the end of 2024
- Investing £40 million in an alternative source of water for the 12,000 customers who currently get their water from Hawridge, reducing overall abstractions from the Chiltern chalk streams by 80% compared to 1990 (to date, we've already reduced abstraction by 63%)
- Working with Affinity Water to establish a new set of chalk stream health metrics so that we can understand what 'good' looks like for a chalk stream
- Growing our smarter water catchment initiative – the first project in the UK to go beyond the water industry to identify all the different pressures including climate change on our rivers and work with partners to address them.
- Collaborating with key groups, such as the River Chess Association, to assess the benefits of addressing multiple challenges together, eg finding solutions to promote biodiversity, prevent flooding and improve access to blue/green spaces

Allen Beechey,
Chilterns Conservation Board



Wastewater – understanding our challenges

Over the next 25 years and beyond, changing weather patterns will create major challenges for our wastewater services, increasing the risk of flooding and reducing the efficiency of our wastewater treatment works and drainage assets. This may also affect sewer flows, water quality, ground conditions, the sensitivity of receiving watercourses and the demand for sludge recycling. We aim to systematically address these challenges by working with our stakeholders and ecosystems to deliver resilient services.

While long-term planning for wastewater across our region isn't currently a statutory requirement, we're tackling these challenges with our regional Drainage and Wastewater Management Plan (DWMP). As responsibility for wastewater management is widespread, we're collaborating with multiple stakeholders to set out how we'll manage it more effectively in the future.

We've used UK Climate Projections (UKCP09, UKCP18 and various emission scenarios), UK Water Industry Research (UKWIR) reports and methods and the DWMP Framework to guide how best to obtain, interpret and use climate change data in our DWMP. This matches the approach to our existing Water Resource Management Plan, which has been through several more planning cycles and iterations.

In 2020, we modelled the impact of climate change on our network and assets for a number of time periods 2030, 2035 and 2050. Some will be more challenging than others – for example, increasing rainfall will likely need long-term interventions at a local level.

As climate change is a significant driver in decreasing water supplies and increasing sewer flooding, we plan to develop nature-based solutions that support the outcomes of both our DWMP and WRMP.

Our Drainage and Wastewater Management Plan – what we’re planning

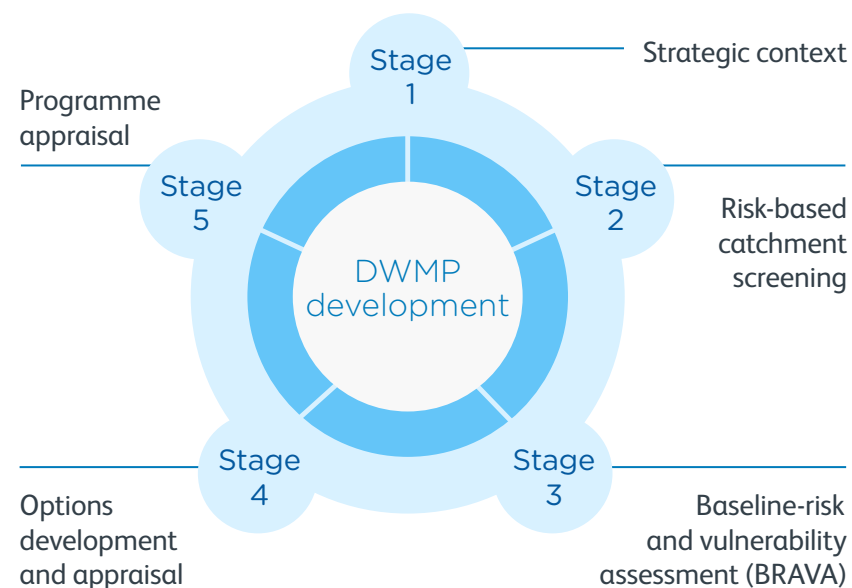
In 2019, we actively supported the development of a national drainage and wastewater framework by regulators and industry bodies including Ofwat, Defra, Water UK, the Environment Agency, Welsh Government, Natural Resources Wales, ADEPT, CCW and Blueprint for Water. Our Head of Environmental Engagement has been involved from the start, setting the scope for DWMPs across the industry as co-chair of the framework’s steering group.

Our DWMP will eventually deliver a strategic action plan for the next 25 years. Working through the five stages of the framework helps us understand the long-term pressures affecting our region and their impact on our service, customers and the environment. We also use three planning periods (2025-30, 2025-35 and 2025-50) to assess the potential impact of each risk, explore how they might progress and determine which areas to invest in. [Find out more.](#)

We’ll review our DWMP on a five-year basis to match our price review process. Our first DWMP will be ready for consultation in the summer of 2022, with final publication in March 2023. We actively encourage our customers to contribute to this process and help shape the future.

We’re still working to align our DWMP and WRMP’s climate change modelling and stakeholder engagement wherever possible. We’re also working on our Surface Water Management Plans and our Groundwater Impacted Sewerage System Plans separately. Our long-term aim is to integrate all these plans within the next 25 years. In the meantime, our developing understanding of DWMP will inform our PR24 planning.

We will be consulting on the development of our plans over the next couple of years and would encourage our customers to participate and inform this process.



Visualising wastewater in real time

The background

We're investing heavily in the technological capability of our Wastewater Management Centre (WWMC), where we manage our wastewater networks. We've upgraded the centre to include our Central Geographical Information Systems (GIS) Room and hold data from around 2.2 million sensors.

Getting ahead of incidents

Our Central GIS Room contains sophisticated IT hardware, used to process the data collected by sensors in real-time. This system will help us understand where the stresses are in our networks and how these systems change over time. Climate change may be the root cause of many pressures the business faces, and this improved system will help us better manage its impacts.

Geographical systems

A key step-change was the decision to combine hundreds of individual wastewater assets into just 78 systems, based on catchment geography. For each of the 78 systems, we'll be able to integrate management of pollution, flooding and customer service.

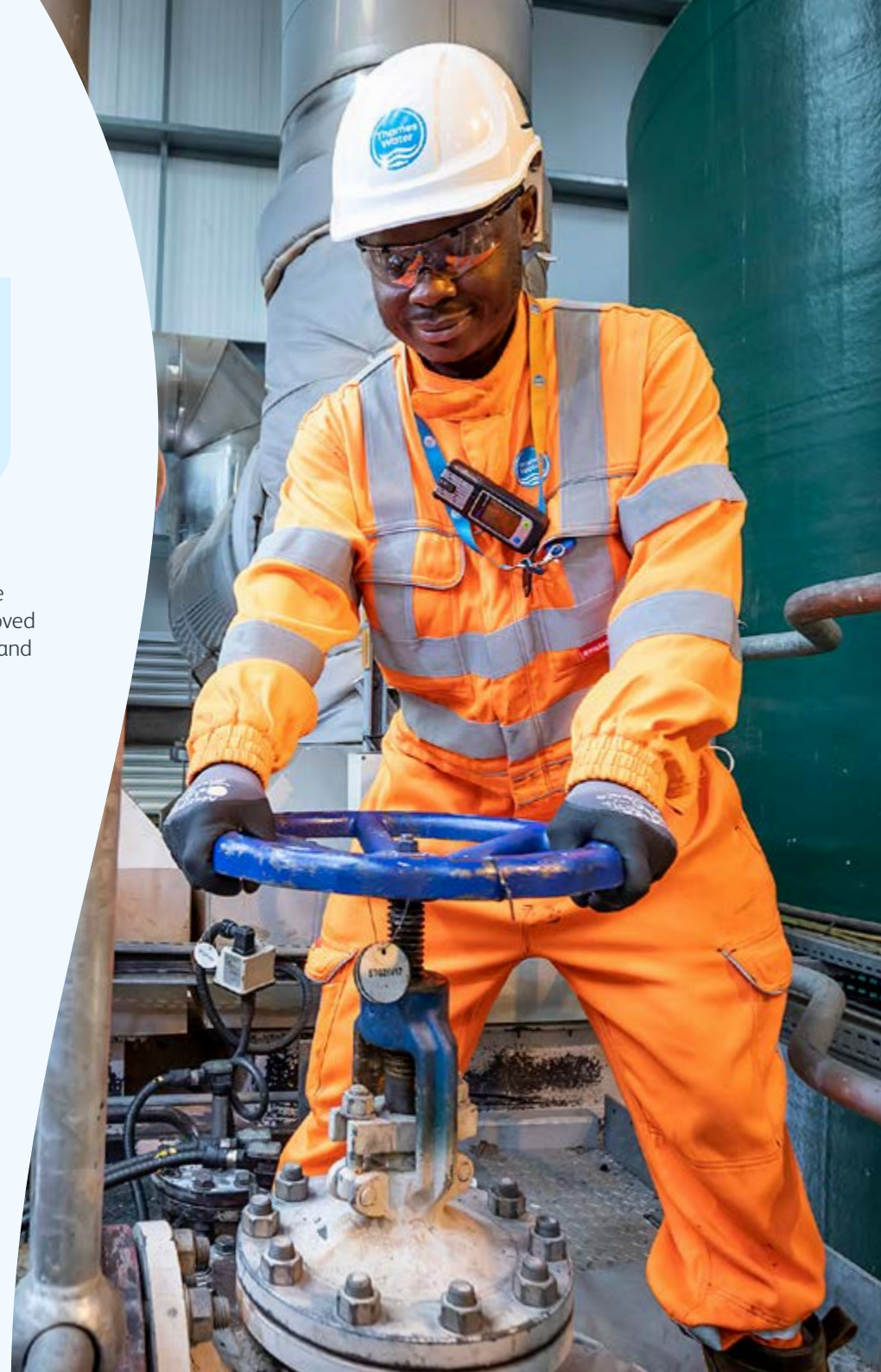
Intelligence Hub

Since our last ARP update in 2016, we've enhanced the capability of the WWMC by setting up an 'Intelligence Hub' (iHub) which links the WWMC to our 'SCADA' (Supervisory Control and Data Acquisition) systems.

The iHub helps us collect validated operational data and ensures we're planning investment with an improved level of understanding of weather and climate impacts.

Benefits of a systems approach

Our 'systems approach' will offer multiple benefits including, early detection of issues, enhanced monitoring and tailored chemical usage demands – reducing overall chemical use and reducing our impact on the environment



Learn more about what we're doing

We're passionate about making plans, but we're even more motivated to get things done. So, if you'd like to read more about the plans we've put into practice, you can see 13 bite-size case studies in [our main ARP document](#).

Topics covered include:

- Smarter water catchments
- Working with WRSE
- Managing supply and demand
- Detecting leaks
- Taking care of water
- Visualising wastewater in real-time
- Sustainable drainage in action
- Preparing for cold weather
- Understanding a 2°C warmer world
- Next stop, net zero
- Protecting chalk streams
- Protecting biodiversity
- Understanding natural capital

Next stop, net zero

The background
In 2019, we made an important pledge to reduce our operational net carbon emissions to zero by 2030 – a full 20 years ahead of the UK government's target and the global Paris Pledge. Although extremely challenging, we're already making progress to achieve the goal. But we don't want to stop at Net zero – we're committed to going beyond this by 2040 and working to become a net negative organisation for the future.

Where are we?
We've been working to tackle our carbon emissions for many years, and we've already made significant progress. Since 1990, our operational emissions have fallen from 816k tCO₂e to 261k tCO₂e, despite our growing air services and 4.3 million customers. We've already enabled through the smartest systems to reduce our carbon emissions, so to reach net zero, we need to explore new solutions and embrace new technology. This will involve greater levels of innovation and collaboration than we've ever had before. We've created a Net Zero Carbon Taskforce made up of experts from across our business who are exploring potential options and developing a comprehensive plan for emissions reduction.

Our route map
We've developed a route map which covers the areas in which we'll actively work to reduce our operational carbon emissions to zero or towards for the future:

- Reduce – Design and operate our assets so they emit as few carbon emissions as possible
- Decarbonise – Phase the same capital items using lower carbon technologies
- Create a net negative future – Grow our output of renewable energy products and procure renewable energy where we can't decarbonise our supplies

What are we doing?
Our in-depth plan includes a range of green initiatives, ranging from renewable energy generation and fuel fuel substitution to energy recovery, energy efficiency and vehicle decarbonisation. Examples include:

- Separating and offset – Consider carbon offsets, carbon capture and storage, and carbon sequestration opportunities
- Increasing our use of biogas to replace fossil fuels on our sites. We're also looking to convert it into biometane so that we can export it to the gas grid and use it for vehicles and alternative to natural gas
- Developing innovative plans to capture heat from our sewage and treat effluent. This includes working with Anglian Council to heat over 2,000 homes from a new state-of-the-art energy centre at our Hoptonville Sewage Treatment Works
- Engaging with our supply chain so that we can understand how they're measuring and reducing their own carbon footprint and look for new opportunities to improve our sites

Looking forward
We've created this route map so that we can understand the scale of the challenge and work together to identify opportunities to move towards net zero. We understand it won't be an easy road, and we can't do it on our own. To overcome the net zero challenge, we'll need to successfully work with all our partners, stakeholders and regulators to unlock brand new solutions. In addition to all this, we're actively exploring how we can reduce the amount of embodied carbon associated with the delivery of our capital projects.

Detecting leaks

The background
Reducing leakage is one of our biggest challenges. It's identifying and repairing leaks is an important adaptation response, helping to lay the foundations for more resilient infrastructure and improve resilience including the impacts of climate change. Since our first ARP report, we've significantly improved our understanding of our ability to monitor our water network systems. This helps us better predict and manage performance challenges, including weather, leakage and bursts. The project is an important part of meeting our end of 2020 leakage target.

The challenge
The identification and repair of leaks plays an essential role in how we'll meet our climate change targets. We have over 300 Leakage Technicians, who are responsible for the detection of leaks. On average, we identify and repair around 1,000 leaks per week across around 1.9m (around 400km) of mains. Despite the volume of investments and resources we've dedicated to leakage, we were still missing our leakage target and needed to approach finding and detecting leaks in a different way. One of our responses was to develop an AI-based 'leak DMA' to help improve the efficiency and effectiveness of our technicians in finding leaks and when in turn increase the speed at which they can be repaired.

Where DMA
The approach is a combination of data science and a machine learning algorithm to analyse 20 years of existing data across over 12 factors – including pipe age, pipe material, soil type, location, junctions – to identify three pipes most likely to leak. It then prioritises them from red – the highest risk level – through amber, yellow and then to green – the lowest risk. The app then directs our technicians towards the areas of the DMA where the highest pipes are likely to be located. We've seen a 14% 30% improvement in our technicians' productivity when they use the app.

Using data loggers to detect leakage
Historically, we used thresholds on our acoustic loggers to identify we had a leak requiring investigation. However, this approach often either missed leaks or alerted when there was no leak (see line 1). Our new dynamic approach uses data from around 20,000 acoustic data loggers and analyses changes in data from what is considered 'normal' for a specific location and only

change would trigger a leak investigation (see lines 2 and 3). This has improved detection by over 30%. As shown in the diagram, under the previous approach, line 1 would have triggered an alarm and an unnecessary investigation because it is above a threshold. With our new approach, we can now identify a potential leak (see line 2) when the background signal increases from its normal level even though it is still below the threshold previously used. Similarly, line 3 would have previously been considered a leak only because the background signal was above the threshold point, however, the tool can detect a leak with more confidence because there is a sustained change in the signal.

30% more leaks are found with acoustic logger data.

Work with us to help shape the future

Looking forward, we'll soon begin consulting on our future plans not just to the end of the decade but to the end of the century. We actively encourage all our customers to participate in these consultations to help shape how we continue to deliver life's essential service.

Water Resources Management Plan

The South East of England is one of its driest regions and our water supplies are being stretched further and further as the number of people living in our area increases. The choices we make today will shape the water supply we can provide in the future. Our Water Resource Management Plan sets out how we'll provide a secure and sustainable water supply for our customers, while protecting the environment.

Drainage and Wastewater Management Plan

We're planning ahead to manage wastewater and drainage issues, so your local area is ready for the impact of climate change and population growth in the future. Since early 2019, we've been working hard to develop our first DWMP with our stakeholders and customers to create a shared plan and provide a reliable and affordable service for years to come. Importantly, everyone will get to have their say in July 2022, when we'll consult on the DWMP – please do get involved.

Business Plan

We want to draw on your needs and expectations so that our water and wastewater services are ready for the impact of climate change and population growth in the future. We invite you to work with us to meet the future needs of drainage and wastewater services in our region.

We will be undertaking consultation on all of our key plans and would like to hear your views. Our consultations and responses will be accessible via our [web site](#).



This document is a shortened version of our
Climate Change Adaptation Report published in
November 2021 and covers the period 2015 to 2020.

