

About our Water Resources Management Plan

Our Water Resources Management Plan 2019 (WRMP19) is one of the key plans that will help us to ensure that our customers get what they have told us is their highest priority – a reliable and sustainable supply of good quality, clean water. The plan describes how we will ensure that we continue to have sufficient water to supply our customers, in the face of future challenges such as climate change, population growth and environmental pressures.

Following consultation on our draft WRMP19 in Spring 2018 we have revised our plan, taking into account representations received from stakeholders and consultees. Any changes to the plan have been highlighted in yellow for clarity.

Our revised draft WRMP19 ('revised draft plan') provides a long-term view of these challenges, planning for the next 25 years. We have also extrapolated data to give us a prediction as to what our water resources situation could be in 40 years time; although the further into the future we project, the greater the uncertainty.

The requirement for WRMPs to be published every five years is set out in the Water Industry Act 1991. It is therefore a well-established and mature part of our business planning process. As with previous WRMPs, our revised draft plan has been prepared in line with guidance that is provided by the Environment Agency. In addition, there are numerous other well documented approaches that we take to build individual components of the plan – for example, methodologies for calculating water resources yield, and guidance on how to take a risk-based approach to planning.

What challenges do we face?

Yorkshire Water already has one of the most resilient water resource systems in the country. There are a number of reasons for this. Firstly, our grid network allows us to move water around Yorkshire to help balance supply with demand. Secondly, we take our water from a variety of different types of water supply, balancing across

reservoirs, rivers and groundwater sources. Thirdly, we plan for extreme droughts that go well beyond those that we have experienced in our historical record.

This level of resilience was recognised by the independent work carried out for Water UK's *Water Resources Long Term Planning Framework* report, published in late 2016, which stated:

- Yorkshire Water “now plans to a higher level of resilience than any other part of the country”; and
- Yorkshire Water is one of only two companies that “plan for resilience to droughts that are worse than those seen in the historic record”.

Further, the report's independent modelling validated our own assessment of the resilience of our water supply system.

However, despite our current high level of resilience, we cannot afford to be complacent at a time where the world around us is changing. With an increasing population, uncertainty about our future climate, and our customers rightly expecting more from us, we need to continue to evolve our plans. We need to be innovative and ambitious, whilst at the same time recognising the importance of security and resilience when planning for water resources.

In addition, our customers remain concerned about affordability now and into the future. We need to find ways of addressing the pressures we face in the future through a changing climate, population growth and environmental protection without causing customers' bills to become unaffordable.

The key challenges that our revised draft plan has identified, and addresses, are:

- a Yorkshire population that is projected to increase by one million by 2045;
- a projected loss of 100Ml/d supply by 2045, due to climate change;
- ongoing environmental pressure to reduce the amount that we abstract; and

- ensuring that we can continue to provide high levels of resilience and meet our agreed levels of service, against a backdrop of maintaining bills at a level that is affordable for all our customers.

How have we created our plan?

Our revised draft plan shows how we will balance the demand for water and the available supply of water in the short, medium and long term, projecting up to 40 years into the future. It is built up from two key components – a demand forecast, and a supply forecast. These forecasts are compared to identify whether, or when, we may have a deficit. A deficit occurs when, in a dry year, the forecast demand (plus an allowance for headroom) exceeds the forecast supply.

If, or when, we reach such a position, the plan identifies potential options to address the forecast deficit. A ‘twin track’ approach is used, looking at ways of reducing demand whilst also exploring options for increasing supply. It is not acceptable, or sustainable, to simply plan to extract more water from the environment.

Our revised draft plan covers the two water resource zones which make up the Yorkshire Water region. These zones are the Grid Surface Water Zone, which covers over 99% of our customers, and the East Surface Water Zone, which is a small area covering Whitby and part of the North York Moors National Park.

Supply forecast

We have worked closely with the Environment Agency to understand where environmental pressures may reduce the amount of water available to us in the future. We will continue to investigate areas that may be affected by reduced abstraction, to ensure that we balance environmental needs with the requirement for maintaining service resilience.

We have updated our assessment of the impact of our changing climate on water resources. Customers have told us that they want to see clear plans for managing the challenges presented by climate change.

We have also considered how water quality may change in the future, and how we will need to invest in a range of solutions to ensure that we do not compromise on

the quality of water supplied to customers. We will continue to work closely with land owners, land managers and the agriculture sector to enhance the resilience of our raw water sources, as the first stage in the journey of ensuring water quality from source to tap. We have ensured that our revised draft plan is aligned with the requirements of our drinking water quality regulator, the Drinking Water Inspectorate.

We have also considered how we might need to respond to the risk of invasive non-native species, and the risks that these may present to current and future water transfers between catchments. We have been working closely with the Environment Agency, and other organisations including the University of Leeds, to understand this risk and how best it can be mitigated.

The key components of our supply forecast, and a summary of how these components have changed since our last plan, are shown in Table 1 below. However, because climate change is the component that has the biggest single impact on our future supply forecast, and because our climate change forecast has changed since WRMP14, we have also included below some more detailed commentary on climate change.

Climate change

Our last plan (WRMP14) projected that we would have a supply demand deficit (against headroom, in a dry year) by 2018/19. Our revised draft plan shows that we now do not expect to see this deficit before the mid-2030s. One of the key reasons for this difference is that our approach to climate change has changed.

The three most significant changes are:

- In WRMP14 we used 2009 UK Climate Projections (UKCP09) medium emissions forecasts to the 2030s. However, the Environment Agency guidelines on which forecasts to use have now changed so for the draft WRMP19 we are using forecasts to the 2080s.
- As in WRMP14, we are using 20 selected climate change model scenarios (out of 10,000 that are included in the UKCP09 dataset). For WRMP14 we analysed the data and selected 10 low probability dry scenarios and 10 from across the whole range of climate change

projections. We modelled these 20 scenarios, and used the median. For our revised draft plan we again carried out an intermediate vulnerability assessment, and based on this selected 20 from across the whole range of scenarios, using statistical sampling stratification to get a representative sample. We also included three dry scenarios in our assessments.

- In WRMP14 we used the Environment Agency scaling equations. In this plan, we are not using the new Environment Agency scaling equations, but are instead following guidance and using an alternative interpolation (similar to that used in 2014, but with a less steep initial gradient). We are doing this because using the current Environment Agency scaling gives a loss of about 70MI/d by year 1 of AMP7 (2020/21), which we do not believe to be a likely scenario in Yorkshire. We have discussed this approach with the Environment Agency and with our external auditor, and both agreed that a decrease of 70MI/d by 2020/21 was unlikely.
- Although we are showing a reduced impact of climate change in the revised draft plan compared to WRMP14, climate change remains the biggest single influence on our long-term future water resources prospects. A new set of climate projection data for the UK (UKCP18) will be published in 2018. To ensure that we understand what this new data is telling us, we are representing the UK Water Industry on the UKCP18 users' group, and we are leading work looking at how the UK water industry will use this latest evidence for future planning.

Table 1 Summary of supply forecast and key changes since WRMP14

Component	Summary for draft WRMP19	WRMP14 position
Climate change	Loss of 100MI/d of deployable output in the Grid SWZ by 2044/45.	Loss of 127.5MI/d of deployable output in the Grid SWZ by 2035/36, and 136.0 MI/d by 2039/40.
WINEP / sustainable abstractions (impact only for first 5 years of planning period)	Loss of 1.5MI/d yield by 2024.	Loss of 2.7MI/d yield by 2020.

Our modelled deployable output includes an existing import from Severn Trent Water. The import provides a raw water source (approximately 50MI/d) to a single water treatment works in the south of our region from the Derwent Valley reservoirs in the Severn Trent Water region. The bulk transfer agreement for this import terminates in 2085, with an early 'break clause' which allows termination by either party from 2035 following a 5-year notice period.

In their draft WRMP, Severn Trent Water included a 15MI/d reduction in the import volume from 2030 in their best value plan. Severn Trent Water have subsequently confirmed that they no longer require a reduction in our import in 2030. We have committed to work together to investigate options for varying the agreement in the wider context of the Water Resources North Group. This joint work will involve water resources modelling of the Derwent Valley system and developing options for the Derwent Valley and wider Yorkshire Water and Severn Trent Water systems.

Demand forecast

To help us understand what the future demand for water may be, we have updated our projections of population increase in Yorkshire. We have also considered how we can help to reduce the amount of water that gets used both by our customers and through our own operations. Our customers have clearly told us that they want us to reduce how much water is wasted through leakage, and in response to this we will be setting ourselves challenging targets for leakage reduction.

The key components of our demand forecast, and how these components have changed since our last plan are shown in Table 2 below.

Table 2 Summary of demand forecast and key changes since WRMP14

Component	Summary for draft WRMP19	WRMP14 position
Household demand – population	Latest projections indicate population of Yorkshire at 6.4 million by 2040, up one million compared to 2016.	Increase in forecast population growth, from 850,000 in last plan.
Household demand – new properties	Up to 578,000 more properties to be served, taking total number up to 2.85 million.	Up to 500,000 new properties.
Non-household demand	A projected continued slow decline in non-household demand, amounting to 18MI/d over the 25-year plan, driven mainly by reduced non-service sector demand.	Slow decline over plan period, 28MI/d reduction over the 25-year plan.
Leakage	Targeting a reduction in leakage of 40% (122MI/d) over a 7-year period from 2018/19, to take leakage down to 175MI/d by 2024/25.	Reduction of 47MI/d over 25-year planning period, to 250MI/d by 2040.

The overall impact of the above changes in household and non-household demand is that we are forecasting that demand will reduce in the early years of the 25 year planning period. There are three main reasons for this:

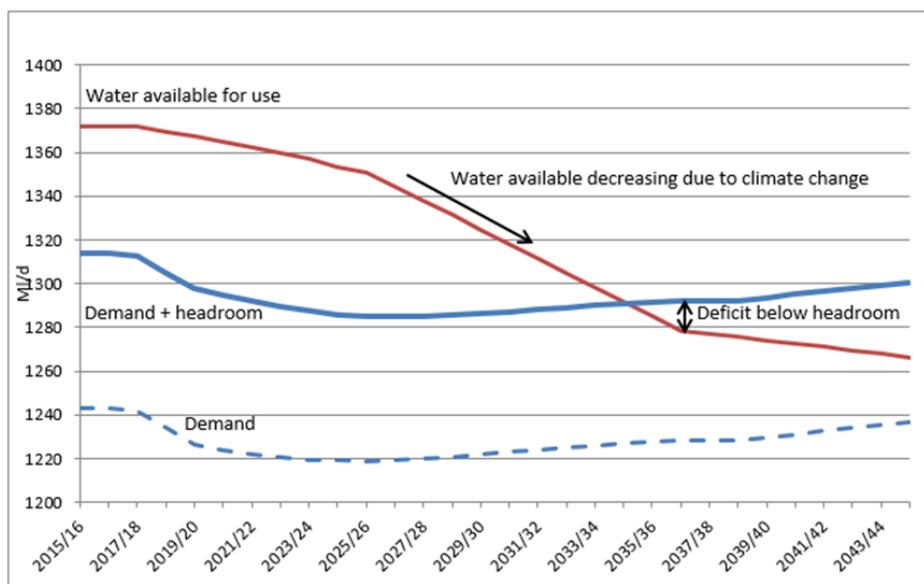
- a continued reduction in leakage for the remainder of AMP6 and into AMP7;
- ongoing reduction in household usage due to increased levels of metering; and
- reduced non-household demand due to a continued decline in industrial (non-service sector) use.

After stabilising in the late 2020s, we are forecasting that demand will increase for the remainder of the planning period up to 2045. This increase is due to the impact of population growth, as well as decreasing numbers of customers opting for a metered supply.

What is our projected supply demand balance?

Our forecast supply demand balance to 2045 is shown in Figure 1. This is our baseline, with no significant additional leakage reduction, or other investment activity, included. This baseline shows that we are currently in surplus, and that we expect that this will continue to be the case until the mid-2030s. After that point, we begin to show a deficit below headroom.

Figure 1 Baseline supply demand forecast



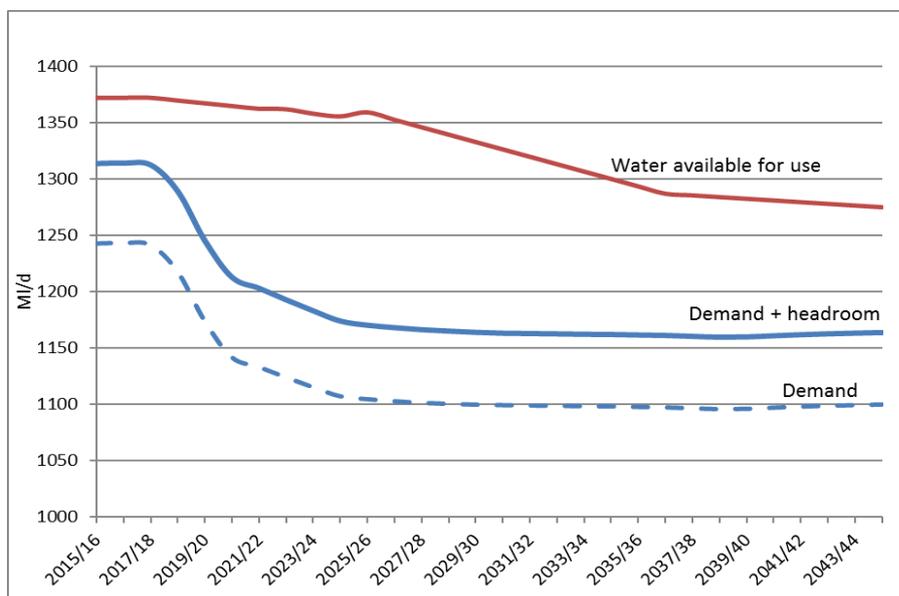
What is our preferred solution?

Although we are not expecting a deficit in our supply demand balance until the mid-2030s, we still need to plan activity and investment that will address the forecast deficit. We also need to ensure that we maintain resilience in our water resources position; we would not wait until the deficit appears before taking action.

In addition, we recognise that we have a responsibility to continue to reduce leakage. In December 2017 we announced our ambition to reduce leakage by 40% by 2025, and our preferred solution reflects this ambition. Our forecast supply demand balance to 2045 for our preferred solution is shown in Figure 2. This shows that with the proposed leakage reduction in AMP7 we do not expect to see a supply / demand deficit at any point during the planning period.

Our preferred solution also includes proposed investment in some of our borehole supplies to enhance our resilience to risks associated with headroom and outage.

Figure 2 Preferred solution supply demand forecast



Summary

Our revised draft plan indicates a risk of a deficit during the 25-year planning period beginning 2034/35. This is predominantly due to the forecast impact of climate change on deployable output. However, the predicted impact is less extreme than

WRMP14 due to a change in the forecasting methodology, and to reflect the fact there has been no reduction in supply due to climate change this AMP. Increased demand management activity, including additional leakage reduction, also reduced the deficit.

For our preferred solution to meet this forecast deficit, we have chosen to implement a 40% leakage reduction target by 2025. In addition to this leakage reduction activity, we will investigate two supply options to provide additional resilience. The supply options are scheduled for implementation in 2022/23 and 2025/26, provided the results of the investigations determine that the abstraction licences are sustainable.

In selecting our preferred plan, we have chosen a solution that minimises environmental risks, meets customer and regulatory preferences and is flexible and sustainable in an uncertain future. This is in line with the needs we, our customers and our stakeholders identify as priorities in our new long-term strategy for Yorkshire Water.

We believe that our revised draft plan will help us to ensure that customers continue to get what they prioritise highest – a reliable and sustainable supply of clean water. Our plan also shows that we can maintain our current high levels of water resources resilience into the future, helping to ensure that bills remain affordable. Other activities that our customers consider to be important – such as reducing leakage – will help to contribute to our sustained resilience.

In addition, recognising that we have a role to play in supporting not only the resilience of our region, but also the resilience of the UK as a whole, we have taken a lead in setting up Water Resources North. This group, which comprises representation from across water companies in the north of England as well as key regulators, will provide a focal point for co-ordinating water resources across the north. It will also allow for integrated and consistent consideration of the opportunities that we collectively have to transfer water to other parts of the country and contribute to enhanced national water resilience.