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# Shaping our future: developing our long-term strategy 2025-2050

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**NORTHUMBRIAN**  
**WATER** *living water*

**ESSEX & SUFFOLK**  
**WATER** *living water*

# A summary of our long-term strategy

**Our long-term vision is to become the national leader in the water sector by working with partners and innovating to deliver effectively and efficiently for our customers and the environment. We will engage with customers, stakeholders, and our investors to make the right investments at the right times to adapt to future challenges and opportunities.**

We are privileged to provide water and wastewater services to the communities we serve in the North East, Essex and Suffolk. We must continually improve our business to make sure these essential services can continue to be enjoyed by customers in the long-term and that we can deliver the improvements that Government, regulators, and our customers want to see.

This document presents our emerging long-term delivery strategy for the next 25 years for consultation. We intend to republish the strategy after further engagement with customers and stakeholders alongside our Business Plan for 2025-30 in October 2023. We would welcome comments and feedback from customers and stakeholders on this strategy by **Friday 14 July 2023**, please send responses to [haveyoursay@nwl.co.uk](mailto:haveyoursay@nwl.co.uk).

## Taking a 25-year view

Our business is inherently long-term. Many of our assets are expected to operate for more than 100 years. We have an enduring presence in the communities we serve and provide services to generations of our customers. In 2014 we completed a major expansion of Abberton Reservoir in Essex, one of the only examples of a major reservoir expansion since the industry was privatised in 1989. This followed several years of discussion with local communities, design and construction, and secured supplies in the region for the last decade. It illustrates the importance of careful long-term planning to ensure the resilience of the essential service we provide.

In developing our long-term delivery strategy, we have taken a structured approach, starting by identifying the long-term outcomes we want to put in place with customers and working back from those to the actions and investments that we will need to deliver. We have sought to use analysis and modelling to provide greater rigour to our work, building on the established long-term planning frameworks we use for [Water Resource Management Plans](#) (WRMP) and [Drainage and Wastewater Management Plans](#) (DWMP), which are also being updated and republished, our [emissions reduction plans](#), and information on the health of our assets. These frameworks use common assumptions and forecasts, in particular for how growth and climate change could affect the services we deliver.

We have examined trends in the water sector and UK productivity to understand what we might be able to achieve in efficiency alongside new investment.

But we have also tried to think more expansively about how the future could be different, including for example, the impact of new markets like the trading of carbon and biodiversity credits, and the opportunities for technology like AI, robotics, and smart networks. We worked with the Oxford University Futures team and workshopped opportunities with a range of innovation experts across water and other sectors to consider the potential impact of these changes.

We have tested our strategy against a range of scenarios developed with ARUP and KPMG. We considered a comprehensive list of factors that could have an impact on the future and our ability to meet our ambitions goals. We considered the materiality and uncertainty of each of those factors and from this ARUP identified a range of scenarios that we have used to test our plan, see [page 36](#). The scenarios also reflect the specific elements that our economic regulator, Ofwat, wanted us to test.

## Setting ambitious long-term goals

We set out a series of long-term targets that we want to deliver by 2050. These are based on:

- Commitments we have already made and our existing strategies and plans to deliver those improvements.
- The improvements we are legally obligated to deliver, including from Government and regulators.
- What our customers and stakeholders want to see improvements in and what they are willing to pay for those improvements.

Many of the targets are driven by statutory requirements but where we have choices, we have carried out significant engagement to understand customer and stakeholder priorities including through the [WRMP](#) and [DWMP](#) planning processes and with our 'People Panels' of informed customers, which we established specifically to consider these long-term issues. We set out the targets that we want to meet on [page 27](#), these include some of the things outlined in figure 1.

We want to engage more with customers and stakeholders on those targets and the level of ambition that we set within them, including now that we can illustrate to customers more clearly the expected cost impacts of the different improvements.

Figure 1: Our targets for 2050



### Reliable service and unrivalled customer experience

Including continuing to offer excellent customer service ranking us in the top two of the sector, improving our drinking water quality performance to be among the best in the country and reducing internal and external flooding by 60%.



### Caring for the long-term needs of the environment

Including making sure 75% of our rivers achieve good ecological status, our combined sewer overflows (CSOs) spill fewer than 10 times a year on average, there are zero serious pollution incidents, significant improvements in biodiversity, a 50% reduction in leakage across our operating areas, achieving a per capita consumption (PCC) reduction to 110 litres per day and achieving Net Zero across all our emissions including scope 1, 2 and 3 and having 100% of our energy use coming from renewable sources by 2040.



### Sustainability and resilience

Including making sure our water supplies are resilient to a 1 in 500-year drought and securing the long-term health of our assets. Improving the sustainability of our chemicals and energy use.



### Affordable and inclusive services

Eradicating water poverty and supporting our customers to make sure bills remain affordable for all.



### Efficiency and prudent investment

Including becoming the most efficient water company in the sector by 2030, having a £100m innovation pipeline by 2030 and reducing our chemical use by 40%.



### Caring for our communities

Spending more than 60 pence in every pound locally in our operating areas and continuing to make sure that our people volunteer locally to support community initiatives.

## The challenges across our operating areas

We operate across three regions and the issues and challenges we face are different.



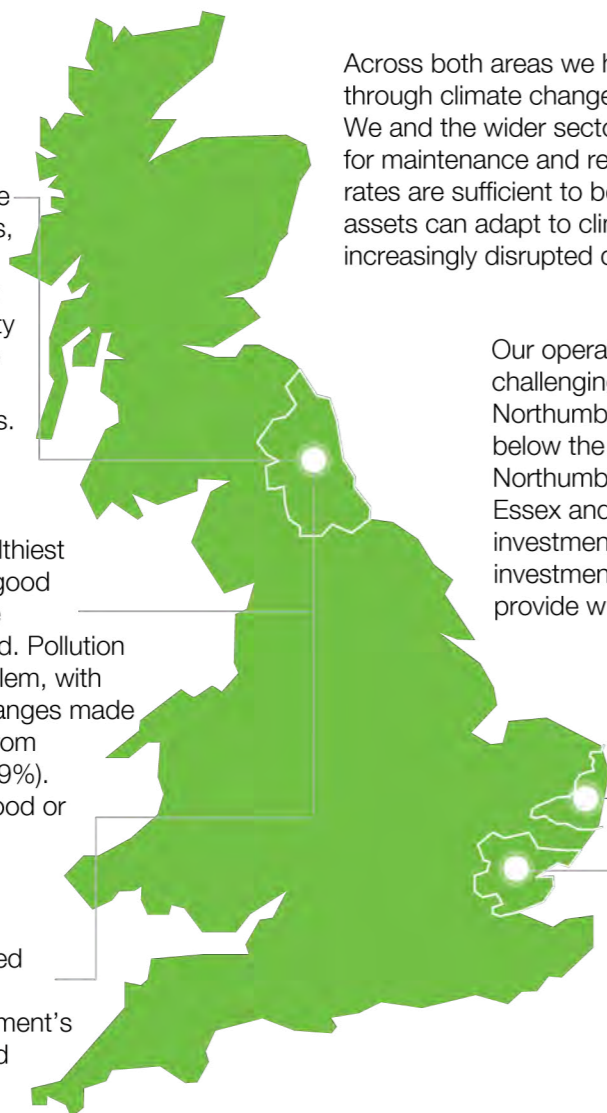
In our Northumbrian operating area, where we provide both water and wastewater services to our customers, greater rainfall and a more generous water supply position is supported by Kielder Reservoir, the largest in the country. This means that the risks to the security of water supplies for our customers are lower, but we need to meet obligations to reduce leakage and consumption across both households and businesses.



The local environment in this region is among the healthiest in the country with the highest proportion of rivers in good ecological status in England – but still only 27% in the Northumbria river basin and 44% in the Solway Tweed. Pollution from wastewater accounts for about 13% of the problem, with more than half of the issues coming from physical changes made to rivers and lakes over many years (38%), pollution from farming (10%), and pollution from abandoned mines (9%). We have 34 bathing waters and 32 of those are at Good or Excellent status.



Our wastewater network also has over 1500 Combined Storm Overflows (CSOs) and we will need to see a substantial step up in investment to meet the Government's Storm Overflow Discharge Reduction Plan targets and other new environmental obligations.



Across both areas we have significant issues with an ageing asset base and through climate change we see increasing numbers of extreme weather events. We and the wider sector are currently investing in line with our cost allowances for maintenance and replacement rates, but we do not consider that these rates are sufficient to be sustainable over the long-term. To make sure our assets can adapt to climate change so that essential services do not become increasingly disrupted during extreme weather events, we need to invest more.



Our operating areas contain some of the most deprived and challenging areas to serve in the country, particularly in the Northumbrian operating area where incomes are on average 15% below the UK average, and while our combined bills in our Northumbrian region are the lowest in England, water bills in our Essex and Suffolk regions are some of the highest, following our investment in the Abberton Reservoir. Given the scale of the investment required, affordability of the essential services we provide will become increasingly challenging to deliver.



In Essex and Suffolk, where we only provide water services, the climate is amongst the driest in the country and climate change will reduce the amount of water available for supply. At the same time reductions are being made to the amount of water that we can abstract from rivers to ensure we leave more water for the environment. Alongside growth and new demand for water means that we have significant water scarcity issues in the region, and we cannot currently supply some new demand emerging in Suffolk.



## Building on strong foundations - driving more innovation and partnership working

We are proud but not complacent about our comparative performance. Over time we have delivered some significant improvements to the services we provide, often brought about through step-changes in improvement, driven through our strong focus on innovation and working in partnership and we set some of these out on [page 46](#). Both of these traits will be critical to meeting the significant challenges of the future.

Through partnerships we can deliver more for less by leveraging expertise, skills, and resources from elsewhere to solve collective problems at lower cost to customers. We have some great initiatives such as our Northumbrian Integrated Drainage Partnership and more recently our North East Catchment Hub partnership with the Rivers Trust and will continue to seek future partnership opportunities, but these take time to deliver.

Innovation is central to how we operate. Through our annual Innovation Festival we develop opportunities for new technology and approaches to drive transformational change. The festival has grown enormously in reach and attendance with participants from around the world. Projects jump-started at the festival are nurtured by the business to ensure we realise their potential through innovation seed funding. Our network of innovation ambassadors keep us continually searching for new ways to deliver material improvements for customers.

Our people are key to delivering our strategy. To continue to deliver we need to continue to support and protect our existing passionate employees while making sure we build on our success as a great place to work to attract the talent we need to deliver in an evolving labour market.

## Our four key investment areas

To deliver the long-term targets and address the challenges that we have in our operating regions we identified four areas where new investment would be required. These areas are:

**Ensuring sustainable water supplies** - we will need to invest significantly in our Essex and Suffolk regions to make sure we can maintain supplies. We will need to roll out smart meters across all customers now and reduce our leakage by a further 40% from a position that is already amongst the lowest in the sector. We will likely also need to invest in new supply-side schemes including additional water reuse and storage schemes, network enhancements to be able to move water around the region better and potentially a new desalination plant. In the North East we will need to offer smart meters to our customers and take steps to reduce water use and leakage, targeting a 55% reduction by 2050. We should not need to invest in new supplies unless demand, including uncertain demand on Teesside is greater than we expect. We may have opportunities to trade water with other regions from Kielder Reservoir.

**Protecting the local environment** - we expect a material and lasting step up in the amount of investment required to deliver major improvements to the natural environment. To meet the UK [Government Storm Overflow Discharge Reduction Plan](#) requirements and the wider performance objectives of the [DWMP](#), we will need to invest around £1bn extra every five years for the next 25 years. At the same time, to deliver further improvements to the environmental programme will be needed, which is considerably larger than for previous periods. If further pollutants are identified as needing to be treated in wastewater, such as microplastics, then this would require a further step-up in investment.

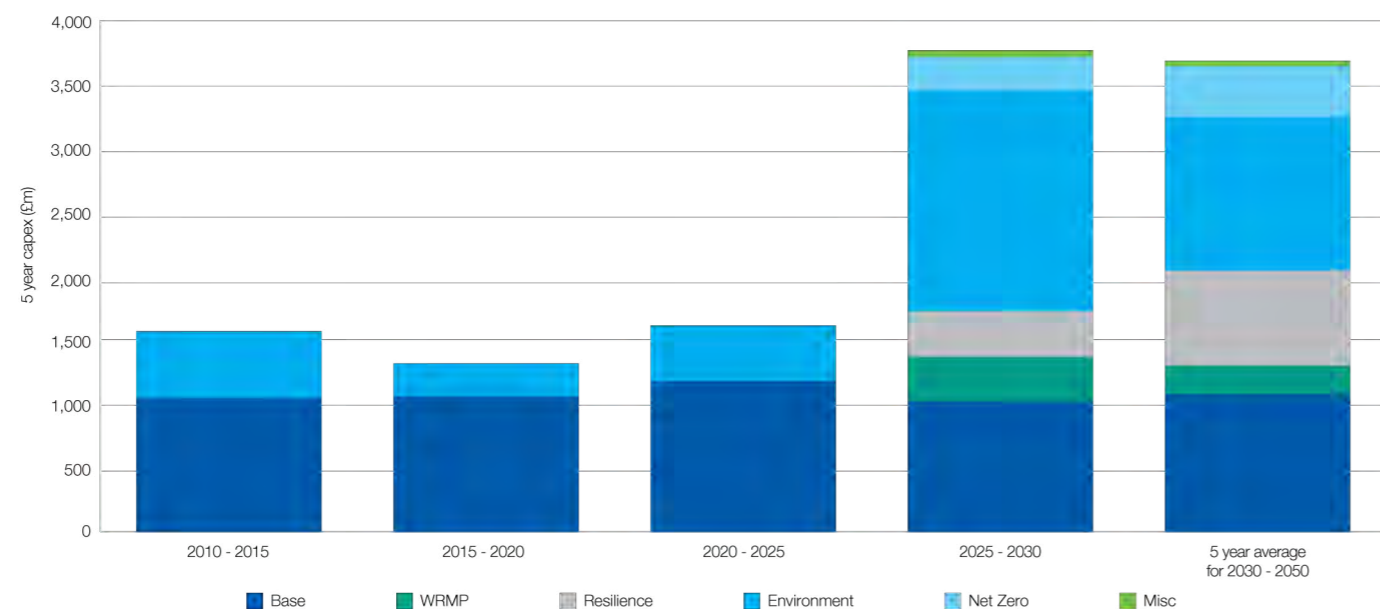
**Delivering Net Zero** - we have already made substantial progress to reduce our emissions and have ambitious plans to achieve Net Zero operational emissions by 2027. The major change we will need to achieve this is the decarbonisation of our fleet of vehicles, which we will need to take forward in the next five years from our base cost allowances. We also need to continue to invest in renewable energy and improve our measurement of scope 3 emissions, all from base costs. We will continue to seek innovative opportunities to reduce operational emissions and have some exciting alternative treatment technologies we are developing internally that could deliver material reductions in emissions. If we can innovate effectively then we expect to be able to reduce costs in future but presently we expect achieving Net Zero by 2050 will still add significantly to costs.

**Maintaining resilience** - to better protect our assets and the services they provide to our customers from the increasing extreme weather events driven by climate change we will need to invest more, for example in local power supplies and flood protection. We also envisage a step up in investment required in the general maintenance investment across the asset base, currently the level of maintenance investment across the sector is below the efficient rate of asset replacement. In addition, the Environment Agency is currently developing a new strategy for sludge to land.

That strategy is not yet public, but it could result in us being more limited in our options to dispose of biosolids, and so we will need to invest to maintain resilience by building storage facilities to manage when biosolids are spread to land when restrictions are in place, and potentially incineration if we lose access to the land bank.

We carried out modelling to scale the investment requirements bringing together all the elements highlighted above. In each area we identified a series of investments that we considered will be needed in the future.

Figure 2: Historical and projected capital investment over time



The core plan involves a substantial increase in investment, the chart below illustrates the key drivers of that investment and why we consider it will be needed. It compares those drivers of investment from the historical 2010-25 period with our expectations for the future 2025-50 period. A core part of our strategy is to maximise efficiency through innovation. But even by doing so, affordability is at risk due to the scale of the investment needed. If we chose to invest less, we would put performance, in particular environmental improvement, and compliance with our legal duties at risk.

### Key decision and 'trigger points'

While we have set out our core plan to 2050 we will need to adapt to new information and change as it arises. We have a series of key choices we will need to make in the future at certain 'trigger points' where new information will be available. If we take action ahead of these points, we are at risk of making the wrong choice or stranding investment that might otherwise not be needed. There are many of these choices, but we identify nine critical ones that we have in the future and the timescales during which those choices will need to be made.

### Bringing it all together

Across our core pathway and the key trigger points we see a significant increase in investment required from where we have been in the past for all of our four key areas. This varies with each scenario based on the extent to which future trends are better or worse than we expect. Even after assuming significant efficiency and productivity improvement from greater innovation, we expect a material uplift will be needed.

This will significantly increase bills and even if earnings grow more rapidly than historically with more positive improvements in our operating areas, we would expect a growing affordability problem. A national social tariff at the 5% income level would significantly help to address this challenge for customers but we will need to find new and different ways to support customers struggling to pay as the affordability challenge grows.

Table 1: Key choices and decision points

Decision	Timing
1. Should we prioritise building the Lowestoft water re-use plant or the North Suffolk reservoir first?	2027
2. Will we need to build a water re-use plant at Southend-on-Sea?	2027
3. Will we need to build a de-salination plant on Canvey Island?	2027
4. Will we need to invest in biosolids incineration?	2026
5. Should we accelerate our storm overflow discharge reduction programme or extend the flood risk reduction it provides?	2024
6. Should we delay investment from 2025-30 to later periods to support affordability in the short term?	2024
7. Will we need to invest in treatment of micropollutants?	2027
8. Could we provide water from our Kielder Reservoir to another water company?	Annually
9. Will new industrial demand on Teesside require further water supply or wastewater treatment investment?	Annually

We highlight in the strategy some things that we will explore beyond a national social tariff to improve affordability, see [page 63](#).

At the same time the investment will need to be financed through new private capital. This will need to include both equity and debt financing with the former required to take up a much bigger part of the investment. Under the central case we will need to identify around £2-3bn of new equity capital over the next 25 years. This could be attracted into the sector either through competition for large and discrete new infrastructure projects or through bringing new equity investment into the existing business.

For the latter arrangement, that investment will not turn cash positive for more than ten years. We highlight some things that could be done to improve the investability of the arrangements that we could explore.

We must continue to work with our partners, challenge ourselves to innovate and invest in our people to make sure we can deliver this investment as efficiently as possible. If we can manage the affordability challenges and attract the necessary private capital then the plans would deliver the objectives we have set out, including better and more reliable services for customers, massive long-term improvements to the environment and more resilient services.

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Howdon sewage treatment works, North Shields

## Guide to this document

In section 1 '[Welcome](#)', we show what is unique and important about the communities and regions we serve, and we set our Purpose, vision, and values – as well as our long-term ambitions for 2050. We developed our long-term ambitions for 2050 by looking at our existing ambitious goals (set in 2018) and considered what we need to deliver to meet our Purpose and legal obligations in the long term.

In section 2 '[Planning for long term challenges](#)', we explain how we have thought about long-term challenges. Our Board worked with experts and water specialists to define plausible future scenarios for 2050 that explore some of these issues focusing on those that could have the most material impact on plans and those that are most uncertain.

In section 3 '[Pathways](#)', we explain how we developed our core and adaptive pathways to deliver these ambitious goals. We want to make sure our long-term delivery strategy and our five-year business plan are based on adaptive planning principles, and that we begin to use this more and more to think about an uncertain future.

In section 4 '[Impacts](#)', we cover the modelling and analysis we have done to develop these scenarios, and the impact of this long-term strategy on our investment plans for 2025-30. This includes total expenditure, bill impacts, implications on affordability and financing requirements for the plausible future scenarios.

In section 5 '[Next steps](#)', we set out how we are consulting on this draft long-term delivery strategy and how we will use the feedback we receive.

To search this document for specific words or phrases press CTRL+F and enter your search term into the text box. The first match will be highlighted and the arrows can be used to navigate results.

We have also included links to help you find sections and to other documents you might find useful. [These links look like this.](#)

# Welcome

**Welcome to our long-term delivery strategy document for the period 2025 to 2050. As we look towards the future, we face challenges that are both exciting and daunting. The world around us is changing rapidly, and we must continuously adapt to meet the needs of our customers and the communities we serve, while protecting and enhancing the environment we live in.**

One of the greatest challenges we face is the uncertainty of the future. We cannot predict what the world will look like in 2050, but we do know that we must be prepared for whatever comes our way. This means being flexible, resilient, and proactive in our planning and decision-making.

The impact of climate change affects us all, and as a water and wastewater company we are often at the forefront of experiencing these impacts. For example, Storm Arwen in December 2021 was one of the most powerful storms our northern operating region has ever seen and was classed as a Civil Emergency. The summer of 2022 saw Europe's worst drought in 500 years. Rising temperatures, changing rainfall patterns, and more frequent extreme weather events are all putting pressure on our water resources and on our wastewater system. We must be prepared to adapt our operations and infrastructure to make sure we can continue to provide a reliable and sustainable water supply to our customers.

Such challenges also bring opportunities. By embracing innovation and new technologies, we can create a more sustainable and resilient water system for the future. We can work with our customers and communities to promote water conservation and reduce demand, and we can invest in renewable energy sources and new ways of treating and distributing water to reduce our carbon footprint.

This document has been built on significant volumes of data on what we know now about our assets and operations, what experts know about future weather patterns and populations trends, and what our customers and stakeholders believe are the key priorities for our future services. It brings together the outputs from the long-term planning processes across our business, including our [Water Resources Management Plan \(WRMP\)](#), our [Drainage and Wastewater Management Plan \(DWMP\)](#) and many other strategies. We have taken that complex information and worked with thousands of customers and stakeholders over the course of the last two years to try to synthesise it into a meaningful plan for the future. This work will underpin our more detailed five-year regulatory planning process, starting with our regulatory Business Plan for 2025-2030, which we will share with you later this year.

As we embark on this journey, we are committed to listening to and understanding the perspectives of our customers and stakeholders every step of the way.

This is important to us because, in addition to providing essential services to our customers, their wellbeing and the environment, it is only by delivering to their expectations and effectively meeting the challenges of the future that we can build trust and maintain legitimacy in their eyes for the years to come.

We want to hear from you and understand your priorities and concerns. Together, we can create a water system that is not only sustainable and resilient, but also meets the needs of all our customers.

Thank you for your interest and support in our long-term delivery strategy. We look forward to working with you to create a better future for us all.



**Heidi Mottram CBE**  
Chief Executive Officer

Northumbrian Water Group



**Andrew Hunter**  
Chairman

on behalf of the Board of  
Northumbrian Water Group

## Who we are

Northumbrian Water Limited (NWL) provides:

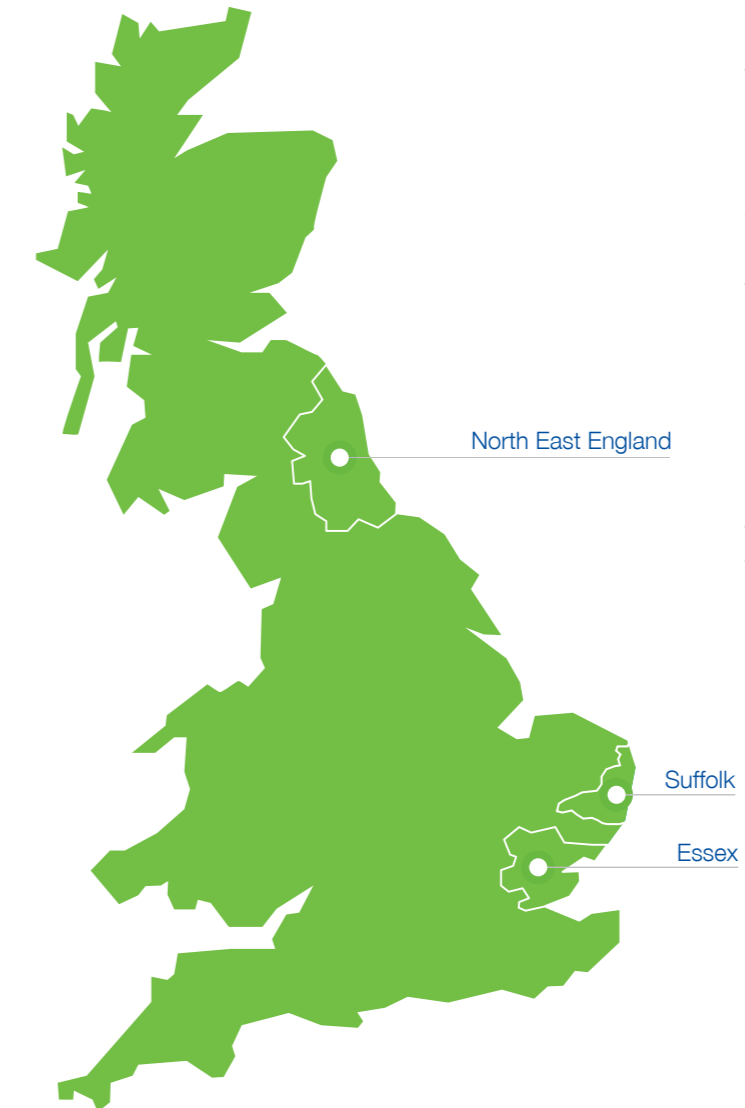
- Water and wastewater services to 2.7 million people in the North East of England, trading as Northumbrian Water (NW).
- Water services to 2 million people in Essex and 0.37 million people in Suffolk, trading as Essex & Suffolk Water (ESW).

ESW is a water only company, while NW is a water and wastewater company. This means that for some aspects of our long-term delivery strategy we take differing approaches. Much of this strategy relates to both ESW and NW, but where this is not the case, we make this clear.

We operate and maintain:

- 50 water treatment works;
- 388 water pumping stations;
- 304 water service reservoirs;
- 26,451km of water mains;
- 413 sewage treatment works;
- 966 sewage pumping stations, and
- 30,237km of sewers.

Every day we supply 1.1 billion litres of water.



## Building on our strong track record

We frequently innovate to bring about positive step changes in the services we provide to our customers, communities and the environment, and have a long record of strong performance. We have done this within a framework of being forward thinking, focused on achieving our national leader vision and reflecting feedback from our customers and stakeholders.

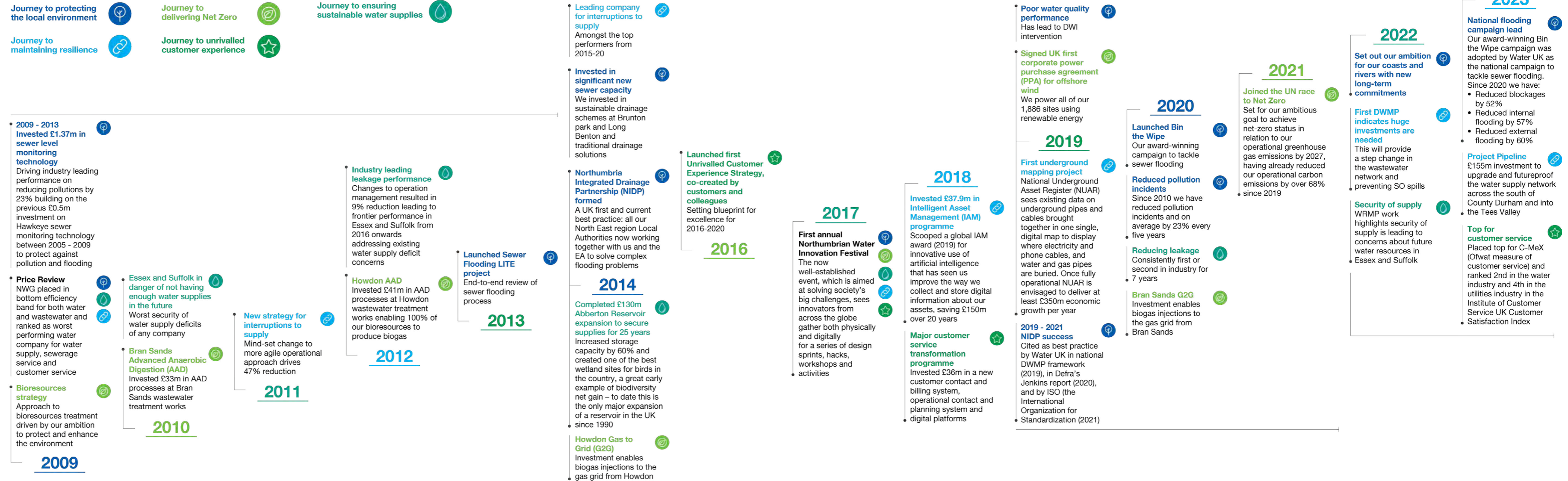
Our journey began with our first Strategic Direction Statement in 2009 and was further developed in 2014 with '[Shaping Our Future](#),' a strategy co-created with customers for the period 2018-2040, and which resulted in our ambitious goals for our [PR19 Business Plan](#). We have continued to build on our approach with the development of this long-term delivery strategy (covering the period 2025-2050) and there is further detail on the steps we have taken in [section 2](#).

# Our journey to national leader

We measure ourselves across a broad range of customer service and environmental performance criteria in our journey to becoming the national leader in the supply of sustainable water and wastewater services.

Driving forward all of those measures at the same time can be hard and the journey often isn't linear, and improvements happen at different times across different performance areas. Often the investments and innovations we make can take a few years to deliver results. We track our progress closely and this chart shows how our performance has improved across a number of areas due to interventions we have made. It also highlights the challenges we currently face.

Figure 3: Our journey towards becoming national leader



## The North East: key features

### Customers

- 1.3m households and 70,000 businesses
- Average income: £35k
- Employment rate: 73%\*
- Service we provide: water and wastewater to 2.7m people



### Geographical features:

- Kielder Water is the largest man-made reservoir in Europe.
- We enjoy unique landscapes and wildlife in the North Pennines, Kielder Forest and Northumberland National Park, and some of the best and cleanest beaches in the UK along the Northumberland Coast.
- Cooler and wetter than most of England, with a higher risk of storms.



### Water:

- Your clean clear tap water mostly comes from reservoirs in protected areas – the North Pennines and Kielder Water & Forest Park – and flows to coastal cities (Newcastle, Sunderland, and Middlesbrough).
- No major new supplies needed since the Kielder transfer scheme in the 1980s.
- 44% of occupied households are metered.



### Wastewater:

- 30,237km of sewers, 966 sewage pumping stations, 413 sewage treatment works, 1,561 storm overflows, and more than a million manholes.
- Networks dominated by historic investments and geography. The population distribution dictates the design of the sewerage system with large coastal Sewage Treatment Works, particularly Howdon (at the mouth of the Tyne) and Bran Sands (at the mouth of the Tees) which treat around half of the wastewater in the region, with many small rural treatment works inland. Coastal treatment works were mostly built from the 1980s (Howdon) to the year 2000 (Bran Sands, Marske, Seaton Carew).



### Environment:

- Highest proportion of rivers in good ecological status in England – but still only 27% in the Northumbria river basin and 44% in the Solway Tweed.
- Pollution from wastewater accounts for about 13% of the problem, with more than half of the issues coming from physical changes made to rivers and lakes over many years (38%), pollution from farming (10%), and pollution from abandoned mines (9%).
- 21,000km of rivers and 34 bathing waters.
- The first and only water company in the UK to use 100% of the sludge from its wastewater treatment to create green power through advanced anaerobic digestion - or as we like to call it, 'power from poo'.



### Business:

- Historic heavy industry is now dominated by chemicals, pharmaceuticals, renewable materials and technology – and the impact of industrial restructuring still affects communities.
- Newcastle has vibrant science, education, culture, digital and service sectors.
- Historic Durham is home to a UNESCO World Heritage site.
- Sunderland is renowned for its manufacturing capability, being the home of Nissan's world-leading car manufacturing base and the focus of one the Europe's leading automotive clusters.
- There are five universities in the North East.



### Income and health

- Over 40% of the population lives in households with an income of less than £20k. More than 25% of the households are socially rented, and households containing lone parents occur more in the North East than in Great Britain.
- More than a third of areas in the region are among the most deprived in England, with incomes 15% below the UK average.
- The highest health care needs in the UK, in part due to higher levels of chronic pain, alcohol problems, COPD and cardiovascular disease.
- With both coast and countryside on hand, the population here has better access to parks and outdoor spaces compared to many other regions, and benefits from some of the lowest levels of air pollution in the country.



\*Note: as of May 2023; employment rates vary over time.

## Essex: key features

### Customers

- 700,000 households and 32,000 businesses
- Average income: £40k
- Employment rate: 75.5%\*
- Service we provide: water to 2m customers.



### Geographical features:

- Geography varies widely, from densely populated London boroughs to green belt and estuaries.
- Urgent action is needed by all sectors on water resources – the surrounding areas in the East of England are even more water stressed, with bordering areas in South East England seeing big reductions in the amount of water that can be taken from the environment and potential investments in new reservoirs.



### Water:

- Expanded Abberton Reservoir from the 1990s to 2014. We invested £130m and increased its storage capacity by 60% or 15billion litres, helping to secure the water supply in the region.
- Most of the water comes from outside our area; around 25% of water in a dry year comes from the Ely Ouse Transfer Scheme. Abberton Reservoir is outside our supply area, along with Layer Treatment Works and Langham Treatment Works which provide water for more than a third of the population.



- Our treatment works were mostly built in the 1930s and 1940s (Langham and Layer), 1950s (Hanningfield) and 1960s (Chigwell). These have been significantly improved and upgraded since, including ground-breaking water recycling using reed beds at Hanningfield.
- Langford Recycling Scheme came into supply in 2001 in response to the 1995-98 drought, enabling us to maintain supplies until the Abberton Reservoir expansion was completed.
- 65% of occupied households are metered.

### Wastewater:

- Essex & Suffolk Water only provides water services. Wastewater services are provided by Anglian or Thames Water depending on your location.



### Environment:

- Both Abberton and Hanningfield are sites of special scientific interest. We work closely with the Essex Wildlife Trust – as Abberton is an internationally important wetland, and both are important sites for birds.
- The rivers we abstract from are at risk from farming, with nitrates and other pollutants entering the rivers.
- We work with the Chelmer and Blackwater catchment partnership to support increased engagement with the public and farmers to reduce this – but algae and nitrates cause problems at treatment works which remain a risk to providing customers with good quality water.



### Business:

- Most of the area we serve falls into London's green belt.
- Essex is a significant contributor to the UK, with a diverse and resilient economy.
- Construction, transport and logistics have particularly high relative concentrations of employment.
- The area has strengths in manufacturing and food production, including an extensive and highly productive agricultural sector.



### Income and health:

- More than 123,000 people in Essex, including 40,000 children, live in areas that are in the 20% most deprived of the whole UK.
- Essex is also home to a growing gap between the most and least deprived districts.
- 4.3% of the population lives in households with an income of over £100k.
- There are some areas with high income deprivation (such as Barking and Dagenham) alongside relatively affluent areas.



\*Note: as of May 2023; employment rates vary over time.



# Suffolk: key features

## Customers

- 127,000 households and 10,000 businesses
- Average income: £37k
- Employment rate: 75.3%\*
- Service we provide: water to 0.37m people.



## Geographical features:

- The Suffolk Coast and Heaths area of natural beauty covers estuaries, farmland, salt marsh, mudflats and other natural features.
- Suffolk is at risk from sea level rise – but we don't anticipate this will affect water supply any time soon.
- Our operating area here also includes Great Yarmouth and surrounding villages which are in Norfolk and a significant part of our water comes from Norfolk.



## Water:

- Urgent action is needed by all sectors on water resources – surrounding areas in the East of England are even more water stressed. Our customers told us they want us to invest now for the future to prepare for severe weather. This needs more resilience and additional supplies – with increasingly difficult options.
- We're leading the sector with some of the lowest levels of leakage in the UK.



- Our three water resource zones (in North Suffolk, Blyth, and Hartismere) are not connected into a single network, so we cannot move water around the region.
- 71% of occupied households are metered.

## Wastewater:

- Essex & Suffolk Water only provides water services. Wastewater services are all provided by Anglian Water.



## Environment:

- Our Ormesby, Lound, and Barsham Treatment Works treat water taken from the River Waveney, Ormesby Broad, and River Bure – which are all part of the Norfolk and Suffolk broads, England's largest protected wetland. These are all at risk from pollution from agriculture.
- A significant proportion of our abstractions are from the Chalk aquifer which extends across the region. Abstractions from this need to reduce to leave more water for the environment.



## Business:

- Mostly rural, with Great Yarmouth and Lowestoft as the largest towns – there is large water demand from agriculture and food processing. There is uncertainty regarding the build of a new nuclear power station at Sizewell C, as well as other potential industrial demands.
- Lowestoft offers a wide range of servicing facilities for North Sea oil and gas and offshore wind farms and extensive marine leisure facilities.
- New pig and poultry rearing businesses and meat processing in our Hartismere zone is pushing demand for water up by 35%, meaning we temporarily cannot supply any further new non-domestic customers with water.



## Income and health:

- Several areas have the highest deprivation levels in the country, with levels higher than any in the North East.
- Great Yarmouth and Lowestoft are both areas of high income deprivation.
- Suffolk also has a higher proportion of retired people than the rest of the UK
- There is above average representation of health care needs such as arthritis, high blood pressure and heart attack.



\*Note: as of May 2023; employment rates vary over time.



Southwold Pier, Suffolk

# Setting our Purpose, Vision and Values

**Our Purpose is caring for the essential needs of our communities and environment, now and for generations to come. We do this by providing reliable and affordable water and wastewater services for our customers. We make a positive difference by operating efficiently and investing prudently, to maintain a sustainable and resilient business.**

Our Purpose is the reason we exist, and it guides our strategy.

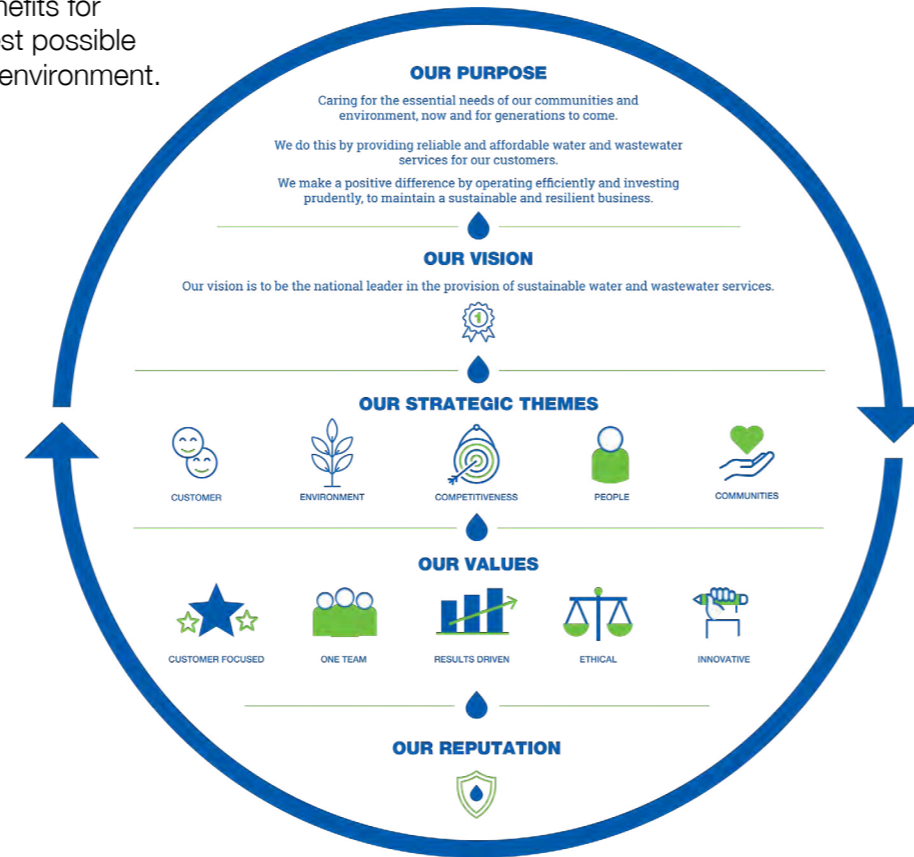
We redefined Our Purpose in 2021 by engaging with employees, customers, stakeholders and our Board to develop a relevant, enduring and shared understanding of why our company exists.

The resulting statement of Our Purpose sets out the reason why we do what we do each day. The role we have as a provider of essential services is a privilege, and it places us at the heart of our communities and environment. Everyone in our operating area makes use of our services, and our assets run up and down every street. We rely on the environment around us for our raw material and have responsibility for returning water back to our environment in a sustainable way, while converting waste into energy and other valuable products; and we must deliver our services in a way that everyone can afford to use them.

Our Purpose is well understood throughout our business, with our dedicated colleagues committed to delivering for our customers, communities and environment every day. As nearly every one of our employees lives in our operating areas, and is a customer of our services, it's not surprising that they care deeply about the service we provide to our communities. Everything we do is focused on maximising benefits for our customers and achieving the best possible outcomes for our communities and environment.

We report transparently on these outcomes in an annual 'Our Purpose' report, which seeks to measure and communicate how we truly live Our Purpose.

Figure 4: Our Purpose, Vision and Values



# Our long-term vision and goals

**We want to leave a positive legacy in the areas we operate. Our role as a water company places us at the heart of our communities and our natural environment and caring for them is always our priority. Taking a long-term view enables us to future proof ourselves, our environment, society, communities and economies.**

Our long-term vision is to be the national leader in the provision of sustainable water and wastewater services - that is, to be the best water company in the UK. We clearly define, with metrics, what this means to us.

Figure 5: Our long-term goals



## How do we define being the national leader?

When we achieve average or better in all the measures that are most important to our customers, and have the most measures in upper quartile in the sector (top 25% of companies) we would define this as being the national leader. In addition we would want to be in the top two for C-MeX (Ofwat's measure of customer service). We have been in upper quartile for C-MeX since its inception.

Our vision is well understood in our business with 91% of our people reporting that they support Our Vision and Our Values.

Our vision helps us all to focus and drive towards common goals, enabling us to achieve success where, in some areas, we have already achieved our 'national leader' vision. We are one of the best water companies for customer service and environmental performance.

In other areas, we have improved steadily and will continue to do so. Our 'national leader' vision is the starting point for setting our ambition for 2050.

## Living our Values

If Our Purpose defines who we are, and Our Vision defines what we do, then Our Values define how we do it.

Our Values are:

- **Customer focused** - We aim to exceed the expectations of our external and internal customers.
- **Results-driven** - We take personal responsibility for achieving excellent business results.
- **Ethical** - We are open and honest and meet our commitments with a responsible approach to the environment and our communities.
- **Innovative** - We continuously strive for innovative and better ways to deliver our business.
- **One team** - We work together consistently, promoting co-operation and mutual support, to achieve our corporate objectives.



How every one of our employees behaves underpins our reputation and building trust among our customers and wider stakeholders is crucial to achieving Our Purpose. Our Values set out the behaviours we expect our people to demonstrate, supporting them to take the right decisions and actions to deliver Our Purpose and Vision.

We know that we have a strong positive culture because of our clear Purpose, Vision and Values. This is evidenced with our appearance 12 times as the only water company named on the Ethisphere Institute's World's Most Ethical Businesses list and being the first water company to achieve the Good Business Charter.

This strong culture, underpinned by Our Values, is echoed in how our customers experience our services. We were delighted to be ranked first in the industry for C-Mex (Ofwat's measure of customer experience) in 2022/23 and credit our deeply embedded customer service culture, which has been supported by focused investment on digital, skills/training, new services, and partnerships for taking us from the middle of the industry to the top.

In 2022 we (Northumbrian Water) ranked top water company out of 15 and fourth utility overall out of 35 in the Institute of Customer Service's UK Customer Satisfaction Index (UKCSI), while Essex & Suffolk Water (ESW) ranked seventh water company overall and thirteenth in the utilities sector. These are our highest results to date and ESW was also named as one of the most improved companies.

The Consumer Council for Water (CCW) annually assess how well water companies are performing in a number of areas that matter the most to customers. In the most recent CCW Water Matters Report, Northumbrian Water is the most trusted water and sewerage company in England. Our trust score in Essex & Suffolk is above the industry average.



Analyst, Horsley laboratory

# Aiming high

## Developing our ambition for the long term

### An ambition grounded in what we know, reaching out to an imagined future.

To set our ambition for 2050, we started with a baseline of areas where we have statutory or legal requirements and targets. For example, the [Government's 25 Year Environment Plan](#) sets long-term targets for water demand reduction and improvements to river water quality. Our long-term planning frameworks, including the [Water Resources Management Plan](#) and [Drainage and Wastewater Management Plan](#) also set long-term targets and requirements we must meet. Our long-term strategy also needs to consider how we contribute to the UK government's 2050 Net Zero target.

In addition, we already have some long-term targets and ambitious goals that we set in 2018 from our [future vision statement](#) and our current [Business Plan](#). For example, we have already committed to reaching zero operational carbon emissions by 2027.

As part of our ambition to be the leading water and wastewater company, we compare ourselves to other water companies and, where we can, to leading companies in other sectors, across performance metrics relating to customers, the environment, quality, risks, and cost.

We considered those areas where we are below average for the water sector and could improve - and where we are above average, but still have ambition to get better. You can read more about our performance in our [Annual Performance Report](#) and [Our Purpose](#) report.

We then discussed these ambitions and requirements with customers and stakeholders and explored their priorities and what they thought about our ambitions. We know it is difficult to engage with customers on long-term issues and so we established regional ['People Panels'](#) in 2021 following [independent advice](#). In these panels we sought customers' views on long-term priorities and level of ambition. We also looked at [our own research](#) gathered through our WRMP and DWMP plans, our ongoing customer research, Ofwat and CCWater research.

Weighing up the various statutory requirements, alongside our previously established long-term ambitions, our historic and projected operational performance and customer and stakeholder expectations to arrive at a single set of logical long-term ambitions is a challenging exercise.

Thinking about the service needs of our customers 25 to 40 years in advance helps us to set out what we need to do now to keep our water and wastewater systems fit for the future. However, over such a long period there is lots of uncertainty. Global warming is causing more frequent and more extreme weather patterns. The population is growing, and demand for water is increasing. We don't know exactly how these issues will impact us just as we cannot be certain about how much innovation and efficiency we might see in the future.

### Statutory Requirements

Our ambition for the future encapsulates the aspirations of our customers and our desire to become the national leader. An important part of this is making sure that we deliver all of our statutory requirements - what the law requires of us. Many of these legal obligations include specific long-term targets that form cornerstones of this long-term delivery strategy.

Our [Water Resources Management Plan](#) (WRMP) sets out how we will make sure that we will continue to meet the national guidelines for drought resilience in the long term. We also must meet targets set under the [Government's 25 Year Environment Plan](#) to:

- Reduce leakage by 50% across the water sector by 2050.
- Reduce household water use to 110 l/p/d by 2050.
- Reduce non-household water use by 15% by 2050 and 9% by 2038.
- Protect and enhance the environment through environmental destination requirements.

Since our Essex and Suffolk regions are seriously water stressed we will introduce compulsory metering of all customers to better manage water consumption.

The [Government's Storm Overflows Discharge Reduction Plan](#) (SODRP) requires us to invest to:

- Protect our designated bathing waters and most of our most sensitive and protected habitats from storm overflow sewage discharges by 2035.
- Eliminate all adverse ecological impact from storm overflows by 2050.
- Make sure that storm overflows discharge in fewer than an average of ten rainfall events per year by 2050.

The [Government's 25 Year Environment Plan](#) (25YEP) also requires us to invest to:

- Reduce nitrogen and phosphorus pollution, through catchment and nature-based solutions where possible.
- Improve drainage and environmental water quality, and reduce surface water flooding risk, through our [Drainage and Wastewater Management Plan](#) (DWMP).



We have other long-term statutory requirements, and must:

- Decarbonise to meet the national Net Zero target by 2050.
- Adapt to climate change, working with the UK National Adaptation Programme.
- Play our part in implementing the Environment Act 2021, including local nature recovery strategies and delivering biodiversity net gain.
- Deliver the Water Industry National Environment Programme (WINEP) every five years, including our role in protecting and restoring water bodies and blue spaces, protecting from and removing pollutants, biosecurity, flooding, waste reduction, and other priority areas.
- Protect 30% of land by 2030, where we need to invest in habitat restoration across our protected areas and beyond.

We must also maintain our ongoing obligations in the long-term, including:

- Serving and protecting customers – providing a better and fairer water service for all and meeting the needs of vulnerable customers.
- Supporting markets to deliver for customers, especially where these can drive long-term sustainable investment.
- Maintaining a resilient water and wastewater system system, including a healthy asset base.
- Delivering high quality water and providing effective drainage.



## Our existing ambitious goals

We already have some long-term targets and ambitious goals that we set in 2018 from our future vision statement and our current Business Plan. Many of these extend beyond 2025. Our progress in meeting our existing targets puts us on track to meet our long-term targets.

### Unrivalled customer experience

We promised to deliver an unrivalled customer experience through a package of measures which are relevant to our long-term target of delivering leading levels of customer service. We are making good progress as we are currently leading on C-MeX, so we are top in the sector. Our Net Promoter Score is at +50 (2022), compared to an ambitious target for “world class service” of +70.

We have an existing target to be one of the top two performing water and wastewater companies for developer services as measured by D-MeX. We are also committed to providing excellent service to New appointment and variations (NAVs) and business retailers.

### Leading in innovation

We committed to be the most innovative company within the water sector and beyond. We measure this in many ways, as reported in our [Annual Performance Report](#). This contributes to our long-term target to have an innovation pipeline of at least £100m by 2030. To date we have won the largest number of bids from the Ofwat Innovation Fund (12 winning bids, 40% of those we have submitted) and have secured nearly £19m in funding. We also have an innovation pipeline valued at more than £66m and are recognised as leaders through our Innovation Festival.

### Improving the environment

We committed to creating a step change in our environmental activities. We have already made several environmental improvements that contribute to our long-term targets to reduce sewer flooding, emissions and pollution incidents:

- Internal sewer flooding has reduced from 2.91 in (2019) to 1.84 (2022) – incidents per 10,000 properties.
- We reduced emissions by 46% between 2009 and 2018, and we are already meeting our target for 2024/25.
- We reduced pollution incidents from 156 incidents in 2015 to 60 incidents in 2022. We were the frontier company between 2017 and 2020, but have fallen back slightly in the last few years, mostly due to increasing incidents from power failures at sewage pumping stations (during storms).

### Building successful economies in our region

We have committed to support our local economies by spending at least 60p in every £ with suppliers in our region every year. We achieved this ambition in 2022 and will continue to maintain this target.

### Affordable and inclusive services

We have committed to eliminating Water Poverty by 2030. Water poverty has reduced from 22% to 9.6% by 2022, and we are ahead of our expectations on social tariffs. In the short term, we’re expecting this to get worse again, and for the cost of living crisis to push more people into water poverty, as inflation impacts on the cost of living and some of the impact of reducing bills in 2020 is undone. In the context of increasing statutory requirements driving bills we are considering how this can be achieved. Despite unfavourable economic conditions, we will continue our efforts to eliminate water poverty.

### Reliable and resilient services

We committed to continue delivering reliable and resilient services by anticipating change, planning ahead and by making the right long term decisions about running our business. Our current per capita consumption target of 118 lpd by 2040 is consistent with our new long-term target and we expect to continue making progress in this area despite the challenges we have had since 2020 through the impacts of the pandemic and the delays to our smart metering programme. Our long-term metering strategy means we will be investing significantly to install meters out to 2035. We are also on track to reduce leakage in line with our long-term ambitions – our leakage levels in Essex & Suffolk are ranked second behind Bristol Water, with a level 33% below the average in England and Wales in 2022.

Our long-term targets build on our existing targets and are set out on the following pages.

### Innovating to provide unrivalled customer experience

The Mowbi is our answer to providing an alternative water supply for customers when their water supply would otherwise be interrupted. The Mowbi gives us another option instead of traditional backup supply methods such as over land supplies using hoses or Arlington tanks.

Mowbis use a pressure vessel much like a hot water tank in which a balloon in the vessel is filled with water. The resulting air pressure is used to discharge the water and so provide pressurised water without power. A Mowbi can provide 120 litres of water, and they can be used together to provide even greater volumes.

This is an innovative solution that showcases the innovation culture we foster across our whole organisation. The spark of an idea of using a pressure vessel in this way became a practical solution when the team had the idea of putting the pressure vessel into a wheelie bin – becoming Mowbi version 1. This proved the concept, but to make Mowbi more practical we brought in a manufacturer to design and build a plastic shell for the pressure vessel. Mowbi version 2 was born. This has panels that allow the user to access the controls more easily. Further iterations have made the Mowbi successively more robust and portable.

Being able to provide a significant amount of emergency water without power and the ability to transport them anywhere (or at least anywhere a wheelie bin can go) has made them an invaluable solution to restoring supplies. They proved successful in the hot summer months of 2022 when temperatures hit 40 degrees, water mains were bursting and supply was short.

Plans are in the pipeline for an even bigger version of the Mowbi that can supply over 2,500 litres and is portable in a different way – the Towbi.



**Our Vision is to be the national leader in the provision of sustainable water and wastewater services.**

To make our goals more tangible we set ourselves long-term targets. We consider these targets to be stretching but achievable. We have developed targets where we:

- Have statutory obligations.
- Consider the importance of the area for our customers.
- Have the potential to transform our business for the benefit of society.

**International comparison**

The performance of the UK Water sector is already among the best in the world across a range of indicators. The [Environmental Performance Index](#), prepared by Yale and Columbia University ranks the UK as second internationally on environmental performance and sixth in relation to wastewater treatment and water resources out of 180 countries. In comparison to European countries the UK offers some of the [highest levels of drinking water quality and customer service](#). The UK also invests more than most European countries in the services but the [cost of water services remains close to the European average](#). Leakage or ‘non-revenue water’ percentage losses are better than the European average.

**UN Sustainable Development Goals (SDGs)**

We aspire to serve our customers and to generate public value for wider society, including the environment. In doing so, we want to challenge ourselves to be leading not just in the water sector but nationally and internationally. We have therefore used the UN’s [Sustainable Development Goals](#) to help develop our long-term targets to ensure we are contributing wherever appropriate to building a better world for all.

**Evolving targets**

The majority of our targets are new. However, for two areas we consider our previously stated ambitions need to be adjusted to align with new information.

**Water poverty**

Our Inclusivity Report will examine the feasible level of support we can give to customers in need in the light of a general increase in water bills to support needed investment. We are considering, for example, whether we should align our definition of water poverty with that proposed in relation to the national social tariff. We remain committed to eradicating water poverty as quickly as possible.

**Sewer flooding**

The National Infrastructure Commission’s report ‘[Reducing the risk of surface water flooding](#)’ highlighted the importance of a national approach to tackle flooding, and the costs and challenges of eliminating sewer flooding. Given this, and the greater insight we have gained from developing our [Drainage and Wastewater Management Plan](#) (DWMP) we are adjusting our ambition to what we consider a stretching but achievable level that would be economically beneficial to deliver.

**Customer priority**

We also engaged with our people, customers and stakeholders to understand their views on priorities and ambitions. These discussions were ‘unconstrained’ and did not account for costs but helped us understand relative priorities.

We triangulated the findings to arrive at a set of priorities and ambitions as shown in figure 6. We consider it is also important to carry out further work to understand whether customers still want to see improvements when they know how their bills would be affected and that is one of the reasons for this consultation.

Key			
Statutory requirements			
Water Resource Management Plan (WRMP)		Government’s Storm Overflows	
Long-term Statutory Requirements		Discharge Reduction Plan (SODRP)	
Government’s 25 Year Environment Plan (25YEP)		Ongoing Obligations	

Figure 6: Our long-term targets

Long-term targets (2050)	UN Sustainable Development Goal	Statutory requirements
Consistently deliver high quality water (Compliance Risk Index (CRI) of zero).		
Deliver leading levels of customer service (as defined by current metrics C-MeX, D-MeX and BR-MeX).		Non-stat
Reduce household water consumption (per capita consumption to 122 l/p/d by 2038 and 110 l/p/d by 2050).		
Reduce non-household water demand by 9% by 2038 excluding growth (from 2019/20 levels).		
Reduce leakage by 55% by 2050 in the north (to 61.1MI/d) and 40% in ESW (to 40.1MI/d) so that we achieve the national target of 50% companywide (from 2017/18).		
Year on year reductions in number of storm overflows operating more than 10 times a year on average, and none doing so by 2050.		
Leading levels of river water quality - work with partners to eliminate, all impediments to our rivers achieving good ecological status caused by our operations, to ensure 75% of our rivers achieve good ecological status, including by reducing net phosphorous loading from treated wastewater by 50% by 2028 and 80% by 2038 from a 2020 baseline.		
Leading levels of pollution incidents - zero serious pollution now and always and reduce the number of category 1 - 3 pollutions by 50% by 2040 (from 2022 baseline).		
Enhance biodiversity - by 2050 all our activities result in a net gain in biodiversity 5% above legal requirement.		
Reduce internal sewer flooding by 60% from our 2025 performance commitment levels.		
Reduce external sewer flooding by 60% from our 2025 performance commitment levels.		
Eliminate Water Poverty - we are reviewing our target. For more information see our 2023 Inclusivity Report.		Non-stat
Achieve Net Zero Scope 1, 2 and 3 emissions by 2050.		
Increase sustainability of chemical treatment by reducing use of existing chemical sources in current treatment processes across water and wastewater by 20% by 2035 and 40% by 2050.		Non-stat
Ensure all household customers continue to have a sufficient and secure supply of water (Plan to be resilient to 1 in 500 year drought).		
Maintain a reliable sewerage network (no more than 1,000 sewer blockages per year by 2050).		
Everyone home safe, every day (zero High Potential Incidents by 2050).		Non-stat
100% of our electricity will come from additional* renewable generation by 2040.		
Leading in efficiency - be the most efficient company in the sector in the round by 2030 and maintain that position.		Non-stat
Have an innovation pipeline of at least £100m (including Ofwat innovation fund competition) by 2030 and maintain it.		Non-stat
Supporting our local economies – to spend at least 60p in every £ with suppliers in our region every year.		Non-stat
Giving time back to the community – for at least 50% of our employees to spend time volunteering every year.		Non-stat

\*Additional = renewable generation that would not have existed if we were not buying the power. This includes Power Purchase Agreements (PPA) with new generation that we guarantee the take-off, and renewable generation behind the meter.

# Planning for long-term challenges

## Our approach

### Our long-term strategy needs to recognise and account for the inherent uncertainty about the future.

Having identified our long-term ambitions for where we want to get to, the next step was to identify the long-term challenges that may make it harder for us to achieve those goals. This process, known as 'horizon scanning', helps identify factors and drivers that could impact on our long-term plans.

In addition to the engagement undertaken to support our [WRMP](#) and [DWMP](#) processes, we engaged with external parties to challenge us to understand the challenges we may face. We ran blue sky thinking workshops with the Oxford University Futures team and worked with ARUP and KPMG to establish a set of scenarios based on future trends and key areas of uncertainty and impact. Our economic regulator, Ofwat, has also identified a number of areas that it wants us to test called 'common reference scenarios'. The trends identified within the Ofwat scenarios are built into our five 'plausible future' scenarios. These scenarios do not describe all possible futures but give us a consistent framework for developing our adaptive planning approach.

Horizon scanning also allowed us to consider how our approach to partnership working, our people, innovation and productivity growth – the foundations for our delivery – may evolve. Thinking about how the foundations of the operation of our business will change enabled us to consider what we would be able to deliver from our existing funding ('base costs') and what would require further enhancement funding.

Across the key areas of investment, we identified a longlist of the activities required to maintain our trajectory to meeting our long-term ambitions under the different scenarios. From this we have taken the no or low-regret activities that are needed in all or most of the future scenarios to form a 'core investment pathway'. This is the pathway we start out on towards our long-term ambitions and the pathway we use to develop our immediate next steps on.

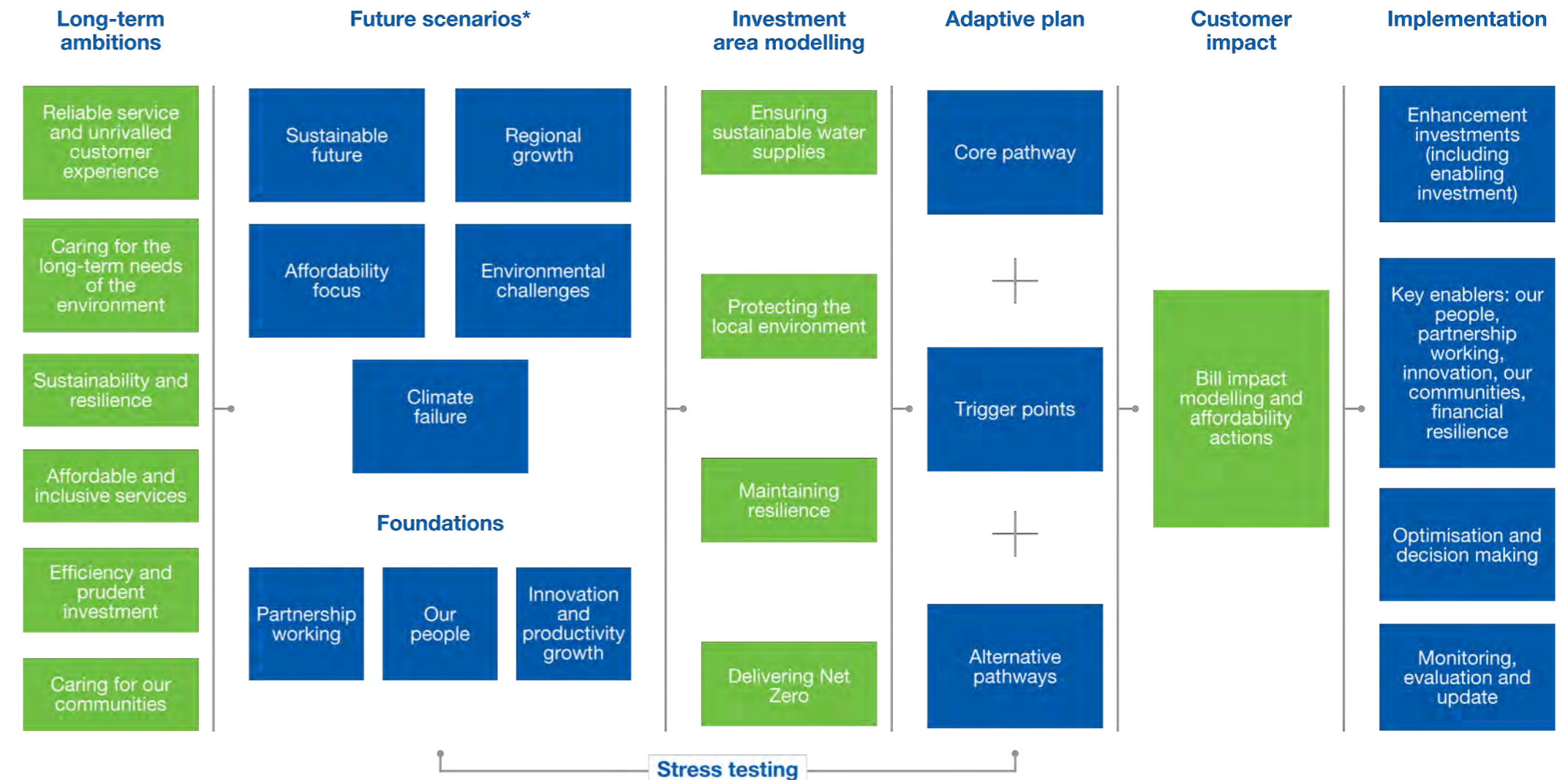
We then used the scenarios to further test this core pathway, and where the scenarios dictate, we need to adapt our plan away from the core pathway. For example, under scenarios where water demand is expected to be higher, we have developed 'alternative investment pathways' for additional water resources that still reach our long-term ambitions. The points at which we move to an alternative pathway are called 'trigger points'. These trigger points are determined by the scenarios.

Between the core pathway and the set of alternative pathways, we can maintain our trajectory towards our long-term ambitions despite the uncertainty of the future we will be operating in. Both the core and alternative pathways are then stress tested with the scenarios again.

This adaptive planning approach enables us to remain agile to the challenges of the future by investing in no and low-regrets solutions now, while preparing and planning for alternative futures so we can adapt to the challenges that materialise.

We will continually monitor and update our horizon scanning, scenarios and our set of alternative pathways to remain agile to future challenges that we are not aware of now, but which will become evident in the future. Regular stress testing of our strategy with the scenarios will make sure we have the best plan in place to realise our ambitions.

Figure 7: Scenario analysis used to inform action for PR24



\*Incorporates and accommodates Ofwat's common reference scenarios

## Horizon scanning

**Over the last two years we have engaged with experts, stakeholders and groups of customers to gain insight into their ambitions for our services now and in the long-term, and to understand what challenges and opportunities the future may hold.**

As a long-term business we use a number of different tools to examine what the future may hold. Our well established WRMP process looks out 40 years to ensure we are prepared to provide sufficient water under different futures. Alongside this we are developing our first DWMP, which takes a similar long-term approach to assess the needs of our wastewater business. Both of these processes see us engage with local, regional and national stakeholders and our customers.

In addition to the extensive engagement in our [DWMP](#) and [WRMP](#), in the summer of 2022 we carried out a series of workshops with internal specialists and external experts from across the energy and water sectors. In these 'Future of Water 2050' workshops, specialist futurologists took the groups through structured exercises to imagine and experience the world in 2050, before working backwards to the present day to plan out what would be needed to deliver the 2050 future state.

We used data and prompts to support holistic and unrestricted 'blue sky' thinking about water and wastewater activities and services. We then stress-tested the ideas from the Future Water 2050 workshops by gathering a group of innovation experts together in a further workshop to consider where innovation could play a role in the future delivery of our ideas.

In contrast to the Future Water 2050 workshop, the innovation workshop's starting point was the 'now' - helping our Executive Team and Operational Leads to look at our existing work on productivity and innovation and challenging us to consider potential opportunities for transformational change. The workshops produced some powerful outputs and great ideas that have found their way into our long-term strategy via an 'execution' exercise. Some examples you will find in this document include setting out our long-term pathway for achieving Net Zero greenhouse gas emissions, the use of sensors in proactively managing asset health and using open data and citizen science alongside smart networks to monitor our wastewater assets.

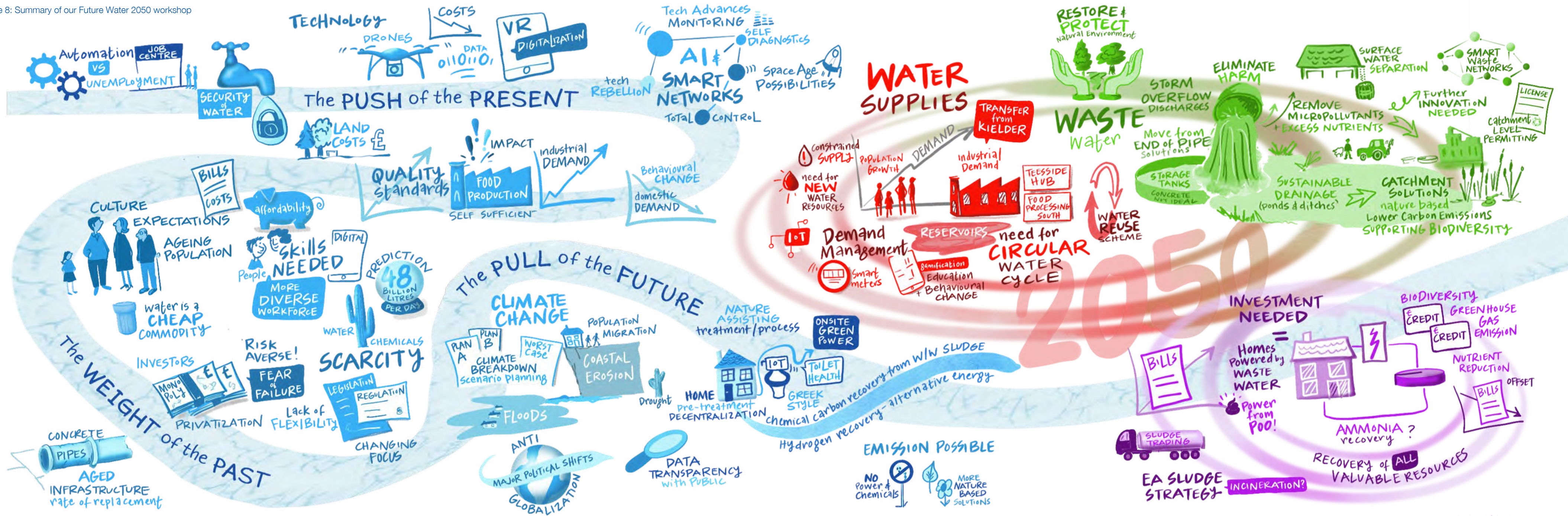
Many days were spent in these workshops, with hundreds of fascinating ideas and interesting discussions. The following pages provide an illustration of the rich seam of insights from the discussions.



Innovation Festival 2022



Figure 8: Summary of our Future Water 2050 workshop



# Future challenges and opportunities

**We have brought together our blue-sky thinking with further work to identify the challenges and opportunities we may face in the future.**

In addition to our horizon scanning activity, we engaged KPMG and ARUP to help us create a framework to understand both what the key drivers and disruptors for our business might be in the future, but also to assess the level of uncertainty around these. We ran workshops on this in 2021 to provide an early long-term direction for the development of our 2025-30 Business Plan. Since then we have learnt more from our blue-sky thinking workshops and, public perceptions have changed significantly, pushing the protection of the local water environment up the agenda. We have updated our analysis and scenarios to reflect this.

This work identified key factors that have both high uncertainty and high potential impact.

The climate emergency has huge potential to affect our communities and operations through rising sea levels and increased risk from extreme weather including:

- Increased flooding at water and wastewater treatment works.
- Storms causing local and regional power and communications outages.
- Hotter summers potentially causing equipment to fail.

The flip side of managing the impact of climate change is minimising our contribution to it through delivering Net Zero. To achieve Net Zero across all our emissions we will need to fundamentally change the way we operate parts of our business and employ technologies that have not yet been developed.

Population growth, and the consequent increase in demand will create further challenges for ensuring we can provide water sustainably. In addition to demand side solutions such as providing water efficiency advice and smart metering, we will most likely need to invest in at least some new water resources in the southeast – but there are a range of options and more than one may be needed. On the wastewater side, urban creep in the North East may increase the need for additional drainage solutions.

Attitudes to sustainability, the desire to protect the local water environment and the resulting changes to legislation are already being seen to have significant impacts on the investment required between now and 2050, in particular to eliminate harm from storm overflow discharges. Further environmental issues, as they are better understood, could result in even greater future investment needs and changes to the way we operate. Anti-microbial resistance, persistent organic pollutants and microplastics are all issues currently under investigation that may need to be addressed in this timeframe. On the other hand, changing attitudes may enable greater gains to be made from behaviour change, such as reducing personal consumption.

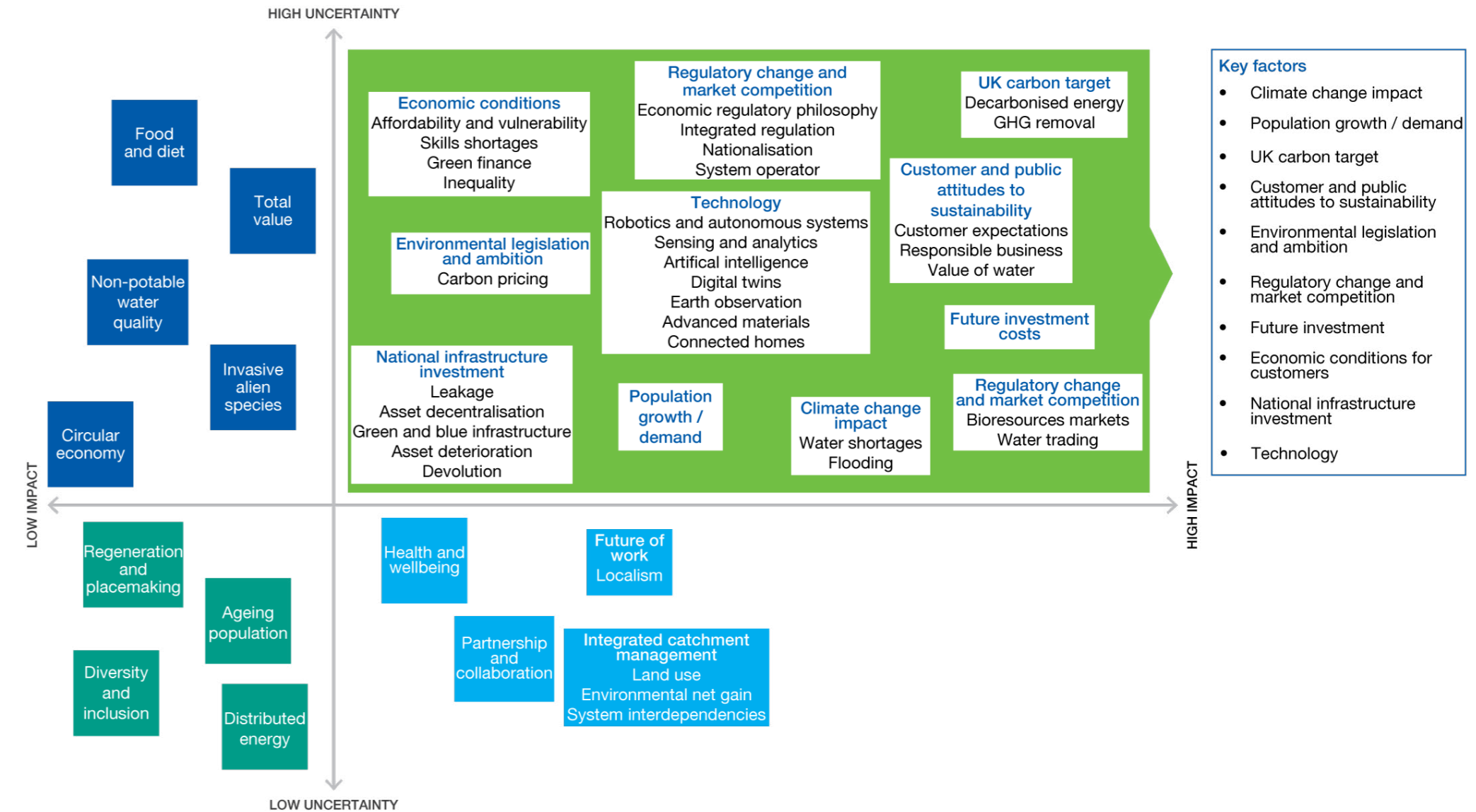
All of these issues raise the prospect of significant future investment requirements, for which investors will need to provide additional private capital. This investment in national infrastructure will need to be efficiently funded and given a reasonable return.

Ultimately bills will need to rise to fund this investment. Economic conditions for customers in the near term necessitate the careful consideration of affordability – as the economy recovers or not from recent world events the situation for customers may get better or worse and so the balance between bills and investment will need to be continually considered into the long term.

Technology and innovation offer perhaps the greatest potential upside – if innovation can be steered in the right direction then this could enable us to deliver more for less, both through new technologies such as smart networks, but also new ways of working and adoption of existing techniques that are yet to be scaled up to their potential, such as catchment and nature-based solutions.

Figure 9 summarises our assessment of the impact and uncertainty of the drivers and disruptors identified. In the following pages we construct plausible future scenarios in which the realised outcomes for the key factors identified here are varied.

Figure 9: Key drivers and disruptors with significant impact on our long-term plans



Source: 'Scenarios & Strategies - 2050 Scenarios', ARUP, July 2022.

# Plausible future scenarios

## We have developed five plausible future scenarios to help determine and stress test our long-term delivery strategy.

Detail behind our scenarios and their development can be found in the ARUP report\* published alongside this document.

As shown in table 2, our scenarios accommodate Ofwat’s ‘Common Reference Scenarios’ and the trends identified within them\*\*.

Our scenarios include assumptions we are making about the future we will be working in. These assumptions include wider economic conditions, attitudes to sustainability, customer affordability, the potential to delay or bring forward investment as well as regulatory change among other trends. This helps us to examine how our plans might need to change, depending on the risks and opportunities in the future. This also helps us to consider what we can do to help to change that future – and what we should do now to be ready if we can’t.

These are not intended to represent all possible futures, but to identify a broad range of possible outcomes so that we might learn from this. Our scenarios are:

### Sustainable future scenario

The UK is on a climate change pathway with greenhouse gas emissions peaking before 2040. We don’t see significant increases in extreme weather events and global temperature rise expected to stay well below two degrees. Changing attitudes from customers towards water use lead to lower consumption, allowing us to avoid the need for some expenditure on new water supplies and climate change adaptation.

Customer expectations on environmental protection are increasing meaning the UK government brings forward the requirement to deliver our storm overflows programme to finish in 2040. Considerable climate finance investment was put into technology innovation which was rapidly taken up across the UK and across the water sector. Although the trend of urbanisation continues across the UK, its impact on the water sector is mitigated by government legislation on sustainability-focused decision making as the country develops.

Early in the period there was a rapid improvement in economic conditions due to the influx of investment and the creation of new jobs, but this levels off later in the period as the UK has reached a stable point in the green transition which leads to steady growth. From a regulatory perspective, water companies have a stronger mandate for action, driven by public preferences.

### Climate failure scenario

A lack of meaningful action has resulted in a trajectory towards four degrees of global warming by the end of the century. The North East and Essex and Suffolk regions see significant changes in weather with increased rainfall intensity and longer periods of drought, the latter more prevalent in the South East.

Although the period starts with a time of high growth, due to this being prioritised over environmental outcomes, economic conditions quickly decline putting significant pressures on the disposable incomes of customers. This pressure leads to further disregard of the environment and sustainability and as such, customer demand for water increases as consumption reduction is not a priority.

The priority for growth over environmental outcomes within legislation was accompanied by greater regulatory intervention that limited the response of water companies to the impacts of climate change. This means there was a lower uptake of green and blue infrastructure and less focus on asset health. Solutions remain conventional or outdated with limited innovation, leading to more expensive solutions. The lack of technological progress means no solutions are developed to eliminate micro-pollutants and incineration of bioresources is an accepted alternative. The cost of investment has also increased, largely due to the regulatory burden.

### Affordability focus scenario

The UK did not prioritise building the green economy in its recovery post Covid-19, and this led to higher costs of living, inflation, and economic stagnation. In the North East region in particular, the inequality gap with the rest of the UK widened, leading to more customers struggling to pay their bills. As a result, it was more difficult to fund large capital projects and non-traditional programmes to allow for lower bills in the short term. Later in the period, the UK begins to catch up with other G8 nations where it was previously left behind on climate investment and the resulting impact on the economy, technology advance and environmental outcomes. As the UK catches up, this opens up more opportunities for investment in sustainable infrastructure and solutions, but the cost remains high as investment was delayed from earlier in the period.

Customers feel the effects of rising costs and struggle to pay their bills. We delay some expenditure from the next ten years, allowing for lower bills in the short term (with higher costs in the long-term on asset health and climate adaptation). There are delays to addressing micro pollutants under this scenario. This scenario is fundamentally different to the other scenarios in that it is focused on timing of necessary investments rather than on uncertainty around the need for investment.

### Regional growth scenario

The North East and Essex and Suffolk regions see an extended period of economic growth due to more focus on regional government spending and investment. This leads to higher population growth in these areas and customers having more disposable income. However, this growth also leads to increase in demand in these areas, particularly from industrial customers, putting increasing pressure on water resources. While the focus has been on economic growth, environmental ambitions have slipped. This has led to less stringent abstraction and bioresource restrictions compared with other scenarios. Climate change is on a moderate pathway leading to an increase in weather variability.

### Environmental challenges scenario

There is increasing pressure from government and society to invest in more advanced wastewater treatment, water treatment, sludge incineration and sewer flooding to align with more stringent environmental ambitions. The additional treatment requires more power and chemicals, creating an additional environmental challenge. While there is increasing pressure, the ability to affordably invest in solutions is limited by slow economic growth and slow technological advancement. Regulatory and economic pressures also increase the cost of capital. This leads to solutions being more costly to customers in the long term compared to the sustainable future scenario. Water demand in the North East and Essex and Suffolk continues to grow at a moderate level and the impacts of extreme weather are also considered moderate in this scenario.

Table 2: Impact of scenarios

Scenarios	Climate change	Technology	Demand	Abstraction reductions
Sustainable future	Benign	Benign	Benign	Moderate
Climate failure	Adverse	Adverse	Adverse	Adverse
Affordability focus	Moderate	Benign	Benign	Moderate
Regional growth	Moderate	Moderate	Adverse	Adverse
Environmental challenges	Moderate	Adverse	Moderate	Moderate*

\*Where the scenario covers trends between the two Ofwat conditions of ‘benign’ and ‘adverse’ we have labelled this ‘moderate’

\*As a result of further scenario development work we have altered Scenario 5 from the ARUP report to reflect a broader set of futures to make sure our strategy is more robust. This is now the Environmental challenges scenario as described above. \*\*All trends from the Ofwat Common Reference Scenarios except the ‘benign’ abstraction reduction assumption have been included in at least one of the five scenarios. This is replaced with a prediction of the plausible ‘extreme low’ developed in line with Ofwat guidance to give a moderate assumption.

# Investment areas

The focus of this long-term delivery strategy is how we can deliver our long-term goals in the face of future challenges

This allows us to understand the potential trajectory of customer bills under different scenarios and so understand whether different investment decisions are needed, and what foundations we need in place to achieve our ambitions.

We have therefore considered what investment will be needed to deliver our long-term goals and have identified four key investment areas. For each of these investment areas we then assess what the key trigger points are and what the different possible pathways of investment could be to reach our ambitions.

We consider these investment areas capture the most important areas of investment for the long-term. However, we recognise there is some overlap between them, and there are probably some smaller areas of investment that we do not capture in this analysis. We have high confidence in our analysis of this area as it is underpinned by the [WRMP](#) and [DWMP](#) process.

Figure 10: Investment areas



Horsley water treatment works, Northumberland

# Pathways

## Core pathway

**Our core pathway includes all the activities and investment we know are no- or low-regret as they are required under a wide range of the future scenarios discussed in the previous section.**

It comprises investment to meet short-term requirements, and to keep the necessary options open for potential longer-term investments. It ensures greater cost effectiveness and efficiency by allowing for optimising the timing of future investment which would be higher regret in the near-term.

Our core pathway includes significant enhancement investment we will need in 2025-30 across our four investment areas (excluding investment we will need, but on which we will have to take a prioritisation decision, as set out in the adaptive pathways). It is what is required to make sure we continue to meet the targets and ambitions that our customers and wider stakeholders want us to achieve.

Our core pathway of enhancement investment is built on a foundation of:

- Pushing and challenging ourselves to make sure we achieve as much as we can from our base expenditure before looking for enhancement investment.
- Driving through efficiencies from different ways of working – with a strong focus on partnership working and innovation.
- Challenging ourselves to ensure investments for the short-term are also the efficient investments over the long-term.
- Phasing and smoothing investment over the long-term to create a sustainable and deliverable investment pipeline that underpins affordable bills.
- Monitoring and investigating where uncertainty could lead to high regrets investments.
- Maintaining strong, long-term financial resilience, helping to make sure we remain an attractive investment proposition and can continue to attract the necessary investment capital.

There is a level of enhancement expenditure that we consider is core into 2050. A lot of the investment activities we know will be required as no or low-regrets have been phased and over consecutive five year price review periods as part of the core pathway. Further potential investment requirements, which are uncertain or where the timing has flexibility, have been included in alternative pathways.

To develop this core pathway and the alternative pathways that follow, we have made broad assumptions about the wider world, the UK's economy and our own costs. While every effort has been made to ensure the assumptions are reasonable and robust, these are not predictions, and we expect actual future costs and bills to vary significantly from these projections, given the 25 year period we are examining.

### Partnership working to revolutionise flood resilience and water management

In a bid to manage the challenges of flooding, we initiated a new approach in 2012 to work with stakeholders to better understand our drainage network.

The Northumbria Integrated Drainage Partnership (NIDP) is an award-winning innovative approach to reduce flood risk and promote sustainable drainage. The partnership brings us together with 14 North East Lead Local Flood Authorities and the Environment Agency to deliver schemes that reduce flood risk from sewers, rivers and surface water runoff in communities across the North East.

Since its inception, 59 drainage areas have been studied, leading to delivery of multi-award-winning projects in Tyneside in the North East, reducing flood risk to around 5,000 homes to the value of around £33m.

The NIDP promotes active collaboration and engagement among various stakeholders. It encourages open communication, sharing of expertise, and joint decision-making to ensure a holistic approach to drainage management. By managing flood risk from all sources and across all partners, including preventing rain water from entering our network, the NIDP approach can also deliver wider benefits including habitat creation and water quality improvements.

Recognised nationally as an exemplar of partnership working in industry guidance and government reports, the successful collaboration leverages data-driven decision-making and implements sustainable drainage practices to achieve significant improvements in flood resilience, water quality, and community engagement.

The partnership stands as a testament to the positive outcomes that can be achieved when diverse organisations work together towards a common sustainability goal.

The NIDP has now developed an ambitious 10-year programme that will carry out integrated studies in 38 more areas to 2028.



## Core pathway by investment area

### Ensuring sustainable water supplies

Our core pathway excludes the big supply-side investments, such as reservoirs or water reuse schemes we will or may need to make. These are set out as alternative pathways in our adaptive plan. There are choices to be made on these, including in terms of the timing and sequencing of those investments.

Our core pathway still includes a necessary level of enhancement investment to ensure sustainable water supplies, with a strong focus on demand-side solutions but also major strategic mains investments in Suffolk to be able to move water around the region more effectively. We have near industry leading levels of leakage reduction that are amongst the best in the world, and we plan to reduce leakage by a further 40% in Essex and Suffolk. We do not consider it is economically viable to reduce leakage by the industry target of 50% as we have exhausted the cheaper leakage reduction options. The difference in cost between 40% and 50% leakage reduction options is around £240 million. Ultimately, we don't want to waste water through leakage, and we know this is very important to our customers too.

We will also continue to invest in technology and programmes that promote and enable reduced consumption by household and business customers, including through upgrading all our meters to smart meters by 2035.

We will continue to raise awareness of the benefits of metered supply and will support all our customers who want to switch onto a smart meter.

Our modelling for Essex and Suffolk suggests there is an urgent need for new water supplies by 2032 and we may need further water supplies depending on the performance of demand-side interventions and leakage reduction. These investments are set out under our alternative pathways. Under our core pathway, we will invest in preparatory expenditure including feasibility studies to keep our options open in terms of the timing and nature of these investments. However, we will need either a new water re-use scheme and/or a new winter storage reservoir in our Essex and Suffolk region. That will need to be confirmed by 2027 following further detailed design work.

Details can be found in our [Water Resource Management Plans](#).

Additional investment is included in our core pathway to address deteriorating raw water quality. This will address issues with nitrates and increased algal growth due to climate change. This investment will also reduce water quality risks from onsite activities. Our customers have also told us they would like to see us address the issue of lead in customer side supply pipes, so we included the cost removing lead in our plan.

### Protecting the local environment

Our core pathway reflects the 'best value' approach to achieving statutory environmental requirements including marginal green investments for storm overflows. Under this pathway, we would meet our environmental goals and assume that the current appetite for (and scale of) environmental investment remains constant in future. This still involves very significant investment, including to meet the requirements and timetable as currently set out under the Government's Storm Overflows Discharge Reduction Plan.

To deliver storm overflow discharge reductions our core pathway includes investment in surface water separation, nature-based solutions that support biodiversity and smart networks. We had proposed investment in smart networks and increased sewer capacity in the last price review covering 2020-25, but these investments were rejected by Ofwat and the CMA. We were disappointed that the regulators took this position as we consider this investment was important to customers and would have supported a more sustainable future. These investments are planned for taking account of the modelled potential impacts of climate change.

Our plan aims to maximise the benefits we deliver by using catchment and nature-based solutions. For example we have proposed an innovative hybrid approach to address nutrient neutrality in the Tees. The proposed package of solutions includes reducing Nitrogen at our largest wastewater works where this is an efficient way of delivering reductions married with a number of nature-based regenerative schemes on the Tees estuary, including seaweed farming and shellfish restoration. This approach will deliver more for the environment at lower costs to customers than traditional solutions. We are currently working hard at senior levels to ensure that this approach can meet the necessary regulatory approvals.

Details can be found in our [Drainage and Wastewater Management Plan](#).

### Maintaining resilience

Our core pathway provides the lowest necessary investment to shift us to a sustainable level of asset maintenance expenditure, with investment in asset health and climate change adaptation required to meet our legal obligations\*. We have selected 'no regrets' investments for 2025-30. Beyond 2030, we expect further assessment and monitoring of our asset base to increase the sustainable investment required in asset health considered 'no regrets'. Adaptation to increasing temperatures to be required in all scenarios, with only the scale of these investments changing.

Our core pathway assumes that we will see some innovation in asset health, particularly for underground assets such as mains and sewers where recent innovation projects (both our own and across the sector) have shown this should be possible soon. From modelling the costs of maintaining resilience under different scenarios we know that the potential benefits of innovation could be very high – but delaying investment too much to take advantage of this could mean higher replacement and deliverability costs in the future. We can take a balanced approach by making investments now where there are likely to be limited gains from innovation and where there are known climate risks with an immediate impact.

Investing in innovation and understanding the impact of extreme heat on water and wastewater networks and processes, especially biological processes, is likely to support lower costs in the future. We would expect that individual components of the plan, such as the selection or sizing of particular schemes, will change over time to reflect different climate change scenarios. However, there are no substantial changes that would require specific and discrete alternative pathways.

Our core pathway also includes investment on bioresources, to reflect likely changes to how we dispose of our sludge. Currently we use advanced anaerobic digestion to create biogas, and the end products – biosolids – are used as a fertiliser for agriculture. Restrictions on biosolids disposal may be introduced to prevent deterioration in soil or water quality. These decisions have not yet been made, and so our core pathway would be to continue with our 2020-25 strategy. However, it is very likely that at least some changes are necessary – and so our core pathway for 2025-30 is to make a gradual transition to adapt to future restrictions by providing storage for bioresources during the Autumn months (when we are prohibited from putting bioresources to land and soil and water quality are most at risk), and to reduce the volumes of biosolids that we produce through dewatering. This is a 'low regrets' option, as this would be required under any likely future scenario and would provide additional resilience.

\*We have previously explored the need to increase asset health investment in '[Regulating for the long-term: Resilient essential services require healthy assets](#)', Northumbrian Water, July 2022.

## Net Zero

Our core pathway for 2025-30 focuses on decarbonising in those areas where we have the most information and direct control over emissions. We will decarbonise our vehicle fleet, maximise emissions reductions from grid electricity use, increase our solar generation capacity and bring the Kielder Hydro generation back in-house. And we will work with our customers to reduce their demand and the consequential emissions from supply. A focused measurement programme will be implemented at Howdon, one of our largest wastewater treatment works, to quantify our actual process emissions in parallel with measurement at our Birtley BEWise Water Innovation Centre - assessing emissions from trickling filters - allowing us to be fully informed of our impact from major asset classes. We will aim to have accredited emissions reporting from all our large suppliers by 2026.

We consider that to deliver a just transition, we should aim to deliver a relatively straight line reductions in emissions between now and 2050. Pulling emissions reductions forward would have environmental benefits – as global warming depends on the stock of greenhouse gases in the atmosphere – but would increase costs to customers in the near-term, and likely overall as abatement technologies will likely reduce the costs of emission reductions in future.

Pushing decarbonisation backwards would increase the deliverability challenge towards 2050 and put an undue burden on future customers. In the future the speed of transition will likely be directed by sector level requirements and/or legislation.

For all of our pathways, we therefore assume a broadly straight line reduction in base emissions to 2050 – although total emissions depend on the timing of other investment programmes.

This approach is underpinned by a strong focus within our core pathway on trialing innovations in one five-year investment period to then confidently roll solutions out in subsequent periods.

We will trial our in-house developed alternative solutions such as algal treatment of wastewater and alternative lower carbon supply routes for chemicals, such as working with other industrial wastewater streams as an alternative source of coagulants for water treatment. And we will collaborate with other water companies through innovation projects to understand and develop technological solutions.

By 2030-35 we will be fully informed and in a position to trial higher-risk abatement technologies and implement proven abatement technologies at scale. Over the long term we will also need to consider the alternative to biogas-to-grid technologies, as the gas network may move from methane to hydrogen supply.

From 2035-50 we will continue this process of implementing new solutions when we are confident, they deliver best value for customers and the environment, including across capital delivery.

Ultimately delivering Net Zero emissions is about doing things differently, not doing different things. We will consequently need to change how we operate in all aspects of our business. Sometimes changes will be small - like optimising journeys to reduce travel or using more efficient pumps to reduce energy consumption. But sometimes more fundamental changes will be needed – like switching to low carbon building materials or researching and developing new low-carbon treatment processes that can completely replace existing high carbon ones.

While we have identified Net Zero enhancement costs separately in this long-term delivery strategy, for the most part these costs will not materialise as standalone Net Zero investments. Instead, what we expect to see is an increase in costs for all our activities – both areas of enhancement identified in this strategy and existing activities funded from base costs. These costs will not be distributed evenly as some interventions will save money, while decarbonising some activities will be proportionally more expensive (and may be inefficient to decarbonise at a national level). What we have tried to quantify here is a high-level view of what the transition to Net Zero emissions may cost us over the coming decades.



Electric fleet

# Foundations of our investment

**The investment areas in the core pathway are built on a foundation of partnership working, innovation and productivity improvement. This approach benefits customers through on-going improvements in service, for example, sustainable solutions to problems and cost-efficiency.**

Partnership working, innovation and productivity growth are also important in our long-term planning. For example, using innovative approaches may reduce the likelihood of needing to make expensive investments at decision points which may arise in the plausible future scenarios.

We provide examples of how partnership working, innovation and productivity improvement contribute to our long-term ambitions in the coming paragraphs.

## Partnership working

Looking to the future it is clear that working effectively with partner organisations will become increasingly important. We can deliver more by working with others toward mutually beneficial goals and for less cost to customers in their bills. We do this by bringing together different funding streams and working with partners who can make non-financial contributions, such as granting access to land for the development of flood defence and drainage solutions.

Bringing together diverse groups can challenge established thinking and ways of working and encourage innovation. It also helps establish new ways of working with nature to continue to deliver the essential services our customers rely on, but in much more sustainable ways.

We have both long-established and new award winning partnerships already in place. The Northumbria Integrated Drainage Partnership (NIDP) is delivering jointly funded integrated flood risk studies and delivery schemes with the Environment Agency and 13 Lead Local Flood Authorities (LLFAs) in the North East of England. We have adopted a collaborative, multi-agency approach to deliver multiple benefits for partners on drainage schemes. Through the partnership more than £25m has been invested so far with more than £15m of that coming from us. We estimate the NIDP will deliver £160m of investment up to 31 March 2030, with Northumbrian Water contributing £73m.

Our new partnership with the Rivers Trust to deliver our plan for environmental investment for 2025-30 is providing invaluable insight and helping us to develop new and different solutions that enhance the natural environment. The catchment solutions that this partnership has developed will make sure that the environmental improvements that our regulators and Government want to see are delivered, but in a more sustainable way with lower carbon emissions and significant cost savings to customers in their bills.

We will continue to work with other organisations to build effective and long-lasting partnerships to deliver for our customers, society and the environment. By collaborating with others, we can maximise the benefits – strengthening, rather than displacing, other organisations that are better placed to act. These partnerships also provide us with more resilience by building a network and supply chain that can provide a broader and deeper range of resources and expertise in response to uncertainty.

## Innovation and productivity improvement

We are already an efficient company and our regulator Ofwat ranked us in the top quarter of companies across the sector for efficiency at the last price review. We are also fortunate to have a mature approach to innovation and are regularly introducing new technologies and ways of working into our business to improve service for customers and the environment, or reduce costs and keep bills affordable.

Innovation is one of our core values and we have actively built a strong innovation culture by employing innovation experts, building a network of innovation ambassadors across the business, and actively working with partners to develop new ways of doing things. This approach is epitomised by our annual Innovation Festival which has been running for many years. In 2022 we welcomed representatives from 26 water companies from as far afield as Australia to collaborate and share ideas on a range of topics including nature-based solutions, regenerative farming, and network challenges, all with an emphasis on partnership working.

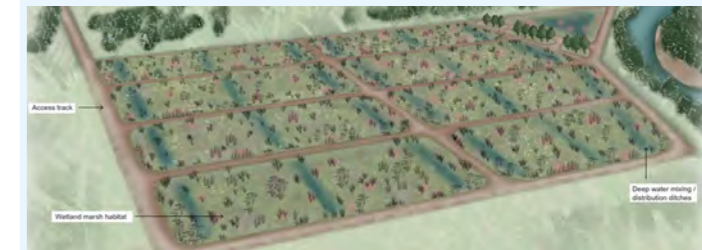
Many of the step-changes in improvement we highlighted in figure 3 have been driven in part by the changes that we regularly bring through our innovation pipeline. We are proud to be the most regular winner of bids through the innovation fund that Ofwat introduced at the last price review. While the festival provides the seed for ideas, it is the dedication of our staff and partners that brings these ideas to life, through trialling practical solutions such as the Low Wadsworth Integrated Constructed Wetland (a testbed for nature-based nutrient removal), Mowbis used to provide short-term supply for customers, ammonia recovery and experimental algal treatment of wastewater.

In the face of our future investment pressures we need to go much further and faster to maximise the opportunities we can leverage from innovation and developments in technologies such as robotics and artificial intelligence. By doing so we will be able to deliver more for less and manage the investment and affordability challenges that we face in the future. Our Open Data Strategy (published summer 2023) is just the latest example of how we are trying to do that.

## Innovating through nature

The Low Wadsworth Integrated Constructed Wetland (ICW) is intended to demonstrate the effectiveness of ICWs at scale as alternatives to tertiary treatment of wastewater to remove nutrients and at the same time give us a testbed to optimise this treatment process. It is planned to cover 2.1 ha, and so could be largest ICW for wastewater treatment in the UK. It is expected to deliver a range of benefits:

- The site will have multiple treatment streams, enabling us to test and optimise ICW treatment and compare the results under controlled conditions.
- It will provide early improvement to phosphorous levels in the River Wear to help deliver the Water Framework Directive objectives.
- The scheme should deliver whole-life cost savings of around £2.5m compared to a traditional ‘grey’ treatment solution.
- The scheme will also be greener than the alternative – it will provide a low carbon solution that also delivers social and biodiversity benefits.
- We will be able to share the knowledge we gain with the sector to enable others to implement ICW solutions more effectively.





## Our people

**Our people are key to our success. Without them we would not be able to deliver the services we provide. So to function effectively we need to make sure that we continue to make Northumbrian Water Group a great place to work. Over the long-term what this means in practice will change as society and the nature of work changes – as has been demonstrated by the impact of Covid-19.**

Our [Workforce 2025 strategy](#) (published in 2018) set out how we would develop and evolve our highly skilled team so that we can deliver the outcomes our customers want. This included our workforce strategies to assess the skills and capabilities we would need in future, along with the leadership and training programmes to deliver this. We are part of the Energy & Utilities Skills Partnership, working to tackle future skills shortages. We work with schools, partners, and other organisations to deliver apprenticeships and other routes into the sector. At our Innovation Festival, we support activities which are specifically aimed at inspiring young people to consider careers related to science, technology, engineering, maths (STEM).

In 2021, we had national recognition as a top employer by securing a spot on the Great Place to Work Best Workplaces list, with particular recognition for wellbeing.

We know that diversity is our strength: we are a signatory to the Social Mobility pledge; we are a Disability Confident employer and a Stonewall Diversity Champion; and we are proud members of the Women in Science and Engineering (WISE) Campaign.

We are also conscious that as a major employer in our regions, we can play a part in delivering the social change we want to see. We are committed to being an inclusive, diverse and equal company for both our employees and for our customers – both because it is the right thing to do, but also because it will help us deliver more effectively.

Our Together for Inclusion, Diversity and Equity (TIDE) strategy sets out our ambition across these areas and how we will deliver against it. Our short-term TIDE targets to the end of 2025 are:

### Inclusion

- Achieve 75%+ self-disclosure around protected characteristics.
- 0% bullying, harassment, discrimination or victimisation across characteristics following investigation.

### Diversity

- More than 35% of colleagues are female.
- More than 4.3% of colleagues are non-white.
- More than 6% of colleagues with a reported disability.

### Equity

- Gender Pay Gap is less than 7%.

In the longer-term we expect our employees views on what a great place to work is will change. And our understanding of what we need to deliver to be an inclusive, diverse and equal organisation will mature and adapt. We continually monitor how our people feel about us through the great place to work survey.

As a company that provides services through hard engineering, we need to always keep the safety of our employees at the forefront of our minds and our culture. We do this through a range of initiatives including rigorous training and apprenticeships, a robust lessons-learned process when incidents occur and regular internal comms to share that learning, and support our '60 second checks' process. We recognise that perfection is hard to achieve, but the health and safety of every one of our employees matters and so we must target zero accidents.



Production operator, Howdon

## Decision and trigger points

Decision points and trigger points are important aspects to our adaptive planning approach and provide a framework for assessing the optimal timing for material investments between 2025 and 2050.

The plausible future scenarios contribute to our long-term strategy by helping us learn how our plans might need to change, depending on risks and opportunities in the future.

We have identified a set of trigger and decision points in line with adaptive planning principles. There are different types of decision points:

- **Prioritisation decision** — this is where we will need to implement two interventions, and the decision is about which one to prioritise (#1 overleaf).
- **Timing decision** — this is where we will need to implement an intervention, and the decision is about when to do so (#s 5 and 6 overleaf).
- **Intervention decision** — this is where it is not certain at present whether we will need to implement an intervention at all, or be able to, and the decision is about whether to do so or not (#s 2,3,4, 7 and 8 overleaf).

The state of the future depicted under the plausible future scenarios affects our decisions. As such, some decisions are more likely under some future scenarios. For example, in a future where there is climate failure, demand Per Capita Consumption (PCC) increases and so we are more likely to invest in additional water supplies.

We have identified a set of decision points that are a subset of all possible investment decisions we may take between 2025 and 2050. These are decisions which are likely to have a material impact on customers' bills and our trajectory towards our long-term goals.

Our decisions will be informed by several factors, including relevant research and feasibility studies, customer and stakeholder views, and greater visibility on the type of future that is unfolding over time.

Over the next few pages we discuss the decisions we will or may need to take, including the rationale for how and when to do so.

### 1. Prioritising Lowestoft water re-use plant or North Suffolk reservoir

Our modelling for Essex and Suffolk suggests there is an urgent need for new water supplies by 2032 and the single factor that affects the supply and demand for water the most is the need to reduce in abstraction from rivers and groundwater to more sustainable levels in the future. Current pressures on water supplies mean that we already have a moratorium on new business demand. From 2030, the amount of water the Environment Agency (EA) permits us to abstract will reduce. To address this need for new water supplies we are completing further detailed designs to decide whether to prioritise building a 'water reuse' plant at Lowestoft or a winter storage reservoir in North Suffolk. Both will be needed, and the decisions relates to which one to build first.

Our current view is that the water reuse plant could be built more quickly than the storage reservoir and provide enough water until the reservoir comes online subsequently. It is our preferred option under our draft [WRMPs](#). However, building a reservoir first would have greater environmental benefits in the near-term, including biodiversity and lower greenhouse gas emissions. This is because little electricity is required to pump water as Suffolk is relatively flat and pumping is needed over relatively short distances. The reservoir also creates natural habitats for wildlife.

We will need to decide by 2027 once we have completed detailed designs of both options.

An important factor will be whether the detailed designs determine whether the North Suffolk reservoir can be built more quickly than our current view as this would allow us to realise environmental and carbon benefits sooner. Under our current view, the water reuse scheme at Lowestoft could be ready by 2032 and the North Suffolk reservoir could be ready by 2040.

This decision whether to prioritise the water reuse plant or winter storage reservoir is relevant under all plausible scenarios as it is a decision over the timing of an investment (sustainable future, climate failure, affordability focus, regional growth).

The plausible scenarios affect whether to prioritise North Suffolk or Lowestoft for the following reasons:

- Under a sustainable future scenario, North Suffolk is likely prioritised given its low carbon properties and demand, climate change and technology are benign under this scenario.
- Under an affordability focus scenario, Lowestoft is more likely to be prioritised given climate change is moderate and North Suffolk may not meet environmental standards.
- Under climate failure and regional growth scenarios, Lowestoft is likely to be prioritised because demand is adverse in this scenario so water supplies are needed quickly, and Lowestoft can be built more quickly than North Suffolk.

While we still need to prioritise the new supply schemes, since consulting on our ESW draft WRMP24, the EA has informed us that we need to allow for further abstraction licence sustainability reductions by 2027 and this is likely to mean we need to develop both Lowestoft Reuse and the North Suffolk reservoir starting in 2025.

### 2. The need for Southend water re-use plant

Under the core pathway, we will continue to ensure sustainable water supplies by reducing leakage by a further 40% in Essex and Suffolk, aiming for compulsory smart metering by 2035 and focusing on water efficiency initiatives. Our plans will also be augmented by the Lowestoft water re-use plant and North Suffolk reservoir.

In the unlikely event that PCC is higher than the 'high PCC scenario' in our draft [WRMP](#), there may be a need to build a water reuse plant at Southend in addition to building a water reuse plant at Lowestoft and a storage reservoir in North Suffolk.

Climate failure is the most likely scenario where there is a need to build an additional water reuse plant at Southend. Under the climate failure scenario, we see higher demand, and greater restrictions on abstraction than anticipated. These circumstances would likely result in PCC being high enough to warrant the investment in an additional reuse plant.

A decision is needed in 2027 after we have finished more detailed designs, assessed the performance of demand reductions and consider the trajectory of the climate failure scenario. If we decide to build a water reuse plant in 2027, investment will begin at that point but these dates could change with the next iteration of our WRMP.

### 3. The need for Canvey Island de-salination plant

There could be further requirements still to reduce abstraction from rivers by 2040 by the Environment Agency (EA). If further requirements transpire, we have identified building a desalination plant at Canvey Island as the best option within our draft [WRMP](#).

The Environment Agency is most likely to impose further requirements where there is strong demand growth and climate change is more severe than anticipated as these factors place pressure on water supplies. As such, the decision to build a desalination plant in Canvey Island is more likely under the climate failure and regional growth scenarios.

The decision whether to build the desalination plant would need to be made around 2030 as part of the 2029 iteration of the WRMP.

### 4. Whether to invest in sludge incineration

There is uncertainty on how future regulations might change the way we dispose our wastewater sludge. We consider that it is very likely that there will be some changes and under our core pathway we will gradually adapt to likely future restrictions. We will build a strategically located storage barn to provide resilience to not being able to spread biosolids to land in Autumn months with additional investment in technology that will reduce the volume of biosolids that is deployed to agriculture land. However, there is uncertainty whether we will be required to find alternative disposal routes in future – currently the best alternative solution to spreading is incineration.

The decision to incinerate sludge is relevant to the environmental challenges as it reflects a future where expected environmental legislative requirements occur between 2025 and 2050 that would limit or stop us from spreading biosolids to land. Whether this is required depends on future learning and understanding of material within our sludge impacts upon the environment associated with emerging themes, such as microplastics, or whether alternative solutions are implemented, such as banning the use of certain products and requiring microplastic filters to be fitted to commercial and domestic appliances such as washing machines. Whether incineration is the optimal solution depends on the alternatives, and the increased greenhouse gas emissions and other air pollution incineration will create.

We consider a decision is required in 2026 to allow time to develop detailed plans in time for the price review in 2029 and investment would begin in 2030. The level of investment over time will also depend on progress made investigating alternative approaches to addressing micro pollutants and other emerging challenges.

### 5. Whether to accelerate the storm overflow programme and extend flooding protection

As part of our long-term strategy, we need to consider how quickly we should deliver reductions in storm overflows required under the government's storm over flows discharge reduction plan which requires us to make improvements to storm overflows by 2050.

We could accelerate the storm overflows programme, which would mean it could be complete by 2040, before government's deadline. Or we could aim to achieve the statutory requirements by 2050 and delay parts of the storm overflow programme until 2030-2035 to prioritise affordability in the 2025-30 period.

A decision to accelerate or delay investment is required in 2024 as accelerated investment in storm overflows would need to begin in 2025.

This decision will require us to balance customer priorities between environmental outcomes and affordability while meeting the statutory deadlines. Accelerating investment may be preferable if climate change, technology and demand are benign, which is the case under a sustainable future. Political pressure, potentially driven by media focus may also accelerate investment. Delaying investment may be preferable under the affordability scenario where there is support for keeping bills low in the short term. Investment could also be delayed if society deprioritised environmental protection, as we assume is the case in the climate failure scenario.

Under our preferred DWMP pathway we increase the benefits of investing in storm overflow discharge reductions by making greater use of surface water separation and sustainable drainage solutions to reduce the risk of sewer. This will cost less in scenarios with lower climate change impacts.

### 6. Whether to delay investment to support bill affordability for 2025-30

The current economic conditions are very tough, and we recognise that customers feel the effects of rising costs and some struggle to pay their bills. This is why we have a decision to make as to whether it is best to delay some investments in the near term to help with affordability pressures.

The affordability focus scenario delays investments in asset health, climate adaptation, Net Zero, lead and storm overflows to achieve bill reductions.

We will in future need to catch up on any investments that have been delayed. They cannot be avoided. As such, delaying investments provides temporary bill relief but will result in higher bills in the future. It may also be more difficult to procure new water supply schemes in the future due to more competition for infrastructure projects. This may lead to further bill increases.

The decision whether to delay investments needs to be made in 2024, as investments we decide to proceed with would need to begin in 2026.

The decision whether to delay investments and support bill affordability in the short term needs to be informed by customers' ability to pay their bills, the impact of delaying investments on service quality and the impact on the environment. Government pressure and welfare policies surrounding the cost-of-living crisis will also affect our decision to prioritise affordable bills or not.

### 7. Wider environmental obligations such as the need to eliminate micro-pollutants

We expect environmental challenges around anti-microbial resistance, persistent organic pollutants and microplastics in the future. There is political pressure for water companies to address these issues and legislation may be introduced requiring water companies to reduce or eliminate microplastics in the water system.

The investment that is needed will depend on the results of current and future investigations into the environmental impacts of these pollutants, and whether alternative solutions can be implemented, such as banning certain chemical products or making behavioural or other product changes to avoid pollutants entering wastewater.

We expect the cost of eliminating micro-pollutants from the water system could be material, especially if legislation is introduced before a cost-efficient solution is found. Our current cost estimates are high as we have not identified a solution yet. We consider the robustness of our cost estimates will improve over time as we refine our approach and if technology improves in this area.

The costs of eliminating micro-pollutants from the water system may be lower than our current estimates as behavioural solutions such as customers putting microplastic filters on washing machines can reduce the amount of the micro-pollutants entering the water system.

We are more likely to invest in eliminating micro-pollutants under a sustainable future, regional growth and environmental challenges. Under a sustainable future there is appetite to make investments in the environment given climate change, technology and demand are benign. Under regional growth, technological growth may increase the likelihood of finding a solution and economic prosperity increases the appetite to pay for the solution. Under the environmental challenges scenario, it is assumed environmental legislation that we expect between 2025 and 2050 is enacted.

We are less likely to invest in addressing micro-pollutants under climate failure where it is assumed there is little technological progress and there may not be solutions to eliminate micro-pollutants. We also delay investing in addressing micro-pollutants under the affordability scenario to support affordable bills in the short term.

We will make our decision in 2027 and begin investing in 2032.

### 8. A potential trade of raw water from Kielder reservoir

Kielder Water is the largest reservoir in the UK by capacity and holds around 200 billion litres of water. It was built in the 1960s to satisfy growing industrial demand but changes in the mix of industry in the region have created a surplus of water that exceeds demand.

The capacity available at Kielder creates an opportunity to export that capacity either through a transfer over the Pennines to United Utilities in the North West or through our system to the south to Yorkshire Water. The need for these transfers has been examined through both the plans of those individual companies but also through the regional water resource groups including Water Resources North and Water Resources West.

In all cases to date the transfer from Kielder has not been identified as a cost beneficial option against available alternatives. The proposed transfer was subject to most significant consideration through the work of Water Resources West. So the current plans do not envisage a need for a transfer from Kielder in the near future.

However, the plans are dependent upon a range of Strategic Resource Options (SRO) schemes that are progressing through the RAPID process and governance. Were some of those options to fall away, for example because a particular company could not trade water that it had intended to or for environmental reasons, then the Kielder transfer could become more important.

We therefore consider that there is a need to have an annual review process of the Kielder trading opportunity until either the opportunity is clearly not required because SRO schemes fall away or because it becomes necessary as the most efficient and effective option for meeting water needs in other regions.

### 9. The impact of new demand on Teesside

Our current water resource management plans should be sufficient to balance supply and demand in the North East. Substantial new demand is forecast in the Teesside region with significant new industry including new investment in hydrogen and battery plants for electric vehicles for example.

We engaged with industrial and commercial customers, the local authority and other stakeholders in developing our demand forecasts. We have also reflected additional work undertaken by the Environment Agency and the Department for Business, Energy & Industrial Strategy (BEIS). These forecasts suggest that our plans should be sufficient to meet the new demand requirements.

However, there remains significant uncertainty about where demand on Teesside will go and we have agreed with the Environment Agency that an adaptive pathway would be beneficial with a regular annual review of the plan and the current demand requirements in the Teesside area to ensure that the available water supply remains sufficient.

### Summary of decision and trigger points

Our adaptive pathways start now. Two of the decision points set out above we want and need to take a view on before submitting our 2025-30 Business Plan in October 2023.

The first (#6) relates to whether we should delay some investment beyond 2025-2030 to help ease the acute affordability burden on some customers which has been compounded by the cost-of-living crisis. The second (#5) relates to whether we should accelerate or storm overflows programme and go further and faster in the near-medium term than we are required to by government and regulators.

Table 3: Summary of decision and trigger points

Decision	Decision point	Trigger point	Relevant scenarios
1. Prioritising Lowestoft water re-use plant or North Suffolk reservoir	2027	2028 (Lowestoft) 2036 (North Suffolk)	Lowestoft: climate failure, affordability focus and regional growth North Suffolk: sustainable future
2. The need for Southend water re-use plant	2027	2031	Climate failure
3. The need for Canvey Island de-salination plant	2027	2031	Climate failure and regional growth
4. Whether to invest in sludge incineration	2026	2030	Environmental challenges
5. Whether to accelerate the storm overflow programme and extend flooding protection	2024	2026	Sustainable future
6. Whether to delay investment to support bill affordability for 2025-30	2024	2026	Affordability focus
7. Wider environmental obligations such as the need to eliminate micro-pollutants	2027	2032	Sustainable future, regional growth and environmental challenges
8. A potential trade of raw water from Kielder reservoir	Annually	Annually	Climate failure, environmental challenges and regional growth
9. The impact of new demand on Teesside	Annually	Annually	Regional growth

Our consultation and customer and stakeholder engagement on this draft long-term strategy will help inform that decision.

The next set of decisions are in 2027 where we will need decide whether to build new water supplies and whether to invest in eliminating micro-pollutants. Building new water supplies and investigating approaches to eliminate micro-pollutants both take time which is why a decision is needed in 2025-30.

The last decision point is in 2032 where will decide whether to invest in sludge incineration. This decision is closely linked to our progress finding approaches to eliminate micro-pollutants.

The decision points are closer to 2025 than 2050 is because we have more certainty around the nature of decisions and their impacts in the near term.

In contrast, there is much less certainty over decisions we will need to take closer to 2050 and it is difficult to estimate the potential impacts of those decisions in a robust way. We will continue to update our adaptive planning approach over time, and we are likely to identify future decisions points from the mid 2030s onwards. For example, we will continue to monitor the development of ecosystem markets and update our long-term strategy accordingly.

# Impacts

## Investment and bill impacts of scenarios

**Considering plausible future scenarios shows the possible impacts on investment and bills over the next 25 years. Decisions and trigger point identified above are inherent within plausible future scenarios and determine the shape of alternative investment paths.**

The cost of plausible future pathways and bill impacts are important considerations for customers and inform our 2025-30 Business Plan. We discuss how the costs and bill impacts for each scenario and how they inform our Business Plan below.

### Totex impacts

Expenditure under environmental challenges, sustainable future and regional growth is relatively high compared to affordability focus and climate failure scenarios. This is in part because there is investment in more activities in these scenarios and they all invest in eliminating micro-pollutants which is a significant cost based on our current estimates. Climate failure has relatively low expenditure due to the limited investment in improving the environment. Expenditure on the affordability scenario is similar to the core pathway except some investments are delayed supporting affordability in the short term.

### Bill impacts

Between 2024/25 and 2049/50, bills in the North East could increase by 200% under the core pathway and by over 300% under the environmental challenges, sustainable future and regional growth scenarios. In Essex and Suffolk, bills could increase by around 70% under the core pathway and more than 100% under climate failure, regional growth and environmental challenges.

The proportionate increase in bills is higher for Northumbrian Water than Essex & Suffolk Water. This is because the majority of investment is needed for wastewater activities, and bills in the North East are for water and wastewater services whereas bills in Essex and Suffolk are for water only. It is also because the plausible future scenarios are more likely to affect investment in wastewater services. Examples include investments in storm overflows and possible legislation requiring sludge to be incinerated. In contrast, the Essex and Suffolk region is affected by the need to build new water supply schemes and under some futures, there is a need to build additional water reuse plants and invest in a desalination plant at Canvey Island.

It is important to note that for the upcoming price review in 2023/24, our regulator, Ofwat, will set the allowances only for the next price control period, 2025-2030.

Even though we are looking at potential investment pathways beyond that, to make sure we invest efficiently as needed in the coming years, the levels of investment through customer bills does not get set at this time. We will continue to reassess future investment needs, and innovations and efficiencies will emerge which can help manage our costs. Affordability support will also continue to be available for customers who struggle to pay, including through the provision of social tariffs.

### Core pathway

In the core pathway we expect totex and bills to rise between 2026 and 2050. This is because of increasing statutory expectations, including through WINEP and the storm overflows discharge reduction plan which mean investment levels will need to be higher than what was allowed in previous price reviews and investment will be required as core across multiple five-year planning periods.

### Affordability scenario

Delaying investment now supports affordable bills in short term. However, there are likely to be increases in bills in future as investment in asset health and climate adaptation are pushed out. A strategy of delaying all investments may not align with customers' preference for stable bills. For 2025-30 we propose to delay some investments such as our storm overflow programme. This approach balances affordability over the short term and longer term and supports stable bills.

### Climate failure scenario

Under climate failure, investment is needed in new water supplies as customers don't decrease consumption and more investment is required to ensure sustainable abstraction. There is no appetite to invest in eliminating micro-pollutants due to low technological growth and the absence of a cost efficient solution. This explains why totex is lower than other scenarios. This scenario teaches us that climate failure accompanied by low technological growth is likely to mean forgoing investment in some areas. Throughout our planning we will continue to work with other water companies and universities to resolve industry issues. This approach increases the likelihood of discovering cost efficient solutions that are manageable in the event of climate failure.

### Sustainable future scenario

Accelerating storm overflows improvements by 2040, investing in Net Zero and delivering environmental improvements are all possible due to benign climate change and demand and improvements in technology. Carrying out these investments is costly and has a significant impact on bills. It will be important to focus on innovation to increase the likelihood of finding cost-efficient solutions.

### Regional growth scenario

Under regional growth, bills increase from additional investment needed in water supplies to meet increased demand and investment in eliminating micro-pollutants. The increases in investment are partially offset by increased industrial demand and higher earnings in the region. This scenario teaches us that it is important to keep out investment options open during 2025-30 Business Plan, as regional growth may increase customers' appetite for investments. Examples include feasibility studies in additional water supplies, which do not commit us to making investments but keep investment options open.

### Environmental challenges scenario

The environmental challenges scenario shows that totex will increase significantly if all expected environmental legislation between 2025 and 2050 is enacted. In a future where technology advances are benign, we are unlikely to find cost-efficient solutions. Low technology growth affects our ability to find alternative solutions which reduce the need for legislation. For 2025-30, this scenario teaches us that innovation and finding alternative approaches will play an important role in reducing the likelihood of legislation. It will also help us find cost-efficient solutions which minimise the potential impact on legislation on customers' bills.

Figure 11: Totex impacts

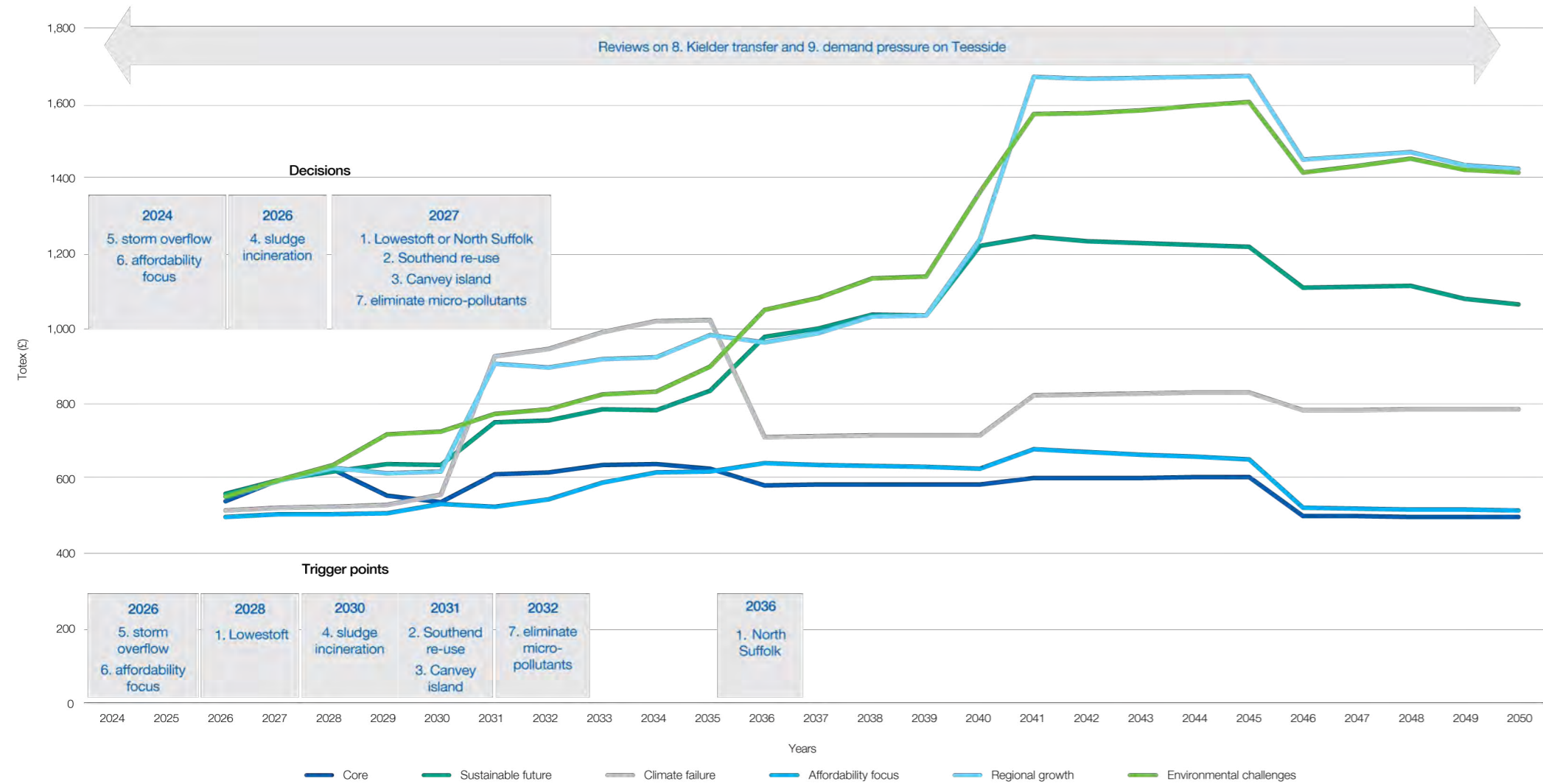


Figure 12: Average total water bill in Essex & Suffolk 2021-50 (22/23 prices)

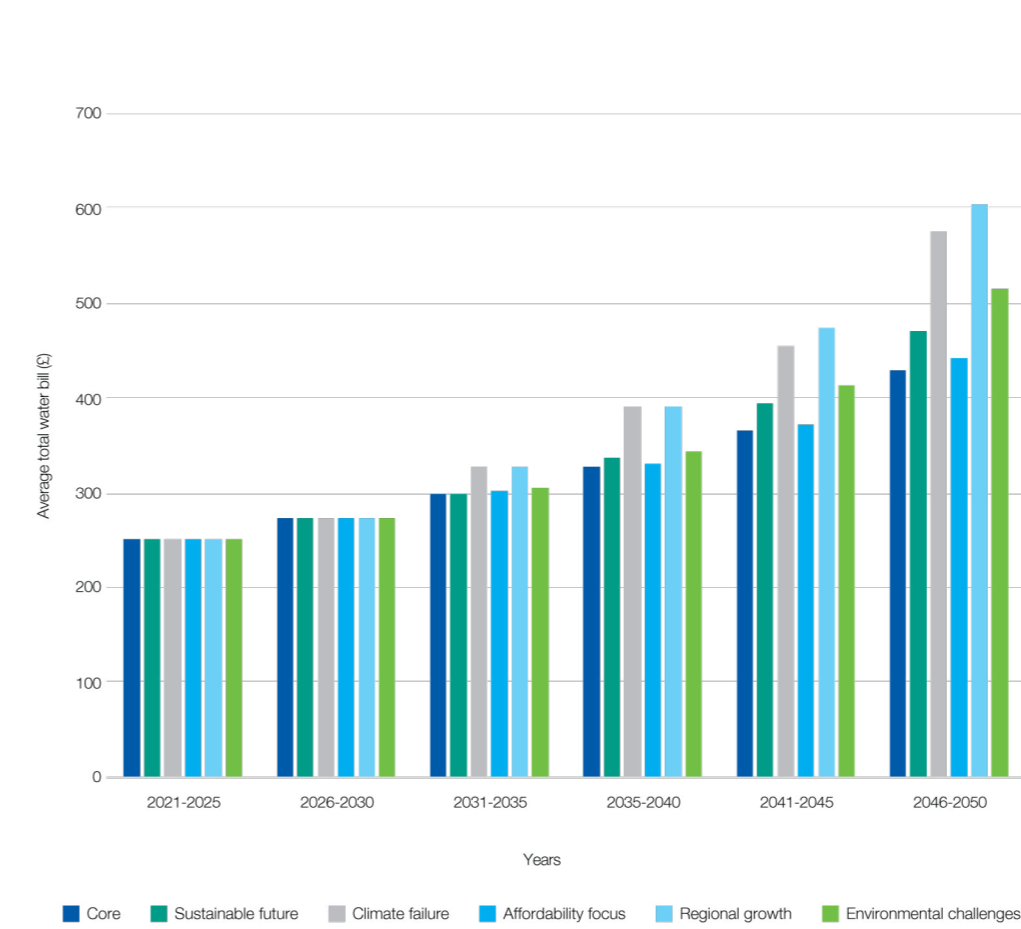
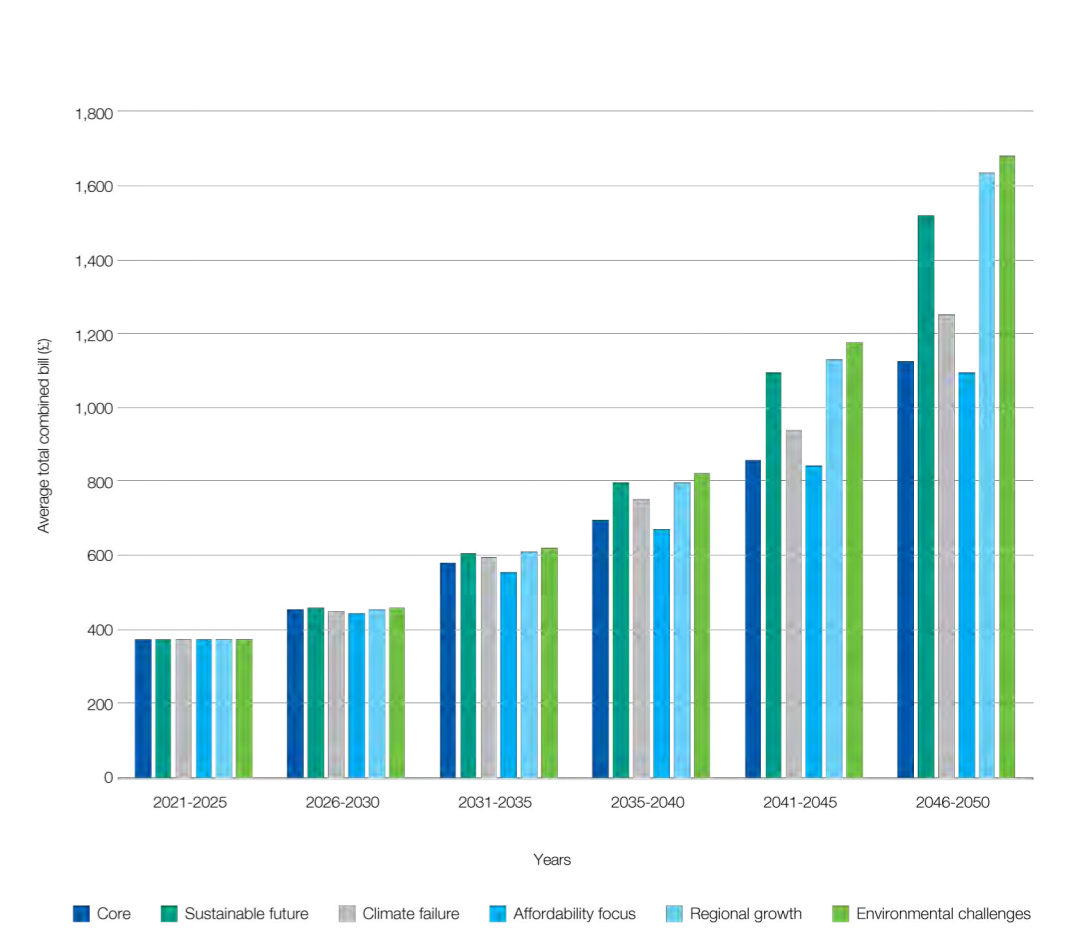


Figure 13: Average total combined bill in the North East 2021-50 (22/23 prices)



## Maintaining affordability for customers

**In the UK we are experiencing the toughest cost-of-living crisis in a generation. The reasons for this are many and varied – the Covid-19 pandemic, the war in Ukraine and the highest levels of inflation since privatisation. In the long-term the affordability of water bills will be dictated by the interplay between movements in bills on the one hand and trends in real incomes on the other.**

Our analysis shows that under all of the scenarios that we have considered, bills are going to rise continually between 2025 and 2050. This is driven by the increasing need to invest to meet statutory obligations to address environmental issues and adapt to climate change and population growth to ensure we can provide reliable, resilient and sustainable water.

Examination of future trends in real wage growth (adjusting inflation) is notoriously difficult. We have looked at trends in median incomes data from the Annual Survey of Hours and Earnings (ASHE) over the period this data is available (1999-2021) regionally for the North East and Essex and Suffolk.

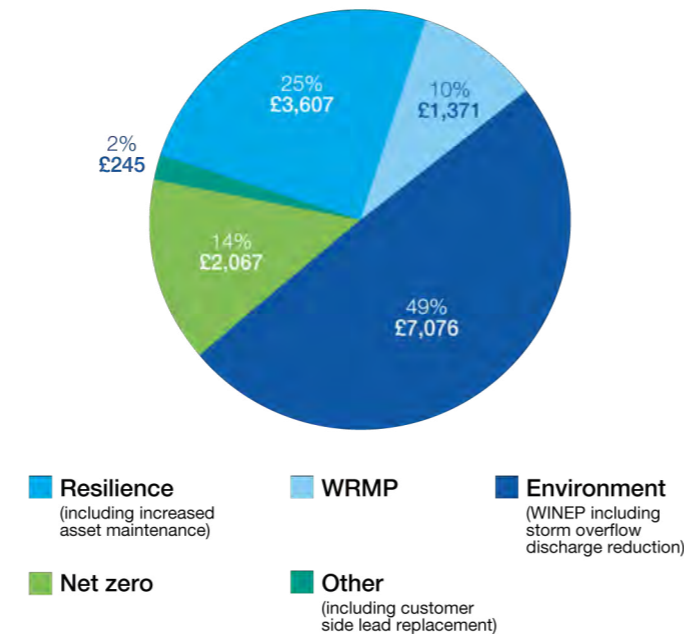
We have considered three possible trends based on the average real wage growth rate, the average for the 50% slowest growth years and the average for the 50% fastest growth years. This allows us to look at the sensitivities of affordability to different real wage growth rates. We then compare these income estimates in 2050 with bills under our scenarios.

The results show that combined water and wastewater bills in the North East rise from 1.3% of the median income in 2024/25 to between 2.1% and 5.3% of of income under the core scenario. Under the scenario with the highest bill (environmental challenges) this could rise to 3.3% to 8.1% of median incomes.

In the core pathway, Essex and Suffolk water only bills go from 0.7% of the median income in 2024/25 to 0.6% to 1.7% of median income in 2049/2050. Under the scenario with the highest bill (regional growth) this could rise from 0.9% to 2.4% of median incomes.

This unprecedented affordability challenge is greater in the North East because we expect to need to invest more on wastewater services, which we only provide in the North East, and because incomes have historically been lower and risen slower in the North East compared to in Essex and Suffolk.

Figure 14: Core pathway investments 2025 to 2050 (investment £ms and % of total).



### Potential solutions

This sort of long-term persistent increase in pressures on customers needs a multipronged approach to reduce the pressure of bills for the majority and provide focussed support for those still left in an untenable position.

Across these various investment areas the vast majority of investments to meet statutory obligations that the business is being required to deliver including significant investment to reduce CSO spills and improve the environment, to achieve net zero by 2050 and to ensure sustainable water supplies. We therefore do not consider there is much scope to remove the investments we have identified and as explored in the scenarios analysis, indeed there are other additional needs that may need further investment.

### 1. Minimise future investment requirements and increase efficiency

The first question is whether the investments that we have included in our analysis can be reduced, and so their impact on bills limited. Figure 14 shows that under our core pathway the majority of the investments relate to areas that we have little or no discretion over as they are driven by legislation.

Instead of removing issues from the list of problems we need to find solutions to save money, can we instead change the way we deliver the solutions? We have already included some aggressive assumptions about productivity improvement in our forecasting, but one way of potentially reducing these costs is to further innovate and find alternative, cheaper solutions, or solutions that can be co-delivered with partners that can contribute financially.

One key area of investment is on reducing the harm caused by storm overflows. Alongside our own activities there are actions that others could take to address existing issues or reduce future pressure on the drainage system.

Enabling flood defence schemes to work in partnership with water companies so that we can address flooding and storm overflows together – and so more efficiently – can also help. We are at the forefront of this collaborative approach, and have an instrumental role in the Northumbrian Integrated Drainage Partnership which aims to do just that.

We will continue to seek further opportunities in this space to reduce costs, but we do not consider that this alone will solve the growing affordability issue given the scale of the investment required.

### Revolutionary register unveiled: transforming infrastructure management and keeping our workers safe

We were the first company to sign a national data-sharing agreement that sees existing data on underground pipes and cables brought together in one single, digital map. NUAR (the National Underground Asset Register) displays where electricity and phone cables, and water and gas pipes are buried, helping to keep utility workers safe and saving the UK economy billions of pounds.

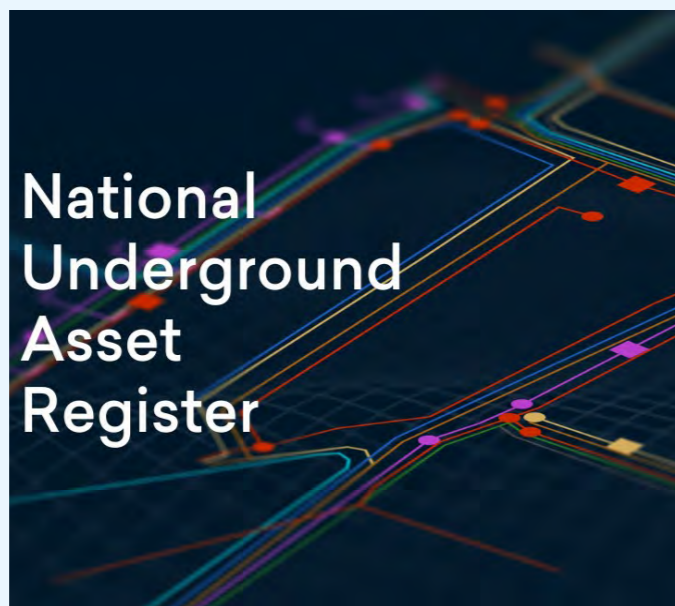
Developed at our 2017 Innovation Festival, the comprehensive database serves as a centralised information system that provides accurate data about the location, type, and condition of underground assets. This information is crucial for effective infrastructure planning, maintenance, and avoiding accidental damages during construction or excavation projects and is now being delivered on a national scale after being adopted by the UK Government.

In 2018 alone, we spent over £1M repairing pipes that had been damaged by third parties, and it's estimated that the cost to the UK's economy of accidental strikes on underground assets is £2.4bn a year. NUAR has been live in our North East operational area since April 2023.

Once fully operational across England, Wales and Northern Ireland, it will help improve efficiencies in construction and development, reduce disruption to the public and businesses from extended road closures and congestion, and is envisaged to deliver at least £350 million economic growth per year.

The register is one of our best examples of what can happen when we become more open with data, providing us with a consistent, interactive digital map of buried asset data, which will be refreshed and kept up to date.

For more information on NUAR, [click here](#).



### 2. Maximise offsetting income

An additional solution to reducing costs is to increase the income that we receive from other sources that can be used to offset rising costs. We already generate income where we can from biproducts of our business. We were the first and still the only water company to use 100% of our sewage sludge to generate biogas, which we maximise value from by injecting the biogas onto the national gas grid. We are exploring the possibility of importing bioresources from neighbouring wastewater companies to make most efficient use of our assets and so reduce costs and increase income.

As markets develop for ecosystem services such as biodiversity and nutrient reductions we can create opportunities to reduce our costs by purchasing credits to meet our obligations where it is more efficient to do so, and generate income that can be used to offset our costs where possible.

We have not yet included increased income from alternative sources in our scenario analysis as this is difficult to scale but this may help bring long-term bills down.

### 3. Social tariffs and affordability support

Social tariffs and affordability support can help to reduce affordability issues for the worst off in society even if overall bills are rising. Our analysis shows that even in low-cost scenarios, bills could be equivalent to over 5% of the median income by 2050.

We already operate a successful social tariff that seeks to support those on low incomes through a wide range of initiatives and partnerships. However, as social tariffs are paid for by our customers, we need customer support to extend these further. Currently in the North East support from customers is limited to increase contributions further.

We would welcome the introduction of a national social tariff as has previously been debated at the 5% income level.

If we are to ensure bills remain affordable then maximising the role for social tariffs and affordability support will be even more important.

### A more affordable future

In summary the affordability challenge we see developing over the next 25 years is too great for one silver-bullet solution. We will need to take a multifaceted approach to bring down costs, generate offsetting income, support the most in need and deliver solutions in and beyond the water sector.



## Financing the plan

**Both the core pathway and all of the alternatives we have developed show a significant step up in the investment from what the sector has made in the past. This is largely driven by new statutory requirements.**

Significant new capital will need to be raised from both equity and debt investors. Historically most of the new investment requirements in the sector and for us have been financed by new debt borrowings – this has been possible because the levels of investment have generally been much lower than our forecasts suggest will be required in the future and we have been able to raise that finance whilst maintaining a resilient financing structure with a good credit rating and gearing at or below 70% (which is close to the average for the sector).

If this significant step up in the investment requirements is seen in the future then investment will be needed from both equity and debt financing on a much greater level as it will not be matched by such a significant step up in revenues from bills.

Table 4: Historical and future capex forecasts from 2010-15 to 2045-2050

£m, 22/23p core pathway	2010-15	2015-20	2020-25	2025-30	2030-35	2035-40	2040-45	2045-50
<b>Enhancements</b>	520	252	429	2,744	2,824	2,633	2,719	2,249
<b>Base</b>	1,050	1,065	1,186	1,024	1,030	1,062	1,096	1,128
<b>Total capex</b>	<b>1,570</b>	<b>1,317</b>	<b>1,615</b>	<b>3,768</b>	<b>3,864</b>	<b>3,695</b>	<b>3,815</b>	<b>3,377</b>

Increases in asset maintenance expenditure are included in enhancements.

The sector has a long-track record of raising debt finance successfully. Provided there is a stable policy environment, predictable and sensible regulation and a fair return for investors - who often have global choices - we do not envisage any problems raising more debt finance under the proposed model.

Table 5 provides some indicative analysis of the level of equity financing required to deliver such a significant step up in investment whilst retaining a resilient financial structure with gearing levels remaining around 70% (their current levels). We start with the capital investment that emerges from the totex scenario modelling we have used in this long-term delivery strategy (A) this is subtracted from the depreciation revenue that we would receive from customers in their bills (B) to arrive at a funding gap (C). In order to retain a gearing level of 70% we assume that 30% of that gap would need to be funded by new equity (D) with the remainder financed through new debt. We assume a base dividend yield of 4% consistent with Ofwat's expectations from the last regulatory price determination, this is slightly higher than current distributions of around 3% and at the bottom end of returns when compared to other regulated infrastructure sectors. The final row provides a net position of equity cash out versus cash in where 'negative' highlights that during that period the net investment made by investors is less than the returns earned and 'positive' implies that returns are greater than equity invested.

Table 5: Indicative analysis of long-term financing requirements

£m, 22/23p	Formula	2025-30	2030-35	2035-40	2040-45	2045-50
<b>Capex</b>	A	3,768	3,854	3,695	3,815	3,377
<b>Depreciation Revenue</b>	B	1,245	1,748	2,155	2,466	2,706
<b>Funding gap (Capex less Depcn)</b>	C = A - B	2,523	2,105	1,540	1,349	671
<b>30% Equity funding injection</b>	D = 30% * C	757	632	462	405	201
<b>RCV at end of AMP</b>	E = (E-1) + C	7,682	9,787	11,327	12,676	13,347
<b>Equity cash out less cash in</b>		Negative	Negative	Positive	Positive	Positive

As we can see:

- The investment requirements are so large that significant new equity is required every five years for the whole of the 25 year period.
- Given the long lives of the assets being invested in it can take more than ten years for the investor to make a return on their investment.
- The table also shows the significant growth in the value of the underlying business which we measure using the Regulatory Capital Value (RCV) which is part of the return that equity investors get for their investment.

The analysis also implies a change to the nature of the returns investors could earn for their investment and the balance between dividend yields and RCV growth. All of these points raise questions about how this future investment programme could be financed.

There are a number of ways that these financing challenges could be addressed:

- In the first instance there may be opportunities to constrain the size of the investment programme, either by altering the ambition or finding more efficient ways of delivering the long-term outcomes.
- It may be possible to bring new equity investment in either into the current ownership of the company or through new financing models and competition for large and discrete investments.
- If the pay-back period is not investable then we could consider adjusting the period over which the investment is returned by accelerating revenues sooner, this would allow equity investors to receive a return on their investment faster making the opportunity more attractive but would raise customer bills and further exacerbate the significant affordability pressures we see. This would not involve customers paying any more money in their bills but it would involve an intergenerational transfer between customer groups with current bill payers generally paying more than those in the future.
- We could soften the level of financial resilience that we think would be needed, we would not advocate this but it is an approach that could be taken.

We have explored three different scenarios. In the first future investment requirements under the core scenario are reduced by 25% either through efficiency or through delivering the investments through other parties. In the second we adjust the pay-back period to deliver the investment over 20 years rather than the life of the assets and under the final scenario we relax the gearing position from 70% to 80% allowing more of the investment to be delivered from debt finance.

Across these three scenarios we observe:

- Scaling back the capex by 25% reduces the overall equity requirement, and changes the timing of equity cash positivity (5 year pay back period). Total Equity injection falls by £0.8bn.
- Accelerating depreciation to 20 years reduces the overall equity requirement, and changes the timing of equity cash positivity. Total Equity injection falls by £0.7bn.
- Assuming higher gearing of 80% reduces the overall equity requirement, but does not change the timing of equity cash positivity. Total Equity injection falls by £0.8bn.
- Additional debt will need to be raised, although there are limits on how much investment can be funded in this way due to the restraint on gearing. Higher interest rates will also increase the cost of debt.

- If all three scenarios are used in combination then this not only reduces the equity requirement significant but also brings the equity cash positivity timing forward into 2030-35 (i.e. a c.5 year pay back period).

Our Board places a strong focus on maintaining long-term financial resilience, and we maintain a detailed five-year plan that is updated regularly and formally reviewed by the Board annually. This is underpinned by a commitment to maintaining an investment grade credit rating, as assessed by independent credit rating agencies Moody's and Standard & Poor's. We also stress test our plans against our most significant risks and uncertainties, currently for a period of eight years (to the end of March 2030).

Our financial resilience has been tested and delivered as intended through recent world events and uncertainty. For example, we have been able to manage the impacts both of Covid-19 and the significant increases in power and chemical costs during 2022 resulting from the war in Ukraine.



Water networks emergency works

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## Next steps

**Thank you for engaging with our draft long-term delivery strategy. We welcome your comments on this draft long-term delivery strategy. We welcome comments on any part of this strategy.**

We will engage with our regional stakeholders through round-table discussions by invitation.

We are also actively talking to our customers about this long-term delivery strategy through our 2025-30 Business Plan engagement.

We will use the feedback we receive to improve our long-term delivery strategy, and we will published the updated version alongside our Business Plan for 2025-30 in early October 2023.

If you would like to provide a written response to this consultation, please do so by emailing [haveyoursay@nwl.co.uk](mailto:haveyoursay@nwl.co.uk) by **Friday 14 July 2023**.



Scroby Sands, Great Yarmouth

# Annex: Detailed scenario analysis

**We face an uncertain future. The plans we put in place, and the investment decisions we make, need to set a solid foundation for delivering the service and the performance our customers expect from us. At the same time, we need to maintain the right level of adaptivity and flexibility so that we can adjust our course in future.**

This means making the necessary investment now, in the upcoming investment period from 2025-2030, that will be 'no-regrets' - in that the investment is required across many plausible futures – which is what we term our 'core pathway'. It also means taking a view, which will inevitably evolve over time, as to what might trigger the need for a different approach and investment profile – these are our 'alternative pathways'.

We have set out alternative pathways for five different plausible futures that we see could play out and have examined when key decisions will need to be made that will determine which pathway we follow.

This adaptive planning approach aims to optimise interventions over time, ensuring that options are kept open until there is sufficient certainty around the best course of action, while ensuring investment decisions are taken when needed.

By looking across future investments we can also identify crunch points and manage these by moving investment forward or backward within our investment portfolio.

Our adaptive pathways start now. There are two decision points we want to take a view on before submitting our 2025-30 Business Plan in October.

It is important to note that for the upcoming price review in 2024, our regulator, Ofwat, will set the allowances only for 2025-2030. Even though we are looking at potential investment pathways beyond that, to make sure we efficiently invest as needed in the coming years, the levels of investment through customer bills does not get set at this time.

We will continue to reassess future investment needs and innovations and efficiencies will emerge that can help manage our costs. Here we set out a summary of the different pathways and what they mean in terms of customer bills.



Kielder reservoir, Northumberland

# Core pathway

**Our core pathway includes all the activities and investment we know are ‘no-regrets or low-regrets’ because they are required under a wide range of plausible futures. It includes investment to meet short-term requirements, and to keep the necessary options open for potential longer-term investments.**

It is built on a foundation of pushing and challenging ourselves to make sure we achieve as much as we can from our day-to-day expenditure before looking for further investment, of continuing to be leaders in innovation and being efficient in how we work, and of making sure we continue to be financially resilient to attract the necessary capital for investment.

Our core pathway maintains a strong focus on reducing leakage and supporting and enabling customers to reduce their demand. It reflects the ‘least cost’ approach to achieving our statutory environmental requirements, including to meet the requirements and timetable as currently set out under the [Government’s Storm Overflows Discharge Reduction Plan](#).

It puts forward the minimum necessary investment to shift us to a sustainable level of asset maintenance expenditure, with investment in asset health and climate change adaptation required to meet our legal obligations.

It focuses, for 2025-30, on decarbonising in those areas where we have the most information and direct control over emissions; and it aims to continue to deliver straight line reductions in emissions beyond that towards 2050. Our indicative estimate of the enhancement cost of the core pathway between 2025-2050 is around £14bn. Under the core pathway, we phase and smooth investment over the long-term to create a sustainable and deliverable pipeline of no-regrets investments. It includes the significant enhancement investment we will need to put into 2025-2030 across our investment areas.

While this remains one of the least impactful scenarios for customer’s bills, under the core pathway, bills progressively go up towards 2050 with a similar % bill increase between price periods. Between 2025 and 2050 we expect to see bills increase up to an annual amount of £1,138 which is nearly triple bills in 2025 for water and wastewater customers in the North East. We expect bills to increase up to an annual amount of £433 which is around 70% more than bills in 2025 for customers in Essex and Suffolk. This is largely driven by the increasing statutory expectations and the subsequent investment that is higher than previously allowed for in price reviews.

### Key activities and interventions

- Delivery of WRMP, DWMP and WINEP requirements
- Feasibility studies into North Suffolk reservoir and Lowestoft water-reuse scheme
- Storm Overflow Discharge Reduction Plan requirements
- Increasing capital maintenance and asset health monitoring
- Delivery of net-zero plan

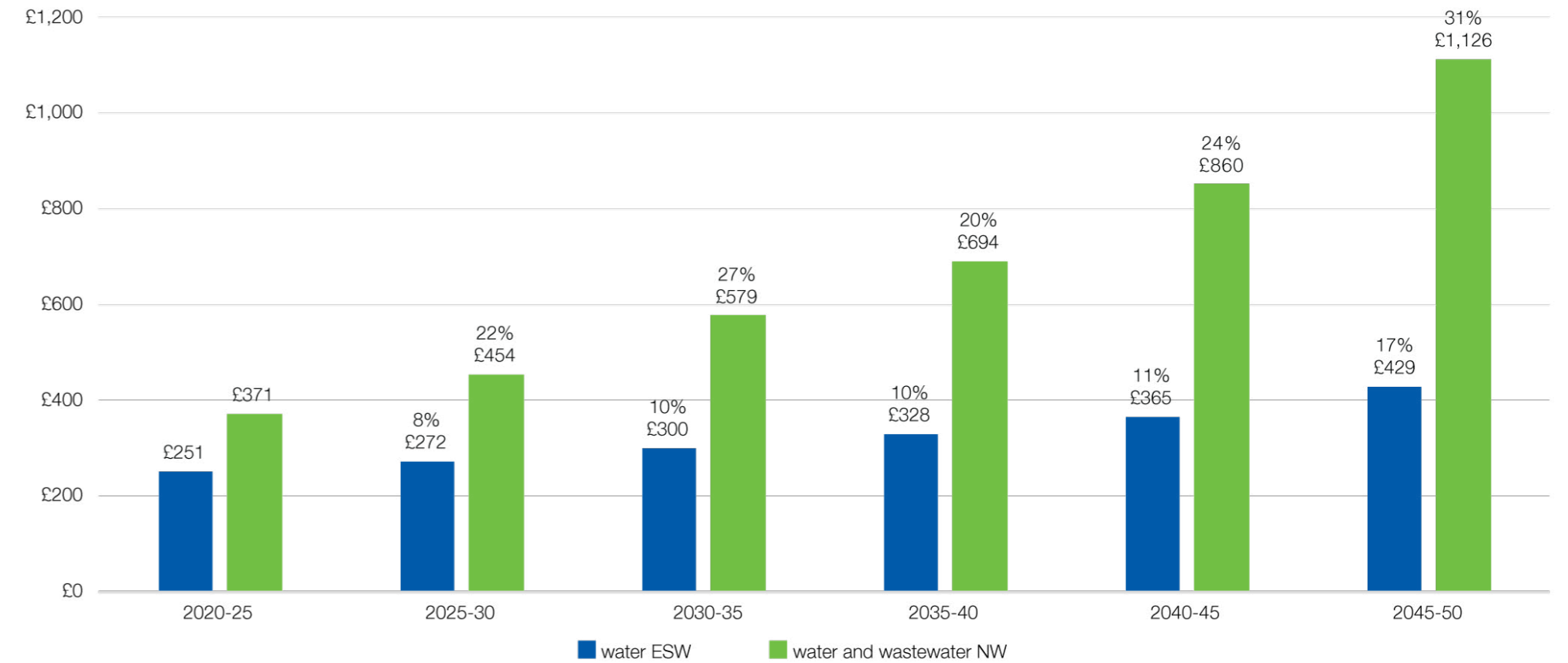
### Key benefits relative to other scenarios:

- This scenario covers all the no-regrets and low-regret actions under a wide range of scenarios.
- This scenario is cheaper for customers than most of the other scenarios while still leaving options open if circumstances require.

### Key risks relative to other scenarios:

- We risk not being able to foresee every required future intervention at present as some events are unforeseeable e.g. Covid-19. We do not consider it would be prudent to include investments for very unlikely events in our core pathway as there is a strong chance that the investment would be ‘regrettable’.

Figure 15: Core pathway average bills for each five year period 2025-2050 (22/23 prices)



# Sustainable future scenario

**In this future, strong action positively affects climate change including through rapid improvements in green technology and innovation.**

Sustainability becomes more important to our customers and the wider public. Climate change is also under control - extreme weather is minimised and we expect global temperature rises to stay well below 2 degrees.

In this future, the trend of urbanization continues across the UK. However, its impact on the water sector is mitigated by changing attitudes towards water usage and government legislation on sustainability-focused decision making. From a regulatory perspective, water companies have a stronger mandate for action, driven by public preferences.

Changing attitudes towards water usage results in behavioural and demand side consumption reductions which allows us to be more efficient relative to other scenarios where there is a need to build more water supplies.

Customer expectations on environmental protection are increasing meaning the UK government brings forward the requirement to deliver our storm overflows programme to finish in 2040.

As such, customers experience environmental benefits such as improved river water quality sooner relative to future scenarios where the storm overflows programme is not accelerated.

Considerable climate finance investment is put into technology innovation which is rapidly taken up across the UK and across the water sector. This enables us to find cost efficient solutions to address environmental issues such as micro-plastics. Customers experience greater environmental benefits such as improved river water quality. They also experience those benefits sooner relative to future scenarios where there is less innovation and technological growth.

Early in the period there is a rapid improvement in economic conditions due to the influx of investment and the creation of new jobs, but this levels off later in the period as the UK has reached a stable point in the green transition which leads to steady growth.

A high level of expenditure is required between 2025 and 2050 to fund interventions and we expect bills to increase. Between 2025 and 2050, we expect that we would need to spend around two thirds more compared to the core pathway. Compared to 2025, we expect bills to be around 4 times higher for water and wastewater customers in the North East and almost double for customers in Essex and Suffolk over this period. This means bills under a sustainable future are at the higher end compared to other scenarios.

Improvements in technology and innovation mean we are more likely to find cost-efficient solutions which partially offset expected bill increases and reduce expenditure. Improvements in economic conditions mean customers may be in a better financial position to afford bill increases relative to other scenarios.

### Key activities and interventions (including the core pathway)

- We build the North Suffolk reservoir, in advance of the Lowestoft water-reuse scheme (but we avoid investment in Canvey Island desalination plant and the Southend reuse scheme).
- We accelerate the storm overflow programme.
- We increase investment on addressing environmental issues such as microplastics.
- We increase investment to reduce surface water flooding in line with RCP2.6 climate projections.

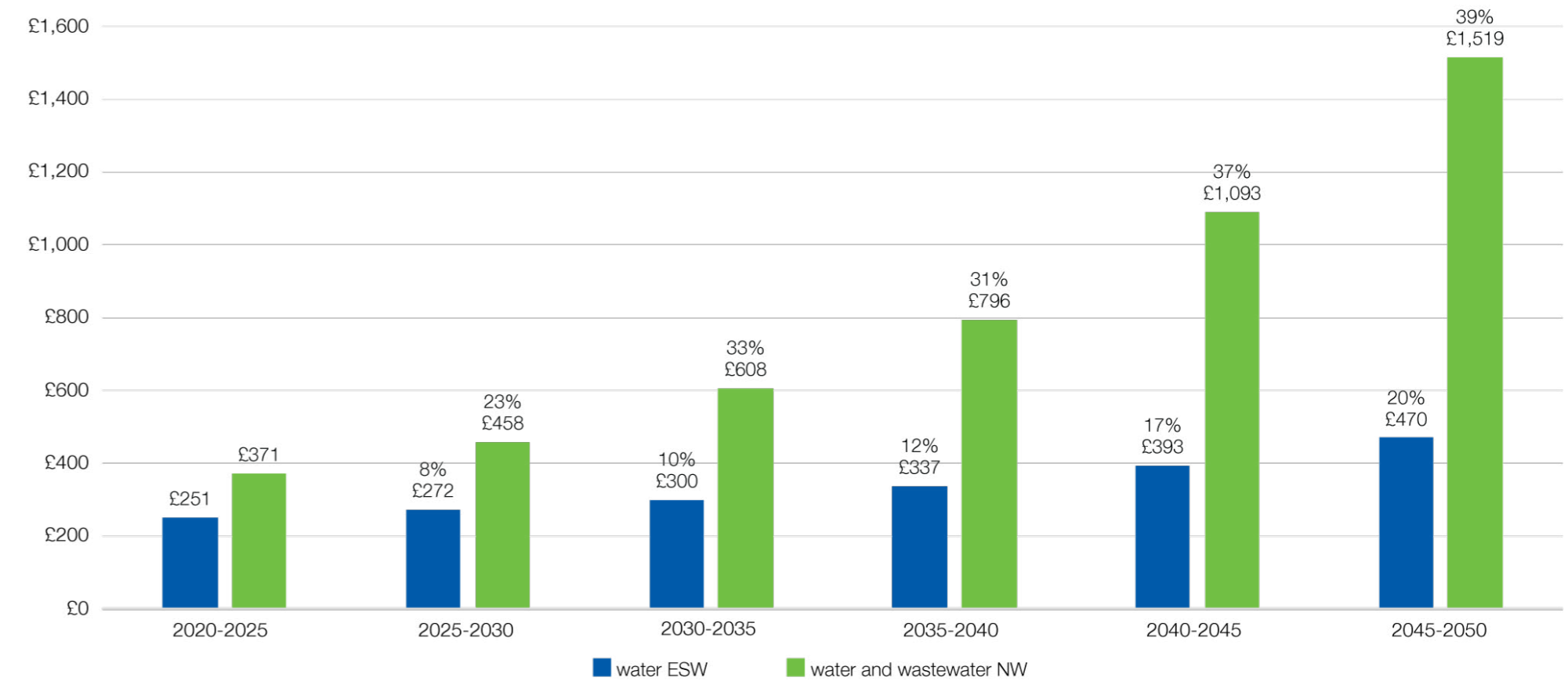
### Key benefits relative to other scenarios:

- Customers experience greater environmental benefits. In particular, river quality improves.
- Customers realise environmental benefits sooner.
- The need to build additional water supplies is minimised due to demand side reductions.
- Bill increases are partially offset by improvements in innovation and technology.
- Improvements in economic conditions mean customers are in a better position to afford bills increases.

### Key risks relative to other scenarios:

- Bills and expenditure are higher due to greater investment in interventions.

Figure 16: Sustainable future average bills for each five year period 2025-2050 (22/23 prices)



# Regional growth scenario

**In this future, prioritising economic growth over sustainability leads to higher demand, as well as relaxed restrictions on abstraction and bioresources.**

In a future where there is regional growth, the North East and Essex and Suffolk regions see an extended period of economic growth due to more focus on regional government spending and investment. There is greater demand from industrial customers and rapidly increasing technology growth.

However, this growth also leads to an increase in demand in these areas, particularly from industrial customers and population growth. This puts increasing pressure on water resources. As a result, there is a need to build an additional water supply in the form of Canvey Island de-salination plant. This comes at a high financial cost and is likely to result in environmental harms e.g. damaging marine habitats and emitting greenhouse gas emissions.

Increasing technology growth enables us to find a cost efficient solution to addressing micro-pollutants which benefits customers through improved water quality.

However, the focus on economic growth means that most environmental ambitions have slipped, there are less stringent abstraction and bioresource restrictions. Climate change is on a moderate pathway leading to an increase in weather variability. Relative to other scenarios, customers experience a few environmental benefits and may be more exposed to the impacts of climate change due to little focus on environmental ambitions.

Bills and expenditure are higher than most other scenarios which is mainly attributed to the large investment in a de-salination plant. Between 2025 and 2050, we expect that total enhancement expenditure would be around double the core pathway. We also expect water and wastewater bills for customers in the North East to increase by more than four times and more than double for water customers in Essex and Suffolk over the same period.

However, strong economic growth and prosperity means that customers may be in a better financial position to afford bill increases.

### Key activities and interventions (including the core pathway)

- We build the Lowestoft water-reuse scheme, in advance of the North Suffolk reservoir.
- We build the Canvey Island desalination plant (but we avoid investment in the Southend reuse scheme).
- We increase investment on addressing environmental issues such as microplastics.

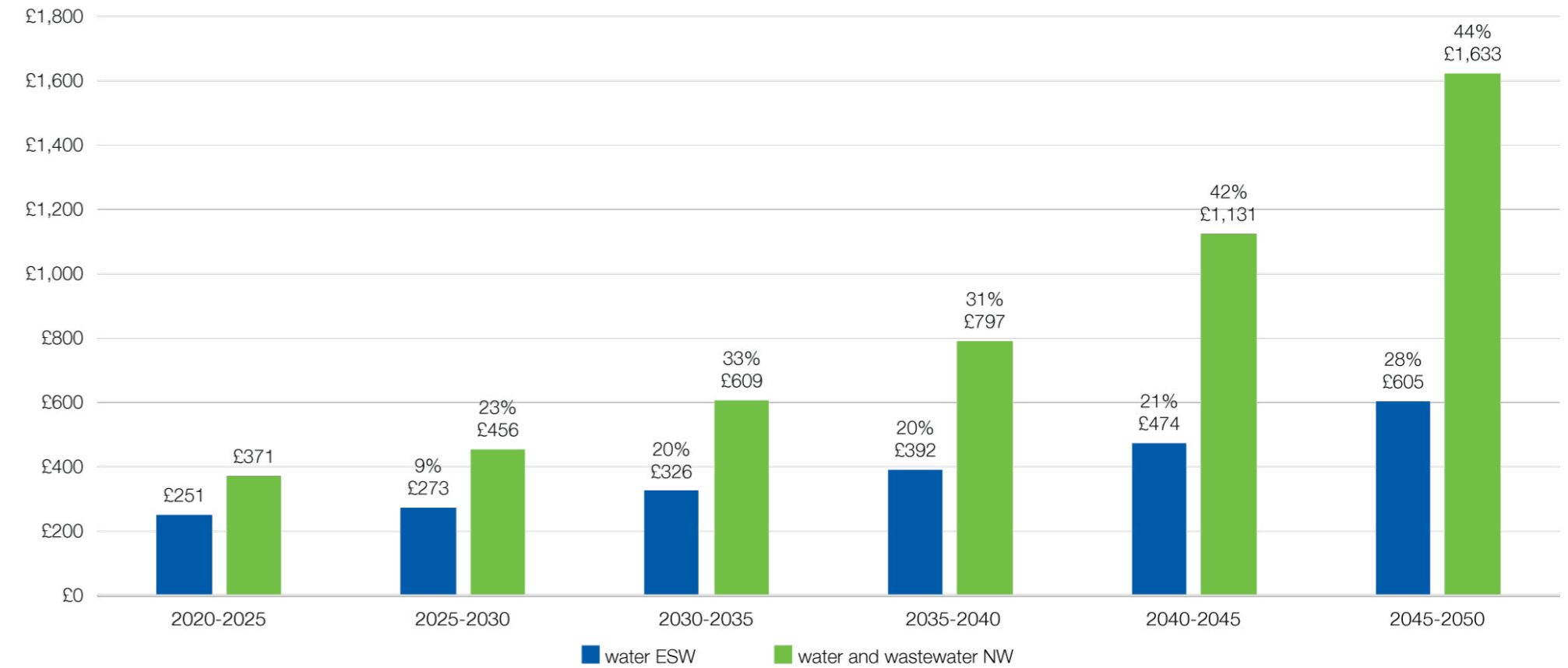
### Key benefits relative to other scenarios:

- Technological growth enable a cost efficient solution for addressing micro-pollutants.
- Improvements in economic conditions mean customers are in a better position to afford bills increases.

### Key risks relative to other scenarios:

- Bills and expenditure are at the higher end due to investment in a de-salination plant.
- Customers experience fewer environmental benefits and may be more exposed to negative impacts of climate change due to little focus on the environment.

Figure 17: Regional growth average bills for each five year period 2025-2050 (22/23 prices)



# Climate failure scenario

## This future sees high climate change impacts in part driven by a lack of effective global climate action.

The UK is behind on carbon targets, there is continued reliance on existing technology, and sustainability is given less priority in society. This means we need additional water supplies and expenditure on climate change adaptation, and little progress is made on cost efficiency through technology innovation.

A lack of meaningful action has resulted in a trajectory towards four degrees of global warming by the end of the century. The North East and Essex and Suffolk regions see significant changes in weather with increased rainfall intensity and longer periods of drought, the latter more prevalent in Essex and Suffolk.

Although the period starts with a time of high growth, due to this being prioritised over environmental outcomes, economic conditions quickly decline putting significant pressures on the disposable incomes of customers. This pressure leads to further disregard of the environment and sustainability and as such, customer demand for water increases as consumption reduction is not a priority.

The priority for growth over environmental outcomes within legislation was accompanied by greater regulatory intervention that limited the response of water companies to the impacts of climate change.

This means there was a lower uptake of green and blue infrastructure and less focus on asset health. Solutions remain conventional or outdated with limited innovation, leading to more expensive solutions. The lack of technological progress means no solutions are developed to eliminate micropollutants. The cost of investment has also increased, largely due to the regulatory burden.

To compensate for customers not decreasing their consumption, investment is required to ensure sustainable abstraction from our water resources. This investment is made larger by slow technological growth and low innovation.

However, the appetite to invest in interventions that improve the environment is low, which means not investing in eliminating micro-pollutants which reduces the totex spend compared to other scenarios.

Bills increase progressively towards 2050 and we expect that total expenditure will be around a third more than the core pathway between 2025-2050. Over the same period, we expect to see bills to more than triple for water and wastewater customers in the North East and more than double for customers in Essex and Suffolk. This is largely driven by the increasing investment in water resource interventions.

### Key activities and interventions (including the core pathway)

- We build the Lowestoft water-reuse scheme, in advance of the North Suffolk reservoir.
- We build the Carvey Island desalination plant.
- We build the Southend reuse scheme.

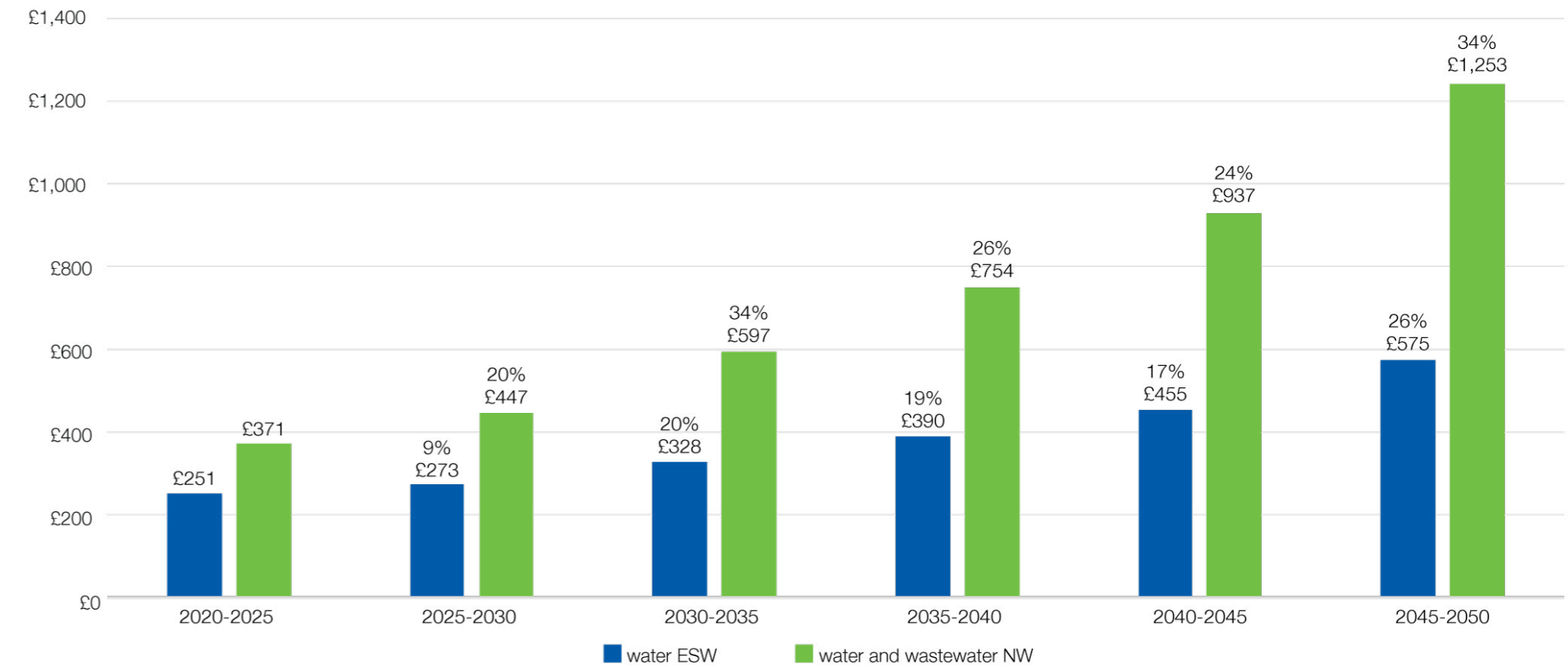
### Key benefits relative to other scenarios:

- Less totex spend compared to most other scenarios.

### Key risks relative to other scenarios:

- The failure of the climate will lead to deteriorating conditions for customers and the environment, further exaggerating problems and requirements for investment in the future.
- The risk to water supply is increased as climate conditions deteriorate and a lack of available investment into asset health.
- Extreme economic conditions leave more customers at risk of being in water poverty.

Figure 18: Climate failure average bills for each five year period 2025-2050 (22/23 prices)





# Environmental challenges scenario

**This future sees the need to invest in more advanced wastewater treatment, water treatment, sludge incineration and sewer flooding to align with more stringent environmental legislation.**

There is increasing pressure from government and society to invest in more advanced wastewater treatment, water treatment, sludge incineration and sewer flooding to align with more stringent environmental ambitions.

Whilst there is increasing pressure, the ability to affordably invest in solutions is limited by slow economic growth and slow technological advancement. Regulatory and economic pressures also increase the cost of capital.

This leads to solutions being more costly to customers in the long term compared to other scenarios e.g. the sustainable future scenario. However, legislation ensures customers benefit from better environmental outcomes such as improvements in water quality.

Water demand in the North East and Essex and Suffolk continues to grow at a moderate level and the impacts of extreme weather are also considered moderate in this scenario. Customers also benefit in this scenario from avoiding the need to build as many water supplies compared to other scenarios.

This scenario requires the most expenditure and results in the highest bill increases. This is due to legislation requiring investment in many interventions, coupled with low technology growth and innovation which reduces our ability to find cost-efficient solutions.

Between 2025 and 2050, we expect total expenditure will be around double the core pathway. We also expect bills for water and wastewater customers in the North East to be around 4.5 times higher, and double for water customers in Essex and Suffolk over the same period.

### Key activities and interventions (including the core pathway)

- We accelerate investments to reduce discharges from storm overflows.
- We increase investment on addressing environmental issues such as microplastics and sewer flooding.
- We increase investment to reduce surface water flooding in line with RCP8.5 climate projections.

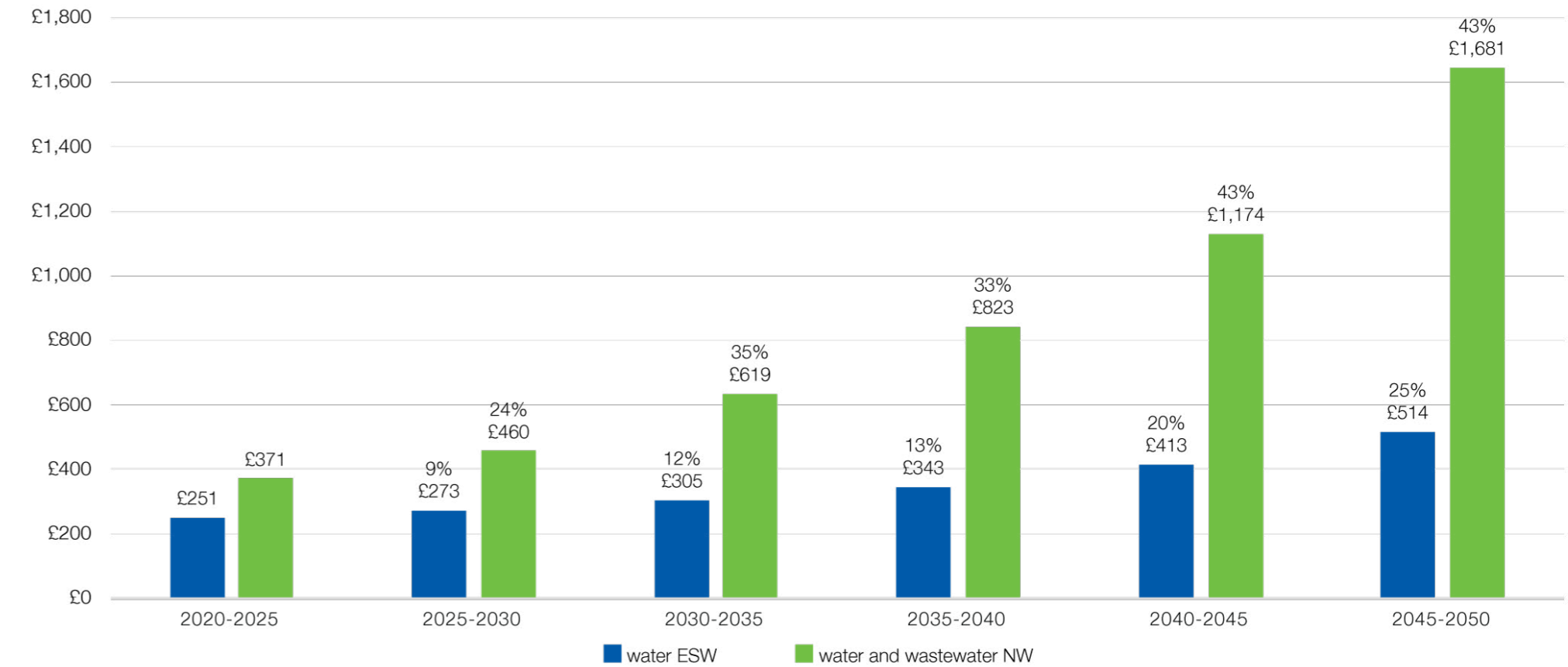
### Key benefits relative to other scenarios:

- Legislation ensures environmental benefits for customers.
- Customers experience greater environmental benefits.
- Customers experience environmental benefits sooner.
- The need to build as many additional water supplies is avoided.

### Key risks relative to other scenarios:

- This scenario is the most expensive and results in the highest bill increases, putting the most pressure on lower income customers.
- Cost of meeting legislative requirements is expensive due to little technological growth and innovation.

Figure 19: Environmental challenges average bills for each five year period 2025-2050 (22/23 prices)



# Affordability scenario

**This is mainly about the here and now. This recognises that customers feel the effects of rising costs and some struggle to pay their bills.**

This scenario focuses on moving investment back to focus on near term affordability.

In this scenario, the UK does not prioritise environmental outcomes in its recovery from Covid-19, this leads to higher costs of living, inflation, and economic stagnation. In the North East region in particular, the inequality gap with the rest of the UK widens, leading to more customers struggling to pay their bills.

As such, customers are more price sensitive in this scenario and more motivated to reduce per capita consumption. This avoids the need to build as many water supplies compared to other scenarios.

To support affordable bills in the short term, we delay some expenditure from the next ten years. This includes delays to investment in our storm overflows programme, asset health, our lead reduction programme and our pathway to Net Zero.

While customers benefit from more affordable bills in the short term, bills are likely to increase later on in the period. This is due to delayed investments beginning and therefore more competition for direct procurement with other infrastructure projects can make investments more expensive the later down the line they begin.

Later on in the period, the UK begins to catch up with other G8 nations where it was previously left behind on climate investment and storm overflow discharge reduction. As the UK catches up, this opens up more opportunities for investment in sustainable infrastructure and solutions, but the cost remains high as investment was delayed from earlier in the period.

In this scenario, customers realise environmental benefits later in the period compared to other scenarios. Customers also experience fewer environmental benefits as investments in eliminating micro-pollutants and addressing sewer flooding do not take place. This can only happen because affordability pressures force the UK government to reprioritise away from the environment.

This scenario sees investment and bills remaining similar to the core pathway over the long term, with lower bills in the short term. This is due to investment in fewer interventions, and delaying investment means some investments are recovered from bills beyond 2050.

We expect combined water and wastewater bills in the North East to roughly treble, but rise more slowly than in the core pathway. Water bills in Essex and Suffolk would increase by slightly more than in the core pathway, with a 73% increase relative to bills in 2025.

### Key activities and interventions (including the core pathway)

- We build the Lowestoft water-reuse scheme, in advance of the North Suffolk reservoir.
- We delay investments in asset health, climate adaptation, Net Zero, lead and storm overflows to achieve bill reductions.

### Key benefits relative to other scenarios:

- We support bill affordability.
- This scenario requires the least expenditure and has the lowest bills.
- The need to build additional water supplies is minimised due to demand side reductions.

### Key risks relative to other scenarios:

- Delaying investments is likely to lead to higher bills later in the period.
- Environmental benefits are realised later in the period.
- There are fewer environmental benefits e.g. investments in micro-pollutants and sewer flooding is forgone.

Figure 20: Affordability average bills for each five year period 2025-2050 (22/23 prices)

