Yorkshire Water Non-technical summary of Draft Water Resources Management Plan 2024

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Contents

Abstract	3
Introduction	4
Water Resources Management Plans	4
Changes to our plans since WRMP19	6
Water Resources North	7
Customer research	8
Our water supply system	9
Key objectives of Yorkshire Water's Water Resources Management Plan 2024	10
Risks to the security of water supply in the future	11
The impact of climate change on future supply	11
Increasing demand	12
Environmental impacts of abstracting water	12
Environmental destination	12
Future of water transfer from Severn Trent Water	13
How we created our plan	14
Our supply-demand balance	15
Baseline scenario	15
Critical period scenario	16
Grid SWZ deficit	16
Our supply demand balance summary	18
Options for closing the deficit	19
Demand options	20
Supply Options	21
Best value planning	23
Best value metrics	24
WRMP24 final preferred plan for closing the Grid SWZ deficit	27
Adaptive pathways	32
Next steps	35
Yorkshire Water WRMP24 Consultation	36

Abstract

Our Water Resource Management Plan is a key component of our long-term, strategic planning framework. It sets out how we plan to maintain a safe and reliable water supply to customers over the long term. We are forecasting a supply demand deficit in the future: This deficit results from the impacts of climate change, population growth, the need to protect the environment and from the loss of imported water from a neighbouring water company. We need to take action to ensure resilient water supplies into the future. Our plan to mitigate the deficit includes a twin track approach to demand reduction and an increase in supply options. Demand options include leakage reduction, smart metering, and water efficiency.

In respect of supply options, in the early part of our plan (2025-2030) we will make use of new supplies including four new borehole sources and associated water treatment works. We have also included plans for two river abstractions and associated treatment. In the medium term our plans include a treated water transfer within our operational area to offset the loss of imported water from outside our region. In the long term, to mitigate the future resource reductions associated with the need to protect sensitive river environments our plans include a transfer from Northumbrian Water and new storage and treatment capacity at existing or new water treatment works.

For periods of dry weather, we will maintain the actions in our drought plan, but over the lifetime of the plan we will reduce our reliance on these measures moving from the most serious of measures being required once in every 200 years, to the most serious of measures being required once in every 500 years. We will also reflect on the experiences of 2022 and expect to include any necessary adjustments to our WRMP in the final version to be published next year.



Introduction

Water Resources Management Plans

Our Water Resources Management Plan (WRMP) is one of the key components of our long-term strategic planning framework. It sets out how we plan to maintain a safe and reliable water supply to customers over the long term. The WRMP considers the next 60 years, by forecasting future supply needs and compares this against a forecast of future demand. It also considers the effect of water use on the environment and how we can minimise these impacts. If there is a risk that supply will not meet demand, the plan identifies the best value intervention strategy to mitigate that risk over the life of the plan.

All water companies are required by legislation to produce a WRMP every five years. This ensures that our plan is kept up to date and that it reflects the changing future challenges that we face. Over the last two years, we have been developing our WRMP24, building on our learning from our last plan, WRMP19. This has included updating all our data to be compliant with the latest regulatory guidelines, best practice methodologies, climate change scenarios and growth projections for the population and number of properties. Our aim is to produce a best value plan that balances the needs, risks, and environmental impacts, whilst taking into account customer and stakeholder preferences, and affordability.

Our WRMP24 has been built to comply with regional and national water resource planning objectives and with Government strategies. It directly aligns with the Water Resources North Regional Plan which includes our operating area. It also aligns with other company plans and strategies for future interventions, to ensure a safe and reliable supply of water to customers. There will be direct alignment between our WRMP24 and our PR24 Business Plan for the regulatory investment period 2025-30, particularly in respect of long-term planning requirements as set out in Ofwat's 'long-term delivery strategies'. Our long-term strategic planning framework includes the production of a Drainage and Wastewater Management Plan (DWMP), which is a new strategic planning framework requirement for PR24. At this stage there is limited direct alignment between these plans, although there are important implications to consider in respect of customers' water consumption and disposal. In the future there will be potential to explore options that would result in direct alignment of the DWMP and the WRMP, such as the use of grey water or effluent reuse to offset potable water demand. Our WRMP24 also aligns with other internal plans including Drinking Water Safety Plans, our Drought Plan, and the Water Industry National Environment Plan (WINEP).

We produce a draft WRMP that is submitted to Defra, and this is followed by a consultation period to allow others to comment on our plans. Following the consultation period, we may revise our plan based on the comments that we receive and any new information that comes to light.

We anticipate that we will review our draft plan ahead of the publication of our final plan to take account of the on-going drought in Yorkshire. As we continue to assess and respond to the impacts of the on-going 2022 drought, we will take this into account within our plan, particularly in respect of the assessment of our critical period, which is taken as a short dry period with high demand. Within the draft plan the critical period is representative of a dry, high demand period experienced in 2018. We will continue to review this in line with emerging data from 2022 and include any required revisions within our final WRMP24.

In May 2023, we will publish a statement of response to the consultation representations we receive. We will revise our plan and submit a revised draft to Defra. This revised draft becomes the final version of our WRMP24 once Defra provide notification that it can be published.



Our draft Water Resources Management Plan 2024 is available to view at: https://www.yorkshirewater.com/about-us/resources/water-resources-management-plan/



Changes to our plans since WRMP19

Our WRMP is revised every five years, which involves reassessing the risks to supply and updating our plans accordingly. Our WRMP24 shows a higher level of risk than that identified in our WRMP19. The WRMP19 risks are summarised below:

Climate change	Projected 109 megalitre per day (MI/d) loss of supply, driving a deficit in our largest water resource zone by the mid-2030s.
Population growth	Population predicted to increase by one million, but increased demand largely offset by a decline in large non-household water users.
Environment	Sustainability reductions in supply identified through the Water Industry National Environment Programme were 1.5MI/d by 2024.

In our WRMP19, we identified a surplus of water at the beginning of the planning period which started in 2020. The impact of climate change on supply availability resulted in a deficit by the mid-2030s. However, the predicted impact of climate change in our WRMP19 plan was much less severe than the impact in WRMP24. This has increased in severity because of a change in approach to climate change impact assessment and use of the latest UKCP18 (UK Climate Projections 2018) data, as set out in the Guidelines.

The solution to the WRMP19 deficit was to invest in leakage reduction and some new groundwater supplies as summarised below:

Supply	Ground water supplies totalling less than 10MI/d to provide additional resilience to outage events.
Demand reduction	Climate change impact on supply offset through year-on-year leakage reduction over the next 25 years, including a three-year rolling average 15% leakage reduction target from 2020 to 2025.

Our WRMP24 plan builds on our WRMP19 plan by continuing our long-term ambition to reduce water demand through leakage reduction and a reduction in customer demand, measured as per capita consumption (PCC). During 2020 and 2021 we experienced a 10% increase in PCC due to the COVID-19 lockdowns. In general people use more water when at home than compared to their place of work. This trend is expected to continue, with social change such as hybrid working patterns, for example being a contributing factor. As a result, demand for water in these two years was higher than we would normally experience. This has impacted on PCC in our supply area, and it will take us until 2025 to reduce PCC to the planned pre-covid levels in our WRMP19¹.

¹ In our WRMP24, we have assumed a sustained demand increase of 1.6% following the COVID-19 pandemic due to increased home working.

Water Resources North

Since PR19, the Environment Agency published the National Framework for Water Resources, *Meeting our future water needs*: *a national framework for water resources* (Environment Agency, 2020). This set out the national priorities for water resources planning across public water supply, other water using sectors (such as agriculture, energy, and other industries) and the environment. It also set out a new tier of regional water resources plans, sitting above the traditional water company WRMPs. There are five regional water resource planning groups across England, delivering these regional plans. Yorkshire Water is part of Water Resources North (WReN).

WReN is designed to oversee water resources planning for Yorkshire and the North East of England. Northumbrian Water, Yorkshire Water and Hartlepool Water are leading the delivery of WReN's Regional Plan, working in collaboration with regulators and other sectors and groups who have an interest in water resources in our region. This includes energy companies, agriculture, industries, environmental stakeholders, and other interested groups.

Further details on WReN can be found at <u>www.waterresourcesnorth.org</u>. A draft Regional Plan will be published by Water Resources North for public consultation alongside our draft WRMP24.

Our draft WRMP24 has been developed in parallel with WReN's Regional Plan. This makes sure that our water company plan is aligned with the regional plan outcomes, as well as the national objectives stated in the National Framework.

National			
National water resource	Regional		
identified by the Environment	Public water supply, non-public water	Company	
Agency's National Framework for Water Resources.	supply needs and environmental destination identified by Water Resources North's regional plan.	Public water suppply needs indentified by Yorkshire Water's Water Resource Management Plan.	

Customer research

Customer engagement for our WRMP24 started early, as part of our work through WReN, and was carried out in partnership with Northumbrian Water and Hartlepool Water. The WReN engagement built on the work that all companies had carried out for PR19. We collaborated at the regional scale, carrying out research across several representative customer groups. These groups comprised a mix of existing household customers, future customers, and citizens, as well as a range of non-household customers. The non-household sessions were held with a mixture of water dependent businesses, for example farmers, and non-water dependent businesses.

Although the research was carried out at a WReN level, it was completed in such a way as to allow each of the water companies to understand the preferences of their own customers, within the overarching regional picture. The key focus areas for the research were defining a 'best value plan' (linked to Regional Plan and WRMP objectives and metrics), environmental destination, water trading and option types to be included in the preferred plan.

A number of key messages were observed from this research. Firstly, customers, citizens and nonhousehold customers are generally unaware of the potential for current or future water scarcity within the WReN region. The proposed Water Resources North WRMP objectives gained general support. Customers were open to the idea of water trading as long as there were no adverse effects on their own supply, and it wasn't being used as an 'easy option' (for example in place of leakage reduction). Timescales for achieving objects set in the longer term were perceived as being too far in the future and customers want to see shorter timelines (5-10 years) even if this is as progress against a longterm goal. There was a general willingness to pay a small increase in bills for investment against these objectives and targets as long as water companies are transparent about this. Support was also evident for the environmental ambition, with the consensus being that abstraction should be reduced.

Since the WReN customer engagement work was completed, we have carried out further research with our own customers to help inform our approach to PR24 and long-term strategies including dWRMP24. The most recent results from this research were available in September 2022 and they are broadly consistent with what customers told us through the WReN engagement programme. Specifically, the research highlights that customers consider the highest priority for Yorkshire Water remains 'providing a continuous supply of water that is safe to drink', just as it was when this research was carried out in 2017. 'Keeping bills affordable for all' was second in importance for most customers which is a significant change from the 2017 study. Customers also place a high level of importance on Yorkshire Water protecting water quality and water bodies in the wider environment, including preventing pollution from sewers and reducing the escape of untreated sewage. Previously, these are some of the priorities that customers were most likely to say they'd be willing to pay more to fund. However, a key theme throughout all stages of the research was the 'cost of living crisis' and it is very clear that both household and non-household customers anticipate challenging financial times in the near future.

Our WRMP24 takes on board the research that we have undertaken and the priorities that customers have identified, notably in how we have developed the metrics that we have used for our best value planning process.

We recognise that our stakeholders and regulators have important views on priorities for our plan. We have engaged with our regulators throughout the development of our draft plan. We have worked to achieve an appropriate balance in the requirements and priorities set out by our regulators and stakeholders. Striking the right balance between achieving acceptable levels of risk, the timescales for risk reduction and affordability of the plan could be an area where there is further work to do with our regulators to manage potential misalignment of priorities. For example, the National Framework for Water Resources Planning sets out a requirement for a level of drought resilience equivalent to a 1 in 500-year level of service for the most serious drought restriction by 2039. There would be benefit to customers in delivering these requirements earlier in the planning period as it would increase resilience and reduce risk, but this must be assessed in light of the impact this would have on customer's bills and the affordability of the overall PR24 plan.

Our water supply system

We have a highly connected network that can transfer water around our supply area. We take water from reservoirs, rivers, and groundwater sources. In most years this provides sufficient flexibility for us to meet customer demand. However, in extreme dry weather when demand is high and we receive much less rainfall than average, we need to enact measures set out in our Drought Plan. Our WRMP24 aims to make us less reliant on drought measures in the future.

For planning purposes, our supply system is split into water resource zones based on our network and our ability to transfer water within our own supply area. Our WRMP24 considers the future needs in the two water resource zones which make up the Yorkshire Water area: These zones are the Grid Surface Water Zone (Grid SWZ), which includes over 99% of our customers, and the East Surface Water Zone (East SWZ), which is a small area covering Whitby and part of the North York Moors National Park.

Our Grid Surface Water and East Surface Water supply zones:



Key objectives of Yorkshire Water's Water Resources Management Plan 2024

Our plan ensures a sustainable supply of water to our customers and aims to ensure any future investment in water resources balances the costs, impacts, and benefits, to achieve an affordable, best value plan for our customers, stakeholders and the environment. Our plan is aligned with regional planning objectives and national ambition and therefore there is direct alignment between our WRMP24 and the objectives of Water Resource North regional plan.

The objectives of our plan are to:

- 1 Meet future water supply needs for Yorkshire whilst meeting all the requirements of Government guidelines for Water Resources Planning.
- 2 Meet and maintain a public water supply drought resilience level of service of 1 in 500 years for the most severe restrictions by 2039 as defined in the Water Resources National Framework.
- **3** Contribute to the Government's ambition in the 25 Year Environment Plan to 'leave the environment in a better state than we found it'.
- 4 Achieve the Yorkshire Water environmental destination and River Basin Management Plan (RBMP) objectives (sustainability reductions) taking a catchment wide approach.
- **5** Meet demand management policy requirements to reduce leakage and per capita consumption as defined in the Water Resources National Framework.
 - Reduce leakage by a minimum of 50% by 2050 from 2017/18 levels with ambitious milestones to achieve this.
 - Take the actions required to reduce per capita consumption to 110 l/h/d by 2050.
- **6** Fulfilling our role as part of Water Resources North to identify the potential to contribute to national water supply resilience.
- 7 Incorporate Strategic Environmental Assessment (SEA) outputs and other relevant environmental legislation (e.g. habitats regulations assessment) into decision making.
- 8 Achieve multiple benefits including non-drought resilience.
- **9** Produce a plan that supports the views of our stakeholders and customers and is not detrimental to social wellbeing.
- 10 Create a plan that is affordable and sustainable over the long term.

Risks to the security of water supply in the future

As a minimum we must ensure we have a safe and reliable water supply for our customers. Our WRMP24 has highlighted some significant risks that, without intervention, could in the future, put our customers' security of supply at risk.

The impact of climate change on future supply

Our data shows that climate change is likely to already be having an impact on our water availability. In recent years we have experienced several periods of prolonged hot, dry weather (2018, 2020 and 2022) that have put our water supply system under stress. In the future, we expect to experience more severe droughts. We must ensure that we remain resilient to dry weather impacts. Existing initiatives, such as our customer water saving programme and Water Promise Campaign for businesses, will also contribute to improving resilience.

We plan to avoid the need for extreme drought actions that restrict water use for our customers and put the environment at risk. As experienced in 2022, it is not always possible for us to avoid drought actions. However, our WRMP24 aims to make us more resilient in the future. Our WRMP24 determines the minimum level of service we will provide. Our target levels of service for our two water resource zones are given below.

Measure	Frequency
Level 1: Drought actions with minor environmental impacts and appeals for voluntary reductions in use	No limit
Level 2: Introduction of temporary use bans	No more than 1 in 25 years on average
Level 3: Supply-side drought permits / orders and non-essential use drought orders	No more than 1 in 80 years on average
Level 4: Emergency drought orders	1 in >500 years (This is an estimate of an exceptionally rare event)

Our WRMP24 has used the latest methodologies for assessing climate change risks. This has identified that we are at risk during drought events and so we must plan to mitigate this risk. To meet the National Water Resource Framework objectives all water companies must plan to be at a 1 in 500-year level of service for level 4 restrictions, for example the use of standpipes, by 2039. Our WRMP24 sets out our strategy for achieving this.

Increasing demand

During hot weather water use increases, and in the last few years we have experienced periods of unprecedented high demand for water. During peak times daily demand can increase by 200 million litres or more. That is equivalent to supplying an additional city the size of Leeds. Additional supplies, along with continued investment in our supply networks will be needed, to ensure we are fully resilient at these critical times. Total daily demand is also forecast to increase in our supply area due to population growth and new housing developments. To help offset this increase we must continue to reduce the water we lose through leaks in our supply network, and we must help our customers reduce the water they use in their homes and at work. To do this, we will continue with our water efficiency campaigns and consider insights from behavioural science and the impacts that different approaches to tariffing may have on consumption.

Environmental impacts of abstracting water

As a water supplier we must consider the impact that our licenced abstractions have on the environment. We affect the rivers that we take water from, but also impact the wider environment through the energy we use to treat water and get it to where it is needed. Where abstractions could have an unsustainable impact, we may need to reduce the amount of water that we take from those sources or find other ways to mitigate the impacts. This reduces our available water supplies. Therefore, we must find alternative, more sustainable sources, whilst also working hard to reduce demand. We have an ambition to achieve net zero operational carbon emissions by 2030 and our future use of water must support this objective.

Environmental destination

Environmental destination is a new requirement for water companies developed through the National Framework and the regional planning process. It builds on the existing Water Industry National Environment Plan (WINEP) process that requires water companies to consider the impact of their abstractions in the short term (usually the next five-year period). In order to protect the environment, the WINEP has led to some reductions in available water supply, known as sustainability reductions. As part of a longer-term approach to strategic planning, environmental destination looks at the impacts of water abstraction beyond the next five years. It considers the impacts at a regional scale and could identify a need for further reductions beyond the first five years of the planning period.

We have reviewed national Environment Agency model scenarios to explore the changes in abstraction that might be required in the long term under the environmental destination driver. The two main scenarios are:

- continuation of the current policy approach to abstraction licensing ("business-as-usual") and;
- 2. greater restrictions on abstraction from protected areas ("enhanced").

We have included reductions in existing supplies as a result of the environmental destination requirements in our draft WRMP24. The licences most likely to be reduced under the business-as-usual scenario include groundwater abstractions in North and South Yorkshire and an abstraction from the River Derwent in North Yorkshire. There remains uncertainty about the impact that environmental destination will have on some of the licences we hold. Therefore, we have created an enhanced scenario to represent a greater impact and associated loss of resource and a low scenario to represent minimal loss.

Future of water transfer from Severn Trent Water

We currently receive a small but significant proportion of our water supply from a transfer provided by Severn Trent Water (STW). The transfer of water comes from the Derwent Valley reservoirs in the STW area and feeds a water treatment works that we operate in South Yorkshire. STW control and maintain the reservoirs and we pay an annual fee for the water we take. The agreement we hold with them runs to 2085, but also allows either party to reduce or cease the transfer in 2035, provided notice is given no later than 2030.

Without the import, our network can supply this area for short periods through existing connections and alternative sources. However, we would not be able to meet the current and future needs of the area, on a daily basis, without the transfer.

STW, like us, must plan for the long term to secure its own customers' supply of water and must find ways to meet future demand, increase resilience to more extreme droughts and protect the environment. It's draft WRMP24 concludes it is likely to require the water currently transferred to South Yorkshire for its own customers at some point in the future. Within our draft WRMP24, we have assumed the loss of the transfer from STW and have therefore identified alternative sources of supply. We continue to investigate alternative sources of supply with our plan taking a low regrets phased approach such that in the first five years of the plan, we secure alternative supplies where they are available in our supply region. In a scenario where the STW transfer is retained, these alternative supplies will be required to mitigate supply demand balance in the longer term. In a scenario where the loss of the STW import is confirmed, a second phase of activity would deliver a transfer within the Yorkshire Water supply region to allow the transfer of the new resource to the south of the region where it would be required.

We are also continuing to work closely with STW on the Upper Derwent Valley Strategic Resource Option (SRO) which could result in increased storage of water in the Derwent Valley that helps to protect the existing transfer whilst also providing STW with the resilient supplies that it requires. We will ensure that our WRMP24 is updated between draft and final to take account of the latest position with this SRO.



How we created our plan

Our WRMP24 sets out how we will balance the requirement to supply water to our customers with the water available over the next 60-years. We build our plan from two key components – a demand forecast, and a supply forecast. In line with the guidance, the baseline scenario in our plan considers the supply demand balance when supplies are low, and demand is high. The supply and demand forecasts are compared to identify if, or when, we may have a deficit. A deficit occurs when the forecast demand (plus a buffer known as 'target headroom') exceeds the forecast supply.

If our forecast shows that there is a risk of a deficit, the plan identifies potential options to address the risk. A 'twin track' approach is taken; looking at ways of both reducing demand and increasing supply to close the deficit. By reducing demand, we reduce the amount of water we need to take from the environment, and this is our preferred method of meeting deficits. However, our WRMP24 shows that we cannot rely solely on demand reduction. We must also identify new and sustainable options for increasing supply.

We appraise all the options available to us and then decide on a 'best value' solution to the deficit. The best value solution we choose is based on results from our optimisation model and a multi criteria analysis assessment. The multi criteria analysis helps us compare different potential solutions against metrics that are key factors in the decision-making process.

Once we have selected a 'preferred' or 'most likely' solution, we build the benefits into our baseline scenario supply-demand balance. This provides us with a final plan scenario that should not show a deficit over the life of the plan. This is illustrated in the figure below. Adaptive pathways and planning are discussed later in this document:



Our supply-demand balance

Our WRMP uses long-term water supply and demand scenarios to assess the potential risk of falling into a supply-demand deficit in the future if no action is taken. Risks are driven by climate change reducing available water supply, by population growth increasing the total demand for water and by the pressure of water abstraction on the environment. This means that some resources may not be sustainable in the future. Supply-demand scenarios give an indication of when we could fall into deficit and allow us to plan timely interventions to offset the risk.

Baseline scenario

Our WRMP24 plans for a 'baseline' scenario. This is the scenario that is considered most representative of future dry years. The baseline scenario represents the annual supply and demand we experience in a dry year as a daily average. It assumes that the volume needed to meet demand is the same each day and it is higher than we would normally see, to represent dry conditions. In an actual year, demand will fluctuate depending on weather conditions. It can be significantly higher during the summer or the winter if we experience extremes of hot or cold temperatures.

The planning period we have assessed in our WRMP24 is a 60-year period from 2025 to 2085. Our future projections start from a base year of 2019/20. As our WRMP includes a large amount of data, the risks and impacts of those risks take several years to assess before we can publish and consult on our plan. The WRMP end to end process typically spans a period of three to four years and for WRMP24, the base year is therefore six years in advance of the start of the planning period.

The baseline dry year annual average scenario is used to identify supply-demand risks and assumes no action is taken to avoid deficits. We have also assessed the risks of alternative low and high annual average scenarios. As there is significant uncertainty in forward forecasts; it is important to prepare for a range of possible futures.

The graph below illustrates the size of the supply demand surplus or deficit for both our East and Grid SWZs, if we take no action through our WRMP planning:



Basline supply-demand balance with no future interventions, showing the surplus or deficit (indicated by a negative surplus), for each water supply zone in different time periods

Critical period scenario

During hot, dry summers we may be at a greater risk than the dry year annual average scenario presents. We can experience additional pressures on our system for short periods when demand is significantly higher than average summer demand. Demand for water increases during hot weather as customers use it for activities such as garden watering and increased showering. Non-domestic use for water may also increase as some businesses that have their own water supplies may run out and so divert to mains supply. Extreme dry weather can put our systems at risk, and this is likely to be exacerbated by climate change in the future. We represent this in our plan as a 'critical period' scenario. The critical period represents a short time period when demand is higher than average summer demand, which means we have to put more water into supply. This can lead to a deficit that is greater than the annual average scenario.

Our East SWZ summer peak demand assessment has concluded that the zone does not require a critical period scenario in WRP24. The zone does experience a significant uplift in demand during the summer usually driven by an influx of tourists to the area. However, peaks tend to be for short durations and remain less than the available supply. This does not drive any greater risk than the annual average scenario and so a critical period scenario has not been created for this zone.

However, our Grid SWZ has been identified as vulnerable to high summer demands and our WRMP24 includes a critical period scenario for this zone. The recent summer dry periods of 2018, 2020 and 2022 have tested our supply systems resilience and have shown that demand can get significantly higher than we have experienced in dry periods prior to 2018. Although supply was sufficient to meet demand in 2018 and 2020, we are enacting activities within our drought plan in 2022 and it is evident that we are experiencing increasingly higher summer demand and for more prolonged periods than previously.

The Grid SWZ critical period assessment has focused on a four-week period of sustained high demand that we experienced in 2018. We intend to review the critical period between our draft and final WRMP24 taking account of the on-going drought we are experiencing in Yorkshire. As with our dry year annual average scenario, we create a baseline critical period scenario to assess the risk and assume no interventions. During peak demand periods, we can draw on our available sources more than we do on average over the year. Historically this has been sufficient to meet peak demands but as peaks increase in magnitude and duration, whilst supply volumes reduce because of climate change, we cannot be certain that we will be resilient to critical periods in the future.

Grid SWZ deficit

Our WRMP24 supply-demand balance indicates that we could be in a deficit during dry years in our largest water resource zone, if we do not implement actions that either increase supply or reduce demand. Below we describe the risks that impact on our WRMP24 supply-demand balance:

1. Reduced supply

Climate change is likely to cause more extreme weather conditions, including prolonged periods of low rainfall and higher temperatures. This hot dry weather means less water is available for water supply and the environment. We also experience increased demand for water during warmer weather. We have assessed the potential impacts of climate change on available water supply for both our water resource zones by calculating the impact of UKCP18 climate change scenarios on water availability, using our water resource simulation model. UKCP18 presents a range of potential futures and we have selected the RCP6.0 scenario for our baseline forecast as this is closest to the medium carbon emissions scenario used in WRMP19. We have chosen this approach by working with other water companies in Water Resources North to ensure consistency of approach across the region. However, the overall impact of the latest climate change methodology is significantly greater than at WRMP19. This creates a risk to our future security of supply but also highlights the sensitivity of our plan to this change in approach. As part of our scenario testing and in line with Ofwat's Long Term Delivery Strategies, we have made assessments against the high reference scenario for climate change which use RCP8.5.

Our Grid SWZ has high connectivity that provides flexibility during dry weather to move water to where it is needed, but it has a limited surplus that in extreme years, will be insufficient to offset the impact of climate change. The zone shows an increasing risk of reduced water availability due to climate change. Our base year of 2019/20 has a reduced water availability of 33MI/d due to climate change; this increases to 40MI/d in 2025, 77MI/d by 2050 and 134MI/d by 2085.

2. Growth in demand

We have used multi regression models to provide household and non-household water demand projections over the planning period up to 2085. With these models we assess these two major components of demand separately, taking into account population and property projections, demographics, service and non-service sector economic projections, variables and interdependencies. The total customer demand is added to other demand components, including leakage to provide what is known as a distribution input forecast. This represents total demand for water.

The population in Yorkshire is forecast to increase by approximately 1.1 million over the 60-year planning period and this means more housing (0.6 million new houses) is needed. The overall impact of this is that demand for water increases by 70MI/d over the 60 years. Non-household demand is showing a slight decline of 5MI/d from 2025 to 2085 indicating that the increase is driven by household water use. However, domestic meter penetration is increasing, and this helps reduce household demand for water. We install a water meter in all new properties as standard, with existing non-metered households able to opt to switch to a metered supply free of charge. Our domestic customer meter penetration in the base year was 56%. Our model predicts it will increase to 66% by 2025 and 89% by 2085.

On average, per capita consumption is declining from 127 litres per head per day (I/h/d) in 2025 to 117 I/h/d in 2050, remaining close to this level for the rest of the planning period. This decline in average consumption is likely to be predominantly due to increased metering, which normally sees customers being more careful about their water use. However, water saving campaigns and new technologies may also impact on demand but there is no method to disaggregate the impacts.

As described earlier, the impact of the COVID-19 pandemic led to an increase in customer use of around 10% in 2020 and 2021. We have assumed a sustained demand increase of 1.6% following the COVID-19 pandemic due to increased home working.

3.Environmental destination

Our supply forecasts incorporate the long-term risks that our abstraction of water has on the environment. Our Grid SWZ could experience a reduction in the volume we can take from some of our groundwater sources as a result of licence changes required to protect the environment, we have therefore assumed a loss of 11 MI/d in 2035. Similarly, in the longer-term there is a risk that one of our River Derwent abstractions could be reduced and we have assumed a loss of 130 MI/d in 2050.

4. Future of water transfer from Severn Trent Water

Due to the emerging risks to the supply and demand balance in the Severn Trent area this existing transfer may not be sustainable in the future, and it could be significantly reduced or even terminated. The loss of supply to our Grid SWZ could be around 50-60MI/d. This loss can be partly offset by the interconnectivity of our network, meaning the actual impact is closer to a 40MI/d loss of available water supply. We have assumed this loss in 2035 in line with the transfer agreement we hold with Severn Trent Water.

Our supply demand balance summary

The combined impacts of the future risks to our Grid SWZ create an immediate risk of deficit in this zone, that increases over the life of the plan. The near-term risk represents an unprecedented extreme drought event, that we are required to plan to in order to ensure future security of supply. It also assumes our supplies are already depleted due to climate change and in the medium to long term, that the impacts of climate change will become more severe, and we will see our supplies reduce further as demand increases. We will also experience a loss of permitted abstraction rights in 2035 and 2050 and likely a loss of supply transferred from Severn Trent Water in 2035.

This represents our baseline scenario and our WRMP24 has reviewed the options available and selected solutions to address the risks. Once we have identified the interventions that we will take to avoid the baseline scenario deficits, we build the benefits into the projections and produce a final plan scenario.

The diagram shows our baseline scenario including the forecast demand, the forecast demand and required headroom, and the forecast supply availability over the life of the plan. The deficit between demand and supply is shown to increase over the life of the plan.



Baseline scenario supply demand balance

Options for closing the deficit

We have a range of options that we could deploy to mitigate the Grid SWZ deficit. We follow an option appraisal and decision-making process to help us decide which combination of options provides the best value solution. Some options will reduce the volume of water we are required to put into supply, whereas others will increase the water available to meet future demand.

We start our options appraisal process by reviewing the potential choices available, 'the unconstrained list') and assessing which are suitable for addressing the risks we have identified in our Grid SWZ ('the constrained list'). Any option that is not feasible is removed from the list so that we only develop feasible options. An option is excluded from the constrained list, if either there are technical limitations that mean it is undeliverable or if there is a risk to the delivery of that option that is too high to proceed. A list of feasible supply option categories and the number of associated options is shown below.



Summary of WRMP24 feasible options

We will continue to develop options for future iterations of our WRMP and are open to considering new or innovative solutions. We have a process for assessing third party options, including water trading via the bidding market. More information can be found in our Bid Assessment Framework on our website https://www.yorkshirewater.com/about-us/water-bidding-market/.

Demand options

Demand Options provide a means of reducing the water we take from the environment and are an important part of our plan. By reducing demand, we reduce the daily average volume of water we put into supply. This reduces the gap between supply and demand. Demand reduction activity cannot prevent peaks in demand from occurring, but it can lower those peaks and help conserve supplies for longer. We have considered the measures available to us for:

- 1. Reducing the water we lose when transferring water from our treatment works to our customers, known as 'leakage'.
- 2. Helping our customers reduce the water they use in their homes so that the average daily per capita consumption (PCC) decreases.
- 3. Working with retailers² (who provide retail services to commercial properties) in our area to help commercial users reduce their demand for water.

We have focused our demand reduction options on meeting the objectives set out in the National Framework, to halve leakage (compared to 2017/18 levels) and achieve a per capita consumption of 110 litres per head per day (I/h/d) by 2050. We have assumed the benefits of the objectives in our final plan. We are still developing our strategy for reducing non-household use to achieve a 9% reduction by 2035 and this will be incorporated into our final WRMP24.

However, delivering these demand reduction objectives remains uncertain and we cannot rule out the risk of demand increasing in the future. Therefore, we take account of this uncertainty in our adaptive planning approach, representing this as an alternative pathway.

Our final planning scenario assumes a year-on-year reduction in leakage that will achieve the policy requirement through a combination of new and existing techniques, for example, active leakage control, pressure management, mains renewal/relining and acoustic logging.

The PCC objective can only be met if we can provide our customers with measures to reduce their water use and if external factors, such as government policy changes, provide a benefit. Our final planning scenario assumes the combined benefit of our actions and government policy will reduce PCC further than predicted in our baseline scenario and achieve an average PCC of 106 l/h/d by 2050. Through our own actions and assuming no benefit from government initiatives our projections show we could achieve a PCC of 112 l/h/d by 2050.

Our actions to achieve the PCC policy requirement include installing smart meters in households in our supply area. All new houses built in our area are fitted with a water meter and from 2025 these will be installed as smart meters. Similarly, any households that are unmetered and choose to switch to a metered supply (optants) will receive a smart meter from 2025 onwards. We will also start a programme of retrofitting existing meters so that all metered properties will have a smart meter installed by 2040. We will retrofit both household and non-household metered properties over a 15-year period. Existing meters that are at the end of their asset lives and would previously have been replaced with a new non-smart meter, will instead be replaced with a smart meter.

² Non household billing and customer service provision is delivered by a number of retailers operating in the Yorkshire region.

The benefits of both increased meter penetration and a move to smart metering will only be realised if we provide our customers with information on the water they use and advice on how they might be able to reduce their use. We are therefore combining smart metering with behaviour change initiatives and offering our customers water efficiency devices that could help them reduce their water use.

For a PCC of 110 I/h/d to be achieved by 2050 other factors affecting water use will also require change. The Government is currently consulting on a new policy on efficiency labelling of products using water – such as dishwashers, washing machines and other devices like toilets, showers and taps. The labelling is intended to provide consumers with information that encourages the purchase of more water efficient goods. This should help drive technology so that the goods available to customers are more efficient in the future. We have therefore assumed a benefit of water efficiency labelling in our final plan.

In total, our WRMP24 demand reduction ambition aims to achieve a benefit of approximately 160MI/d between 2025 and 2050. The largest proportion of this (95MI/d) reduction will be from our additional effort to lower leakage levels across our network. Our smart metering and water efficiency activity will contribute 31MI/d and the government initiative on the labelling of white goods, 39MI/d. These actions will benefit both our zones.



Assumed benefits of demand reduction actvity 2025 to 2050

Supply Options

Our options for increasing available supply are a combination of increasing use of existing available resources and introducing new supplies into our grid network. They include options for importing new supplies from Northumbrian Water in the form of a transfer from the River Tees, supported by Kielder reservoir. We continue to work collaboratively with Northumbrian Water on the validation and development of this transfer option.

As is required in the National Planning guidelines, we have considered a scenario where having closed the deficit in our plan, we would export water to neighbouring water companies. At this point in time, these options have not been selected in other companies preferred plans. Subject to future surplus, we will continue to work with others through the Regional Planning groups to assess this option for the future.

The new supply options that are available to us and have been considered within the development of our plan include:

- New groundwater sources
 - require abstraction permissions to be granted by the Environment Agency.
- Ground water enhancement greater use of existing resources that we are already permitted to abstract.
- New surface water sources require abstraction permissions to be granted by the Environment Agency.
- Surface water enhancement greater use of existing resources that we are already permitted to abstract.

• Aquifer recharge

discharge water to groundwater when the water is not needed in supply and conserve for when it is needed.

- Bulk supply transfer (import water from another water company).
- Conjunctive use/new internal transfers.
- Desalination/tidal abstraction.

Options available to water companies for WRMP24 also include planning to an alternative drought risk scenario and implementing drought measures that can temporarily restrict water use or increase available supplies during dry weather. In the short term, we will be required to rely on these actions whilst we are implementing the demand reduction and increased supply options needed to make us resilient to a 1 in 500-year drought event.



Best value planning

As part of our decision-making process, we compare the costs and benefits of several potential solutions (combinations of feasible options known as candidate solutions) before selecting the solution we put forward in our WRMP.

Initially we create solution programmes using an optimisation model, which we refer to as our Decision-Making Framework (DMF). We input cost and benefit information for all our feasible options into our DMF model and use it to optimise a solution to the baseline dry year annual average and critical period scenarios. The impacts and benefits of each option are monetised to represent the six capitals. The capitals represent valuable assets that can be impacted by our activities and for our WRMP we can use the capitals to measure the impacts of our options. The capitals are explained below:

To meet all the identified needs associated with water resources management planning, we have assessed the risks and benefits of the optimised solution programmes and created candidate best value plan solutions that achieve all the wider objectives. The optimised and candidate solution programmes are compared against pre-defined 'best value' metrics to assess which can be considered a best value plan.

Best value metrics

Each candidate solution and the least cost plan is compared against the best value metrics. We have adopted the best value metrics used in the WReN regional plan, with the addition of a resilience metric that is company specific to Yorkshire Water.

The WReN metrics were presented to customers as part of regional plan focus group sessions and to the WReN stakeholder steering group. The aim was to seek customer and key stakeholder views and to understand the relative valuation of the metrics. The resilience metrics are based on the Yorkshire Water Supply System Strategy output. The Water Supply System Strategy process was primarily developed for our Price Review 2024 (PR24) Business Plan to meet non-WRMP needs, but during its development it has identified WRMP related needs and options, which have been carried through into WRMP24.

Our best value metrics are measured using a variety of units such as net present value costs, biodiversity net-gain units and tonnes of carbon dioxide and illustrated in the diagram below. Others are qualitative metrics such as customer preferences and resilience. To compare the solution programmes against each other, the metrics are 'normalised' to a comparative scale between 0 and 100, where 100 is the most optimum score of an individual metric across all the solution programmes considered.

We used our DMF model to produce optimised solutions programmes based on:

- Cost represented by the financial capital and calculated using the criteria specified by the regulatory guidelines.
- Carbon impact represented by our carbon capital, which monetises the carbon dioxide emissions for building and operating the supply and demand options.
- Social and natural capital impacts represented by monetised values of both the positive and negative impacts of the options.
- All six capitals.

The optimised solution programmes are combinations of the available options that could be used to close the supply-demand deficit. However, they will not necessarily select options to meet all the policy requirements or achieve broader objectives. We therefore create solutions manually based on the initial optimisations. This allows us to adjust the impacts a solution has across the metrics. It also allows us to validate the initial optimisations from a governance perspective. We may also adjust the programmes to reduce non-quantifiable impacts: These include risks that the necessary licences would not be granted to deliver certain solutions, or the combination of options selected may not present a no or low regrets solution.

Demand reduction option benefits to meet the policy requirements and plan objectives have been assumed in all our candidate solution programmes, although they are not all achieved in the least cost plan. We have then used our optimised solution outputs to provide a portfolio of supply options, from which we selected different combinations for closing the remaining deficit.

Solution programme reference	Description
Candidate solution 01	Options were mandated into the programme to
	address the loss of the Severn Trent transfer
	address the River Derwent environmental destination risk
	 address resilience needs (a combination of groundwater and surface water supply options)
	The optimiser could then select based on cost from the remaining options in the portfolio.
Candidate solution 02	This solution was a variation of solution 01 but was not assessed any further as the outcomes were no different.
Candidate solution 03	This solution programme included the same mandated options as candidate solution 01 plus a combination of additional groundwater and surface water options, including a new surface water treatment works. The optimiser had limited scope to optimise and selected one additional option which was a new interconnecting pipeline.
Candidate solution 04	This solution programme was a variation on candidate solution 03 with fewer groundwater options mandated and the new water treatment works replaced with an option to transfer a river source to an existing water treatment works and there was no scope for additional optimisation. As a result, the total new supply benefit was reduced.
Candidate solution 04.01	This solution programme was the same as candidate solution 04 except that an additional new water treatment works option was mandated into the programme to treat existing reservoir supplies and remove a risk of deficit in the longer term (2060s).

We created five candidate solutions which are summarised below.

The candidate solution programmes were compared against the critical period least cost optimised solution using the best value metrics. This allows us to compare the benefits, as illustrated below:

Normalised Metric Results Comparison: Critical Period least cost and candidate programmes

There is inevitably a trade-off to be made across the metrics in the development and assessment of candidate solutions. For example, selecting options with the greatest benefit across all metrics, would in most circumstances result in an unaffordable plan. In addition, other metrics can compete against each other, for example resilience and carbon reduction. Our aim is therefore to make 'trade-offs' between the metrics and decide on a solution that maximises benefits across the metrics without creating an unaffordable plan.

Critical Period (CP) least cost (grey) is the least cost plan which closes the deficit over the lifetime of the plan and therefore scores most highly on the Cost of the Plan (totex) metric. The least cost plan does not meet all the objectives (PCC reduction), with several of the candidate solutions outperforming the least cost solution on a broader range of metrics. All candidate solutions score 100 on PCC and leakage as the benefits have been mandated into the programmes.

Candidate solution 04.01 (orange) has the highest normalised score for five of the 13 best value metrics (customer preference, human and social wellbeing, biodiversity, multi abstractor benefit and flood risk management) and has been identified as the best value plan. Candidate solution 04.01 presents the joint lowest cost solution of the candidate solutions and for programme resilience is mid-way between the highest and lowest scores. The trade-offs are natural capital, carbon, and public water supply (PWS) drought resilience. Option deliverability shows little variation.

CP is Critical Period

Although candidate solution 04.01 does not have the lowest natural capital score, it is equal to all but candidate solution 01 (green) and scores highest of all programmes on biodiversity. The carbon results of all solution programmes show a very small range (72 for candidate solution 04.01 to 78 for the least cost solution). Carbon emissions from solutions are based on the capex and opex of the solution, therefore the least cost solution will tend to score comparatively better, but the variation between the solutions is not considered material.

The public water supply drought resilience score could be improved by investing in some of the schemes selected in solution programmes 01 (green) and 03 (blue). However, these include an increased number of groundwater supply options in the same aquifer and our environmental assessment highlights this could be detrimental to the environment and the designated Water Framework Directive status of the aquifer. We shall investigate this further to understand if additional groundwater supplies could be available in the future.

To offset the public water supply drought resilience risk, we will plan to a lower level of service in the short term (a 1 in 200-year drought return period) and will be resilient to 1 in 500-year drought return period no later than 2039. Although the alternative programmes improve the public water supply drought resilience score, they do not score 100, and we would still be required to plan to a 1 in 200-year drought return period in the short term.

Our preferred programme reduces the number of new supply options at the start of the planning period compared to some of the alternative programmes, ensuring that the preferred programme is deliverable. The preferred programme is also a low regrets solution in that in some of the alternative programmes the full benefit of the early investment is not required in the medium term once the benefit of the demand reductions accumulate.

WRMP24 final preferred plan for closing the Grid SWZ deficit

Our final preferred plan is candidate solution 04.01. It includes solutions that reduce demand and increase supply. It includes investment in seven new supply schemes in the first five years of the plan (2025-30) which provide a combined benefit of 273MI/d. In peak periods this benefit may be greater (290MI/d) as two of the options have been designed to provide a greater benefit at peak times. Further peak benefits may be possible and will be considered when we carry out impact assessments, before applying to the Environment Agency for new abstraction permits.

Table showing the components of our preferred plan

Component	First year of benefit	Benefit (MI/d) on full implementation
Plan to a 1 in 200 level of service	Immediate effect	52 in 2025, reducing to 46 in 2050 due to climate change reducing supply
Drought measures	Immediate effect	Assumed benefits circa 40
Halving leakage by 2050	2025	95
Smart Metering and water efficiency	2025	31
Efficiency labelling of water use appliances	2027	39
New groundwater supply and Water Treatment Works	2025	6 (8 maximum)
New surface water supply – River Aire abstraction	2025	34
Abstraction licence transfer at low flows	2027	0.3 (15 maximum)
New groundwater supply – South Yorkshire	2028	5
New groundwater supply – North Yorkshire	2028	5
New groundwater supply and Water Treatment Works support to grid	2029	15
Increase York WTW capacity (new abstraction from River Ouse)	2029	50
North to south Yorkshire treated water transfer – 50MI/d capacity 0 MI/d benefit	2035	n/a – required to transfer new source of supply to South Yorkshire
Transfer from Northumbrian, supported by Kielder Water	2050	140
Additional bankside storage at York Water Treatment Works	2066	11
Kirklees Water Treatment Works	2068	8

Due to the immediate risk created by the modelled climate change impact on available supplies, we will operate to a lower (1 in 200-year) level of drought resilience than our target level of service, which is to be resilient to a 1 in 500-year drought return period. The baseline risk represents a 1 in 500-year level of service deficit. By operating to a 1 in 200-year level of service, we reduce the deficit, but this is a trade-off with resilience to extreme drought events. We have a goal to achieve the 1 in 500-year level of service, but the time to implement the solutions has been factored into our plan and until 2039 we will plan to a 1 in 200-year level of service. This reduces the Grid SWZ dry year annual average deficit by approximately 45 to 50MI/d in each year we assume the lower risk. (The benefit reduces over time as climate change reduces our available resources). This is in line with the Water Resources Planning Guidelines which state that companies should aim to achieve a 1 in 500-year level of resilience by 2039. We will specifically consult on the views of our customers and stakeholders in respect of our preferred plan and the proposed approach of planning to a 1 in 200-year drought return period in the early part of the plan.

Our final plan also assumes a benefit of supply and demand drought measures (approximately 40MI/d) that was not assumed in our baseline scenarios. In an extreme drought, it is likely we shall be required to impose restrictions on use to reduce demand and apply for temporary changes to existing abstraction permissions to increase supply. As we implement our plan and achieve the benefits associated with our solution programme, we will be less reliant on drought measures and will become resilient to a 1 in 500-year drought return period. We have assumed the benefits of these measures in our final plan scenarios until 2039 when we plan to be resilient to a 1 in 500-year drought event.

The preferred plan includes the demand reduction measures specified in the plan objectives, the halving of leakage compared to the 2017/18 levels by 2050 and the achievement of an average PCC of 110 I/h/d by 2050. The preferred plan assumes a level of benefit delivered by the water efficiency labelling of white goods. Once the benefit of these demand reduction solutions had been accounted for in the plan, we selected supply options from those that had been included in the optimised solution programmes to close the remaining deficit.

Our WRMP24 includes two key risks that must be addressed as the existing sources of supply are unlikely to be available in the future. These losses must be offset by new supplies as it is not feasible to assume they can be offset through demand reduction alone. This includes the loss of the transfer from Severn Trent Water to South Yorkshire and the potential significant reduction in our abstraction on the River Derwent in North Yorkshire. These losses must be offset by new supplies as it is not feasible to assume they can be offset through demand reduction alone.

We plan to offset the deficit that would be created by the loss of supply from the Severn Trent Water import through a low regrets, phased approach. The first phase of this is investment in a new water treatment works (alongside an existing water treatment works in York, which will be retained) to treat water from an existing permitted abstraction that we have on the River Ouse). The second phase delivers a new internal connection from this new treatment works to South Yorkshire. The new works will be available by 2029 and will also provide additional resilience to the York area. The internal connection will be available from 2035 onwards, when the transfer is scheduled to terminate. Should the scenario arise where the transfer from Severn Trent Water remains viable, then the second phase internal transfer will not be required, but the additional supply capacity delivered in phase one will be required in the longer term.

The River Ouse abstraction and new treatment works and the Northumbrian Water, River Tees bulk transfer options were selected in almost all of the optimised solution programmes. Once these options were built into our preferred plan, we needed to select options that could be brought on-line within a short time frame to help close the near-term deficit.

The decision on which near-term options to include in the preferred programme, was based on the environmental impacts of the new supply options and the resilience benefits. Our WRMP is subject to a strategic environmental assessment (SEA) and, where applicable, Water Framework Directive (WFD) and Habitats Regulation Assessments (HRA). Our SEA, WFD and HRA assessments influence our decision on which combination of options to include in the preferred plan and highlight any major impacts that could be a risk to the delivery of the schemes.

In addition to the River Ouse new treatment works and the Northumbrian Water, River Tees bulk transfer options, we have selected seven new supply options for our preferred plan in order to achieve near-term benefits. The options selected from the optimised portfolio are those that achieve resilience benefits in the Dales area, which has experienced significant growth in recent years, and in areas of our grid network that required additional support during daily peak demands, particularly during dry or cold weather.

The preferred solution results in a reduced environmental impact overall by increasing the volume of demand reduction and decreasing the number of new supply options compared to the optimised solutions. This improves the deliverability of our plan: However, we cannot avoid environmental impacts completely and environmental impact assessments and mitigation strategies will be developed during the implementation of the schemes.

During the delivery of our new supply options, we will be required by legislation to deliver a 10% biodiversity net gain if our schemes impact on land (e.g. new sites or pipelines) and are required to support our operational carbon net zero ambition. We will address these objectives when we deliver the schemes and endeavour to reduce the impacts as much as possible. However, the nature of the schemes is likely to require biodiversity and carbon offsetting to achieve the objectives. Incorporating demand reduction into our preferred plan helps us reduce the carbon and biodiversity impacts, which is preferable to offsetting.

We have also avoided the inclusion of options in the portfolio that do not present a low regrets plan. For example, we have avoided over-reliance on transfers from Northumbrian Water. We have chosen not to included investment in aquifer recharge options that may not be viable due to the environmental destination impacts on the source of the recharge (River Derwent).

When we include the selected options in our dry year annual average scenario, the deficit from 2025 onwards is closed. The risk of deficit identified in our Grid SWZ critical period scenario cannot be closed until 2027/28 as we are constrained by the time to deliver the solutions: The latest climate change data and methodology has resulted in an immediate deficit in both our dry year annual average and critical period scenarios. We are proposing to start the delivery of our WRMP24 plan early (pre-2025) to close the Grid SWZ dry year annual deficit by 2025. The critical period deficit in 2025/26 to 2026/27 is a headroom deficit. Our available supply is predicted to be greater than forecast demand but not greater than demand plus target headroom for the zone. We shall therefore operate at a reduced headroom for the first two years, which closes the deficit by accepting a higher risk in the early years of the plan. The deficit is closed as quickly as possible by bringing forward solution delivery into AMP7. These early start schemes will be delivered subject to agreement with regulators.

The chart below shows the supply demand position through time and the benefits associated with the delivery of the preferred plan.

Supply demand position following delivery of the preferred plan

Between our draft and final plans, we will continue to review and adjust our plan. In our WRMP19, the risk of supply demand deficit was not apparent until the mid-2030s and could be closed through our planned leakage reduction activity. We recognise the need to address the risk of the impacts of climate change on the reduction in supply, but we are also conscious the change in methodology could be over stating the risk. Before confirming our final WRMP24, we will review the approach with our regulators and assess if it presents an appropriate representation of our systems and the climate change risk. We will continue to investigate the preferred plan options further and determine if any alternative strategy exists to reduce the risk of deficit in the early years of the plan. We will review the critical period assessment in light of the on-going 2022 drought in Yorkshire.

Adaptive pathways

The baseline and final planning scenarios developed in our WRMP24 represent a single pathway that is based on what is considered most likely at this point in time. However, there is much uncertainty in the severity of the climate change impact and population growth scenarios that are included in our baseline scenario. Despite careful planning, it may be the case that the benefits of our solutions do not turn out to be exactly as we have designed them to be. We have assessed the potential of alternative futures and have plans in place to deviate to alternative pathways if they are triggered.

The demand reduction objectives are challenging and require innovative techniques to be identified and proven to be successful over the life of the plan. We must therefore plan for the uncertainty around achieving these targets, particularly in dry years.

The supply option benefits are also uncertain, particularly given that a number of the options require consents, including planning permissions and abstraction permits that will be subject to impact assessments. Preliminary studies are needed beyond WRMP option development before we can fully define the benefits. For the supply options that are needed in the near-term, we will address this risk through developing additional options, beyond those included in our preferred plan. As our plan shows an immediate risk, it is possible that our final WRMP24 may alter as we build in further learning from the on-going drought, with the options to meet this near-term risk evolving between our draft and final plans.

The future of the Severn Trent Water transfer is also uncertain. The most likely scenario is that the transfer will terminate in 2035 but there is still a possibility that it could continue. Yorkshire Water and Severn Trent Water are investigating the potential of increasing the capacity of Severn Trent's Derwent Valley reservoirs. This is being developed as a strategic Resource Option (SRO) though the RAPID³ gated process. This alternative to the in-region options would raise the Derwent Valley reservoir dams, increase available resource, and allow the current transfer from Severn Trent Water to be retained. If the outcome is that the reservoirs can be increased sufficiently to meet both Severn Trent Water's future needs and our demand in South Yorkshire, then the transfer could be maintained. Our WRMP24 final plan scenario includes a solution for offsetting the loss and we have an alternative pathway that assumes the continuation of the transfer.

It may also be possible that the River Derwent loss resulting from environmental destination requirements will not occur in the future or conversely, that the impact will be worse than included in our baseline. The extent of the loss will not be known until further studies have been completed. These need to consider the potential environmental benefits from any reduction, the scale of any abstraction reduction, and the impact on our available supplies. We have therefore considered pathways for no loss, and for a more extreme loss of 160MI/d, compared to the baseline of 130MI/d.

We have identified five core pathways for our WRMP24 that could change the plan significantly as we progress, and the future becomes more certain. The five core pathways represent known uncertainties which have the potential to require a substantial alteration to our chosen solution and can be linked to defined trigger points. There are several more potential pathways or variations to those we have included, and these potential variations will become evident over time. As the WRMP is revised every five years, we have scope to identify, assess and adapt to these variations as more information becomes available.

³ RAPID is the Regulator's Alliance for Progressing Infrastructure Development.

This diagram illustrates the pathways being considered as part of our plan:

- Decision point: the latest point at which a decision on moving to an alternative pathway can be taken
- Trigger point: the point at which an alternative pathway will be followed
- ED = Environmental destination

Pathway I: Preferred plan (most likely) scenario. This represents the solution programme that we have selected as our best value plan to meet the dry year annual average and critical period baseline scenario deficits.

Pathway 2: STW transfer maintained. This pathway assumes the STW transfer could be maintained in the future. The internal transfer main from York to South Yorkshire and the additional bankside storage at the York Water Treatment Works included in the preferred plan would not be required. The River Derwent licence would be reduced in this pathway and the Northumbrian Water bulk transfer option is still required.

Pathway 3: Low demand reduction. This pathway recognises that the success of our planned demand reduction activity cannot be guaranteed. Further, it assumes that the year-on-year combined benefits of leakage reduction and PCC reduction will be half that assumed in our preferred plan pathway. This pathway would bring forward the Northumbrian Water bulk transfer option and leave us vulnerable in the longer term. We have not identified the longer-term solution in this pathway, as our WRMP24 plan to build upon our available options and understand alternatives to the Northumbrian Water River Tees bulk transfer will be incorporated into WRMP29 to address this risk.

Pathway 4: Enhanced environmental destination. This pathway represents the enhanced environmental destination and the risk of additional deficit, if the outcome of the River Derwent investigation is less favourable than assumed in our preferred pathway. Under this scenario we would be required to invest in additional options in the 2060s. This includes a new abstraction from the Humber Estuary that would be stored in a tidal abstraction reservoir or treated at a desalination plant in East Yorkshire. Use of the Humber Estuary would require significant environmental investigations in advance of further option scoping to ensure the water was available and further development to understand the most appropriate option to then treat that water for supply purposes. **Ofwat core pathway**: This pathway represents the minimum interventions required to ensure a low regrets plan where the future risks are mitigated, and we are resilient to future drought events. It assumes all options planned in the near term (2025-2030) will be implemented. However, there is potential that the STW transfer could continue if STW's plan diverts to a different pathway. There is also a possible outcome from the River Derwent investigations that the licence is not reduced. The decision points for these actions are in the future and so they are not part of the core pathway. This pathway is termed the 'Ofwat core pathway' as it is the WRMP pathway that Ofwat's Long Term Delivery Strategies guidance requires to be used as the core pathway in long term planning approach for PR24.

Next steps

The enhanced need for new supplies in our WRMP24 compared to our WRMP19 has created the requirement for us to explore more potential options for our WRMP. We shall continue to review the options as we progress towards our final WRMP24 and for the next iteration of our plan, WRMP29 (2030-35). This will include ensuring we are prepared for the loss of the STW transfer and the reduction in the River Derwent abstraction licence.

We are continuing to experience an ongoing drought in Yorkshire, and this may identify new risks or increase the assessed severity of existing risks. This could also require us to make changes to our plan between draft and final. We will review our critical period assessment which is based on the latest available 2018 data projections, in light of the dry weather and demand patterns we have experienced in 2022.

We shall continue to work with STW on the SRO for raising the Derwent Valley reservoirs and expect clarity on the future of the transfer to be reached by 2030. Our WRMP24 includes a new internal transfer from North Yorkshire to South Yorkshire to offset the loss. This will address the key risk and strengthen the resilience of our network, but we will continue to explore the possibility of less carbon intensive options that will support our carbon net zero objective.

We have assumed that any reduction on the River Derwent abstraction to meet environmental destination will not occur until 2050. The loss will be offset by investment in a bulk water transfer from Northumbrian Water from the River Tees. The option will make use of Northumbrian Water's surplus and some existing infrastructure. However, significant additional infrastructure and new assets will be required to transfer the water to Yorkshire Water customers. This would include an additional main and electricity supply at one of Northumbrian Water's pumping stations, a new main from the River Tees to the York area and additional treatment capacity at both source and destination. The water will need to be treated to a sub-potable standard before transferring to Yorkshire to avoid the spread of invasive species. It will then need to be treated to potable standard at the destination. Due to the length of the transfer, the quality of the water will deteriorate, and we cannot reliably treat to potable standard at source and transfer to where it is needed. To better inform our understanding of the resource availability from the River Tees and the supporting infrastructure requirements, we plan to work collaboratively with Northumbrian Water to establish a Strategic Resource Option (SRO) that we will seek to progress through the RAPID⁴ gated process. This relates to the funding of investigations and development of water resource solutions.

We share the Government's ambition to achieve a sustainable water supply for the environment, but we must balance both this ambition and our responsibility to provide a secure water supply to our customers. Further work is required to understand the scale of abstraction loss and the impacts of the reduced abstraction on the River Derwent, and this is required before we proceed with a large scale transfer that will have significant environmental impacts during delivery and operation. The delivery of the transfer option or any identified alternative could take ten or more years to complete. Significant planning and investigations, including creating a biodiversity net gain action plan, will be required before the construction phase can begin. For this reason, we will progress the proposed SRO well ahead of the decision point for the transfer, ensuring the appropriate planning time to demonstrate this option would represent best value to our customers.

Our draft plan will be published for consultation, and we will consider all consultation responses in the development of our final plan.

⁴ RAPID is the Regulator's Alliance for Progressing Infrastructure Development.

Yorkshire Water WRMP24 Consultation

This draft WRMP has been published for consultation and we will consider all the responses we receive to this draft plan. During the consultation period and in confirmation of our final plan, we will continue to work with stakeholders, in particular ensuring that we engage on the changes that may be required as we develop our understanding of the ongoing drought and the implications on long term security of supply.

There are some key areas of our draft WRMP24 on which we wish to seek the views of our customers and stakeholders, and these are listed below. The specific questions are available to answer here https://www.surveymonkey.co.uk/r/Yorkshire_Water_DraftWRMP24, with options to provide broader comments and feedback.

The Key areas for consultation questions and the views we aim to solicit are listed below:

• Plan objectives

Aims to determine level of support for the objectives identified in the plan and understand if there are any further objectives that should be included.

• Levels of service

Seek views on our proposed levels of service for drought resilience, including how quickly we should aim to meet the government's target for 1 in 500-year levels of drought resilience. We anticipate the need to make changes to our final plan because of the on-going 2022 drought, and seek to understand customer support for the need to make changes to our final plan to support future resilience.

• Policy requirements for demand reduction

Our dWRMP sets out policy objectives on demand reduction that reflect the National Framework for Water Resources, Government expectations and Environment Agency guidelines – seek views on these policies including a 50% leakage reduction by 2050 and a per capita consumption of 110 I/h/d by 2050.

• Uncertainty, risk, and relative cost

Explore views on the levels of certainty associated with proposed solution types and the associated relative costs. Use scenario-based propositions to assess preferences.

• Range of options considered to address the supply demand deficit

Seek views on range and appropriateness of demand options. Explore support for some specific policy areas including the government's proposed scheme for water efficiency labelling and potential Yorkshire Water policy to install a meter on 'change in occupancy', i.e. when a new customer moves into a house that was previously unmetered. Seek views on the range of supply options and identify any other options that could be considered.

• Metrics for assessing the best value plan

Seek views on the levels of support for the proposed metrics. Are there any other metrics that should be included?

Preferred plan

Seek views on the levels of support for the preferred plan. Will seek opinions of preferred approach to specific requirements such as replacement of the Severn Trent Water import. Seek views on the levels of support of the longer-term investment for the transfer of water from Northumbrian Water.

If you wish to submit feedback or comments direct to Defra, this can be done using the details provided below. Please send your response to the email addresses or postal address by 24th February 2023.

Email: <u>water.resources@defra.gov.uk</u>

OR write to:

Defra Water Resources Management Plan Water Services Department for Environment, Food and Rural Affairs Seacole 3rd Floor 2 Marsham Street London, SW1P 4DF