

UUW56

Wastewater Network Plus Business Plan

October 2023

Chapter 8 supplementary document

This document provides details of our AMP8 Wastewater Network Plus price control delivery plans that are in the context of our long-term strategy. It provides additional details, at a price control level, of how we expect costs to map across customer outcomes and performance commitments; in particular we will provide detail of the activities we expect to undertake to deliver the targets we have proposed.

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1. Introduction

1.1 Key headlines

- **Value for money:** Our AMP8 business plan for Wastewater Network Plus outlines £8,208m of expenditure, from 2025 to 2030, enabling us to meet our stakeholder and customer expectations.
- **Delivering customer priorities:** Continuing with an effective and efficient wastewater collection service with a focus on surface water management to tackle flooding issues at source, as part of our Rainwater Management Strategy. We are also promoting nature based solutions through our innovative Advanced WINEP to address future spill targets. Both programmes will add value to communities and improve resilience to climate change.
- **Delivering a further step change in flooding performance,** Continuing to reduce the impact of sewer flooding using our Dynamic Network Management (DNM) capability, targeting a 32% reduction in internal sewer flooding by 2030, consistent with our PR19 two AMP strategy.
- **Building on our track record of performance:** We have a proven track record in delivering industry leading pollution performance in this technically challenging area which we will continue to drive forward targeting a reduction in annual incidents by a further 25% in AMP8.
- **Delivering an ambitious environmental programme:** We plan to deliver our largest programme of investment to secure environmental benefits by protecting and improving 541km of river and reducing spills at 437 overflows, a reduction in spills of 26.8% across AMP8 as part of a 60% reduction over the decade to 2030; on track to the long-term target of less than 10 spills on average per overflow by 2050.
- **Prioritising investment:** Our plan sets out interventions that are in-line with our core pathway to achieve long term Environment Act targets for an 80% reduction in phosphorus by 2037 with an additional 803kg/day removed from the environment in AMP8
- **Delivering for future generations:** Our plan supports growth and development for 61,736 additional people in the Northwest with investment in additional capacity at our wastewater treatment works so we are resilient for the future
- **Delivering long-term resilience:** We are targeting improved resilience of key wastewater treatment works and sewers at risk from coastal and river erosion driven by the impact of climate change. Our plan almost doubles the sewer renewal rate, when compared to AMP7.
- **Our catchment to coast approach:** Our proposed plan will build on our Dynamic Network Management capability to connect our system to the wider catchment. Our pilot in Windermere, supported by a bespoke performance commitment targets catchment benefits for customer and environmental improvements.
- **Operating efficiently to reduce costs:** We will harness technology, Innovation and markets to drive efficiency and benefits for customers and have set ourselves stretching targets to ensure we focus on the most valued aspects to the service we provide.

1.2 Overview

- **Section 2** provides an overview of the context of the North West including customers, stakeholders and communities; the environment we work within and an overview of our operations.
- **Section 3** discusses our AMP7 track record.
- **Section 4:** introduces our AMP8 vision and plan, including a summary of the relevant performance commitments, maintenance, resilience and innovation.

- **Section 5** shares our long term strategy for wastewater services in the North West, including an overview of our core and adaptive pathways for wastewater, aligned to our drainage and wastewater management plan (DWMP).
- **Section 6** shares our plan summary.

1.3 Structure

- 1.3.1 This document provides details of our AMP8 delivery plan for the wastewater network plus price control, aligned to our long term delivery strategy. It provides additional details, at a price control level, of the activities we expect to undertake to deliver the targets we have proposed.

2. Context of the North West

2.1 Summary of the region

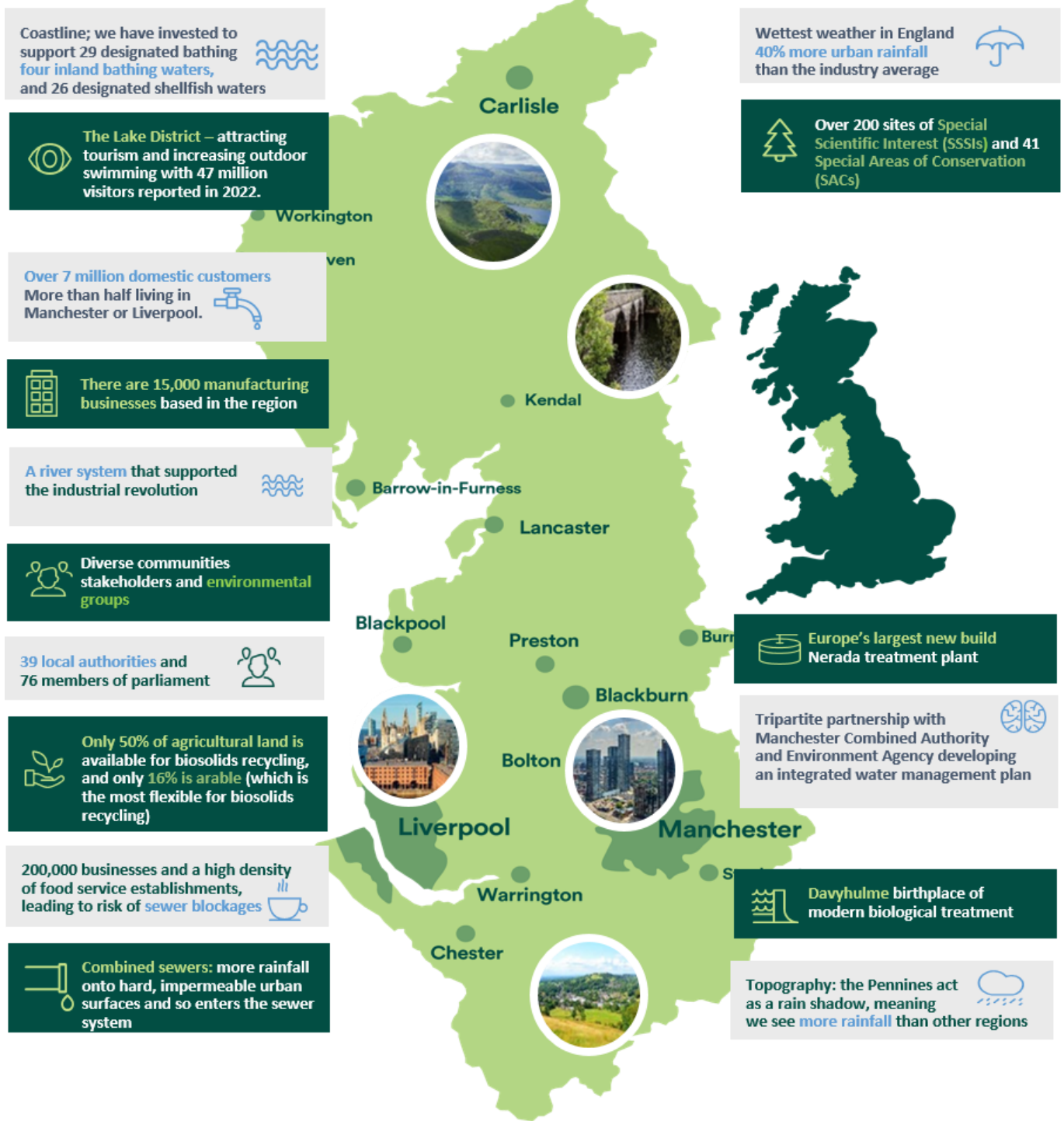
Customers, stakeholder and communities we serve

- 2.1.1 The North West is the UK's most populous region. Over 7 million people rely on United Utilities every day for the provision of their essential wastewater services. The population has grown by 8.6% since 2002 and projections forecast around an additional 1 million people by 2050, increasing demand for wastewater removal services. More than half of customers live in the areas of Greater Manchester and Liverpool, but large populations are also in the urban areas of South Lancashire and the Fylde Coast, with millions of visitors to the region every year.
- 2.1.2 Additionally we support around 200,000 businesses (non-household customers) across the region that have a range of needs in terms of location, scale and complexity of discharges into the UWW system. The region is home to the largest proportion of manufacturing industry in the UK, with 15,000 manufacturing businesses based in the region.
- 2.1.3 We work closely with stakeholders and communities who are instrumental in shaping and influencing our investment plans and supporting the delivery of plans through partnerships and collaboration. The political structure of the North West is diverse and devolution has brought more decision making and increased financial autonomy to a local level. We work closely with both Greater Manchester and Liverpool City Region, as well as all other local authorities across the North West, in particular on environmental and social issues.
- 2.1.4 We have built strong relationships with a wide range of stakeholders that work across geographies and community interests; including local government, environmental and social charities, businesses and academic institutions. Land owners and tenants, such as our long standing partnership with the RSPB, support us in improving land management to deliver catchment and climate resilience, protect water quality and biodiversity, and allow inclusive recreational access.

The environment we work to protect

- 2.1.5 The North West is home to some of England's most beautiful landscapes. Diverse geographies, topography, land use and the weather combine to make the North West unique. The landscape was carved by glaciers to form iconic upland lakes and the region is blessed with over eight thousand kilometres of rivers.
- 2.1.6 Today the North West, along with other western areas, experiences some of the wettest weather in England.
- 2.1.7 Investment to protect and restore the environment includes the reinvestment of outperformance to support our Better Rivers programme and ranges from industry leading catchment management programmes to innovations in treatment technologies with Europe's largest Nereda treatment process at Blackburn Wastewater Treatment Works, introduced in 2021. More recently, machine learning, artificial intelligence and leading edge analytics through our DNM capability has been critical in optimising our systems and maximising existing network capacity to further reduce pollution and improve the performance of our system.
- 2.1.8 The North West has been shaped by its environment, economy, history and people, creating distinctive features and characteristics which impact on our operation. In particular, this makes the management of storm overflows and flooding a bigger challenge in the North West compared to other areas.

Figure 1: Overview of our wastewater services and characteristics of the North West



Source: UUW Ww visual

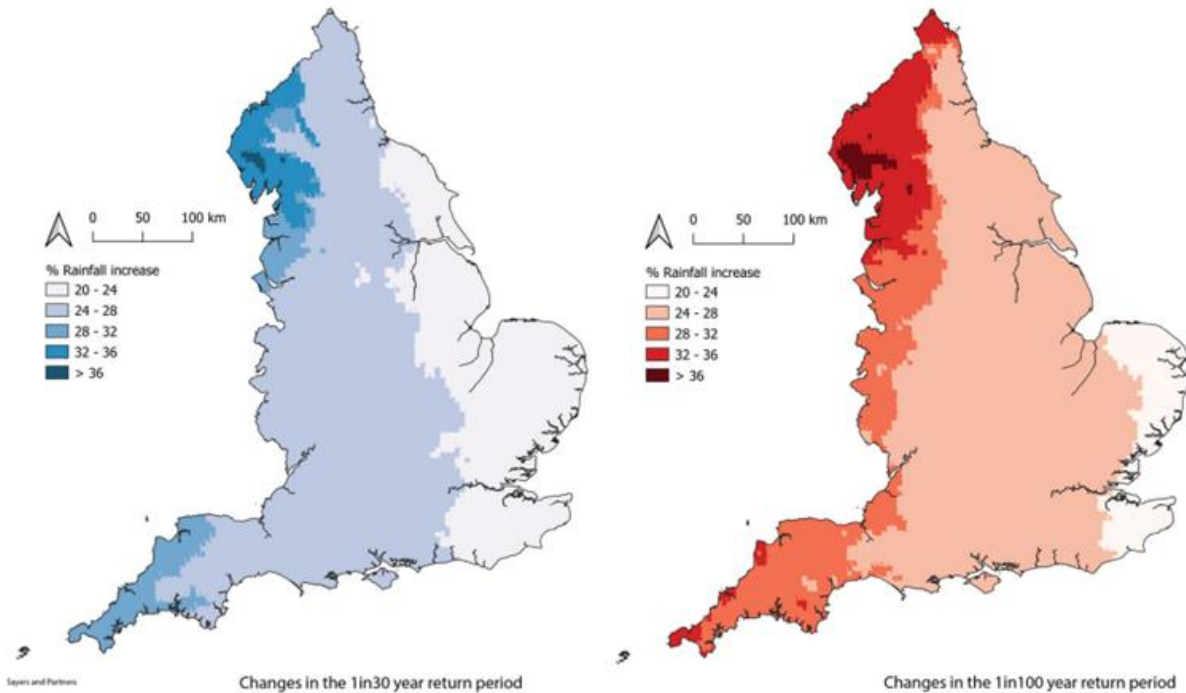
Climate Change and the impact on the northwest

2.1.9 A recent study¹ found that the intensity of rainfall during extreme events could increase by 5 – 15 percent per degree Celsius of regional warming. This increase in intense rainfall is unevenly distributed across England.

¹ Kendon, E.J., Fischer, E.M. & Short, C.J. [Variability conceals emerging trend in 100yr projections of UK local hourly rainfall extremes](#). *Nat Commun* 14, 1133 (2023).

- 2.1.10 A report for the National Infrastructure Commission, Sayers et al., (2022) found the North West sees greater shifts in rainfall intensity than central and southern areas in both 1 in 30 and 1 in 100 year storm by the 2080s; (Figure 2)

Figure 2: Uplift in the 1 in 30 year (left) and 1 in 100 year (right) return period rainfall by the 2080s from baseline period (1981 - 2000) assuming a 4°C GMST rise by 2100 (from pre-industrial times)

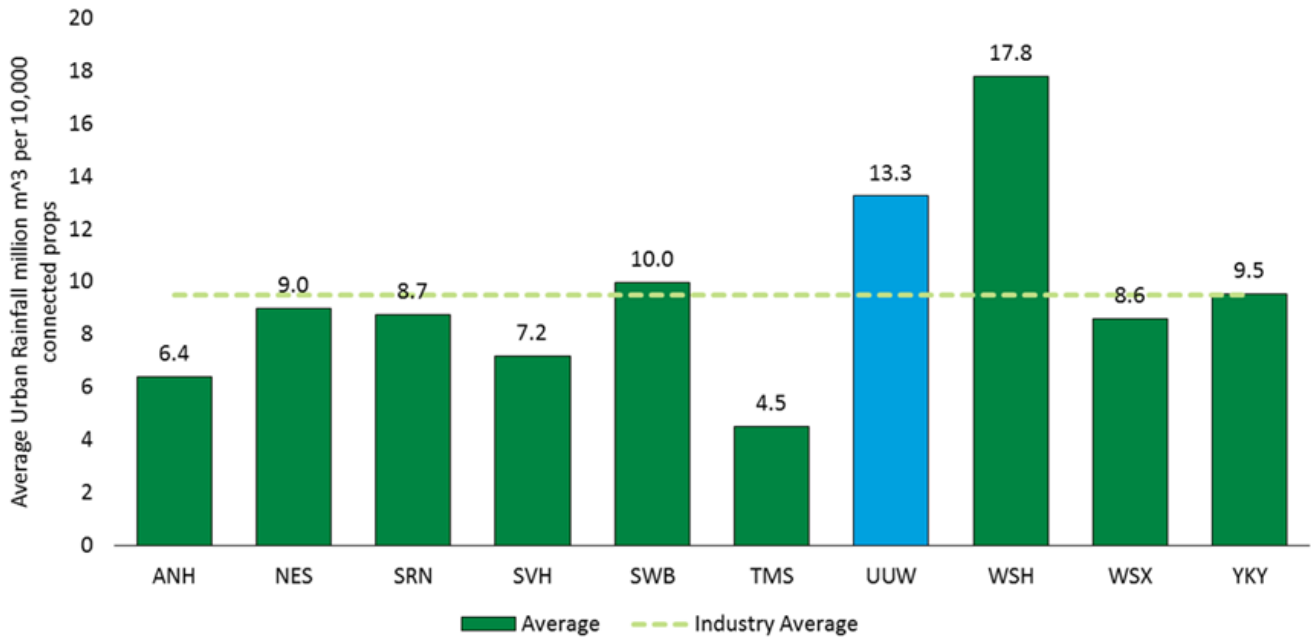


Source: National Infrastructure Commission, Sayers et al., (2022)

Urban rainfall and the impact on the wastewater drainage network

- 2.1.11 The North West has a unique set of factors that affect the level of risk to drainage services that we manage on a day-to-day basis. The function of the drainage system is key to delivering outcomes for sewer flooding and storm overflow performance.
- 2.1.12 A principal factor impacting drainage is rainfall. The North West experiences some of the wettest weather in England. Using Ofwat's 'urban rainfall' calculations (October 2022) dataset (BN4505) demonstrates that, when normalised per sewer connections, UUW's urban rainfall is 40% higher than the industry average Figure 3. Therefore, as high rainfall coincides with the urban conurbations of the North West, more rainwater falls onto hard, impermeable urban surfaces and enters the sewer system, relative to other regions. High rainfall results in higher flooding risk and drives the increased storm overflow spills needed to alleviate that risk.
- 2.1.13 Figure 3 shows Welsh Water also experiences high urban rainfall but we do not consider the difference between ourselves and Welsh Water to be entirely reflective of differences in urban rainfall. Rather, our analysis has found urban rainfall in Welsh areas may be systematically overstated due to differences in the way the extent of geographical areas are measured between the two countries. In addition, the North West region has experienced numerous and extreme storms in recent years, causing major disruption to communities and infrastructure, including our own.

Figure 3: Urban rainfall (million m³) per 10,000 connected properties.



Source: Ofwat, urban rainfall calculations² BN4505

- 2.1.14 In addition to the 40% higher than average rainfall, the North West has more combined sewers compared to other water company areas; Over 54% of our sewers carry both foul and surface water compared to an industry average of 33%. As combined sewers convey both foul and surface water flows, they have less hydraulic capacity than separate systems during periods of heavy rainfall, making them a greater risk of service impact (such as sewer flooding). Clearly, this effect will be particularly pronounced in areas of higher urban run-off, whereby the associated presence of combined sewer compounds the impact of storm events. The interaction between these two factors is, in our view, the largest single impact on drainage cost and performance.
- 2.1.15 Storm overflows were built historically on combined sewers as an essential way of providing pressure relief valves to protect streets, homes and businesses from sewer flooding. In the North West, rapid urban expansion in the 1900’s left a legacy of combined sewer systems in the heartlands of Victorian cities. There are 2,280 storm overflows across the North West, meaning there are 2.9 overflows per 100 km of sewer network (2022-23 data).
- 2.1.16 The issues created by having higher than average rainfall along with the highest proportion of combined sewers creates greater challenges for draining and treating wastewater. These environmental factors lead to us managing a higher level of risk of sewer flooding and overflows spills from weather related events, compared to other companies. Both these issues are releases from the system; with spills being to rivers and flooding affecting customer’s properties.

² Ofwat’s ‘urban rainfall’ calculations (October 2022) dataset (BN4505)

3. AMP7 Track record

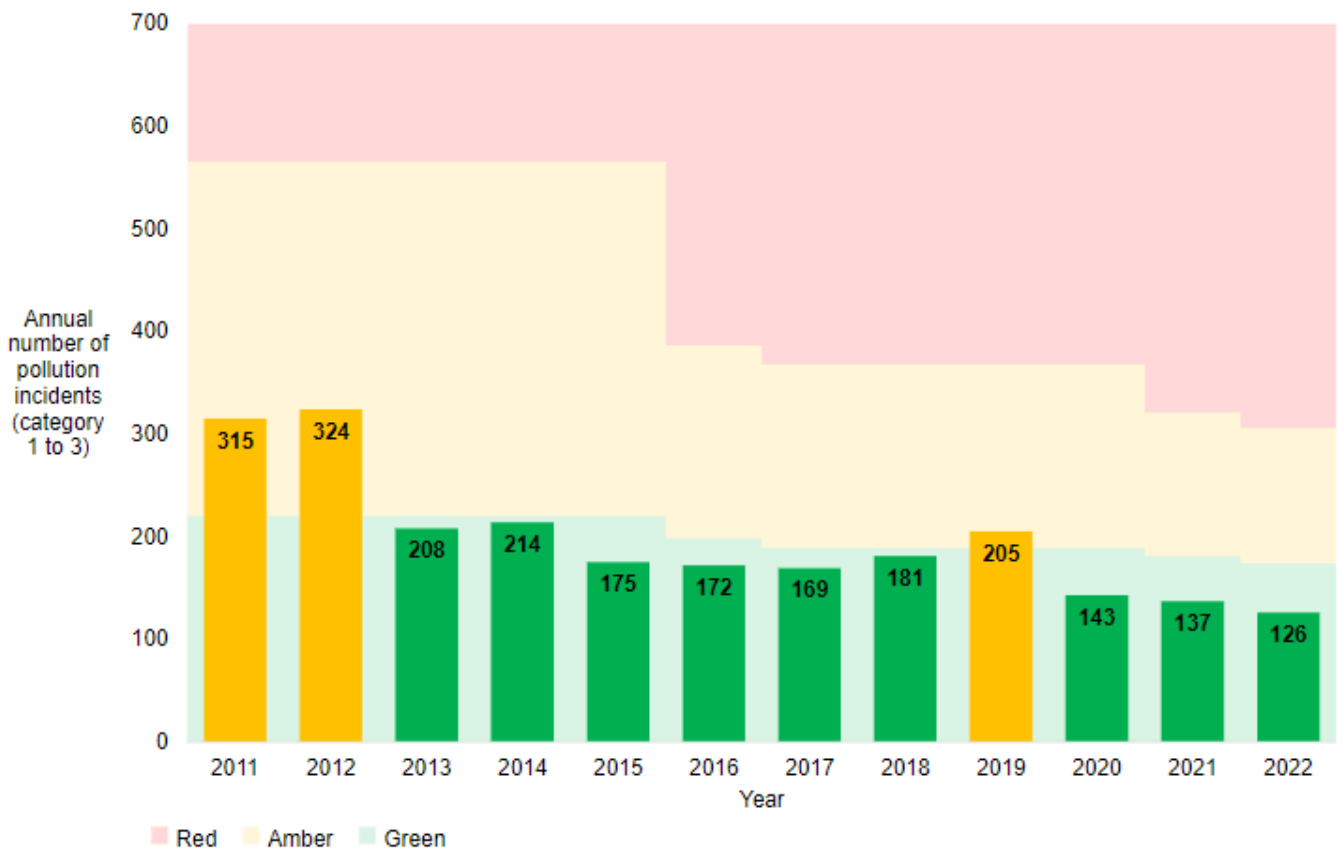
3.1 Current Performance

- 3.1.1 In planning for AMP7 we established outcomes which encapsulate how we meet customers' expectations.
- 3.1.2 UUW08 Delivering at efficient cost, 8 describes in detail how we have delivered these outcomes, and our performance against the measurable commitments that we made two of these outcomes, however, are particularly relevant to our Wastewater Network Plus plan so we summarise the current performance to set the scene for our future strategy.

The Natural Environment is protected and improved in the way we deliver our services

- 3.1.3 We are a consistently strong performer across the board for performance commitments with 80 per cent of PCs achieved to date in AMP7, showing improvements from AMP6 to AMP7, as we focus on the measures which matter most to the customers, and those that are important for the environment and asset health.
- 3.1.4 To date in AMP7 we have achieved our best ever performance on category 1-3 pollution incidents (Figure 4), including zero category 1-2 events as we continue to see the benefits of our Pollution Incident reduction Plan. This plan encapsulates our culture, systems thinking training and maintenance delivery.

Figure 4: Annual number of pollution incidents (category 1 to 3) from United Utilities sewerage assets, also showing EPA status and thresholds.



Source: United Utilities EPA data report 2022, published 12 July 2023

- 3.1.5 We are on track to deliver the AMP7 environmental improvement programme, we are making an early start on requirements in the Environment Act, reducing spills and improving 184 kilometres of

waterways. So far, all schemes have been completed on time, and one catchment – the Wyre – has had all its schemes completed. The overall net days early and late is currently zero.

- 3.1.6 In AMP7 we have been investing in our 'Better Rivers, Better North West' plan. Supported by £230 million of AMP7 outperformance reinvestment. We have made four pledges, supported by 30 specific commitments, to deliver over the next three years, and in doing so we will kick start a river revival ahead of AMP8. We published our first progress report 'Better Rivers Report 2023' on 28 April 2023 with an update on all of our pledges and commitments.
- 3.1.7 We identified a numbers of sites in PR19 with supply and demand needs and included them in our bespoke performance commitment to accommodate additional population equivalent. The outcome measures performance as population, which provides flexibility in where we deliver interventions. This flexibility has proved beneficial as delays or reduction in growth at the locations identified and acceleration of growth elsewhere has led to re prioritisation of the programme and delivery of alternative schemes.
- 3.1.8 We have reinvested outperformance payments to improve services for customers and the environment, and secured an acceleration of investment to improve river water quality and bring forward interventions to reduce overflow spills.
- 3.1.9 The programmes 'Accelerating partnerships to deliver natural solutions' and 'tackling storm overflows' will complete in AMP7 with a proportion of the 'WINEP accelerated schemes for Bury' extending into AMP8. This AMP8 requirement is described in full in supplementary document *UUW65*.

Table 1: AMP7 Performance: The Natural Environment is protected and improved in the way we deliver our services

Performance Commitment	Units	Actual			Projected	
		2020-21	2021-22	2022-23	2023-24	2024-25
Pollution incidents	Number of incidents per 10,000 km sewer length (incidents)	18.49 (143)	17.71 (136)	16.29 (126)	16.03 (124)	16.03 (124)
Treatment work compliance	Percentage non-compliance	99.75	98.98	98.45	98.96	98.96
Improving river water quality	Net position in number of days early or late across the region versus the target (reported by catchment)	0	0	0	0	0
Protecting the environment from growth and new development	Additional Population equivalent accommodated	0	94	6,979	10,613	97,219

Source: *UUW Annual Performance report*

We collect and recycle your wastewater

- 3.1.10 The performance commitments associated with this outcome are summarised in Table 2 and are focused on the reduction of the risk of flooding.
- 3.1.11 Our improved performance for sewer collapses is a result of the proactive approach we have embedded through new technology and improving our operating model. When our blockage performance over AMP7 is normalised by km of sewer length, to date we are industry leading. For both measures (2022/23

reported data), we continue to develop and implement a wide variety of schemes and initiatives to improve our performance.

- 3.1.12 We continue to develop initiatives to improve our flooding performance, most notably the continued deployment and development of our industry-leading DNM capability. Under DNM, our in-sewer monitors indicate when issues are forming, allowing our teams to proactively attend site to resolve the issue, in many cases before a customer experiences a service interruption and needs to contact us.
- 3.1.13 We have positively performed in raising customer awareness to reduce the risk of sewer flooding this year due to our continued promotion of impactful messaging to customers. This includes our 'Stop the Block' campaign and our sponsorship of ITV Granada/Border weather bulletins, where we have adverts illustrating preferred behaviour of putting wet wipes and used cooking oils/fats in the bin. We ended the year with a 64.2 per cent customer awareness score, which is 39 per cent over our baseline and 33.0 per cent above the level required by the performance commitment.
- 3.1.14 Under our two hydraulic flood risk resilience measures, we continue to implement a range of projects. These include major capital schemes, smaller hydraulic projects and cellar disconnections. These projects contribute to a reduction in the overall hydraulic risk score, which means that fewer customers will experience flooding at their properties as a result of hydraulic inadequacy.

Table 2: AMP7 performance: We collect and recycle your wastewater

Performance Commitment	Units	Actual			Projected	
		2020-21	2021-22	2022-23	2023-24	2024-25
Sewer Collapses	Number per 1,000 km sewer (incidents)	14.61 (1,156)	13.70 (1,080)	14.13 (1117)	13.68 (1,083)	13.07 (1,036)
Sewer blockages	Number of blockages	22,639	20,697	20,203	18,013	17,256
Risk of sewer flooding in a storm	Percentage of population at risk	13.42	13.35	14.33	N/A	N/A
Internal sewer flooding incidents	Number per 10k Connected Properties (incidents)	4.467 (1,521)	2.979 (1,023)	2.319 (801)	2.979 (1,035)	2.881 (1,007)
External sewer flooding incidents (AMP7 is measured in incidents)	Number per 10k Connected Properties (incidents)	20.113 (6,849)	18.121 (6,223)	17.125 (5,916)	16.299 (5,663)	15.665 (5,476)
Customer awareness of the risk of flooding	Percentage change from the baseline	4.1	17.4	39.0	22.6	24.5
Hydraulic internal flood risk resilience	Modelled Flooding Incidents	41.84	40.61	38.49	39.10	38.08
Hydraulic external flood risk resilience	Modelled Flooding Incidents	179.84	184.04	173.3	177.40	176.40

Source: UUW Annual Performance report

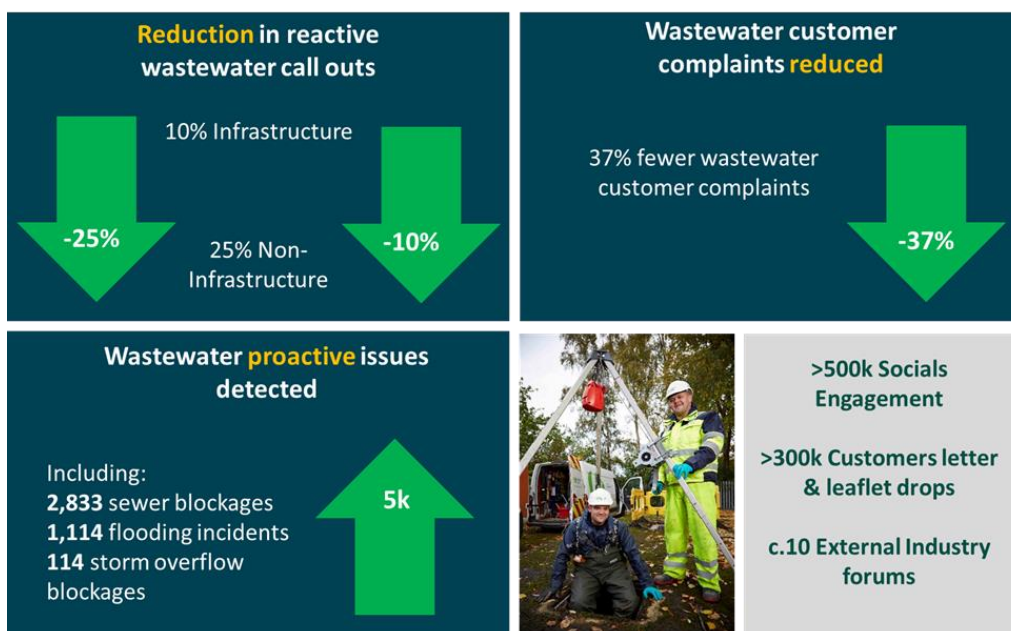
Focus on Dynamic Network Management (DNM)

- 3.1.15 DNM has been created to help manage wastewater networks more proactively and is believed to be the largest integrated solution of its kind globally. The project was delivered in 2022-23.
- 3.1.16 DNM analyses, visualises and raises alerts on the performance of wastewater infrastructure through predictive analytics and machine learning. This provides real-time visibility across the wastewater network, including sewer networks, storm overflows, detention tanks and pumping stations and helps quickly identify issues such as the formation of blockages and unexpected rising levels in sewer networks to enable proactive action to be taken before they impact customers or the environment.
- 3.1.17 The system can accurately detect a deviation against expected performance, for that given location, time and weather pattern and in combination with alert logic identifies potential issues and the root causes. This combination of live data, AI and logic driven analytics allows the identification of issues such as infiltration, inundation and blockage formation in addition to deterioration of performance of our powered assets such as pump efficiency and asset health.
- 3.1.18 DNM provides visualisation of performance and connectivity across the complete network, on all infrastructure and non-infrastructure assets. This allows our operators to manage the drainage network as a complete system. It gives us insight into how external factors can influence the performance of our network, and how the individual assets within the system influence each other. This means we can manage the network as a whole, rather than just responding to individual issues as they emerge

In AMP7 we have completed the following:

- Installation of monitoring devices, rain gauges, a cloud based platform, system level AI and bespoke alert hierarchy
- Installation of 17,500 intelligent sensors and enhanced monitoring implemented on more than 1,500 sites (Pumping stations, Detention Tanks & CSOs.)
- Availability of integrated data from all of the newly installed sensors with the pre-existing EDM and STS data into the cloud analytics
- Implementation of a new proactive operating model
- The approach is now being used in over 160 drainage areas across our region

Figure 5: The benefits of Dynamic network management in AMP7



Source: UUW DNM Success and foundation board presentation

- 3.1.19 With system monitoring, visualisation and analytics now in place the aspiration for the next step in the solution is into optimisation as we prepare for AMP8.
- 3.1.20 DNM has been a great success in AMP7 and our plan is to continue to mature the system through into AMP8 and roll-out to other priority drainage areas. More information on how this will be implemented is in section 6.

Environmental Performance

- 3.1.21 A number of the performance commitments contribute to the annual Environmental performance assessment (EPA) metrics. The EPA data is published annually and contains current year and historic performance data (as published at the time, based on data provided in part by water companies). Table 3 provides a summary of the EPA result published on 12 July 2023.
- 3.1.22 Environmental Regulators routinely compare our performance to our peers and our past record in this comparison is excellent, achieving 4-star environmental rating in the Environment Agency annual performance assessment for 2 of the 3 years in AMP7 to date (Table 3) and five times in the last eight years.

Table 3: AMP7 EPA Star Rating.

EPA Metric	2020	2021	2022
Total Pollution (sewerage) (category 1 to 3)	Green	Green	Green
Serious pollution incidents (sewerage and water supply) (category 1 and 2)	Green	Green	Green
Self-reporting of pollution incidents (sewerage and water supply)	Green	Amber	Green
Discharge permit compliance (numeric)	Green	Green	Amber
Delivery of the WINEP	Green	Green	Green
Sludge disposal and use	No data	No data	Green
Supply demand balance index (SBDI)		Green	Green
Event duration monitoring (EDM) delivery	See Table 4 below		
Overall Rating	Industry leading 4 star	Industry leading 4 star	Good 3 star

Source: United Utilities EPA data report 2022, published 12 July 2023

- 3.1.23 All water companies have investment in place to monitor all storm overflows by December 2023. We have published the EDM storm overflow annual return dataset received from water companies. This shows how often and how long the monitored storm overflows operated during 2022. The 2022 dataset also includes water company reasons for performance issues with monitors and reasons for high spill counts.
- 3.1.24 By 31 March 2023 we have already achieved a 39% reduction in reported spills since 2020.

Table 4: United Utilities storm overflow EDM results for 2022.

United Utilities storm overflows	
Total number of storm overflows listed in the annual return	2,254
Total number of storm overflows with EDM commissioned	2,004
Percentage of storm overflows listed with EDM commissioned	88.9
Total number of storm overflows with spill data	1,971
Percentage of storm overflows listed with spill data	87.4
Average number of spills per storm overflow with spill data	35.1
Average duration (hours) per monitored spill event	6.1

Source: United Utilities EPA data report 2022, published 12 July 2023.

3.2 How pilots have informed our AMP8 and longer term business planning

- 3.2.1 As part of our commitment to using innovative approaches to deliver great service to customers, we delivered a programme of trials in AMP7 that aimed to test new ideas and concepts, and inform our AMP8 plan. A total of 24 pilots were commissioned across the end to end water and wastewater system; from protecting our water resources, to improving the resilience of our wastewater system and optimising our bioresources assets. We are proud to have worked with over 20 partner organisations and receive more than £900k of partnership funding to support delivering these pilots and trials.
- 3.2.2 Seven of the pilots commissioned have been used to inform our Wastewater Network plus strategy. We worked with customers and organisations across the North West to address issues including:
- reducing the risk of flooding during rainfall events
 - predicting and managing issues before they arise
 - working in collaboration with others to achieve common goals
- 3.2.3 Table 5: provides a summary of our pilots, the learning and what we are doing next.

Table 5: AMP8 pilot summary – wastewater deliverables

Pilot	What did we do?	What did we learn?	What are we doing next?
Property level surface water separation	Tested viability and scale of property level disconnection to prevent flooding and better manage rainwater, by separating out rainwater and preventing it from entering a combined sewer.	Property level separation is more complex than first thought and had low customer uptake.	The learning will inform how we use it as part of a solutions hierarchy in future. It is not proposed for wide scale rollout as part of our rainwater management enhancement.
Water for schools	Installing SuDS at 'clusters' of schools where there are hydraulic challenges. Working in partnership with the Department for Education in order to promote the benefits of the scheme and encourage schools to participate. Also incorporates water re-use rather than traditional SuDS solutions alone.	A targeted approach at a flood cluster level did not maximise hydraulic impact, therefore a tiered approach would be more beneficial for bill reduction.	Target schools with large site areas with solutions and provide education on water reuse for smaller sites where SuDS would not provide benefit. We are also exploring opportunities to work with the wider government portfolio e.g. NHS sites or prisons in a similar way

Pilot	What did we do?	What did we learn?	What are we doing next?
Smart water butts	Smart water butts benefit from a 'smart' valve which is linked to the internet, and uses rainfall data and weather forecasts to automatically empty ahead of rainfall events; optimising the attenuation of rainwater. This pilot deployed circa 200 smart water butts to assess their effectiveness.	Smart water butts are up to 75 times more effective than standard water butts in-terms of attenuating storm water. Commercial or residential properties with larger roof areas are best value for money.	Finalisation of trials and exploring how these can be made more cost effective for the AMP8 plan.
Upper Mersey Place Based planning	Trial of partnership working to manage multiple risks and gain wider benefits for both UUW and others. The pilot tests elements such as data sharing mechanism, governance and benefits in a more efficient way. We worked with approximately 60 partners across 11 organisations managing five sub catchments.	We have realised there are opportunities to reduce cost and carbon expenditure through such partnerships, especially given the scale of the WINEP investment in the Upper Mersey.	The five place based planning pilots have been formally adopted into the Upper Mersey catchment plan and interacting with the Greater Manchester Integrated Water Management Plan.
National Trust NFM partnership	Tested the delivery of natural flood management through a partnership mechanism with the National Trust generating opportunity to influence across its estate which has a high footfall of customers. It includes elements of integrated water management, aligning to rainwater management principles and intergenerational influencing.	Successfully established a working partnership with National Trust in the Cheshire area and developed a natural flood management feasibility study based on UUW and national trust requirements.	Delivering nature based solutions via the National Trust could prove to be more efficient as part of the AMP8 plan.
Ultra Violet (UV) predictive machine learning	Apply a machine learning approach to UV operations to predict deviations outside of normal operating signatures so that restorative action can be undertaken to maintain performance. This improves site compliance and reduces the risk of failing works.	We have successfully proven that we can predict UV failures (measure applied dose and qualified dose) up to four hours in advance	We have the potential capability to reduce UV non-compliance using predictive learning.

Pilot	What did we do?	What did we learn?	What are we doing next?
Wastewater treatment demand modelling tool	<p>A forecast demand modelling tool at a single wastewater treatment site. The tool uses data to predict parameters such as flow and load expected to be received at a wastewater treatment works; enabling proactive control interventions intended to improve site efficiency and compliance.</p>	<p>We have developed the capability to predict the flow and load into wastewater treatment works with up to 80% accuracy, enabling improved optimisation and discharge compliance.</p>	<p>Develop the concept at other wastewater treatment sites over AMP8.</p>

4. AMP8 Vision and plan

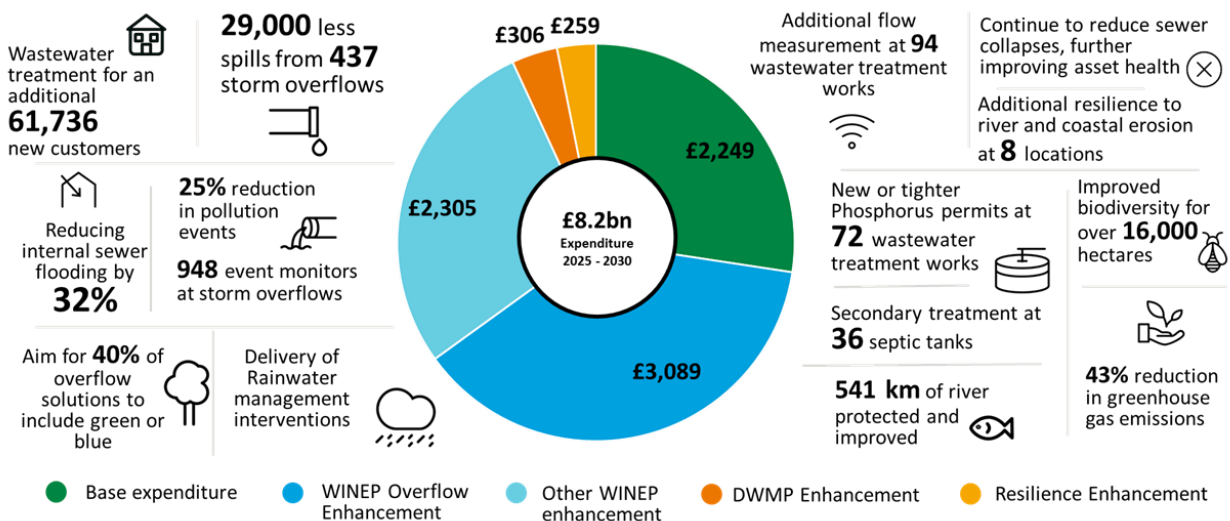
4.1 Wastewater service for the North West

- 4.1.1 Over the last five years we’ve made great progress towards our goals, delivering for customers, communities, and the environment. During this time, we’ve also been having conversations; listening to customers, communities and stakeholders.
- 4.1.2 We recognise that expectations are changing rapidly and extensively. In the next five-year period we plan to make a significant step change to address environmental issues and address customer priorities – this will be the start of our journey to meet our most stretching long-term ambitions by 2050.
- 4.1.3 Through customer research and stakeholder engagement we have found:
 - Customers find service aspects which impact them directly are most important and those with immediate impact or consequences are of higher priority than those with consequences in a more distant future,
 - Customers are highly engaged where health is seemingly at risk and the reduction of sewer flooding is a top priority
 - Customers want to see a reduction in pollution incidents as this is perceived as a service failure
 - The environment is a higher priority than it has been previously and is linked to customer identity and values
 - Customers and stakeholders agree it’s important to see step changes in performance but not at any cost, this must balance with affordability.

4.2 Overview of our plan for the Wastewater Network Plus price control

4.2.1 We have set ourselves stretching targets to ensure we focus on the most valued aspects of the services we provide and Figure 6 illustrates the outcomes we plan to deliver through our AMP8 plan.

Figure 6: Our plan for the Wastewater Network Plus price control



Source: UUW AMP8 plan for price control

4.3 Current and future drivers for change

Climate change

- 4.3.1 The North West experiences some of the wettest weather in England; 40 per cent more urban rainfall than the average. The region has also experienced numerous extreme storms in recent years, causing major disruption to communities and infrastructure, including our own. These extreme events are likely to become more frequent in future. Government bodies like the Committee on Climate Change, National Infrastructure Commission and Defra have highlighted climate change and the impact on water and drainage as a key strategic concern for the UK³.
- 4.3.2 Higher than average rainfall and a higher prevalence of combined sewers creates greater challenges for draining and treating wastewater. This contributes to the North West having higher risk of sewer flooding from weather-related events and more frequent risk of spills from overflows. To ensure long-term resilience to the growing impacts of climate change on the sewer network, we need to plan beyond historic trends for an increase in the frequency and duration of storm events and consequently higher peak wastewater flows during a storm. This will lead to additional pressure on the capacity of wastewater systems.
- 4.3.3 Our AMP8 Wastewater Network Plus business plan, DWMP and Long Tern Delivery Strategy (LTDS) have all been informed by Met Office UK Climate Projections published in 2018 (UKCP18), these are the most robust climate projections currently available. There is however considerable uncertainty in how effective international efforts to reduce emissions will be and there is considerable difficulty in modelling something as complex as the global climate. Adaptive planning enables us to better mitigate the risks, as the impacts become more certain

Population growth and new development

- 4.3.4 The population of the North West of England is expected to continue to grow. There are however local variations, with some areas growing rapidly due to high levels of development such as South Manchester and Carlisle. Local variations in development have a significant impact for wastewater drainage and treatment, as there are discrete drainage areas to which a connection can be made, varying in size and capacity. The number of development sites and locations identified in local authority plans can also change significantly during the business plan timescale creating difficulty in forecasting reliably where and when the impact will be
- 4.3.5 Tourism plays a key role in the region's economy and culture. Between April and December 2021, the North West region saw the fourth highest number of day visits in England, over 13 million visits, accounting for some 13% of England's day visit market. Populations can increase by up to 68% during peak periods in some popular towns. This creates challenges in planning for water and wastewater services, with fluctuating increases in discharges to our sewer network.
- 4.3.6 In addition to domestic population, changes in trade flow and load can also have an impact on our treatment and network processes; trade effluent forecasts indicate volumetric growth of approximately five per cent by the end of AMP8 and the government's growth plan (2022) has a clear ambition to drive growth across the country which may increase levels of trade in some locations.
- 4.3.7 We have a statutory obligation (Water Industry Act 1991, Section 94) to extend our system to ensure we continue to effectively drain our area. To meet these requirements there must be available wastewater network capacity for new developments so that the resultant flow and load is treated to the required standard in order to protect the environment in the long term.
- 4.3.8 We are also legally required to comply with wastewater treatment works permit conditions where increased population equivalent can have an impact if an intervention is not delivered.

³ DJS Research on behalf of United Utilities, Climate Change and Resilience, January 2021

Increasing service expectations

- 4.3.9 Continuous research and engagement programmes mean we have significant amounts of customer feedback on a range of priority areas. This allows us to track customer priorities over time and compare this with revealed preference data. Analysis shows that individual events do not tend to permanently shift overall customer priorities, but cumulative events (e.g. storm overflows) and macro trends (e.g. cost-of-living challenges and environmental focus) do move them over time.
- 4.3.10 Affordability is the current number one driver given cost-of-living challenges, but environmental issues are likely to rise to the fore by 2050, either as a reaction to negative climate events or after global efforts to tackle adverse effects in the intervening decades. Specifically, biodiversity, storm overflows, carbon and bathing/river water quality will likely grow in priority due to cumulative events and macro trends. Our priorities tracking over time shows us that minimum service expectations, leakage reduction, and consumption, as well as investing in long-term asset health and sewer flooding prevention will always be important.
- 4.3.11 These findings support the improvements in resilience and asset health, pollution, leakage and environmental protection in our AMP8 plan and enable us to prioritise these areas in both the short and long term.
- 4.3.12 More information is available in UUW03 Customer and communities shape our business plan, and UUW21 Customer research methodology Technical Appendix.

Evolving digital world

- 4.3.13 The evolving digital world is forcing a movement between extremes:
- From globalisation to micro-communities;
 - From open data through to privacy concerns and the growing demand for a digital detox;
 - Through to control at the centre, complemented by data analysis and insight at the edge; and
 - All whilst ensuring security and minimising threats from hackers.
- 4.3.14 In order for data to be valuable in an organisation it needs to be of quality, governed and accessible, with a data literate workforce. There is growing demand to share data publicly (yet maintain anonymity and security), in order to aggregate data sets to derive revenue from the analytical insights. This will be the force behind the shift from reactive to predictive utility organisations.
- 4.3.15 There is a growing trend of individuals demanding micro-communities, where they have full understanding of their food, services, energy and water, the ingredients and sources. This also applies to an individuals' impact on a zero carbon, sustainable future, particularly amongst Gen Z. The same can be said for the water cycle and catchment management – with consumers knowing where their water comes from, its quality at the tap, how they impact this, through to the cost to consume and use it. The growing use of 'edge devices' will enable this micro perspective on all things water and consumption related.
- 4.3.16 Data points about lifestyle, fitness, location, health are generated every second of the day. Data has provided greater insights and control over lives, with the gadgets to go with it, but the threat of biohackers and security of data is ever increasing. As a result, there is a growing trend for a digital detox and greater privacy of personal data.
- 4.3.17 The availability of data also provides opportunities for customer to view and engage with our performance, we are held accountable for the outcome of our investment and this can lead to beneficial collaboration with stakeholders.

Asset health and resilience

- 4.3.18 Our resilience strategy has evolved over time and in response to improved intelligence, threats, trends, and emerging risks as we mature our approach to operational resilience. This approach is detailed in our

2017 paper – Measuring Resilience in the Water Industry⁴. This approach provides better overall systems resilience than simply focusing on asset reliability. We firmly believe that is not good practice to only invest in a more reliable system, while neglecting the capacity to respond and recover from an incident, or to not implement sufficient resistance to malicious threats.

- 4.3.19 Building on the well-established 4R model, first developed by the Cabinet Office in 2010, we have evolved our risk and resilience framework to include ‘review’ as a fifth ‘R’. We recognise that threats evolve, and will continue to identify emerging risks; therefore, we must continuously review our risk exposure and learn lessons from incidents and near misses. We target this learning both internally and across other sectors both in the UK and internationally.
- 4.3.20 We are further developing our proactive and predictive maintenance regime with the continuation of Dynamic Network Management (DNM) and application of the concept at selected wastewater treatment works.
- 4.3.21 Increased coastal and riparian erosion resulting from climate change is expected to put more critical infrastructure at risk, such as pipes situated on eroding coastlines and riverbanks.

Future quality regulation and government priorities

- 4.3.22 We have seen a fundamental shift in the expectations of environmental stakeholders and customers. This has led to new environmental legislation which is driving an unprecedented environmental improvement programme for AMP8 that could become a new level of investment for AMP9 and beyond. While driving the platform for transformation in the wastewater system we are fully aware of the challenge customers face for affordability.
- 4.3.23 For the AMP8 period obligations have been set out in The Water Industry Strategic Environmental Requirements⁵. This document was developed by the government and our Regulators; the Environment Agency and Natural England and contain a mixture of statutory requirements; and non-statutory enhancements which water companies are expected to consider within the business plan.
- 4.3.24 The Water Industry Strategic Environmental Requirements (WISER) describes the statutory and non-statutory expectations of water companies for PR24, together with expected practice, with the Water Industry National Environmental Programme (WINEP) setting out the specific actions that Water Companies need to take to meet their environmental legislative requirements and related government priorities.
- 4.3.25 Further to these statutory obligations, the Blueprint for PR24⁶, has been developed by a coalition of key environmental non-governmental organisations and sets out recommended actions for Government, regulators and water companies.
- 4.3.26 The government’s key priorities for water companies are:
- significantly reduce the frequency and volume of sewage discharges from storm overflows, so they operate infrequently, and only in cases of unusually heavy rainfall
 - achieve zero serious pollution incidents, and significantly reduce all pollution incidents
 - reduce nutrient pollution from wastewater treatment works
 - maintain, restore, and enhance protected sites and priority habitats such as chalk streams
- 4.3.27 More information on these obligations and how we plan to meet them is provided in supplementary document *UUW79 Statutory Obligations Summary*.

⁴ unitedutilities.com/globalassets/z_corporate-site/about-us-pdfs/looking-to-the-future/measuring-resilience-in-the-water-industry_final.pdf

⁵ <https://www.gov.uk/government/publications/developing-the-environmental-resilience-and-flood-risk-actions-for-the-price-review-2024/water-industry-strategic-environmental-requirements-wiser>

⁶ [Blueprint for PR24](#)

Net zero greenhouse gas emissions

- 4.3.28 The affordability and resilience of our operations and services fundamentally rely on a stable climate and a healthy natural environment. Consequently, greenhouse gas (GHG) emissions management and reduction is of exceptional importance to United Utilities and customers.
- 4.3.29 The new Environment Act will make it much harder to deliver further absolute reductions and achieve net zero because of substantial growth from the emissions associated with the required new infrastructure, electricity and chemicals. Despite these challenges, we have identified options to reduce emissions whilst providing additional benefits. In developing our latest plans, we have innovated and optimised to contain the emissions from the delivery of our legal and regulatory requirements. However, we cannot entirely mitigate the substantial growth pressures and achieve substantial further reductions within existing base allowances.
- 4.3.30 To retain a science-based trajectory in AMP8 and beyond will require transformation and substantial investment beyond our historic base allowances. Having assessed costs, benefits and technical feasibility of our needs and options, our AMP8 plan delivers low regrets interventions which strive for the most sustainable long term approach towards the priorities agreed with customers and stakeholders, affordability, improvements to service and the water environment, and GHG emissions.
- 4.3.31 We've developed an ambitious enhancement programme specifically targeting GHG emissions reductions. Undertaking this programme in AMP8 is vital to our low regrets, adaptive long term emissions reduction plan and overall ambition to reach the national legal requirement for net zero 2050 and maintain a science-based trajectory that support the national legal five year carbon budgets. For more detail, see *UUW67 Cross price control enhancement case 25*.

4.4 Delivering great service –AMP8 performance commitments

- 4.4.1 Performance commitments are the metrics used to measure the service Water and Sewerage Companies (WaSCs) deliver for customers and the environment. Common performance commitments have been selected by Ofwat to address three outcomes:
- Outcome A: Customers receive excellent service every day
 - Outcome B: Reducing the Environmental Impact
 - Outcome C: Improving Asset Health and operational resilience
- 4.4.2 All three categories are required to protect the interests of customers and secure the resilience of companies both in the short and the long term.
- 4.4.3 In addition to common performance commitments, a set of three bespoke performance commitments are proposed in line with the key outcomes. The bespoke performance commitments have been developed where there is a significant additional benefit to customers and the environment that cannot be delivered without a strong strategic steer.
- 4.4.4 Our overall package of AMP8 Performance Commitments, alongside our robust forecast of performance for the remainder of AMP7 provides ambitious levels of service at excellent value for money. This demonstrates ambition in our service improvements whilst being mindful of cost pressures on customers and pace of delivery over AMP8 and the long term. Stretching performance ambitions from AMP7 to AMP8 target sustainable improvements.
- 4.4.5 A summary of the performance commitments associated with the wastewater price control is shown in Table 6 below, with detail on each in the subsequent sections.

Table 6: Summary of Wastewater Network Plus performance commitments

Ofwat Outcome	Performance Commitment	Units	2025-26	2026-27	2027-28	2028-29	2029-30
Customers receiving excellent service every day	Internal sewer flooding	Number of incidents per 10,000 sewer connections	2.32	2.23	2.14	2.05	1.96
	External sewer flooding	Number of incidents per 10,000 sewer connections	15.20	14.75	14.40	14.07	13.65
Environmental impact	Biodiversity	Biodiversity units per 100km ² of land in the company's area.	0.00	0.00	0.07	0.38	0.64
	Operational greenhouse gases (Wastewater)	Percentage reduction from baseline (tCO ₂ e)	-15.03	-15.17	-15.32	-10.22	-10.66
	Total Pollution Incidents	Number of incidents per 10,000 sewer length	16.03	15.69	14.80	13.79	12.02
	Serious pollution incidents	Number of serious pollution incidents	0.00	0.00	0.00	0.00	0.00
	Discharge permit compliance	Percentage Compliance	100.00	100.00	100.00	100.00	100.00
	Bathing Water Quality	Percentage score	61.8	61.8	61.8	61.8	63.0
	River water quality (Phosphorus)	Reduction in kilograms of phosphorous per head of population	15.01	15.33	20.90	21.01	21.25
	Storm overflows	Annual Average number of spills (regional)	26.20	25.60	24.20	22.40	19.60
Asset health	Sewer collapses	Number of collapses per 1,000 of sewer length	12.94	12.80	12.67	12.54	12.41
Bespoke performance commitments	Embodied Greenhouse Gases	Percentage reduction from baseline (tCO ₂ e)	0	0	0	0	0
	Wonderful Windermere	Kg of phosphorus removed	9.5	38.0	38.0	57.7	77.4

Source: Source: UUW Annual Performance Report

Outcome A: Customers receiving excellent service every day

Internal Sewer Flooding

Delivering ambitious performance improvements that takes account of our operating circumstances and long-term targets


Purpose and benefits


To incentivise companies to reduce the number of internal sewer flooding events to help minimise disruption to customers


Current performance


- 1
 - **High incident numbers.** In absolute terms, based on our 2022-23 incident numbers, UUW ranks 10th out of 11 companies, however these figures do not reflect the differences in the regional operating circumstances of each company
- 2
 - **Best improvement.** In relative terms, UUW’s performance improvement of 46.6% between 2020 and 2023 far exceeds that seen in the industry, where the upper quartile has improved 33.3%
- 3
 - **IDAS development.** We continue with Integrated Drainage Area Studies (IDAS) to support our Dynamic Network Management deployment. Understanding the connectivity and performance of our assets ensures we target DNM effectively
- 4
 - **DNM implementation.** This plan includes our investment in sensors to enable our Dynamic Network Management capability, which uses real time information from the network to identify potential issues before they cause flooding.


Our AMP8 Plan delivers against five key themes

- 

Value Sewer flooding can have a significant impact on the health and mental wellbeing of affected customers. Through further reductions in AMP8 we plan to improve the experience for customers.
- 

Risks & resilience We continue to roll-out and mature our DNM capability to ensure resilience of the drainage system. This resilience underpins our AMP8 ambition as we strive to deliver another step change in internal sewer flooding performance.
- 

Efficiency New monitoring and inspection techniques to optimise maintenance activities, alongside operational improvements are driving further improvements in flooding performance. This is efficient as well as good for customer experience.
- 

Customer expectation Internal sewer flooding is highly important to customers and should be resolved as quickly as possible. There are significant health concerns and the inconvenience of having to move out of a property for a considerable time was considered highly inconvenient.
- 

Innovation Our digitally enabled capability (DNM) to support a proactive approach to network management. This innovation will underpin our situational awareness to push our sewer flooding performance further than before. We plan to roll-out DNM further and mature our capability (e.g. the use if to the next priority drainage areas in AMP8).

Our AMP8 performance targets aligned to the long term

Units: Number of incidents per 10,000 km sewer length

AMP7	AMP 8					AMP9	AMP10	AMP11	AMP12
2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2034-35	2039-40	2044-45	2049-50
2.88	2.32	2.23	2.14	2.05	1.96	1.65	1.49	1.43	1.43
% imp.	19.4%	22.6%	25.7%	28.8%	31.9%	42.7%	48.3%	50.3%	50.3%

External Sewer Flooding

Delivering ambitious performance improvements that takes account of our operating circumstances and long-term targets

Purpose and benefits

To incentivise companies to reduce the number of external sewer flooding events to help minimise disruption to customers

Current performance

- 1


Improving performance. During AMP7, we have continued to deliver a step change improvement in external flooding performance, while the upper quartile position has not progressed.
- 2


DNM implementation. This plan includes our investment in sensors to enable our Dynamic Network Management capability, which uses real time information from the network to identify potential issues before they cause flooding.
- 3


IDAS development. We continue with Integrated Drainage Area Studies (IDAS) to support our Dynamic Network Management deployment. Understanding the connectivity and performance of our assets ensures we target DNM effectively
- 4


New predictive technology, and proactive inspection. Our proactive inspection and rehabilitation programme is also delivering benefits and will continue with our maturing use of VAPAR – AI technology to detect sewer defects.


Our AMP8 Plan delivers against five key themes

- 

Value Sewer flooding can have a significant impact on the health and mental wellbeing of affected customers. Through further reductions in AMP8 the experience for customers will be improved.
- 

Risks & resilience We continue to roll-out and mature our DNM capability to ensure resilience of the drainage system. This resilience underpins our AMP8 ambition as we strive to deliver another step change in external sewer flooding performance.
- 

Efficiency New monitoring and inspection techniques to optimise maintenance activities, alongside operational improvements are driving further improvements in flooding performance. This is efficient as well as good for customer experience.
- 

Customer expectation Customers find sewer flooding inconvenient and unpleasant, particularly if it is within property boundaries.
- 

Innovation DNM is digital proactive approach to network management. This innovation will underpin our situational awareness to support a further step change in external sewer flooding performance. In addition VAPAR is increasing the rate at which we can process CCTV imagery and standardise prioritisation of rehabilitation is further supporting a proactive approach to drainage services

Our AMP8 performance targets aligned to the long term

Units: Number of incidents per 10,000 km sewer length

AMP7	AMP 8					AMP9	AMP10	AMP11	AMP12
2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2034-35	2039-40	2044-45	2049-50
15.66	15.20	14.75	14.40	14.07	13.65	10.89	10.87	10.93	10.90
% imp.	2.9%	5.8%	8.0%	10.2%	12.8%	30.5%	30.6%	30.2%	30.4%

Outcome B Reducing the environmental impact

Biodiversity

Proposing ambitious plans to protect and enhance biodiversity through WINEP






Purpose and benefits

This new measure incentivises to conserve and enhance biodiversity while delivering service to customers. The benefits are reduced extinction risk, increased resilience to climate and water resources changes and enhancements in ecosystem service provision such as water quality, localised climate regulation, pollination, clean air and physical and mental health benefits.

Current performance

- 1 • **DEFRA metrics.** This is a new measure for AMP8 and utilises the Defra metric for biodiversity assessment which is in itself a relatively new assessment tool.
- 2 • **No industry UQ.** There is no information on past performance for this measure across the industry and little comparative information to assess levels for upper quartile performance.
- 3 • **Biodiversity assessment.** We have completed a desk top exercise to assess the biodiversity unit assessment.
- 4 • **Best value solutions.** This assessment has been used for the purpose of comparing options to support the selection of the best value solutions.

Our AMP8 Plan delivers against five key themes

-  **Value** Large elements of our delivery plans focus our biodiversity efforts on restoring habitats on SSSI sites and the required action to improve the specific features of SSSIs. This will deliver benefits to habitats and quality of place.
-  **Risks & resilience** Delivering improvements to biodiversity through the WINEP will add habitat resilience and protection from development activities
-  **Efficiency** To ensure efficient and best value actions we plan to complete a pre delivery, on site biodiversity assessment for WINEP schemes that target biodiversity improvement. This will drive a forecast of investment in terms of biodiversity units. This assessment will ensure good value for money and will also be externally validated so we are assured of our efficient and best value actions
-  **Customer expectation** Customers place value on biodiversity protection. Although we recognise our role in raising awareness of our contribution to the UK’s ambition.
-  **Innovation** This is a new measure and we expect to learn a great deal in-terms of effective assessments and cost effective solutions,

Our AMP8 performance targets aligned to the long term

Units: Biodiversity units per 100km2 of land in the company's area

AMP7	AMP 8					AMP9	AMP10	AMP11	AMP12
2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2034-35	2039-40	2044-45	2049-50
0.00	0.00	0.00	0.07	0.38	0.64	6.09	15.48	25.65	35.82
Cumulative	0.00	0.00	19.53	111.14	187.84	916.83	2672.06	4427.70	6183.33

Operational Greenhouse Gases (WW)

Embracing the latest technologies and innovation to manage the impact of greenhouse gases

Purpose and benefits

Incentivising companies to minimise the impacts of substantial growth in investment on operational emissions, by embracing efficiency, the latest technologies and innovation

Current performance

- 1

Track record. We have a strong track record of emissions reduction; since 2010 we have achieved more than 70% reduction in our scope 1 and 2 emissions.
- 2

Carbon pledges. We have made strong progress towards our six carbon pledges and putting us ahead of many other water companies on their emissions reduction.
- 3

Green power. We now only use green electricity and have invested in new renewable self-generation facilities,
- 4

Taking opportunities. We have implemented low cost opportunities which complement our land, renewable and bioresources strategies and are making progress against our carbon pledges in line with our science based targets.

Our AMP8 Plan delivers against five key themes

- Value** Robust emission reporting will be build on existing transparent reporting that will improve trust with customers and raise awareness of our contribution to the UK’s greenhouse gases.
- Risks & resilience** A key risk to this measure is the challenge of reducing emissions while accommodating a growing population and our largest environmental programme to date.
- Efficiency** Our WRAP framework, decision support tools and robust internal cost challenge will guide us to select the best option for customers.
- Customer expectation** Customers place a high value on carbon and reducing emissions. Although we recognise our role in raising awareness of our contribution to the UK’s ambition.
- Innovation** We will build on our experience in renewable technology and self-generation opportunities and also develop our understanding of emissions and robust sampling and reporting of greenhouse gas emissions from our activities.

Our AMP8 performance targets aligned to the long term

Units: : Percentage reduction from baseline (tCO2e)

AMP7	AMP 8					AMP9	AMP10	AMP11	AMP12
2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2034-35	2039-40	2044-45	2049-50
-13	-15	-15	-15	-10	-11	-25	-31	-38	-41
% imp.	-15%	-15%	-15%	23%	15%	-94%	-162%	-194%	-215%

Total Pollution Incidents

Meeting or beating the industry upper quartile through technology and smart networks

Purpose and benefits

To incentivise companies to reduce the number of total pollution incidents. Pollution is a priority for customers and stakeholders and reducing pollution improves the natural environment

Current performance

- 1


UQ leading performance. We continue to strive to improve our performance on pollution. Our ambition is to push the projected industry upper quartile position forward throughout AMP8.
- 2


4 star EPA performance. During AMP7, we have regularly earned a 4* rating as measured by the Environment Agency and we have been frontier performers for pollution 2 or the 3 years of AMP7.
- 3


Pollution reduction plan. We have a robust pollution reduction plan which details our approach to driving down pollution incidents.
- 4


DNM implementation. This plan includes our investment in sensors to enable our Dynamic Network Management capability, which uses real time information from the network to identify potential issues before they cause pollution.


Our AMP8 Plan delivers against five key themes

- 

Value Our continued improvements in pollution performance will improve the natural environment of the North West, adding value to communities who enjoy the aquatic environment.
- 

Risks & resilience As we continue to roll-out and mature DNM and operational capability around DNM the resilience of the drainage system improves. This resilience underpins our AMP8 ambition as we strive to drive the industry upper quartile and frontier performance for pollution incidents.
- 

Efficiency Innovation such as DNM alongside operational improvements is driving pollution reduction prior to incidents occurring. This is efficient as well as good for customer experience.
- 

Customer expectation We strive to eliminate pollution incidents in the longer-term, and customers rightly expect to enjoy the rivers and lakes of the North West. Reducing pollution incidents regularly ranks high in priority in customer research.
- 

Innovation DNM – a digital platform to support a digital proactive approach to network management. This innovation will underpin our situational awareness to push our pollution performance further than before.

Our AMP8 performance targets aligned to the long term

Units: Number of incidents per 10,000 km sewer length

AMP7	AMP 8					AMP9	AMP10	AMP11	AMP12
2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2034-35	2039-40	2044-45	2049-50
16.03	16.03	15.69	14.80	13.79	12.02	11.14	11.63	11.63	10.70
% imp.	0.0%	2.1%	7.7%	14.0%	25.0%	30.5%	27.4%	27.4%	33.3%

Serious Pollution Incidents

To incentivise the reduction in the number of serious pollution incidents that impact the environment and improve environmental quality

Purpose and benefits

This measure is to incentivise companies to eliminate serious pollution incidents. Pollution is a priority for customers and stakeholder and targeting the most serious incidents is vital for improving the natural environment

Current performance

- 1

- **Target of zero serious incidents.** We have a strong track record on environmental performance and we target zero serious pollution incidents. We are proud of securing a number of years with zero serious pollution incidents.
- 2

- **Across a large network.** We cover a vast sewerage network which presents a risk everyday, however with new technology and improved operational practices we are targeting consistently to meet zero incidents.
- 3

- **Pollution reduction plan.** We have a robust pollution reduction plan which details our approach to driving down pollution incidents and those most serious events.
- 4

- **DNM implementation.** This plan includes our investment in sensors to enable our Dynamic Network Management capability, which uses real time information from the network to identify potential issues before they cause pollution.

Our AMP8 Plan delivers against five key themes

- Value** Through targeting zero serious pollution incidents we will support health and wellbeing of the environment and improve the quality of the North West.
- Risks & resilience** As we continue to roll-out and mature DNM and operational capability around DNM the resilience of the drainage system improves. This resilience underpins our AMP8 ambition as we strive to drive to consistently achieve zero pollution incidents.
- Efficiency** Innovation such as DNM alongside operational improvements is driving pollution reduction prior to incidents occurring. This is efficient as well as good for customer experience.
- Customer expectation** We strive to eliminate serious pollution incidents and customers rightly expect to enjoy the rivers and lakes of the North West. Reducing pollution and serious pollution incidents regularly ranks high in priority in customer research.
- Innovation** DNM – a digital platform to support a digital proactive approach to network management. This innovation will underpin our situational awareness to push our pollution performance further than before.

Our AMP8 performance targets aligned to the long term

Units: Number of serious pollution incidents. This measure is not normalised.

AMP7	AMP 8					AMP9	AMP10	AMP11	AMP12
2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2034-35	2039-40	2044-45	2049-50
	0	0	0	0	0	0	0	0	0

Discharge Permit Compliance

Meeting exacting permit standards to protect the environment of the North West

Purpose and benefits

To incentivise companies to fully meet all discharge permit limits and help protect the environment

Current performance

- 1

Target of 100% compliance. The target for this PC is 100% which is extremely challenging but will drive forward improvements in river water quality.
- 2

EPA 4 star performance. During AMP7, we have regularly earned a 4* rating as measured by the Environment Agency and we have achieved 100% compliance for wastewater treatment works once – making this an extremely stretching target.
- 3

Permit compliance plan. We have a plan which will continue through into AMP8 that continually improves information on our assets and performance.
- 4

DNM roll-out. Near real time information supports targeted interventions across the system.

Our AMP8 Plan delivers against five key themes

- Value** Continued compliance with permits improves river water quality and the quality of place.
- Risks & resilience** Our information on assets and their performance continues to improve. This information supports remote forecast failure of critical assets. We plan to develop our maintenance excellence programme, with a focus on preventative maintenance and condition based monitoring of our assets. This focus allows us to intervene before assets fail, reducing the risk of discharge compliance issues.
- Efficiency** We have set up regional control hubs across the North West, coordinated by our central remote monitoring and control centre. Our plan is to evolve this in AMP8. This improved visibility and approach to risk management supports efficient delivery of permit compliance.
- Customer expectation** Customers rightly expect compliance with permits and we agree with the target to continue at 100% compliance. As permits tighten with new legislation we strive to meet the new standards that support an improving environment.
- Innovation** DNM will continue to develop in AMP8 and we plan to incorporate signals and situational awareness to treatment assets where there is performance benefits and efficiencies to be made.

Our AMP8 performance targets aligned to the long term

Units: Percentage compliance.

AMP7	AMP 8					AMP9	AMP10	AMP11	AMP12
2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2034-35	2039-40	2044-45	2049-50
98.93	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Bathing Water Quality

Improving bathing waters through improved operations and working in partnership

Purpose and benefits

To incentivise companies to improve water quality at surface waters designated for swimming, to help enhance the environment and support the creation of social and economic value

Current performance

- 1

Improving performance. We have made significant investment over the past few investment periods that has led to great improvements in the bathing water across the North West.
- 2

Asset health. During AMP7, we have continued to maintain our assets and their contribution to bathing water quality.
- 3

Partnership delivery. Partnerships are key to bathing water quality as many contributors play a part. We continue to support the partnerships across the North West that support bathing water quality.
- 4

Developing new technology. We continue to develop our coastal water quality models which inform and guide interventions in an effective way.

Our AMP8 Plan delivers against five key themes



Value Access to safe bathing waters adds value to communities who wish to swim or enjoy walks nearby to good bathing waters.



Risks & resilience Managing our assets in a robust way is key to the success of this measure. Where our assets contribute to bathing water quality we plan to maintain and operate to minimise risk to bathing water quality.



Efficiency We have an important role to play in bathing water quality, however there are broad range of other contributors. Such as agriculture and tourism. We will work across partners to promote efficient interventions.



Customer expectation Access to safe bathing waters is increasing in importance and customers want to trust the water they want to access for recreation.



Innovation Robust monitoring and control of our assets is key to maintaining our contribution to bathing water quality. Working in partnership is also vital to making further improvements to water quality and we will continue to work with local partnerships to drive improvements. These interventions can be optimised via our coastal models

Our AMP8 performance targets aligned to the long term

Units: Percentage score.

AMP7	AMP 8					AMP9	AMP10	AMP11	AMP12
2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2034-35	2039-40	2044-45	2049-50
61.8	61.8	61.8	61.8	61.8	63.0	63.0	63.00	64.1	66.4

River Water Quality (phosphorus)

Going beyond environmental permits to remove more phosphorus from the environment than ever before.

Purpose and benefits

To incentivise companies to remove greater amounts of phosphorus over and above that required by environmental permits, to improve river water quality

Current performance

- 1

Building on existing limits. This measure covers 165 treatment works which already have or will receive a phosphorus limit in future AMPs.
- 2

Track record. During AMP7, we have delivered a large programme of phosphorus removal interventions which is benefiting the environment. This measure builds on previous and AMP8 planned schemes to go beyond permitted performance.
- 3

New techniques. We operate a number of sites with tight phosphorus permits and this measure builds on existing operational performance to push boundaries of techniques.
- 4

Partnership delivery. We have had success with some partnership schemes that have delivered wider environmental benefits and enabled efficient project delivery. This measure incentivises this even further.

Our AMP8 Plan delivers against five key themes

- Value** Going beyond historical baseline performance will deliver real benefits to the rivers of the North West. This will improve water quality and the amenity value of better river water quality.
- Risks & resilience** An incentive to push beyond current permit limits will mean that the service we provide is more robust to the permit level. Reducing risk of permit exceedance.
- Efficiency** This measure will incentivise new and effective removal techniques. This will push the boundaries of performance and drive new and efficient options.
- Customer expectation** There is a high regard for rivers as natural beauty and rivers directly reflect the health of the countryside, wildlife and the environment in general. This measure was considered more important than bathing water quality as rivers flow through all water company areas.
- Innovation** This measure will incentivise us to go beyond what existing techniques can deliver and also to explore new technologies. This could include electrocoagulation, natural coagulants and reactive media as well as partnership projects.

Our AMP8 performance targets aligned to the long term

Units: Percentage reduction in phosphorus.

AMP7	AMP 8					AMP9	AMP10	AMP11	AMP12
2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2034-35	2039-40	2044-45	2049-50
3.65	15.01	15.33	20.90	21.01	21.25	76.35	88.74	88.74	88.74

Storm Overflows

Aiming to deliver both the biggest percentage improvement and the biggest absolute improvement in spills by any company in the industry

Purpose and benefits

To incentivise a progressive reduction in the number of spills and adverse impacts of discharges from the company’s storm overflows to reduce the impact on public health and the environment.

Current performance

- 1


Customer insight. We know from customers that compliance with current legal standards is not enough and we need to do more.
- 2


Better Rivers North West. We have responded in AMP7 with operational improvements, accelerated investment and accelerated investigations. We have established our Better Rivers Better North West programme to drive improvements and spill reduction.
- 3


Pollution reduction plan. We have developed our overflow reduction plan and have an ambitious plan for AMP7, AMP8 and a long-term plan to meet the targets for 2050
- 4


Stretching long term targets. This measure stretches us to deliver an ambitious plan from AMP7 through to AMP8 to meet a stretching targets and reduction in overflow spills


Our AMP8 Plan delivers against five key themes

- 

Value Reducing spills will improve the river water quality and amenity spaces for communities to enjoy.
- 

Risks & resilience The programme we have developed will add resilience to drainage system to reduce the risk of spills. Our region experiences more rainfall on average than others. By taking rainwater out of the system and adding capacity we add resilience.
- 

Efficiency Our plan is balanced between delivering reductions that impact river quality and deliver a significant reduction in total spills. We have challenged costs across the programme to ensure we have an efficient cost.
- 

Customer expectation We know from customers that compliance with current legal standards is not enough and we need to do more.
- 

Innovation We plan to expand our system in line with our DNM ambition so that we can optimise capacity and how effectively the system operates. This approach will be applied to traditional solutions as well as blue/green infrastructure for the first time.

Our AMP8 performance targets aligned to the long term

Units: Annual average number of spills (regional)

AMP7	AMP 8					AMP9	AMP10	AMP11	AMP12
2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2034-35	2039-40	2044-45	2049-50
29.21	26.20	25.60	24.20	22.40	19.60	17.17	13.10	10.90	8.50
% imp.	10.3%	12.4%	17.2%	23.3%	32.9%	41.2%	55.2%	62.7%	70.9%

Improving asset health and operational resilience

Sewer Collapses

Driving further improvements, building on our AMP7 step change in performance, through tech-driven proactive collapse detection and prevention


Purpose and benefits


To incentivise companies to reduce the number of collapses across the sewerage system as part of an asset health measures


Current performance


- 1
 - **Track record.** In AMP7 we have delivered improvements in sewer collapses and the service impacts that are associated.
- 2
 - **DNM implementation.** This plan includes our investment in sensors to enable our Dynamic Network Management capability, which uses real time information from the network to proactively identify collapse risk and reduce impacts to customers in AMP7.
- 3
 - **Operating model.** Our first time resolution operating model, built around DNM, continues to mature and deliver benefits, our AMP8 plan is centred around this digitally enabled capability and operating model.


Our AMP8 Plan delivers against five key themes

- 

Value By reducing collapses the disruption caused by collapses will be minimised. This adds value to communities and the economy.
- 

Risks & resilience Reducing collapses is an asset health measure. By proactive collapse recognition and targeted intervention the resilience of the drainage system will improve.
- 

Efficiency Improved situational awareness and asset management capability will support proactive collapse detection which will drive efficient service delivery.
- 

Customer expectation Customers expect a resilient service and also value that disruption caused by sewer collapses is minimised.
- 

Innovation Our digitally enabled capability (DNM), supported by a network of sensors ‘learns’ normal flow signatures and detects deviations to alert us to deterioration in the network. In addition VAPAR is increasing the rate at which we can process CCTV imagery and proactively identify sewer collapses and standardise prioritisation of rehabilitation

Our AMP8 performance targets aligned to the long term

Units: Number of collapses per 1,000km sewer length

AMP7	AMP 8					AMP9	AMP10	AMP11	AMP12
2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2034-35	2039-40	2044-45	2049-50
13.07	12.94	12.80	12.67	12.54	12.41	12.14	11.86	11.59	11.32
% imp.	1.0%	2.0%	3.0%	4.0%	5.0%	7.2%	9.3%	11.3%	13.4%

Bespoke performance commitments

Embodied Greenhouse Gas Emissions

Taking a ‘cradle to build’ approach to reducing embodied greenhouse gas emissions from some of our largest wastewater treatment, non-infrastructure projects within the Water Industry National Environment Programme (WINEP)

Purpose and benefits

We propose a new bespoke commitment to reduce the relative impact of embodied greenhouse gases (carbon)

Current performance

- 1

1 Early submission. This measure was omitted from our submission in April 2023 as we thought the measure did not meet Ofwat’s criteria in relation to ‘company specific circumstances’.
- 2

2 Revised approach. However, we have evolved our thinking and we are pleased to be able to support Ofwat and the sector’s priority to improve this area of reporting during AMP8, as part of developing the required maturity for AMP9 and beyond.
- 3

3 Focussed targets. We escalated our focus on scope 3 emissions after setting our science based targets in 2020. Adding focus on embodied emissions within UUW and our suppliers.
- 4

4 Link to net zero. We will continue our active leadership role in the sector on net zero by sharing our learning in this PC and helping co-develop the reporting tools and practices for the long term success of the sector in this area.

Our AMP8 Plan delivers against five key themes

- 

Value Our WINEP is expected to be one of the largest in the industry. This measure will incentivise innovation and a reduction in the impacts of this investment in AMP8, adding value to communities and improving place
- 

Risks & resilience Managing climate change is essential to the long term affordability and resilience of wastewater services for customers. This measure supports our ongoing and long term strategy to achieve net zero GHG emissions in line with national ambitions that are designed to ensure we and the UK play our role in keeping rates of climate change to manageable levels.
- 

Efficiency We will focus on efficient material usage, design optimisation and switching to low carbon alternatives, where technology and innovation allows. We will collaborate with, and incentivise, our supply chain partners to support the delivery of our strategic aims for AMP8.
- 

Customer expectation Research indicates that reducing carbon emission is key to managing ambitions for UU and the UK
- 

Innovation The measure will incentivise us and our supply chain to measure, manage and reduce scope 3 GHG emissions. It will also support the improved management of emissions which compliments our on-going focus on financial and resource efficiency through innovation and collaboration.

Our AMP8 performance targets aligned to the long term

Units: : Percentage reduction from baseline (tCO2e)

AMP7	AMP 8					AMP9	AMP10	AMP11	AMP12
2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2034-35	2039-40	2044-45	2049-50
0.00	0.00	0.00	0.00	0.00	0.00				

Wonderful Windermere

Improving the health of Windermere by using UUW’s expertise in wastewater treatment, working with others in the community to help them improve how they operate and maintain their assets

Purpose and benefits

To improve the quality of Lake Windermere through partnerships and reduction of phosphorus beyond permit limits

Current performance

- 1


Partnerships. We have a strong partnership in place with Love Windermere to address Windermere’s particular catchment challenges and this has served the lake well to date and will be central to future improvements.
- 2


Track record. UUW has invested significantly to reduce phosphorus and nutrient inputs from assets. We plan to maintain this good performance and seek to optimise.
- 3


Regulatory compliance. We have currently met our long-term target for phosphorus reduction in this catchment as set by the Environment Agency.
- 4


Community engagement. We have established a ‘shop’ in Windermere to have an open door to visitors and customers. This transparency is key to raising awareness and developing a collaborative approach to tackling water quality challenges.


Our AMP8 Plan delivers against five key themes

- 

Value Windermere is a nationally significant waterbody with UNESCO world heritage status that receives over 7 million visitors each year. Through water quality improvements the amenity value will increase
- 

Risks & resilience Phosphorus is cited as one of the reasons for Windermere not achieving DEFRA’s ‘good’ status. Through a system led plan the resilience of the lake will be improved.
- 

Efficiency We continue to invest where our contributions make a difference to the lake. However, over 60% of phosphorus inputs come from non-UU sources. Working collectively are able to deliver improvements where most cost effective for customers
- 

Customer expectation Windermere is the ‘jewel in the crown’ of the Lake District but with climate change and a range of other inputs the standard of the lake is not to the expectations of customers and communities
- 

Innovation Intensive online monitoring on key point source assets, as well as in-network monitoring to track changes in water quality; localised engagement with key partners to promote positive behaviours; and, support of land management practices to reduce agricultural runoff.

Our AMP8 performance targets aligned to the long term

Units : Kg of phosphorus removed (cumulative)

AMP7	AMP 8					AMP9	AMP10	AMP11	AMP12
2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2034-35	2039-40	2044-45	2049-50
0.00	9.50	38.00	38.00	57.70	77.40				

4.5 Environment

4.5.1 Customer research indicates protecting the environment is a key priority. Research for the Drainage and Wastewater Management Plan and Water Resources Management Plan carried out in April 2021⁷ showed that 21% of those customers surveyed ranked removal of wastewater in the top three greatest long term challenges.

4.5.2 The Water Industry has taken steps over the last four decades to improve the water environment, however there is a collective ambition for the WINEP to deliver more for the environment, customers and communities. This reflects society's high expectations and the UK government's ambition to leave the environment in a better state for the next generation.

4.5.3 It has been recognised by the UK government that, without a change in the way water companies operate by 2050 there could be issues with increased pressures to meet the demand of customer, industry and agriculture as well as increasing issues with flooding and resilience in the natural environment. Therefore water companies have been challenged to mitigate for their activities and provide a resilient, cost efficient service that benefits both customers and the natural environment.

Water Industry National Environment Programme (WINEP)

4.5.4 The development of the WINEP has been informed by the key regulatory guidance including; the WINEP methodology, WINEP options development guidance, WINEP options assessment guidance, WINEP driver and supporting guidance. Our approach reflects the specific context within which we operate in the North West of England.

4.5.5 There are multiple requirements to deliver a programme of environmental improvements agreed with the Environment Agency these are driven by the following legislation:

- The Water Environment (Water Framework Directive) Regulations 2017
- Urban Wastewater Treatment (England and Wales) Regulations 1994
- Environment Act 2021
- Habitats Regulations 2017
- Natural Environment and Rural Communities Act 2006
- Wildlife and Countryside Act (SSSI) 1981
- Levelling up and regeneration (nutrient neutrality)
- Bathing Water Regulations 2013
- Marine and Coastal Access Act 2009

4.5.6 Enhanced interventions to address the WINEP requirements include:

- Improved or additional wastewater treatment works Final Effluent Limits; Environmental Investigations; Davyhulme; and Wigan & Skelmersdale (*UUW*)
- Storm overflow spill improvements and Improved flow and Event Duration Monitoring (EDM) (see supplementary document *UUW64 – Wastewater Quality Overflows enhancement claims*)
- Green Recovery (*UUW65 – Wastewater Quality Additional requirement enhancement case 20*)
- Sewage sludge (*UUW66 – Bioresources enhancement case 22*)

4.5.7 **Future Permit Requirements:** We have undertaken a significant exercise to identify the most cost effective way of meeting the future permit requirements we are required to comply with. The Discharge

⁷ UUW DWMP WRMP immersive options final report https://www.unitedutilities.com/globalassets/z_corporate-site/about-us-pdfs/p130-dwmp-wrmp-immersive-options-testing/final-report.pdf

Permit Compliance performance commitment monitors our performance against updated permit requirements as they are issued.

- 4.5.8 **Environmental Investigations:** The programme of environmental investigations is required in order to determine whether future investment is justified to mainly meet the Environment Act, Water Framework and Bathing Waters Directives mainly. The programme is vital in terms of ensuring a robust evidence base is developed to inform any future environmental improvement schemes so that they offer good value to customers. In agreement with the relevant environmental stakeholder, investigations have been scoped for the following:
- Environment Act storm overflows investigations;
 - Chemical investigations programme 4 (CIP4);
 - Nitrogen technically achievable limit;
 - Bathing waters investigations;
 - Shellfish water investigations;
 - Marine Conservation Zone Investigations; and
 - Microplastics Investigations.
- 4.5.9 **Storm overflow spill improvements:** The Environment Act 2021 and Government’s Storm Overflow Discharge Reduction Plan (SODRP) sets out new, tighter targets for water companies to better manage storm overflows. The SODRP published in August 2022, will drive a step change in ambition and performance across the water industry to address the legacy of storm overflows and the pressure from climate change.
- 4.5.10 This new legislation changes the way companies can approach improvements to storm overflows and moves away from the traditional assessment of harm and cost vs benefit analysis to focus on reduction in spill frequency, in addition to harm. Improvements are no longer subject to a cost vs benefit assessment which will enable companies to intervene on more overflows to reduce overflow spills.
- 4.5.11 The North West has the highest proportion of combined sewers in the industry and higher than average urban rainfall. Combined sewers convey both foul and surface water flows, resulting in a reduced hydraulic capacity in periods of high rainfall. Companies with higher levels of both combined sewers and rainfall will be particularly affected by hydraulic overload resulting in sewers reaching capacity more frequently resulting in more frequent storm overflow spills.
- 4.5.12 Numerous overflows within the programme have multiple drivers. In these instances the design and solution has been developed to address the most onerous requirement, to avoid abortive spend. Multiple factors impact the design of solutions, where it has been possible to design the scheme to address all future drivers we have taken this opportunity. In certain cases additional work is required in the catchment (such as surface water removal) for a viable long term solution for an overflow to be developed. In these cases we are addressing the Water Environment (Water Framework Directive) Regulations driver initially, with the intention of reviewing the performance of the overflow in the future to address the more onerous Environment Act requirement. There is also an Environment Act requirement for appropriate 6mm in two dimensions screening on overflow discharges. We have included 351 screens in our plan.

Table 7: Overflows requirements for the different drivers

Legislative driver	Design requirement
The Bathing Water Regulations 2013	3 spills per bathing season for coastal discharges 1 spill per bathing season for inland bathing waters
The Water Environment (Water Framework Directive) Regulations 2017	Appropriate spill frequency/duration/volume reduction to meet the WFD target in the receiving waters

Legislative driver	Design requirement
The Water Environment (Water Framework Directive) Regulations 2017 (Shellfish waters)	10 spills per annum
Environment Act 2021	10 spills per annum
Environment Act 2021	Screening of spills to 6mm in two dimensions

Source: WINEP

- 4.5.13 The 437 overflows which are being addressed as part of the AMP8 wastewater WINEP programme are located all across the North West. The AMP8 storm overflow reduction element of the WINEP is anticipated to reduce spills from overflows in line with the storm overflow performance commitment. This reduction in spills will help to enhance and protect the environment and move towards the target of 10 spills per overflow by 2050 as detailed in the Environment Act 2021.
- 4.5.14 In addition to improved final effluent discharges; storm overflow reductions; and environmental investigations, the Environment Agency requires us to enhance service standards in order to deliver environmental benefits through improved flow and event duration monitoring. This includes the delivery of MCERTS certified flow measurement, MCERTS certified event duration monitoring and river water quality monitoring. The need for investment is driven by the Urban Wastewater Treatment (England and Wales). More information on these interventions are described in *UUW64 – Wastewater Quality Overflows enhancement case*.
- 4.5.15 **Green Recovery:** The Environment Agency require us to enhance service standards in order to deliver environmental benefits through improved flow and event duration monitoring. This includes the delivery of MCERTS certified flow measurement, MCERTS certified event duration monitoring and river water quality monitoring. The need for investment is driven by the Urban Wastewater Treatment (England and Wales)
- 4.5.16 As part of the Green Recovery programme we are currently pursuing a programme of Natural Flood Risk Management (NFM) and SuDS to kick-start partnerships across strategic catchments in the North West (Greater Manchester, Fylde, and Eden) to expand the use of natural capital benefit to value and subsequently deliver partnership projects. Using our experience of rainwater management solutions we have taken the approach for AMP8 to integrate this as far as possible into our solution development for intermittent discharges. More detail on rainwater management is included in *UUW65 – Wastewater Quality Additional requirements enhancement case 15*.
- 4.5.17 **Sewage sludge:** We propose to deliver a substantial WINEP programme to achieve significant enhancements to the natural environment across the North West, improving the resilience of our agricultural recycling activities and meeting increasing regulatory controls under the Waste Framework Directive. *UUW66 – Bioresources enhancement case 22*.

Reservoir Act 1965

- 4.5.18 Under the Reservoir Act 1975 UUW has a duty to inspect and maintain reservoir structures and undertake remedial action identified by a Qualified Civil Engineer.
- 4.5.19 Sludge lagoons are legacy assets historically used for the storage of wastewater sludge. These are non-operational assets, usually within the boundary of wastewater treatment works, which fall within the wastewater network plus price control. UUW are reviewing the future of redundant assets and want to ensure that they are safe and compliant. Following a desk top study, ten sites have been identified as requiring further investigation to determine whether they are considered a reservoir under the Reservoir Act 1975.
- 4.5.20 The engineering analysis has identified that a phased approach with investigations followed by a site specific solution provides the most cost effective solution to comply with the Act by providing best value for customers whilst balancing cost and risk. Through our Delivery Route Allocation Planning (DRAP)

process, we have identified the most cost effective procurement route for delivering these solutions should they be required.

Direct Procurement for customers

- 4.5.21 In support of Ofwat’s position of ‘Direct Procurement for Customers (DPC) by default’ on all discrete projects above £200m totex, we have undertaken a thorough and proactive assessment of our entire AMP8 portfolio to identify DPC opportunities most likely to offer value for money for customers. Our WINEP held the majority of candidates for projects above £200m totex.
- 4.5.22 UUW has proposed two schemes for DPC which come from our WINEP. One of these is an AMP8 scheme (Manchester Ship Canal BOD programme) with a totex of £313m. The other is a scheme at Wigan and Skelmersdale which could be designated for delivery in AMP9. Both of these schemes would require the agreement of the Environment Agency to revised regulatory dates.
- 4.5.23 UUW has proposed an AMP8 scheme which is a bundle with one project over £200m and others of similar scope that we have included to unlock economies of scale and maximise the potential applicability of DPC. We have identified a further project for Wigan Wastewater treatment works and Skelmersdale Wastewater treatment works as being a key future DPC opportunity subject to the agreement of revised regulatory dates with the EA and believe targeted market engagement and early commencement of procurement activities has potential to unlock significant value for customers.
- 4.5.24 Our approach to DPC can be found in *UUW52 – DPC Overview*.
- 4.5.25 Both these DPC opportunities are subject to further discussion with the Environment Agency, as late changes to requirements have been received into our WINEP (received on 3rd July 2023) which are further described in *UUW43 – WINEP Optimisation* (Davyhulme; and Wigan and Skelmersdale and in the WINEP variation summary, with the inclusion of Pennington Flash).

Flexibility and adaptive planning

- 4.5.26 Where possible we are making use of phasing and adaptive planning to ensure we meet statutory requirements in a way that prioritises delivery of least- low- or no-regret measures first and balances costs across the AMPs where appropriate. This ensures we capture new statutory requirements and that we continue to meet existing ones despite changes in demand and climate change. Where there is uncertainty we are proposing investigations ahead of action so subsequent investment can be best value. We are also actively seeking partnerships to help spread costs across responsible and/or benefitting parties.
- 4.5.27 Customers should only pay for environmental outcomes that are actually delivered and not those where there is lack of certainty over their requirement or where they may not be delivered. Due to evolving environmental legislation and supporting Environment Agency driver guidance, uncertainty is inherent in this submission and both customers and companies need a mechanism to manage this uncertainty and associated changes.
- 4.5.28 Focusing on outcomes also allows for in-programme flexibility to refine deliverables. For example the exact location and scope of a scheme within the programme continues to evolve at the time of this submission. Any changes to our programme will be made in agreement with the Environment Agency and Your Voice to ensure confidence that we are only working on improvements that are fully justified.
- 4.5.29 We have factored the impact of climate change into the development of our WINEP in several ways, for example we account for climate change in our hydraulic models when identifying the need for storm overflow improvement schemes (*UUW64 – Wastewater Quality Overflows*) and developing options to address the drivers. We also include for climate change when modelling the future requirements for our wastewater treatment works permits. Where impact is forecast in the near future (AMP8 or 9) solutions can be adapted to include climate change for wastewater treatment works. This means we can include resilience to climate change in an efficient way as we deliver other statutory drivers.

4.5.30 Specifically our adaptive plan for Davyhulme Wastewater treatment works, our largest treatment works, includes the construction of a phosphorus recovery plant for the sludge liquor stream in AMP8. This first step of our plan will satisfy the requirement to prevent deterioration in phosphorus concentrations in the Manchester Ship Canal by reducing the phosphorus loading on the treatment works. This process will reduce phosphorus by removing it from the sludge liquor stream, therefore reducing the load back to the head of the works. This will be incorporated into the final scope for Davyhulme Wastewater treatment works. more information on the plans for Davyhulme are available in *UUW43*.

4.6 Asset Health and Resilience

- 4.6.1 Resilience is considered throughout our business planning process and we have identified the key areas where there will be significant resilience benefits:
- Increasing network capacity to support spill reduction: Our commitment to invest £2,900M in the wastewater network, will help to improve the resilience of the system against storms and heavy rainfall and in turn reduce the number of storm overflow spills by 2030.
 - Maintaining wastewater treatment assets: Maintaining the resilience of our 584 wastewater treatment works through £743M of investment in AMP8 maintaining assets and ensuring that there is sufficient capacity to meet the current and future growth of the North West
 - Keeping the sewers running: Through £695M of resilience investment across the 79,000 km of sewers we operate, our ambitious plans will keep the sewers flowing while reducing the risk of property flooding. This investment includes £132m in sustainable rainwater management solutions to provide future resilience to the increased risk of sewer flooding driven by the impacts of climate change.
 - Doing our bit for climate change: Investing £195M in reducing our greenhouse gas emissions, will help to deliver a water service for the North West more resilient to climate change.
- 4.6.2 We have made good progress, and continue to deliver, on our PR19 resilience action plan, enhancing our services, securing performance improvements, and maintaining and increasing our resilience to a broad range of current and future shocks and stresses. We strive for continuous improvement from our frontier position at PR19 – learning lessons, developing our thinking and benchmarking against other utilities and sectors.
- 4.6.3 Our climate adaptation assessment demonstrates a clear threat to our ability to maintain an affordable and resilient service now and for the future. We are managing this growing challenge by continually adapting our assets, processes and systems to maintain an acceptable level of resilience at the lowest possible cost.
- 4.6.4 We have consciously reduced our asset replacement rates in targeted areas during AMP7, while investing in innovative approaches to better understand our asset base. Our industry-leading understanding of our assets, as assessed by the Asset Management Maturity Assessment (AMMA), tells us that, during AMP8, we need to transition to a strategy more focused around asset renewal, informed from our investment in situational awareness.
- 4.6.5 UUW is situated in an operating region that is especially susceptible to coastal and river erosion. Climate change projections indicate that the North West will experience more frequent and intense winter storms⁸, storms that can be expected to accelerate the rate of erosion of the land supporting our critical infrastructure.
- 4.6.6 To secure the long-term resilience of our coastal and riverine asset base against accelerated erosion rates, we plan to protect approximately 2.8 km of sewers, 3 outfalls, and 2 Wastewater treatment works

⁸ Environment Agency (2022) *North West River Basin District Flood Risk Management Plan 2021 to 2027*. Available [here](#).

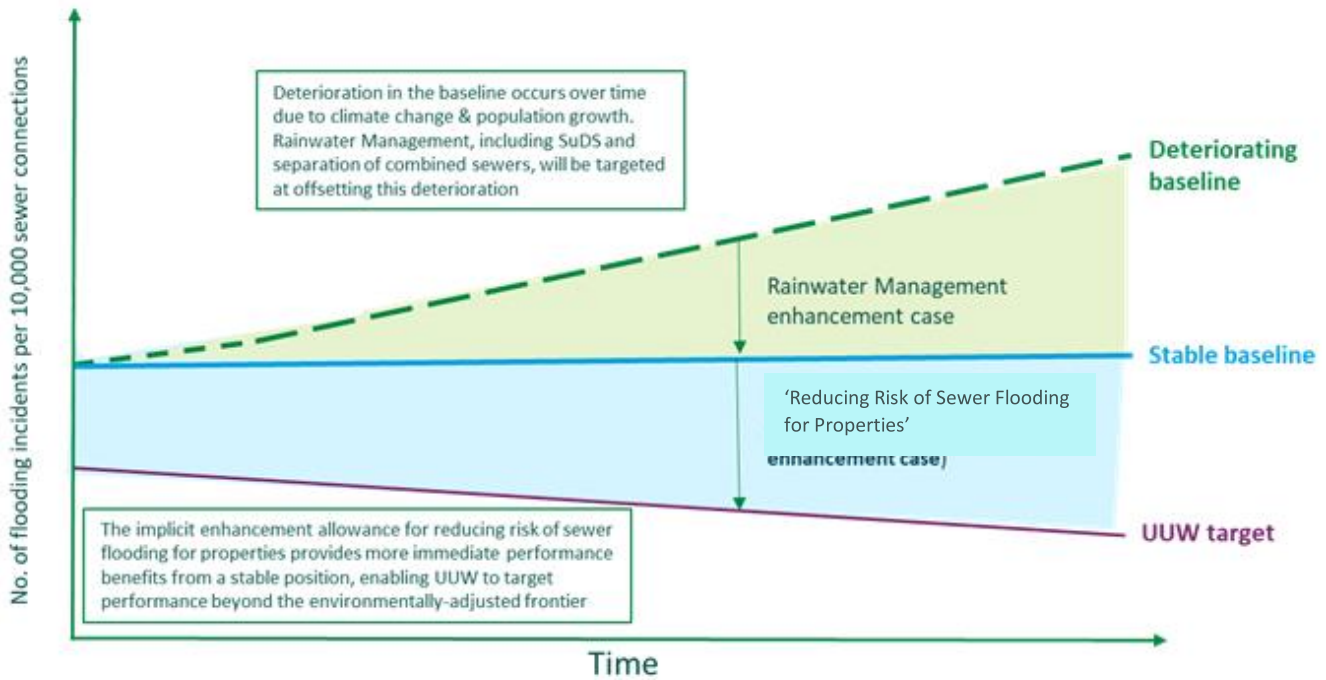
from increasing erosion risk. We will also continue to respond reactively to erosion where necessary. (UUW65 – *Wastewater Quality Additional requirement enhancement case 17*).

- 4.6.7 A partnership to mitigate coastal erosion at Crosby provides an opportunity to deliver a project through a different process and the learning from this can be applied elsewhere. In addition to this, where possible, solutions were chosen that deliver environmental and amenity benefits and work with the natural processes of the watercourse. Examples include reinstatement of the original river channel and implementation of bio-engineered protection measures (e.g. vegetated sand bags). The investigations will also provide us with potential opportunities to deliver new and innovative solutions to mitigate the erosion risk.

Focus on rainwater management interventions and the additional benefits

- 4.6.8 We are working hard to improve our flooding and overflow performance, but note that interventions for these outcomes are not always synergistic. For example, grey storage solutions to prevent spills from storm overflows to watercourse capture escapable water within the tank and therefore do not provide upstream flood alleviation beyond that offered by the existing storm overflow. Equally, removing rainwater connections from one part of the drainage catchment may not alleviate flood risk elsewhere.
- 4.6.9 We're planning for significant additional rainfall from climate change whilst significantly driving down storm overflow spills and continuing to reduce sewer flooding. Consequently, there is a significant volume of surface and foul water to be managed, at many locations, without exacerbating the flood risk that the storm overflows protected against. We are proud to have developed an AMP8 programme of interventions which addresses drainage service challenges through a blend of traditional and nature-based solutions. Our AMP8 programme is also set in the context of the long term through our DWMP and within that our long term plans for overflows.
- 4.6.10 There are several areas of our plan which propose rainwater management interventions: -
- *UUW64 Storm overflows enhancement case*– investment in blue/green infrastructure and hybrid solutions to address spills targets in AMP8
 - Advanced WINEP – blue/green infrastructure targeting spills targets at overflows with drivers beyond AMP8
 - *UUW65 – Wastewater Quality Additional requirement enhancement case 15* – blue/green infrastructure to secure resilience against the effects of climate change to protect against the risk of future deterioration in flooding
 - *UUW65 – Wastewater Quality Additional requirement enhancement case 18; and,*
 - *UUW44 - Cost Adjustment claim submission (Drainage claim).*
- 4.6.11 Our rainwater intervention ambition for AMP8 is substantially bigger than previous investment periods. The demands of new spill targets, addressing flooding and climate change risks require this step change.
- 4.6.12 As a consequence of the range of contributing factors we have a balanced programme to support customer awareness, maintaining sewer capacity and the focus of this section, a range of interventions to manage rainfall to support sewer flooding and sewer overflow risk. These interventions support AMP8 drainage ambitions, as well as longer-term targets and risks from climate change.
- 4.6.13 A representation as to how these sewer flooding programmes complement each other, and how managing rainwater is a key part of the plan, is shown in Figure 7

Figure 7: Sewer flooding investment programmes and the impact on performance



- 4.6.14 While the risks to sewer flooding and storm overflow spills are the same; hydraulic capacity and operational issues, the intervention types and location to address flooding and spill risks are often different. Spills solutions are closer to the watercourse and flooding solutions are often located nearer customer properties.
 - 4.6.15 We are pleased with the on-going engagement with the Environment Agency and Ofwat to develop the advanced WINEP proposal. This programme looks to deliver blue/green infrastructure in partnership to start to address long-term spill targets. This will showcase what is possible for natural solutions, how effective partnerships can work in delivering benefits to the environment and communities. We hope that the learning and success can be shared with the wider industry through AMP8 and to inform PR29, as we look to expand our ambitions for rainwater management.
 - 4.6.16 Our Advanced WINEP, while focussed on future spill drivers at overflows that are not in the AMP8 WINEP, has flexibility at its heart. Exact locations for blue/green infrastructure take time to optimise; for hydraulic reasons but also to find the most appropriate partner and land owners. This flexibility is built into the framework of the Advanced WINEP to ensure optimal solutions are found while protecting customers with an effective Price Control Deliverable if benefits cannot be delivered.
- Maintenance Excellence**
- 4.6.17 Our maintenance excellence strategy is about keeping our assets and equipment as safe, cost-effective and reliable as possible. An efficient maintenance strategy is vital for providing the high-quality services customers depend on. And for our colleagues, it is key that we minimise labour-intensive, unplanned and potentially hazardous work.
 - 4.6.18 To achieve maintenance excellence, we aim to minimise asset failure and avoid expensive repairs or short-term fixes. We are doing this by optimising the scheduling of routine maintenance work, prioritising our most critical assets and investing in innovative technology. We have dedicated teams working in new ways to prevent asset failure across the business.
 - 4.6.19 We routinely model all aspects of our asset base, predicting their current risk and future deterioration. We predict their repair, refurbishment and replacement under various credible investment and service performance scenarios. This modelling is carried out at asset level, including approximately five million sewer lengths, one million water mains and half a million non-infrastructure assets.

4.6.20 Our approach will be to continue our proactive approach to maintenance work and consequently reduce reactive maintenance. Optimising future network maintenance activities ensures that it is carried out at the right time and frequency, prioritising the most critical assets. This will extend the asset life and identify potential failures before they occur giving a more robust service to customers.

Asset risk modelling

4.6.21 Our industry leading understanding of our assets, as assessed by the Asset Management Maturity Assessment (AMMA), will continue to educate our approach to managing our asset base to continue to deliver an appropriate blend of asset rehabilitation, renewal and operational interventions to target cost effective resilience now and into the future.

4.6.22 Our service delivery is underpinned by our asset base. We have proactively invested to better understand the health of our asset base since privatisation. This understanding of asset health helps us to make informed decisions about the most appropriate blend of strategies to deliver improving service performance, while maintaining and enhancing our operational resilience. This approach leads to an informed adoption of investment in differing degrees of reliability, resistance, redundancy and response and recovery.

Predictive and proactive operation

4.6.23 The new capability we have realised through DNM has enabled us to manage our wastewater network more proactively. Given the success of this initiative, we plan to invest further in AMP8 to expand the provision of DNM, increasing monitor coverage across existing DNM drainage areas and expanding to new drainage areas such that more customers can benefit from the step change in service provision that DNM provides. In this way, we can prevent more flooding other cause (FOC) incidents by further increasing the ability to proactively detect blockages and intervene before the system has time to become sufficiently surcharged to cause a service impact. Over the remainder of AMP7, we will be continually reviewing the outputs from our DNM platform to further understand the optimum number of sensors for a given area and scale the size of our AMP8 programme accordingly.

4.6.24 To build on the success of DNM we have a vision to connect DNM to strategic treatment facilities, where there are benefits, and pioneer the thinking and technology out into the wider catchment.

4.6.25 In-certain catchments, our drainage systems are intrinsically linked to other systems, such as highway drainage systems, agricultural run-off and private drainage systems. As a result of these inter-linked systems, environmental outcomes cannot be met by single organisations alone. Effective partnerships can address some issues, however we believe that partnerships, plus a framework supported by technology is the key to unlocking efficient interventions and new levels of customer and environmental outcomes.

4.6.26 This is a new and innovative approach that will allow United Utilities and all stakeholders involved in the management of a water catchment to understand the part they play in maintaining and improving the health of waterbodies. We are planning to enhance our monitoring and control capability deploying new monitoring systems as well as taking in lots of data that is currently available from other stakeholders and partners in order to be able to improve the natural environment.

4.6.27 Through connecting the catchment we, or an appropriate partner, will become a system convener. The system will allow anyone involved in the management of water quality to access the information they need to understand what impact they are having and what they need to do in order to reduce that impact. This will involve U UW proactively operating and maintaining its network to reduce pollution risk or optimizing the wastewater treatment process we use to minimise the nutrient load in receiving water bodies. However, we will also be looking to other stakeholders to carry out interventions such ensuring septic tank discharges are compliant with requirements or that run off from agricultural or surface water is done so in a controlled and beneficial way.

4.6.28 Windermere has been chosen as the area for us to develop this innovative approach because we recognise the importance it plays in providing ecological, environmental, economic benefits to the local community and beyond. We are completing a six month trial to identify what is possible and are

collaborating with our partners in order to begin monitoring, analysing and improving the health of Windermere. After that we plan to embed the elements we have identified in order to start full catchment management by 2025.

- 4.6.29 We will pilot this approach to understand how we promote, incentivise and track the roll-out and benefits of this strategy. We aim to learn from the pilot for future roll-out and wider benefits realisation for customers and the environment.

Power resilience

- 4.6.30 The collection, treatment, and discharge of wastewater is fundamentally energy intensive. The UK water industry uses just over two per cent⁹ of the total electricity used in the UK per year to provide reliable wholesome water to customers and to recycle treated water safely back to the environment.
- 4.6.31 Access to reliable and consistent sources of energy are essential to the effective operation of modern water and wastewater treatment assets, due in part to their energy intensity but also the proliferation of monitoring and system feedback loops in treatment processes to ensure compliance. The reliability of energy is an issue that the DWI acknowledge¹⁰ as risk to long-term water quality and the risk to reliability of energy sources associated with a changing climate.
- 4.6.32 The enhancement proposal provides a robust solution to reduce the risk and impact to customers and the environment in the event of a mains power loss at some of these locations, to bridge the gap between the loss in mains supply and the mains power being restored.
- 4.6.33 The solution aims to deliver resilience now and in the future, accounting for climate change in both a benign and extreme future. With wetter winters and more extreme weather predicted, the likelihood of power disruptions and their impacts is heightened, with the increasing frequency and severity of storms and flood risk. Our most critical assets would have an extra layer of protection through the provision of a back-up power supply.
- 4.6.34 Large significant supply side power interruptions and their impacts are specific hazards, which are outside of management control. However we recognise our duties to maintain continuity of supply plan is to reduce the consequences of such events
- 4.6.35 More information is available in *UUW67 Cross Price control enhancement case 26*.

Minimising the operational impact

- 4.6.36 We have a statutory requirement under the Urban Wastewater treatment directive to maintain sewers to minimise sewer leakage especially in source protection zones.
- 4.6.37 In addition to this the government storm overflow reduction plan includes principles to reduce the amount of surface water connected to the combined sewer network including limiting any new connections or offsetting them by removing surface water elsewhere and the expectation for companies to prevent additional rainwater from entering the combined sewer. This can lead to unsatisfactory overflows and the SOAF states that problems due to asset maintenance (including infiltration and cross connections from duel manholes where more water is getting into the combined sewer than should be) need to be resolved, without going through the main stages of the SOAF framework.
- 4.6.38 To mitigate these risks, we plan to target areas with the highest importance (criticality) for assessment and rehab, which may result in targeted programmes to reduce infiltration to and leakage from the sewer network, with this including work in source protection zones if deemed necessary.
- 4.6.39 In addition, as part of our ongoing operations we plan to continue our good performance on odour management and will monitor and respond to any emerging risks in AMP8.

⁹ Water companies use just over two per cent of the total energy used in the UK each year, [Great Britain's monthly electricity stats](#), 2023

¹⁰ Access to reliable and consistent sources of energy are essential to effective delivery of water and wastewater services, [DWI: Long Term Planning for the Quality of Drinking Water Supplies](#), 2020

Better Rivers Better Northwest

- 4.6.40 We have seen good progress in AMP from our Better Rivers Better North West programme and we plan to continue this in AMP. The focus will continue to be reducing overflow spills and improving river health. In addition to spills the programme will monitor and investigate emerging challenges.
- 4.6.41 For example, we anticipate needing to monitor and potentially respond to flow compliance as a result of the Environment Agency evolving and confirming the approach for measuring flow compliance. We also continue to improve flow monitoring, with new monitoring being installed in AMP. This new situational awareness may present new issues for investigation and potentially resolution in AMP. Any issues are likely to exist due to legacy design shortfalls with treatment works. This will be a continuation of understanding and managing risk in AMP.
- 4.6.42 Also, as new monitors are installed across the wastewater system we anticipate new information will become available that will require investigation and potentially intervention to resolve. This new situational awareness may give rise to information on how emergency overflows are performing and uncover assets that have not been known to us before and require permitting.

4.7 Innovation

We are ready to innovate again for AMP8

- 4.7.1 We are proud of our multi-AMP track record using innovation to deliver efficiencies, customer and environmental improvements. Our innovation portfolio, model and processes has guided us to adopt ideas in AMP7 that will continue to deliver value into AMP8, resulting in sustainable benefit to customers, wider society and the environment.
- 4.7.2 Our AMP8 innovation effort is directed by what customers tell us is important. They are aligned to Ofwat's core innovation themes, 2050 Water sector strategy and other government and regulatory ambitions – and our ambition for a stronger, greener and healthier North West.
- 4.7.3 We have an active innovation investment portfolio of new concepts and market-ready ideas for AMP8 adoption; we are excited about the potential of ideas being trialled such as:-
- AMP7-adopted ideas that need optimising – such as using drones for asset health condition assessments
 - New innovations being tested now including our AMP8 pilot portfolio and the outputs for all Ofwat Innovation Fund projects
- 4.7.4 In addition, we are optimistic of the prospect of finding even more ideas through our future Innovation Lab programmes and other global scouting.

Using smart networks: Reducing wastewater network blockages - Deragger

- 4.7.5 Sewage pumping stations are at the centre of our improvements to the operation of wastewater networks in reducing the risk of failure and managing operating costs. Blocked pumps account for 80–90 per cent of all unplanned sewer work, and evidence shows that blockages, and the build-up of rags prior to blockages, increases pumping energy costs, which has a detrimental impact to asset life.
- 4.7.6 Our global scouting discovered the Deragger solution, which monitors in real-time the energy demand of the power to the pump, detecting the instant that even a single wet wipe starts to impede the pump impeller (from increased or abnormal energy demand.) This detection allows the Deragger to slow and stop the pump the instant that an impediment forms, briefly reverse the pump to dislodge the impediment and, therefore, allows the wipe to pass in suspended flow through the system, preventing the creation or build-up of rag-balls.
- 4.7.7 We used our innovation process to pinpoint areas of focus by asking '*where would new innovation provide the most benefit?*' From this, we selected the Deragger anti-ragging device, which addresses the problem of ragging of wastewater pumps (such as the inappropriate disposal of wet wipes).

Conventional solutions merely detect any blockage once it has already started to form, by which time it is too late.

- 4.7.8 We collaborated with Wessex Water on this solution, where we both provided sites for Deragger trials and shared information on the operational activities, reducing the time to trial by sharing knowledge. We have now rolled out at scale in over 300 locations.
- 4.7.9 This innovation supports our reduction in reactive blockage call-outs and saves 10 per cent energy/carbon compared to conventional solutions.

4.8 Growth and new development

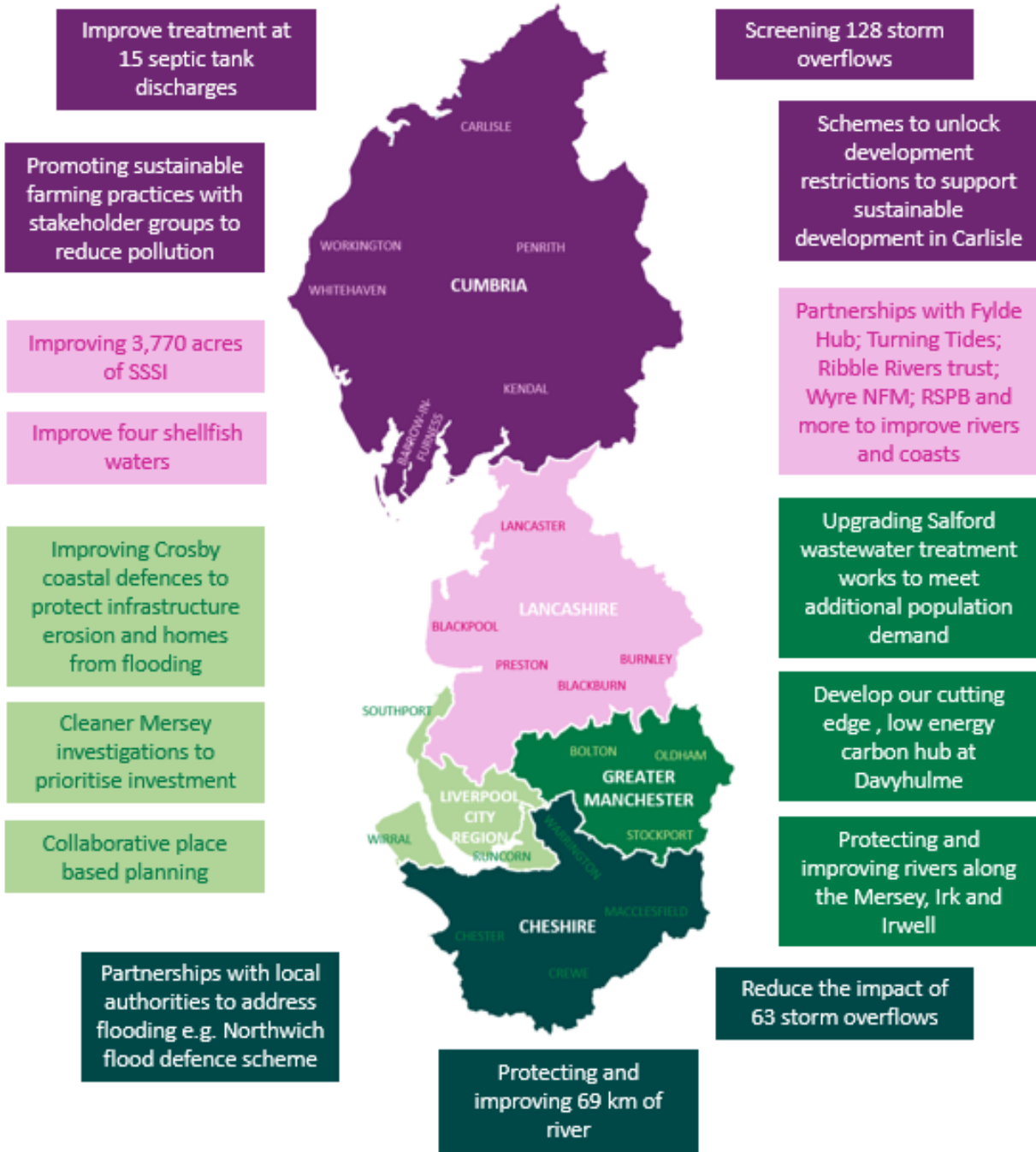
- 4.8.1 The resident population in the North West is growing, and expected to be over 8 million by 2050. We have an obligation under the Water Industry Act (1991) to ensure that new developments are effectively drained and the resultant wastewater is treated to the required standard to ensure there is no deterioration in environmental impact or customer service. Customers and stakeholders expect us to provide services that keep pace with new development and that the capacity of our systems will not limit economic growth.
- 4.8.2 UUW has 584 wastewater treatment works with a broad range of flow and load capacity. In many locations this capacity is gradually being utilised by the flow and load from growth generated by new development and these locations are often those where further growth is forecast, Additional population above the design capacity presents a compliance risk and is likely to have an adverse environmental impact due to premature spills to the environment or insufficient treatment to meet the final effluent permit. Both of these scenarios can result deterioration of the receiving watercourse and ecosystems due to oxygen depletion and are likely to result in the wastewater treatment works failing the discharge permit compliance performance commitment.
- 4.8.3 A risk based approach was taken to ensure the schemes included in the enhancement programme were those where we are confident that new development will have an impact during the business plan timescale.
- 4.8.4 Solution design incorporates all growth where there is certainty in the forecast data available (including growth beyond 2030). This will enable us to deliver solutions that are more resilient in the longer term. Additional drivers (environmental quality or maintenance requirements) are also reviewed alongside any growth projects to facilitate identification of further efficiencies and projects will accommodate the projected growth for the business plan timescale and beyond to ensure resilience to future risk.
- 4.8.5 Revenue from developer charges is used to increase network capacity and accommodate additional flow and load from new developments where required. The solution to protect the network and the treatment works can be delivered as part of one project to resolve the full impact. More information on the application of the infrastructure charge is given in *UUW54 - Developer Services Business Plan*.
- 4.8.6 We have identified 12 locations that require investment in AMP8 to meet supply and demand needs for this five year period. The wastewater treatment works identified vary in size and location and will accommodate an additional 61,736 population equivalent.
- 4.8.7 In addition to this we are monitoring the large garden village developments in a number of locations such as the Cuerdale Garden village near Blackburn and the Handforth garden village in Cheshire as part of our longer term plans.
- 4.8.8 In line with the DWMP we have developed adaptive pathways in order to assess and amend our plans if growth forecasts change within the AMP, which will continue to be our approach when assessing risks posed by these large garden village type developments. In the case of accommodating growth in the south of the Carlisle catchment, the build out rate may be affected by a number of external factors, these are risks identified in the housing market demand and capacity assessment, so our plans are adaptive in order to manage changes.

- 4.8.9 The plan also includes the network system in the area in line with our systems thinking approach.
- 4.8.10 The flexibility of the programme protects customers in that the highest priority locations will attract investment, even if those priorities alter during the business plan timescale. The design horizons and the quality of the forecast data ensures an optimum level of resilience.
- 4.8.11 In addition to the programme to accommodate new development and growth, it is estimated that approximately 64,700 properties are not connected to the public wastewater network and rely on privately owned, operated and maintained wastewater collection and treatment systems. Such systems include septic tanks, cesspits and small package treatment plants, which, when installed and maintained properly, provide a sustainable method for wastewater disposal.
- 4.8.12 Where appropriate, connections to existing UUW sewerage infrastructure can be made for typically rural settlements, protecting the local environment and amenity value.
- 4.8.13 More information is available in *UUW65 – Wastewater Quality Additional requirement enhancement case 21*.

4.9 The North West is made up of diverse counties

- 4.9.1 We've built our plan for the next five years around the five counties of the North West, as each is different with its own particular challenges and opportunities. Through embedding this approach we are delivering outcomes which are tailored for customers in the places where they live.
- 4.9.2 Because delivering locally is important for us, we've been working with stakeholders and customers to develop our understanding of unique needs at a local level across the sub regions of the North West and we've tailored our plans for each. Our five county level plans make our investment programmes and the benefits that they deliver more meaningful to customers.
- 4.9.3 Our plan delivers service improvements across all our five counties although also within our plan are specific schemes with greater importance in a particular county, Figure 8.
- 4.9.4 More detail on our plan for the five counties is available in Chapter 2 and Chapter 6.

Figure 8: Our wastewater plan for the five counties



5. Our long term strategy for wastewater

Key Points:

- **A transformational investment for the future:** Our long-term plan for wastewater outlines £30.3 billion of totex expenditure over the next 25 years targeting bold ambitions for drainage and wastewater treatment. Reducing storm overflow spills is a priority and we aim to deliver against the timelines of the Governments Storm Overflow Discharge Reduction Plan (SODRP).
- **Protecting customers from sewer flooding:** By 2050, our plan aims to further reduce internal flooding by 50 per cent and external flooding by 30 per cent. It also targets improvements to the resilience of our network, for example by reducing sewer collapses.
- **Protecting the water environment:** By 2050, our plan aims to further reduce pollution incidents by 33 per cent. We will continue to protect and restore catchments, rivers and coasts throughout the North West, including action by 2030 to improve 11,728 hectares of Sites of Special Scientific Interest (SSSI) and 386 km of river. Additionally we are investing to improve and maintain the status of shellfish waters at 34 storm overflows and at 35 storm overflows for bathing waters. Our approach sets out our ambitions to unlock wider environmental outcomes, while meeting our statutory obligations.
- **Embracing latest innovation:** We will use technology and data solutions to further enhance our system operation, expanding our dynamic network management approach to proactively identify operational issues and optimise performance, minimising sewer flooding and pollution at lower cost and greenhouse gas (GHG) emissions.
- **An adaptive plan that will remain fit for the future:** We have tested a range of scenarios and pathways to ensure that our plan can adapt to future uncertainty in the face of climate change, population growth and environmental changes, as well as understanding the opportunities offered by innovation and technology. The pathways associated with these scenarios are described in section 5.4.
- **In summary,** our core pathway offers a flexible, low regrets and best value solution, which provides significant environmental improvements and benefits to customers in the North West with more resilient wastewater services.

5.1 An overview of our long term plan for wastewater

- 5.1.1 Our adaptive plan for wastewater enables us to deliver our ambition for the North West under plausible extremes of climate change, demand, technological development and changing expectations.
- 5.1.2 Our adaptive plan is comprised of a core pathway of low regrets investment and expenditure that keeps future options open, and alternative pathways containing investments required under more extreme future scenarios. Figure 9 highlights some of the investment and outcomes our core pathway delivers. Figure 10 shows under what circumstances we may need alternative pathways to help deliver our ambition. Our alternative pathways are described by clear decision and trigger points which we will proactively monitor. Alternative pathways may be required at different points in time. In many cases, alignment of trigger and decision points with regulatory cycles is important to ensure efficiency and best value for customers.

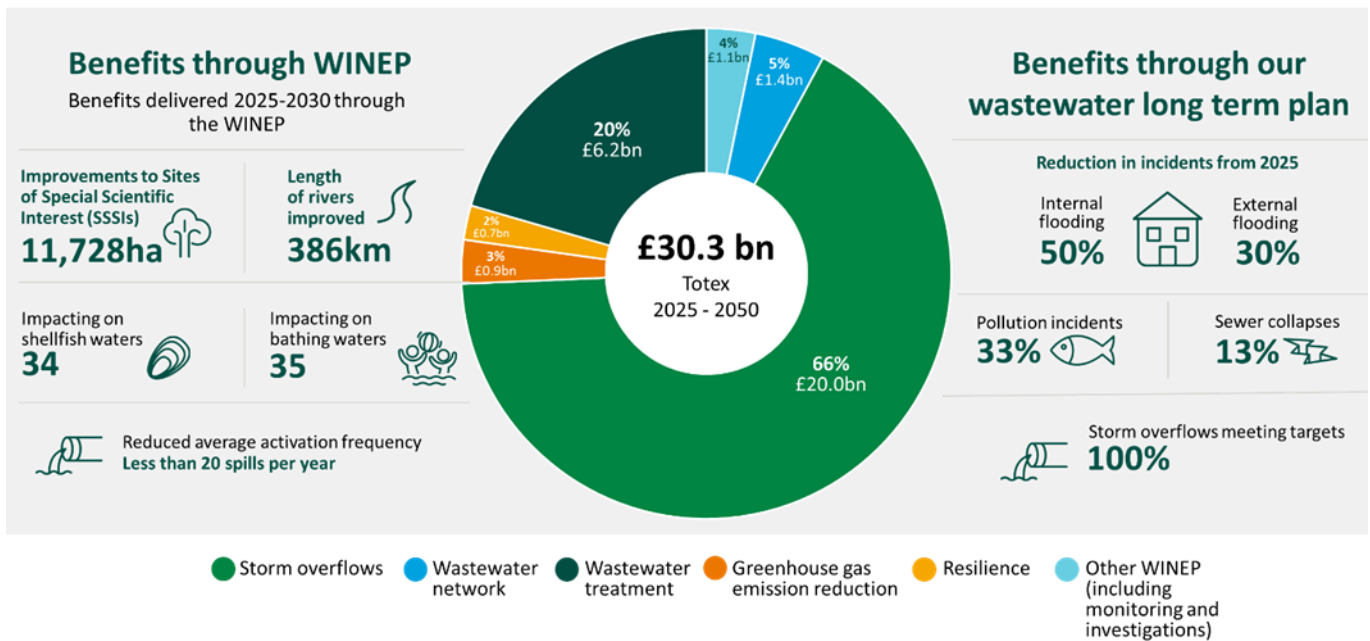
The benefits delivered by our Core Pathway

- 5.1.3 Our long-term plan for wastewater includes £30.3 billion of investment between 2025 and 2050. A significant proportion of this spend, £20.0 billion, is associated with delivering the step change in requirements for storm overflows, driven by the Governments' Storm Overflow Discharge Reduction Plan (SODRP). £1.38 billion is associated with solutions for flooding, pollution and collapses identified through our Drainage and Wastewater Management Plan (DWMP). £6.2 billion of non-overflows WINEP spend based on current expectations about future drivers, and £867 million demonstrates the scale of

offsetting for greenhouse gas emissions, given the size of the enhancement programme and associated emissions.

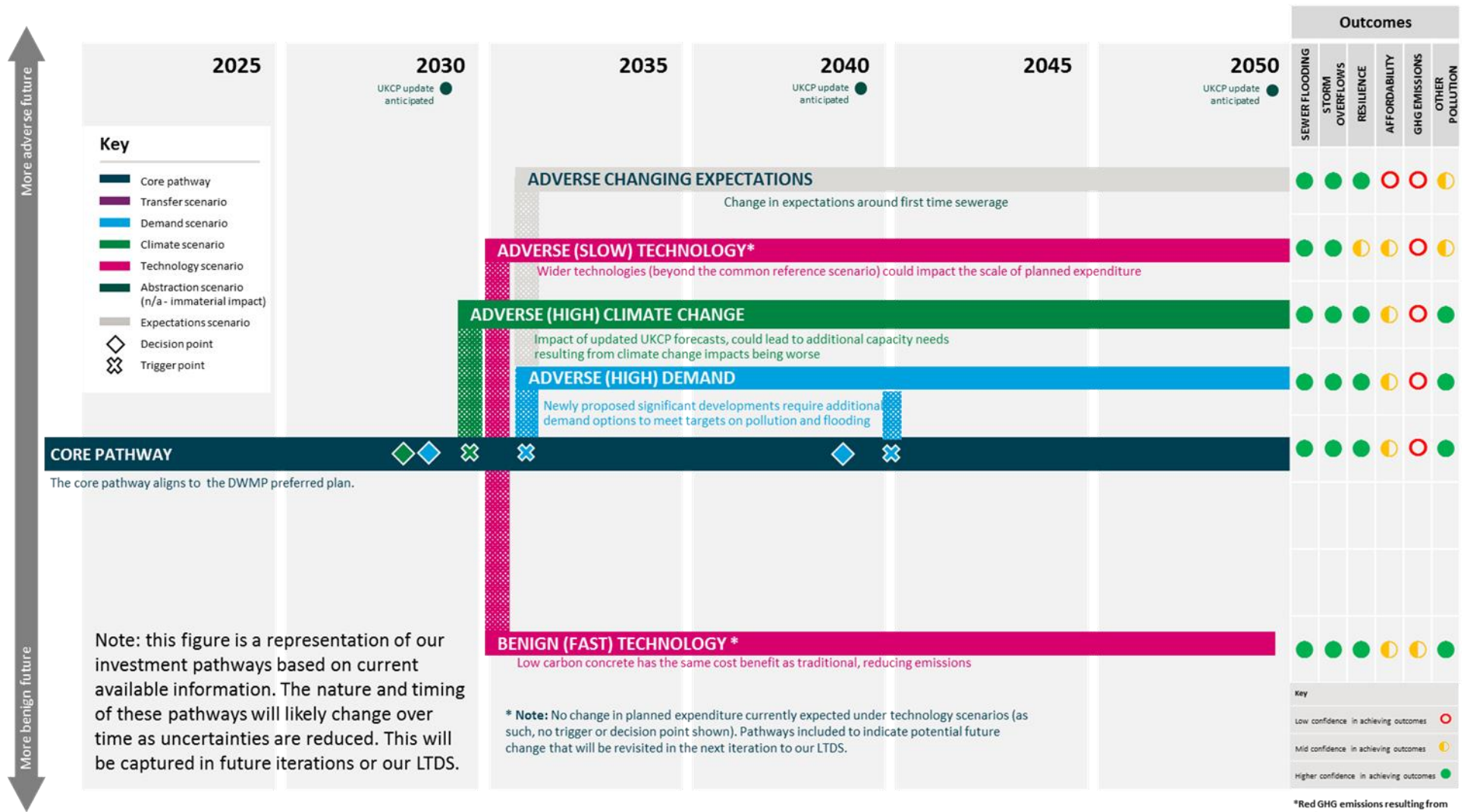
- 5.1.4 The planned investment in our core pathway delivers a range of outcomes by 2050, these are summarised in Figure 9 and further detailed in section 5.2. This investment aims to deliver across all of our ambitions, for example removing or storing enough rainwater to reduce overall annual spills by 29,000 by 2030. By 2050, our core pathway delivers a 50 per cent reduction on internal sewer flooding, a 30 per cent reduction on external sewer flooding from 2025 baselines and delivers resilient services, reducing sewer collapses by 13.4 per cent.
- 5.1.5 Our action on storm overflows aims to provide improvements and benefits across the 25 years of our long-term plan, meeting long-term and interim targets set out in the Government’s SODRP. For the environment, our ambition is to deliver improvements to Sites of Special Scientific Interest (SSSIs) across almost 11,728 hectares, improve 386km of rivers and deliver a 33.3 per cent reduction in pollution incidents, including no serious pollutions.

Figure 9: A summary of our totex expenditure and outcomes delivered through our long-term plan for wastewater



- 5.1.6 Figure 10 below outlines our adaptive plan for wastewater. Our core adaptive pathway aims to deliver under the benign and adverse scenarios, and keeps options open for the future, as demonstrated. There are challenges in meeting greenhouse gas (GHG) emission targets and delivering a plan that is affordable, this is driven by the significant scale of our statutory WINEP programme to deliver against the SODRP.
- 5.1.7 Our adaptive plan for wastewater identifies a core pathway of expenditure to 2050 along with a number of decision and trigger points, which indicate where an alternative pathway of expenditure may be needed to meet our ambitions under changing external factors. The diagram also includes an indication of how challenging it will be to meet each outcome under the different scenarios, demonstrated by the 'red, amber and green' markers. Due to the scale of the statutory overflow requirements for wastewater, affordability and GHG emissions are challenging to achieve under every scenario.

Figure 10: Our adaptive plan for wastewater



5.2 Our core adaptive pathway to deliver our wastewater ambition

- 5.2.1 Our long term strategy for wastewater acknowledges the extensive planning we already do in developing future plans e.g. through the DWMP and the WINEP:
- DWMP: we undertake extensive option development, testing and adaptive planning through the development of the plan. The DWMP, has a long-term planning horizon to 2050. Our DWMP aligns to Water UK’s document ‘A framework for the production of Drainage and Wastewater Management Plans’;
 - WINEP: we have completed extensive option development and testing to identify investments to improve the environment under the WINEP. Future planned WINEP schemes are concentrated over the period to 2035 (as required by the Environment Agency), however, they also provide a starting point for longer-term thinking cf. our Advanced WINEP proposal to commence in AMP8 the work on catchment components of future WINEP overflow schemes. Our WINEP programme aligns to the Environment Agency’s WINEP Methodology, which in turn addresses relevant aspects of the government’s 25-Year Environment Plan; and,
 - Storm overflows: our AMP8 enhancement programme is targeting spill reductions at 437 storm overflows. It is anticipated to deliver over 600,000 m³ of new storage capacity, an increase in treatment capacity at 37 WwTWs, and implementation of over 170 sustainable drainage solutions (SuDs). This plan is the first phase of our longer term storm overflow reduction plan that meets government’s new SODRP
- 5.2.2 Addressing the challenges requires an ambitious and holistic approach, utilising new technology, regulatory reform, partnerships, innovation and natural solutions alongside building new systems and capacity.
- 5.2.3 To develop our long-term plan for wastewater we have considered over 65,000 different options, with a particular focus on adaptive solutions, better surface water management and optimisation of our assets. The range of interventions identified are those which have the potential to mitigate against the long-term risks identified during the risk identification stages of the DWMP process.
- 5.2.4 The long-term plan sets out a pathway and direction of travel to meet our long-term planning objectives. It must, however, be continually reviewed as part of an adaptive approach given the levels of uncertainty regarding factors outside of management control such as climate change and policy changes.
- 5.2.5 The long-term plan considers a range of components:
- Wastewater treatment – activities that are mandated by legislation or are required to maintain compliance with discharge permits;
 - Storm overflows – investment associated with meeting the targets within the government’s SODRP;
 - Our long term ambitions for rivers in the North West, to:
 - make sure our operations progressively reduce impact to river health;
 - be open and transparent about our performance and plans;
 - make rivers beautiful, supporting others to improve and care for them; and
 - create more opportunities for everyone to enjoy rivers and waterways; and
 - Service performance improvements – optimised outputs of the non-legislative aspects of the plan e.g. to reduce internal flooding.
- 5.2.6 We tested a range of approaches and scenarios and this has allowed us to understand the best set of activities at a regional level for meeting the long-term planning objectives. The two main approaches that were explored are the lowest whole life cost and best value. Following testing with stakeholders,

the best value approach was used to be used to identify the best set of options to meet planning objectives.

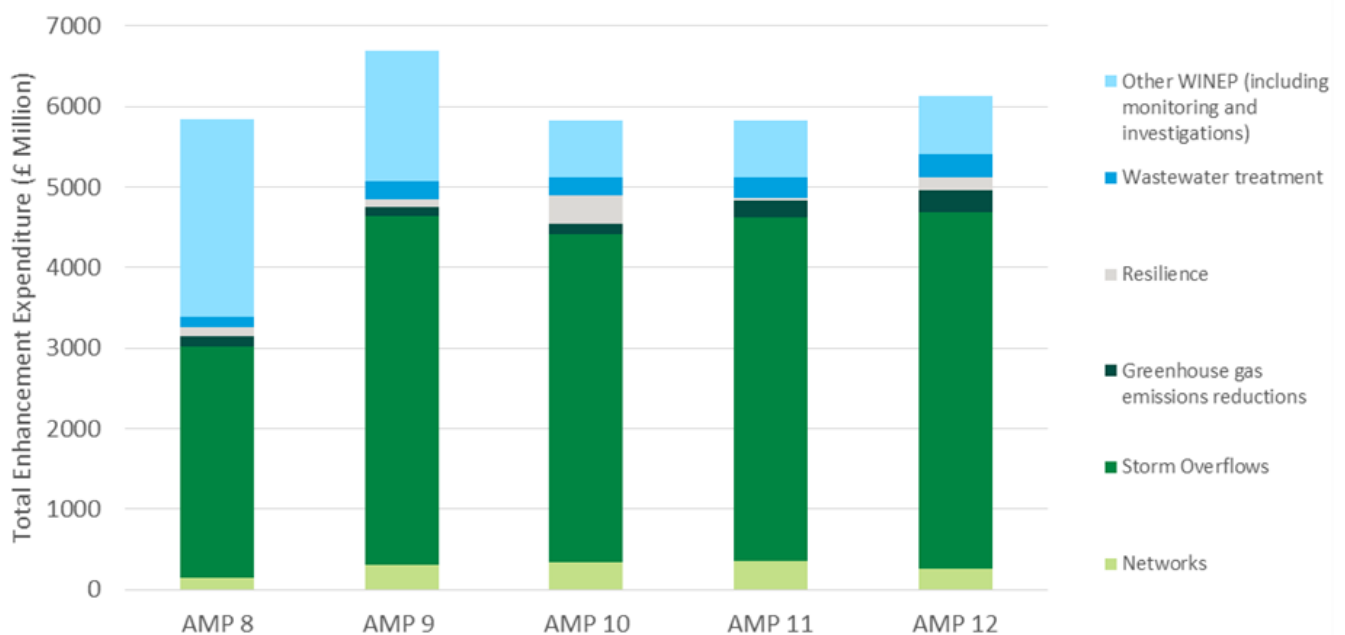
5.2.7 Our current core pathway is focused on the areas where we have greatest certainty, with a risk-based approach being taken for those areas of greater uncertainty, which are inherently higher risk.

5.2.8 In total, in our core pathway, we forecast £30.3 billion of investment to ensure we can achieve our long term performance ambitions. This includes circa £20 billion to meet the government's SODRP targets.

The detail of our core pathway for wastewater

5.2.9 The enhancement expenditure in our wastewater core pathway is summarised in Figure 11 by AMP and by broad expenditure grouping. Full details are provided in data table LS4.

Figure 11: Wastewater core pathway: summary of enhancement expenditure by type



5.3 Our alternative adaptive pathways for wastewater

5.3.1 Our wastewater core pathway meets statutory requirements and where there are choices is resilient to the key future uncertainties we are likely to face and as such, its component solutions are low regret and we have high confidence in the need for this investment. To deliver our forecast performance outcomes under certain, more extreme future scenarios, however, we would need to invest in different solutions. As these solutions are only needed under a single or small number of scenarios, they are higher regret. We have presented these higher regret solutions as alternative pathways which we would only propose to switch to if the need became clear.

5.3.2 We have tested the impact of the following benign and adverse scenarios, and considered what expenditure is required under each of these scenarios to deliver our ambition:

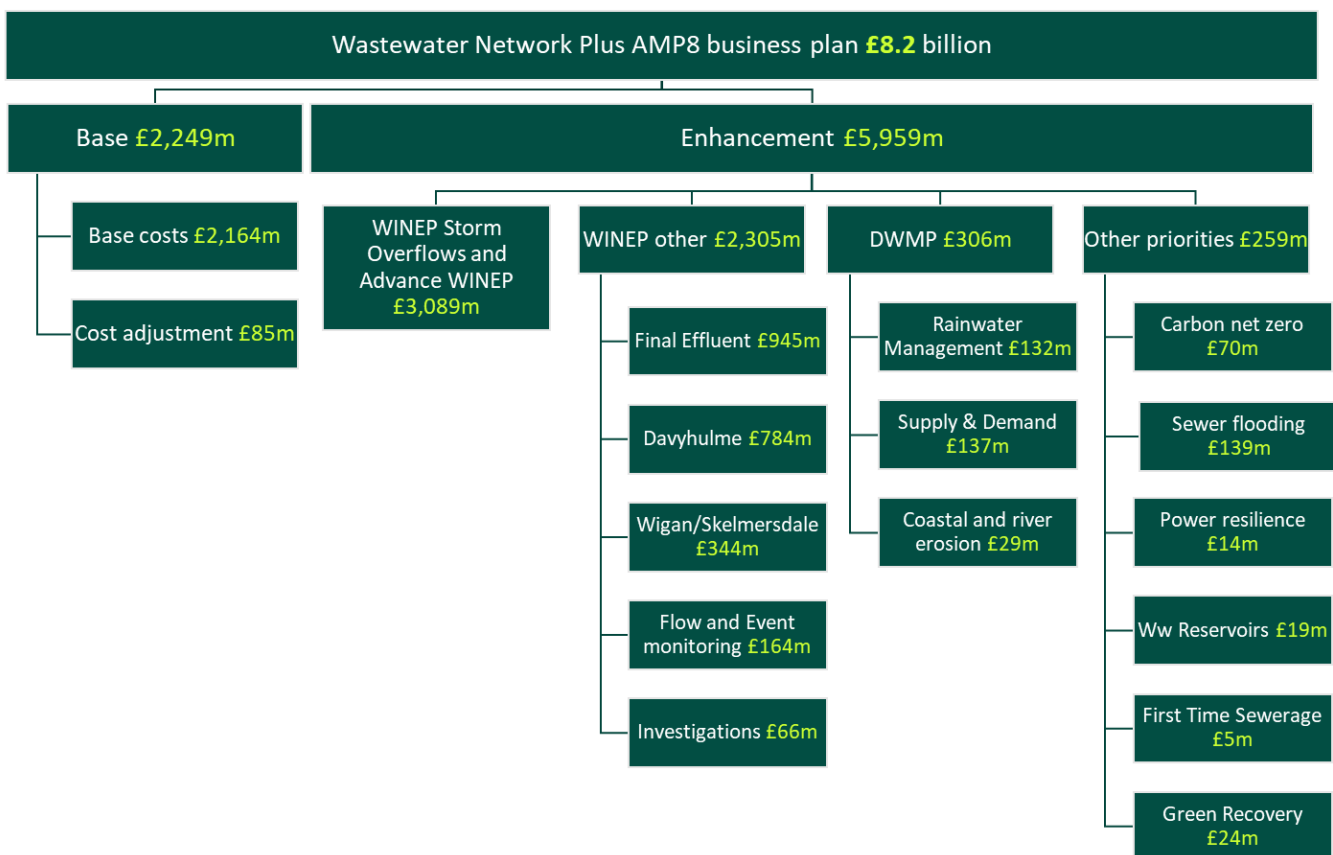
- Climate change;
- Demand;
- Technology; and,
- Changing expectations.

5.3.3 For full details of the long-term delivery strategy please refer to UWW12 Long term delivery strategy.

6. AMP8 Plan Summary

- 6.1.1 Our AMP8 business plan for Wastewater Network Plus outlines £8,208m of expenditure, from 2025 to 2030, enabling us to meet our stakeholder and customer expectations. The proposed cost allocations is summarised in Figure 12. The price base used is FY23.
- 6.1.2 Wastewater network plus base costs are £48 million higher than the AMP7 FD, largely driven by higher ongoing opex as a result of our AMP7 enhancement programme. AMP8 enhancement totex primarily relates to our obligations under the WINEP, including the requirement to significantly further reduce the use of storm overflows, with other enhancement programmes to support new homes, manage rainwater, improve power resilience, protect against coastal and river erosion, and reducing greenhouse gas emissions. We include one cost adjustment claim for our higher ongoing phosphorus removal costs, and one conditional cost adjustment claim to reflect the combined effect of urban rainfall and combined sewers making our drainage system more susceptible to flooding,

Figure 12: Wastewater Network Plus totex breakdown



- 6.1.3 Our aim is to achieve the ambitious benefits set out in this plan by providing great service to customers, at the lowest sustainable cost, in a responsible manner. We commit this plan for Wastewater Network Plus as central to achieving this vision.
- 6.1.4 As part of our Wastewater Network Plus business plan submission we have included a number of cases for enhancement funding and cost adjustment, these are shown in Table 8.

Table 8: Wastewater Network Plus business plan enhancement summary

Enhancement	Summary	Capex (£m)	Opex (£m)	Totex (£m)
WINEP				
Wastewater treatment works final effluent limits <i>UUW63 case 11</i>	Multiple statutory drivers require changes in final effluent permit requirements. Drivers include The environment Act; Water framework Directive; Urban wastewater treatment regulations; Habitats regulations; Natural Environment and Rural Communities Act 2006; Wildlife and Countryside Act (SSSI); Levelling up and regeneration (nutrient neutrality); and Bathing Water Regulations. Interventions, including (but are not limited to) process improvements or additional process units and/or chemical dosing.	929	16	949
Investigations <i>UUW63 case 12</i>	The Environment Act, Water Framework and Bathing Waters Directives mainly drive the need for these investigations. The programme is vital in terms of ensuring a robust evidence base is developed to inform any future environmental improvement schemes so that they offer good value to customers	65.84	-	65.84
WINEP Wigan and Skelmersdale <i>UUW43</i>	WINEP Optimisation covering our core plan and three potential variants to our WINEP	343.83	-	343.83
WINEP Davyhulme <i>UUW43</i>	As above	784.25	-	784.25
Storm Overflows <i>UUW64 case 13</i>	A total of 437 intermittent discharges require upgrade to meet environmental and/or spill frequency requirements as outlined in The Water Environment (Water Framework Directive) Regulations 2017, The Bathing Water Regulations 2013 and the Environment Act 2021.	3,046.24	43.19	3,089.43
Flow and EDM <i>UUW64 case 14</i>	Related to the delivery of MCERTS certified flow measurement, MCERTS certified event duration monitoring and river water quality monitoring. The need for investment is driven by the Urban Wastewater Treatment (England and Wales) Regulations 1994 and Environment Act 2021, these are statutory drivers within the WINEP. Where there is some flexibility for additional/optional delivery we have not chosen to progress these in AMP8 to minimise, where appropriate, the size and scale of the AMP8 WINEP.	156.98	7.20	164.18
Green Recovery <i>UUW65 case 20</i>	As part of the Government's Green Recovery 1 process where investment was accelerated and allowed into AMP7 there are 2 schemes with delivery dates that are in the AMP8 timeframe.	23.88	-	23.88

Enhancement	Summary	Capex (£m)	Opex (£m)	Totex (£m)
Reservoir Act 1965				
Wastewater reservoirs <i>UUW65 case 19</i>	UUW has a duty to inspect and maintain reservoir structures and undertake and remedial action identified by a Qualified Civil Engineer. UUW has identified 10 legacy sludge sites (with multiple sludge lagoons) for further investigation and remediation to ensure compliance under the Reservoirs Act.	19.33	-	19.33
Direct Procurement for Customers (DPC)				
Direct Procurement for Customers (DPC) <i>UUW43</i>	In support of Ofwat's position of 'Direct Procurement for Customers (DPC) by default' on all discrete projects above £200m totex, we have proposed two schemes for DPC which come from our WINEP. One of these is an AMP8 scheme (Manchester Ship Canal BOD programme) with a totex of £313m. The other is a scheme at Wigan and Skelmersdale which could be designated for delivery in AMP9. Both of these schemes would require the agreement of the Environment Agency to revised regulatory dates			
Providing Services to Additional Customers				
Supply and demand <i>UUW65 case 16</i>	We have an obligation under the Water Industry Act (1991) to ensure that new developments are effectively drained and the resultant wastewater is treated to the required standard to ensure there is no deterioration in environmental impact or customer service. Where proposed development exceeds the existing treatment capacity, investment is required to accommodate the growth, this interventions are designed for future populations.	136.23	0.80	137.04
First time sewerage <i>UUW65 case 21</i>	It is estimated that approximately 64,700 properties are not connected to the public wastewater network and rely on privately owned, operated and maintained wastewater collection and treatment systems. Such systems include septic tanks, cesspits and small package treatment plants, which, when installed and maintained properly, provide a sustainable method for wastewater disposal. This investment will therefore ensure that, where appropriate, connections to existing UUW sewerage infrastructure can be made for typically rural settlements, protecting the local environment and amenity value	5.00	-	5.00
Wastewater network management				

Enhancement	Summary	Capex (£m)	Opex (£m)	Totex (£m)
Rainwater Management <i>UUW65 case 15</i>	Resilience to the impact of more frequent and intense storms is a national priority. We need to ensure long-term functionality and resilience to the growing impacts of climate change. We propose a shift from traditional grey storage solutions, towards rainwater management techniques to deliver an additional equivalent storage volume of 29,941 m ³ . This will be mostly be delivered through implementation of Sustainable Drainage Systems (SuDS) alongside increased network capacity via delivery of customer side interventions (water butts).	128.66	3.59	132.26
Reducing flood risk <i>UUW65 case 18</i>	As a result of the unique operating circumstances in the North West, including 40% higher than average urban rainfall and the highest proportion of legacy combined sewers in the industry, UUW provides services to an operating region with an elevated sewer flooding risk. It is therefore imperative in enabling us to reduce the risk of sewer flooding for customers. Activities to be funded include: expansion of our highly successful dynamic network management (DNM) initiative; enhanced targeting of proactive interventions in areas of historically high flood risk and expansion of our property-level flood mitigation programme.	139.00	-	139.00
Carbon reduction				
Carbon net zero 2050 <i>UUW67 case 25</i>	Our plan to net zero 2050 sets out our framework for delivering bold GHG emissions ambitions, including the low regrets approach we'll take to 2030 which is outlined in this enhancement case.		70.3	
Resilience				
Coastal and River Erosion <i>UUW65 case 17</i>	UUW is situated in an operating region that is susceptible to coastal and river erosion. Climate change projections indicate that the North West will experience more frequent and intense winter storms ¹¹ , storms that can be expected to accelerate the rate of erosion of the land supporting our critical infrastructure. To secure the long-term resilience of our coastal and riverine asset base against accelerated erosion rates, we set out an enhancement case that will allow us to protect approximately 2.8 km of sewers, three outfalls, and two wastewater treatment works from increasing erosion risk.	29.0	-	29.0

¹¹ Environment Agency (2022) *North West River Basin District Flood Risk Management Plan 2021 to 2027*.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1120229/North-West-FRMP-2021-2027.pdf

Enhancement	Summary	Capex (£m)	Opex (£m)	Totex (£m)
Power resilience UUW67 case 26	To achieve our ambitions of minimising service disruptions to customers and protecting the environment, we need our key sites to be supported by a reliable back-up source of power. This solution will deliver resilience now and in the future, accounting for climate change in both a benign and extreme future. With wetter winters and more extreme weather predicted, the likelihood of power disruptions and their impacts is heightened, with the increasing frequency and severity of storms and flood risk. Our most important sites would have an extra layer of protection through the provision of a back-up power supply.	12.7	1.4	14.1
Cost adjustment claims				
Drainage UUW44	Ofwat's proposed base cost model suite for PR24 does not adequately capture the effect of United Utilities Water's (UUW) unique operating circumstances, including 40% higher than average urban rainfall and the highest proportion of legacy combined sewers in the industry, on the cost to convey wastewater. While we welcome Ofwat's proposal to <i>potentially</i> include urban rainfall in a subset of sewage collection and wastewater network plus models, we consider this only a partial representation of UUW's compounding cost drivers.	-	-	-
Ongoing phosphorus removal UUW44	The AMP7 WINEP requires UUW to comply with phosphorus removal permits at or near the technically achievable limit – less than or equal to 0.5mg/l – at 43 of our WwTWs. The operating expenditure associated with ongoing compliance at these sites is material and will not be reflected in the historical cost record used to inform the efficient benchmark. Therefore, UUW requires an uplift of £85.2m to its costs to facilitate ongoing compliance with its legal obligations.		85.00	

United Utilities Water Limited
Haweswater House
Lingley Mere Business Park
Lingley Green Avenue
Great Sankey
Warrington
WA5 3LP
unitedutilities.com



Water for the North West