WATER RESOURCES MANAGEMENT PLAN

ANNUAL REVIEW 2021

Liz Coulson
Portsmouth Water Ltd
PO Box 8
West Street
Havant
Hants
PO9 1LG

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1 EXECUTIVE SUMMARY

Portsmouth Water is a community focussed water company, with a strong performance history in supporting and maintaining good relationships with our customers. We also have a changing role in the South East region with our bulk supplies to our neighbouring water company, and the development of Havant Thicket winter storage reservoir in collaboration with Southern Water which is due for completion early 2029.

Our WRMP19 was published in November 2019 and sets out how we plan to maintain our supply demand balance up to a 1 in 200 year drought scenario between 2020 and 2045. Our previous Annual Review 2020 highlighted that in 2019-20, we had underperformed and not reached certain WRMP19 targets (PCC), but that we over performed significantly on other WRMP19 targets (leakage). In addition to this, our proposed AMP7 supply schemes have been undergoing environmental assessments and further analysis which has meant adjustment to the implementation schedule of these schemes.

In consultation with the Environment Agency we decided that producing a set of revised planning tables was the most appropriate way to identify whether a risk was present to our proposed bulk supply commitment of an additional 9 Ml/d to Southern Water in 2024 and that our supply of water to customers may not be fully resilient up to a 1 in 200 drought event. Our Revised WRMP19 makes use of our most recent data and knowledge, and uses our new forecasts which have recently been developed as we produce our WRMP24. This Annual Review compares our outturn values for 2020-21 with our forecast Revised WRMP19 values, and how these may differ from our original WRMP19.

There is no doubt that the impact of Covid during 2020-21 was significant on the operation of our business. It affected both how we could work as a business and how our customers consumed water. This meant a significant change in the pattern of water use, with people using water in their domestic property throughout the day and a large drop off in commercial water use due to the closure of businesses. Despite the combined challenges of Covid related increases in consumption and a hot spring and summer, we maintained our supply with no significant impacts to our customers. On top of that, we also still maintained our Havant Thicket delivery plan and delivered one of the key and critical elements of that project, the associated Bulk Supply Agreement (BSA) with Southern Water.

The key headlines within this Annual Review are:

- Despite the challenges of Covid, we completed some key projects, and maintained outturn supply demand balances of 20.38 Ml/d and 24.25 Ml/d for our annual average and critical period scenarios respectively, so our customers were not at risk.
- Our outturn value for PCC is 170.54 l/h/d which is above our Revised WRMP19 forecast of 155.4 l/h/d. Analysis indicates that this would have been 152.9 l/h/d had it not been for the impacts of Covid.
- Our outturn leakage figure is 23.55 Ml/d which has surpassed our Revised WRMP19 target by over 3 Ml/d and we are in a strong position to achieve our leakage targets throughout AMP7.
- Our Revised WRMP19 shows that with the adjustments we have made, we would be in deficit from 2021-22 throughout the rest of AMP7 if we experienced a 1 in 200 year drought scenario.

As we look forwards, we have some challenges to resolve around our resilience in extreme dry weather events in the future. We don't perceive there to be a significant risk at this point, but we are working hard to understand the real risk with our new methodologies and models. We will provide a key progress update to our regulators in December 2021, at which time we expect to fully understand the benefits of our AMP7 schemes so that we can input the results into the WRSE regional modelling in January 2022, and report progress more fully in June 2022.

2 GENERAL

2.1 Introduction

The Water Act 2003 places a duty on all water companies to prepare a Water Resources Management Plan (WRMP). As part of the WRMP process, it is a statutory requirement to review progress against the Plan and report it to the Secretary of State in an Annual Review.

We published our Final WRMP in November 2019 (WRMP19)[1], which has recently been updated to reflect both our current company position and advances in industry-wide approaches to improve our data and forecasts. This Annual Review will set out how we have updated our WRMP19, and our performance in 2020-21 in comparison to this. Updated guidance published in March 2021[2] sets out the content of the Annual Review and the submission procedure.

In accordance with the guidance, this review will:

- Highlight any changes that have been made since the development of WRMP19;
- Report on the actions that the Environment Agency and Defra asked us to work on after the publication of our final WRMP19 and Annual Review 2020;
- Report on progress against our forecast data for 2020/21 in our revised WRMP19 (Revised WRMP19); and,
- Report on the overall summary of the supply-demand situation
- Provide a forward-look for our WRMP programme

Our annual return data is used to confirm our Supply Demand Balance Index (SDBI), an Environmental Performance Assessment measure, previously called Security of Supply Index (SoSI). Our annual review and annual returns data will also be used in future to monitor our progress in delivering the National Framework measures for England, such as reductions in per capita consumption, leakage and increases in water supply.

2.2 Supply Area

Portsmouth Water is a community focussed water company, with a strong performance history in supporting and maintaining good relationships with our customers. We also have a changing role in the South East region. We support our neighbouring water company, Southern Water, with bulk supplies of wholesome water so that they can reduce their abstractions on the world renowned chalk rivers. Additionally, we are developing Havant Thicket winter storage reservoir in collaboration with Southern Water, which is due for completion early 2029, to enable a further bulk supply into their Hampshire zone.

Our supply area is made up of a single Water Resource Zone (WRZ). The distribution system includes significant strategic treated water storage and a spine main that runs East to West across our Region. This system ensures that all of our customers in the supply area shown in Figure 1 experience the same level of service.

[1] https://www.portsmouthwater.co.uk/wp-content/uploads/2019/11/Final-Water-Resources-Management-Plan-2019.pdf

[2] Water resources management plan annual review and annual data return, Guidance for water companies in England and Wales. Developed by the Environment Agency and Natural Resource Wales (March 2021)

Figure 1: Portsmouth Water's supply area

There have been no changes to the company area or WRZ configurations since WRMP19. However some customers on new housing estates are supplied by New Appointments and Variation companies (NAVs).

2.1 Levels of Service

When dry weather conditions persist, causing groundwater levels to pass predefined trigger levels, Portsmouth Water will implement its drought plan. Continued dry weather would result in a steady escalation of restrictions on household and commercial users of water, designed to reduce their demand for water. These restrictions range from Temporary Use Bans (TUBs) such as bans on the use of hosepipes to Non-Essential Use Bans (NEUBs, also referred to as ordinary drought orders) that may start to impact businesses in the local area.

As a last resort, water companies may also ask for emergency drought orders in order to allow the use of standpipes and rota cuts to further reduce the demand for water. These actions are part of the Emergency Plan and not the Drought Plan. Portsmouth Water has agreed with its customers the frequency at which demand restrictions might need to be implemented. The agreed Levels of Service (LoS) are:

- Temporary Use Bans to be implemented no more frequently than in a 1 in 20 year drought event.
- Non-Essential Use Bans to be implemented no more frequently than in a 1 in 80 year drought event.
- Emergency Drought Orders to be implemented no more frequently than in a1 in 200 year drought event.

In advance of the implementation of TuBs, we would be approaching customers to make them aware of the water resource situation for the company and be asking them to reduce their water consumption voluntarily. In approaching customers, we would use the full range of media types to efficiently reach as many sections of our customer base as possible.

Given that we did not introduce any water restrictions on customer usage in 2020-21, we have upheld our performance commitment in the Business Plan and maintained our agreed level of service despite the effects of high demand from Covid combined with the hot summer.

3 WATER RESOURCE POSITION

In this section we provide a general view of the water resource position experienced in 2020-21.

We saw a year of extremes ranging from the sunniest spring on record, to extremely wet months in the later part of the year leading to severe flooding in parts of the country. In addition to this, we experienced the impacts of Covid whereby demand reached an all-time high, and consumption usage changed as we all got used to a different way of life. Although our groundwater levels were below average throughout the middle part of the year, we started and ended the year in a healthy water resource position. The following sections show the weather fluctuations, groundwater levels and the impacts of Covid in more detail.

3.1 Rainfall & Groundwater Levels

Groundwater levels are a good indicator of the water available from the chalk aquifer from which we abstract the majority of our water for supply. We therefore monitor the levels on a daily basis and compare them to the 30 year long term average (LTA) and the Drought Trigger line, as shown in Figure 2.

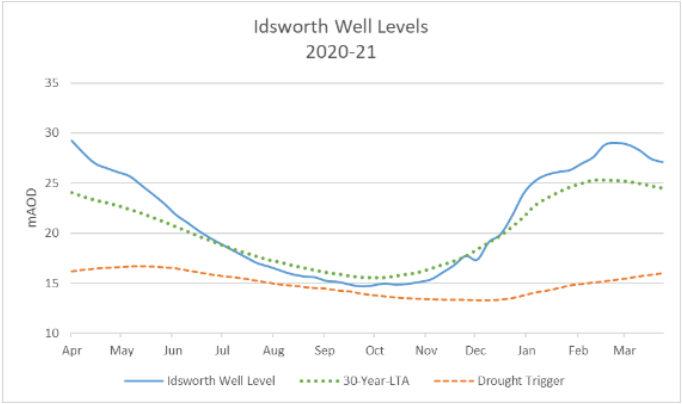

Figure 2: Groundwater levels

The effect of passing this trigger would have been to start proactively working with our customers directly and through the media, asking them to use less water voluntarily.

As the graph in Figure 2 shows, we started the year in a healthy resource position due to the unseasonably wet weather at the start of 2020 which fully recharged our groundwater supplies.

The spring of 2020 saw particularly warm and dry conditions, proving to be the sunniest spring since records began in 1929, with significantly lower than average rainfall in May as shown in Figure 3. Although some rain was experienced in June, the sunny spring reduced our groundwater levels to just below average.

Overall, the summer of 2020 was warmer and wetter than average, followed by an extremely wet October which caused severe flooding in parts of the country, which was again experienced in the later part of December at which point our groundwater levels started to recover.

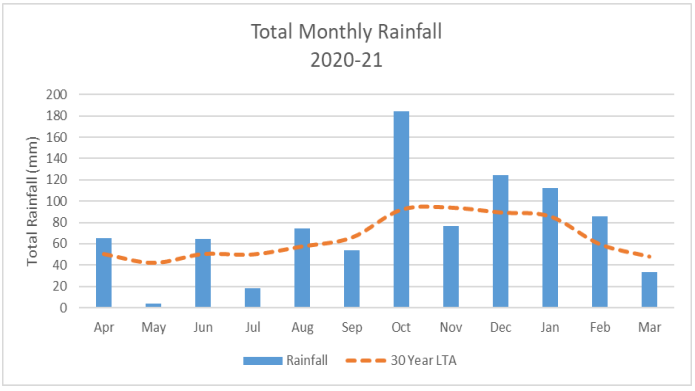

Figure 3: Total monthly rainfall

This trend continued into early 2021, with the first two months experiencing heavier rainfall than average, which resulted once again in a speedy and full recover of our groundwater supplies. This data clearly shows that 2020-21 was not considered a 'dry year' for reporting purposes.

3.2 Overview of the Impacts of coronavirus

There is no doubt that the impact of Covid was significant on the operation of our business. It affected both how we could work as a business and how our customers consumed water. In order to ensure the safety of our colleagues and customers, we had to rapidly change the way we operated, whilst still maintaining the water supply at all times. To adhere to lock down and social distancing requirements, all staff who could do so, were asked to work from home. In order to minimise travel and personal contact between colleagues and with customers, operationally we ceased non-essential activities, such as meter-reading, some repairs at households, water quality sampling at households, and mains renewals activity.

Through careful risk assessment and some modification to working practices, we were slowly able to resume most activities through the course of the summer, ending the year with services essentially back to normal.

The whole country was experiencing similar issues with many closing their doors for a period of time and many people working from home where they had previously been going in to their place of work. This meant a significant change in the pattern of water use, with people using water in their domestic property throughout the day and a large drop off in commercial water use due to the closure of businesses.

More detail of the impacts of Covid are provided in the relevant sections throughout this report. However, the following points summarise changes compared to 'expected' results based on our demand models.

It is important to look at these changes together and not as isolated metrics, which could be misleading about the pressure our resources were under. It is best to look first at the Distribution Input figure to understand the holistic impact these behavioural changes had on the total amount of water we had to put into supply to satisfy total customer demand, in order to contextualise the changes in household and non-household demand.

- **Distribution input** – We saw a 6% increase in Distribution Input (DI) demand compared to that expected in the year by our demand model. We estimate that this is split 4% increase due to Covid restrictions and 2% increase due to weather.
- **Household demand** - We have seen a 14% increase in household demand compared to the model. 12% of the increase has been attributed to Covid restrictions, and a 2% increase due to the weather. This is an increase of c.15 litres per person per day in normal water usage, significantly higher during peak demands.
- **Non-household demand** - We have seen a 14% reduction in non-household demand compared to the model. 16% decrease attributed to Covid restrictions, and 2% increase due to weather. Covid has resulted in a reduction of c.10 Ml/d in demand during restriction periods. The peak summer period saw an increase in demand due to added UK tourism levels as the international travel ban led to more people taking holidays in our region ("staycations").
- **Demographics -** In general, our more rural and affluent customers are located in the northern part of our supply area and their Per Household Consumption (PHC) is typically about 400 litres per property per day, compared to our more urban and costal customers with demand often less than 300 litres per day. In 2020-21 we saw general increases in demand with significant increases in the urban and costal areas. The largest increases are focused in urban areas, Portsmouth in particular, but also Gosport and Bognor. This reflects where many working aged people live and would in normal conditions not be at home but at their place of work.

Table 1**Error! Reference source not found.** below shows our estimates of the overall changes in demand by class of customer for each month. Note that household demand is consistently higher than expected whilst non-household demand is lower.

Effect of Covid			
Month	HH Demand	NHH Demand	DI
April	13%	-38%	1%
May	9%	-14%	3%
June	6%	-1%	4%
July	0%	12%	2%
August	13%	1%	9%
September	11%	23%	12%
October	13%	-18%	4%
November	15%	-30%	3%
December	15%	-27%	4%
January	16%	-30%	4%
February	17%	-34%	4%
March	17%	-35%	3%
Average	**12%**	**-16%**	**4%**

Effect of Weather			
Month	HH Demand	NHH Demand	DI
April	8%	8%	8%
May	4%	4%	5%
June	0%	0%	-1%
July	0%	0%	-1%
August	8%	8%	7%
September	0%	0%	0%
October	0%	0%	0%
November	0%	0%	0%
December	0%	0%	1%
January	0%	0%	1%
February	0%	0%	2%
March	0%	0%	1%
Average	**2%**	**2%**	**2%**

Table 1: Effect of covid and weather on demand and DI

Despite the combined challenges of Covid related increases in consumption and a hot spring and summer, we maintained our supply with no significant impacts to our customers. On top of that, we also still maintained our Havant Thicket delivery plan and delivered one of the key and critical elements of that project, the associated Bulk Supply Agreement (BSA) with Southern Water.

3.3 Daily Water Balance

In order to secure sufficient production capacity is available to deliver the water required by our customers we use a live tool called the daily water balance. In the tool we have a rolling demand forecast that is used to plan production capacity requirements. Actual demand is overlain in the tool to improve future demand forecasts.

Figure 4 shows the data from the tool for 2020-21. It shows actual demand (DI) in blue and our available supply production capacity in red.

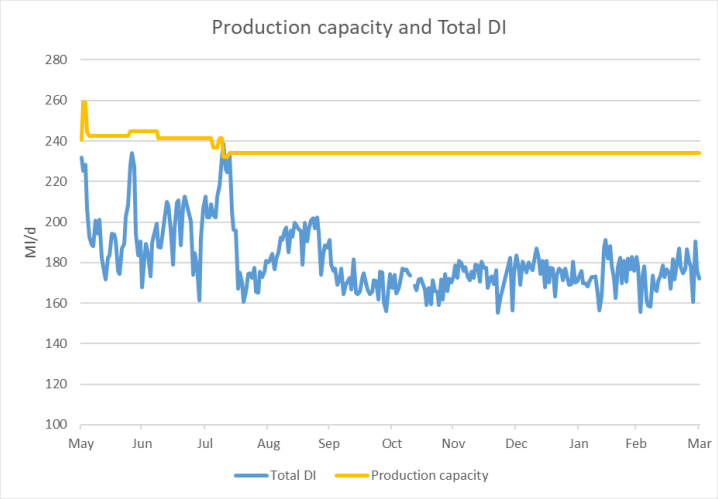

Figure 4: DI and production capacity forecast

There were points in the year, driven by short spells of particularly hot weather demand which challenged production capacity. However, the resilience of our network provided, in this case, by the strategic treated water storage capacity within the network meant that these short-lived periods did not affect our ability to supply water to our customers.

4 WRMP19 AND OUR REVISED WRMP19

In this section we discuss feedback we received from our WRMP Annual review 2020, which reported on our 2019-20 performance, and the work subsequently undertaken as a result.

4.1 Background

Our WRMP19 sets out how we plan to maintain our supply demand balance up to a 1 in 200 year drought scenario between 2020 and 2045. Our previous Annual Review 2020 highlighted that in 2019-20, we had underperformed and not reached certain WRMP19 targets (PCC), but that we over performed significantly on other WRMP19 targets (leakage). In addition to this, our proposed AMP7 supply schemes have been undergoing environmental assessments and further analysis which has meant adjustment to the implementation schedule of these schemes.

Feedback from Defra, Ofwat and the Environment Agency on the annual review 2020 was centred around concerns that the revised delivery schedule of schemes and the relatively high PCC could present a risk to our proposed bulk supply commitment of an additional 9 Ml/d to Southern Water in 2024 and that our supply of water to customers may not be fully resilient up to a 1 in 200 drought event.

Our recommended action from Defra, Ofwat and the Environment Agency was to:

"keep track of the water available for bulk supplies to the region as a whole, and focus on demand management activities to minimise the risks to these proposed transfers."

Furthermore, the Environment Agency specifically stated that:

"The company should review the water available for the bulk supplies to Southern Water as given the multiple issues identified there is a risk to bulk transfer and potentially to security of supply that Portsmouth Water need to recognise, investigate and address. The company need to report progress through quarterly meetings and AR2021."

In consultation with the Environment Agency we decided that producing a set of revised planning tables was the most appropriate way to identify whether a risk was present. By creating revised planning tables we could fully understand if there is a security of supply risk to our own customers, and to the bulk supplies to Southern Water in each drought scenario, and if so, identify potential mitigation measures to put in place until WRMP24 is implemented in 2025.

Our Revised WRMP19 makes use of our most recent data and knowledge, and uses our new forecasts which have recently been developed as we produce our WRMP24. We believe this to be the most appropriate information to use to give us an accurate view of our current position. In particular, our Revised WRMP19 includes:

- Updated demand forecast, using outturn data and WRMP24 methodologies;
- Revised demand modelling to include the full range of drought scenarios for calculation of baseline demand and demand option benefits;
- Re-calculation of target headroom figures to reflect uncertainty in new demand forecasts;
- Updated outage assessment, using WRMP24 methodologies;
- Updated leakage forecast, using outturn data and WRMP24 methodologies;

- Updated demand management options using current AMP7 strategies and WRMP24 forecasts;
- Updated supply option schedule and benefits following further scheme analysis;
- Use of our new Pywr system simulation model to define the benefits from Temporary Use Bans (TUBS) and Non-Essential Use Bans (NEUBS) during the relevant drought scenarios;

As a result of the use of industry best practice techniques, this work has refined our view of the original WRMP19 'options', which are how we propose to maintain the supply-demand balance. This refinement is captured in Table 2.

Option code	Preferred Final Plan Option name	AMP7 (2020/21-2024/25)	AMP8 (2025/26-2029/30)	Revised WRMP 2019 adjustment
CO46	Household water efficiency programme (partnering approach, home visit)	2020–21		New basket of demand side options and benefits to reflect latest WRSE Group related work streams. Including; • Revised water efficiency programme • Virtual home visits • Change of Occupier metering • Further fixed network noise loggers to reduce leakage • The targeted provision of water saving devices
CO46b	Waterwise programme	2020–21		
CO26	Subsidy to customers that purchase water efficient appliances (washing machines and dishwashers, showers and WCs)	2020–21		
CO34	Water saving devices – Retrofitting existing toilets	2020–21		
CO06a	Metering on change of occupancy – existing meter pits	2020–21		
DO04a	Fixed network of permanent noise loggers connected to telemetry - Tranche 1	2020–21		
CO40	Water saving devices – spray taps	2020–21		
CO84	Voids metering	2020–21		
CO78	Voluntary restraint and leakage action	2020–21		
CO79	Mandatory restraint	2020–21		New view on the effectiveness of mandatory restraint from Pywr modelling
CO80	Imposition of Drought Direction Restrictions (mandatory commercial restraint)	2020–21		
RO68	Source S – Drought Permit	2020–21		No change but with completed analysis and environmental reports.
RO21a	Source O – Maximising DO	2020–21		Delivery now expected to be 2023-24 with a revised yield benefit following a feasibility review.
RO23a	Source H – Maximising DO	2020–21		Delivery now expected to be 2023-24 with a revised yield benefit following a feasibility review.
RO24a	Source C– Maximising DO	2020–21		Delivery now expected to be phased over 2023-24 and 2024-25 with a revised yield benefit following feasibility review.
RO22a	Source J – Maximising DO	2024–25		Updated assumptions regarding yield benefit and operation following a feasibility review. No change to implementation date.
DO04b	Fixed network of permanent noise loggers connected to telemetry - Tranche 2		2025–26	New basket of demand side options and benefits to reflect latest WRSE Group related work streams.
CO06	Metering on Change of Occupancy - all properties		2025–26	
RO13	Havant Thicket Winter Storage Reservoir		2029–30	Revised DO based on updated designs

Table 2: Preferred Final and Revised WRMP19 Options

It is recognised that as a result of this work there have been updates to our Revised WRMP19 relative to our Final WRMP19, and the reasons for these updates are summarised throughout this Annual Review report where appropriate.

Following Annual Review guidance, such changes to components of the water balance and/or supply-demand balance as a result of better understanding are not routinely considered a

'material' change of the WRMP. Therefore we do not consider that we are required to re-consult on our WRMP.

The development of our Revised WRMP19 has taken place as a separate piece of work to this annual report and is separately shared with stakeholders and regulators. The full report can be found on our website. Where appropriate we have summarised the results of this revised WRMP19 work in this document, but please refer directly to the report online for the methodology and results of this work in full. Throughout the project, we have been working closely with the Environment Agency to ensure that our approach is acceptable and answers the regulators original concerns.

The next phase of our Revised WRMP19 project is to make best use of our new Pywr model to enable us to more fully understand the potential benefits of our schemes. This will be ongoing work, and presented to the regulators at key milestones, and in next years Annual Review 2022.

The values in our Revised WRMP19 are now our most up-to-date, and supersede the values in our original WRMP19. Therefore, we have compared our outturn data to our Revised WRMP19 values, and supplied our original WRMP19 values for illustrative purposes only to show how they have changed.

5 BASELINE SUPPLY

In this section we review the elements of our performance that collectively account for our supply capability. We identify the outturn performance we have achieved from our sites against the Revised WRMP19, and subsequently explain the reasons for any difference between these values and our original WRMP19.

A summary of the differences between our Final WRMP19 and Revised WRMP19 **dry years** (1 in 20 year event) baseline supply are provided in the table below, alongside the outturn values of 2020-21.

Baseline Dry Year Supply 2020-21 assumptions	Final WRMP19		Revised WRMP19		Outturn Values	
	Annual Average Ml/d	Critical Period Ml/d	Annual Average Ml/d	Critical Period Ml/d	Annual Average Ml/d	Critical Period Ml/d
Deployable Output	226.39	280.00	226.39	280.00	222.99	274.10
Outage	12.2	11.6	6.7	6.4	7.7	9.1
Treatment works losses	2.4	2.4	2.4	2.4	4.07	4.58
Bulk supply exports	30	30	30	30	5.08	4.66
Total baseline Water Available For use (WAFU)	**181.79**	**236.00**	**187.29**	**241.20**	**206.14**	**255.76**

Table 3: Baseline supply – Final WRMP19, Revised WRMP19 and outturn comparisons

From the table it can be seen that our outturn WAFU was greater than both the final WRMP19 and revised WRMP19 requirements.

The following sections provide details on the various contributing components of our baseline supply capabilities displayed in the table above, and explain our outturn values.

5.1 Deployable Output as Baseline supply

A full review of Deployable Output (DO) was undertaken in 2017 for WRMP19, which was taken forwards for use in Revised WRMP19. In the review we explored 'conventional plus event-based DO or time-series' in line with Risk Composition 2 within the UKWIR guidance[3], which allowed us to consider the implications of alternative/more severe droughts than those in the historic record through the consideration of stochastic data. Full details of this method are provided in WRMP19 and the DO Assessment. A full review of our DO assessment will be carried out for WRMP24, and any subsequent changes will be accounted for in our outturn DO for the remainder of AMP7.

5.1.1 Outturn Deployable Output

This section summarises the adjustments made at an individual site basis when calculating our outturn DO.

Source U was not included within the WRMP19 DO numbers, as it was converted to a solely raw water augmentation source prior to 2017. However, Source G, was originally included in WRMP19 DO numbers with a DO of 1.5 Ml/d Annual Average and 3.3 Ml/d Critical Period. However Source G is now also a raw water augmentation source and so has been considered as a DO reduction when calculating our outturn DO.

Two sources, Source I and Source E, are currently experiencing long term outages due to water quality issues since 2017 and have also been removed from the outturn DO for 2020-21.

The total adjustments made to the WRMP19 DO values are shown in Table 4.

DO Reductions	Annual average Ml/d	Critical period Ml/d
Final plan 2020-21 dry year DO in Revised WRMP19	**226.39**	**280.00**
Source G: Raw water augmentation	-1.5	-3.3
Source I: Long term outage	-1.5	-2.1
Source E: Long term outage	-0.4	-0.5
Outturn 2020-21 dry year DO against Revised WRMP19	222.99	274.10

Table 4: Outturn dry year DO for 2020-21

The outturn DO values for 2020-21 dry year, are 222.99 Ml/d and 274.10 M/d for the annual average and critical period respectively.

5.1.2 DWI Notices

We have had a number of DWI notices served on our treatment works for parameters including cryptosporidium, hydrocarbons and risks to disinfection. Each site has a programme of works designed to deal with the issues, including treatment upgrades, installation of monitors where required, increased monitoring and changes to company processes. None of

[3] UKWIR, 2016, "WRMP 2019 Methods – Risk Based Planning", UKWIR Ref. 16/WR/02/11.

the DWI notices and associated works have any impact on the resilience of supply from a WRMP perspective.

5.2 Outage as Baseline supply

Outage is defined as a temporary loss of deployable output at a source works. It can relate to planned or unplanned events and covers a wide range of influences from power failure to short term pollution incidents.

5.2.1 Revised WRMP19 Outage

Our Revised WRMP19 uses the new consistent approach to outage assessment which was developed for the Water Resources South East (WRSE) regional resilience plan, and which each of the member companies will use for the development of their WRMP24. This provides the most up to date industry approach and latest company knowledge.

For the Final WRMP19, data was analysed for the period 2007-2016. For the Revised WRMP19, we based our assessment on data from 2013-2020. This period was selected to provide a good balance between data quality and length of data set. The new outage assessment includes the benefits of our Final WRMP19 preferred options, as well as accounting for the actions we have undertaken during AMP6 and in support of our Business Plan to consider resilience and additional requirements both in the short and long term.

The assessment methodology and results have been presented to the Environment Agency to ensure that they find the approach acceptable for use in the Revised WRMP19. For full details on the methodology, please refer to the Revised WRMP19 report.

Outage allowances have been calculated for the dry year annual average (DYAA) and dry year critical period (DYCP) scenarios. The calculated outage allowance values are shown in and they represent the scenario with a probability of 90% (or an exceedance probability of 10%).

Outage allowance scenario	Final WRMP19		Revised WRMP19	
	Value in Ml/d	As a % of DO	Value in Ml/d	As a % of DO
DYAA	12.2	5.4	6.7	3.5
DYCP	11.6	4.1	6.4	2.7

Table 5: Outage allowance for the Final and Revised WRMP19

The revised outage allowance is lower than the published Final WRMP19 allowance for the following reasons:

- All long duration events were capped at 90 days.
- Events were separated into long and short duration events, with specific probability distributions for both. This prevented the skewing of duration distributions, which artificially increases the outage allowance.
- The choice of distributions used were reviewed for all site/hazard combinations with a contribution to outage >0.2 Ml/d.
- Length of data record used in the assessment was also reviewed. In order to balance data quality with capturing a sufficient period of data, the record from 2013 to 2020 has been used for the revised assessment to determine the outage allowance

Our outage assessment will be revisited once we have finalised our AMP7 scheme benefits by December 2021. Any resulting changes will be accounted for in subsequent Annual Reviews to ensure our supply-demand balances reflect these changes.

5.2.2 Outturn Outage

In the WRMP guidance, outturn Outage falls into three categories;

- Less than 3 months and which has not been undertaken for maintenance or other planned reasons
- Less than 6 months and should have an action plan to recover the losses
- Longer than 6 months but the mitigation plan has been agreed by regulators

Therefore outages longer than 6 months without an agreed mitigation plan are not included in our outturn outage figures, but have been accounted for in reductions to the DO detailed in section 5.1.1.

Only our Source H falls under one of these categories as a long term outage as the site has been offline since the end of 2019 due to water quality concerns. However, there is a plan to bring the site back on line. Therefore Source H is not considered a reduction in DO, but represents our outturn outage values for 2020-21.

As shown in Table 5, this makes the actual outage for 2020-21 to be 7.7 Ml/d average and 9.1 Ml/d critical period, compared with our Revised WRMP19 outage allowance of 6.7 Ml/d average and 6.4 Ml/d critical period.

5.2.3 Managing outage

We understand the need to manage outage carefully as it is an important component of our supply demand balance. A major threat to outage at our treatment works is from oil spills, and so one of the studies we undertook in AMP6 explored the most effective solution to ensure resilience to this risk. Although no properties are at risk of supply on an average day, some 100,000 customers would be at risk of short term low pressure at peak demand. Our 2020-25 Business Plan therefore includes £2.4m to address the risk and improve resilience at peak demand.

As part of this investment, we are involved in three Catchment Partnerships which include initiatives to reduce domestic oil pollution for example through the offer of subsidised surveys of old oil tanks and/or subsidised replacement of oil tanks with plastic double bunded tanks. We have also recently installed VOC monitors at all sites at risk from pollution, in order to be able to better monitor the pollution plume and make an informed decision on when the site can be started up again. This is likely to reduce the outage durations of any future pollution events related to oil spills.

Furthermore, we are implementing a new system called Storage and Production Optimisation in Real Time (“SPORT”). The SPORT system will continuously analyse and select the optimum pump combinations from the multiple inter-connected sources we operate to balance reservoirs and meet customer demand. Where outage occurs, the SPORT system will allow automated capability to restart works, and where this is not possible, SPORT will analyse and modify the optimum pump combinations on available pumps. Only where reservoirs cannot be balanced within defined limits will out of hours responses be required.

Furthermore, we have plans to increase solar power at our sites as a means of generating green energy.

5.3 Bulk Supplies as Baseline supply

Portsmouth Water currently operates two bulk supplies to Southern Water. One is feeding East into their Sussex Zone, with a capacity of 15Ml/d which is available on a ‘best endeavours’ basis, with a sweetening flow of 1 Ml/d required at all times. Our second bulk supply to Southern Water is from our Source A, sending water West into their Hampshire Zone. It is also

up to 15Ml/d with water volumes guaranteed through a reservation basis, implemented between our respective company production teams.

In addition to our current bulk supplies, we are also committed to supplying Southern Water with additional bulk supplies in the future to support their Hampshire zone as they continue to reduce abstraction from their chalk rivers. One of these additional bulk supplies is due to commence in 2024, at a volume of 9 Ml/d. The other will be in association with the development of Havant Thicket, increasing bulk supplies by a further 21 Ml/d in 2029, of which the Bulk Supply Agreement has recently been delivered as a critical element of the project.

5.3.1 Outturn bulk supplies

For conservative planning purposes, in the final and revised WRMP19 plans, these exports were assumed as 15 Ml/d for both annual average and critical period, totalling 30 Ml/d to Southern Water. In 2020-21 we have exported significantly less than the 30Ml/d the plans allow, as shown in Table 6. This difference has supported our surplus in our supply demand balance.

	WRMP19 2020-21	Outturn value 2020-21
Annual average	30 Ml/d	5.08 Ml/d
Critical period	30 Ml/d	4.66 Ml/d

Table 6: Total bulk supply exports to SWS

The critical period value is defined as being the volume supplied to Southern Water during the peak week (i.e the week at which distribution input was at it's highest).

5.4 Treatment works losses and operational use as Baseline supply

Treatment losses is the term used to describe water that is taken from the environment, but does not enter supply due to requirements of the treatment process or maintenance and upkeep of the distribution network.

To calculate losses, we subtract the bulk supplies and distribution input values from the total raw water abstracted. The table below therefore shows the numbers used to derive our outturn average value for 2020-21. Distribution input is detailed further in section 9.

Losses	Annual average Ml/d
Raw water abstracted	188.48
Bulk Supplies	5.08
Distribution Input	179.33
Treatment works losses and operational use	**4.07**

Table 7: Calculation of outturn treatment works losses and operational use

As with the bulk supplies, the critical period is defined as the week at which distribution input was at its highest. The impact of covid on distribution input is explained in section 9.2. However, in this instance during the peak DI week, we were actually depleting service reservoir storage and so less water was being abstracted. Using this formula produces a negative value for 'losses'. We have therefore uplifted the average 'losses' value as a percentage of the raw water abstracted, to obtain a critical period 'losses' value of 4.58 Ml/d.

5.5 Sustainability Schemes as Baseline supply

Portsmouth Water's area of supply includes numerous protected rivers, harbours and coastlines, highlighted in Figure 5.

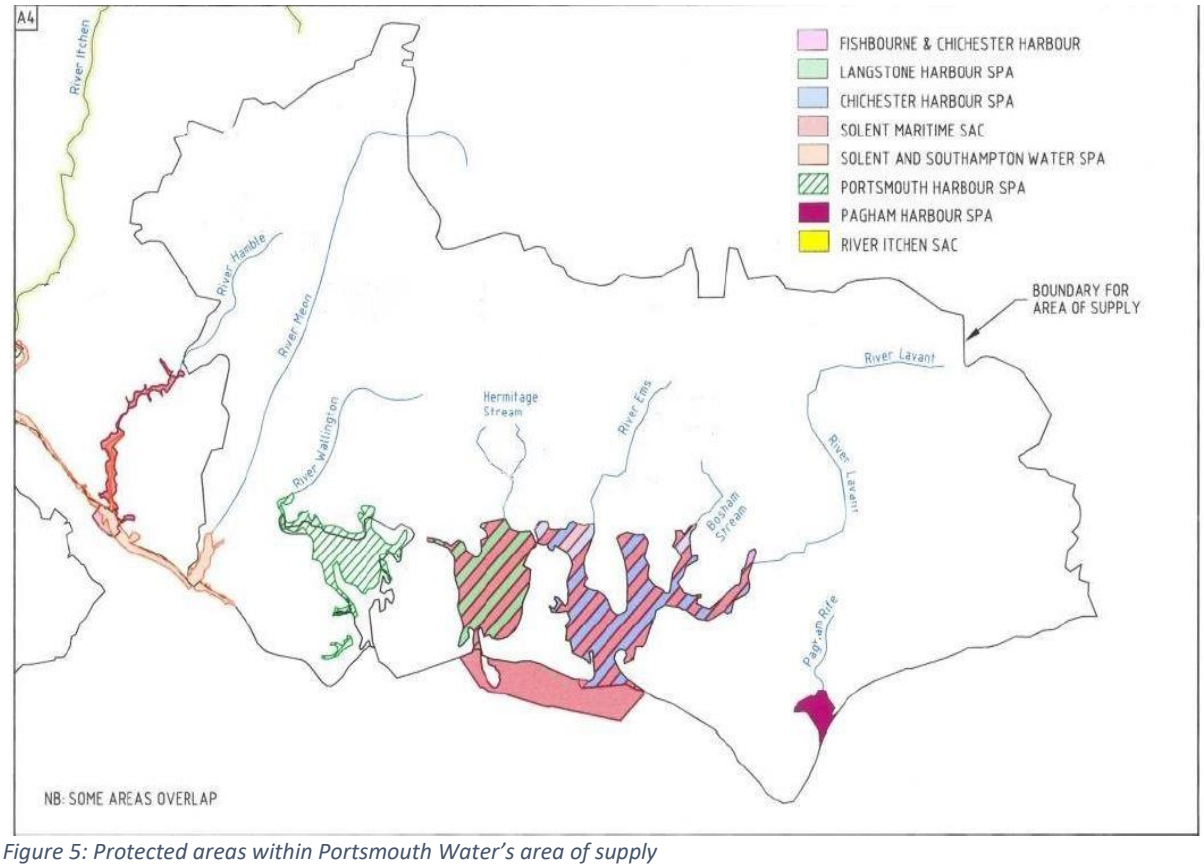

Figure 5: Protected areas within Portsmouth Water's area of supply

The Company has complied with all previous sustainability reductions and has voluntarily reduced a number of abstraction licences in the past.

5.5.1 AMP7 WINEP Schemes

In this section we set out which activities were included in the Water Industry National Environmental Programmes (WINEP) for AMP7 and our progress against our delivery targets.

In 2018, the Environment Agency set out which activities were to be included in our WINEP3. This included three water resource schemes to be undertaken during AMP7. The schemes are in their early investigatory phases, and so have no impact on the DO forecasts of 2020-21. However, they are outlined in the following sections.

Scheme 1; Source F WFD No Deterioration

This WINEP investigation is required to investigate and undertake options appraisal for preventing deterioration of ecological status from flow pressures, in the two waterbodies identified by the EA as being impacted by abstraction at our Source F. In June 2020 we appointed a consultant, Wood, to undertake this WFD No Deterioration investigation on our behalf. Phase 1 of the project is complete which included a summary of previous investigations, a review of impacts of abstraction in the Meon catchment, a review of ecology data, and an assessment of the predicted future abstraction growth from the site.

From previous investigations and an initial review of current data it may be concluded that the river is not adversely impacted by current rates of abstraction. However, it cannot be concluded at this stage that there is no risk of future increases in abstraction that could potentially further reduce river flows in the Meon. As the Meon is already failing the EFI (at Q50 and below), any further increase in abstraction impact is considered to present a risk of deterioration according to the Environment Agency guidance. Since failures of the EFI do not appear to have manifested in ecological impacts, this might suggest that a local flow target may be more appropriate for the river than the EFI.

At this point of the Source F WINEP study we are having a review of the Meon as a whole and redefining our scope of work so that the catchment is looked at holistically and we take into consideration all of the investigative work completed/undergoing in the Meon. In addition, we want to fully understand the implication to individual site licenses of the environmental ambition scenarios the Environment Agency have put forward to the Regional water planning process. In July 2021 we will be appointing a consultant to undertake this work. As part of this, we will be reviewing the likely growth from all of the sources on the Meon, which will then feed back into the Source F WINEP investigation.

The outcome and next steps of the Source F WINEP investigation will be discussed and agreed with the Environment Agency at the point of appointing consultants. It is possible that no further work is needed if there is no longer any growth proposed at Source F, or can be moved to AMP8 if growth is delayed beyond 2030.

Schemes 2 & 3; River Itchen CSMG & River Itchen Salmon Action Plan

This WINEP investigation is required to determine if abstraction licences are impacting on the ability of a waterbody/waterbodies to achieve the Natura 2000 (N2K) Conservation Objectives or Favourable Condition for Sites of Special Scientific Interest (SSSI). In addition it is also required to consider the impact of meeting revised standards to protect Salmon as proposed by the Salmon 5 Point Approach.

Portsmouth water, Southern Water and South East Water developed a scope, and commissioned Wood to undertake the assessment during 2020-21 and is continuing into2021-22. Several Project Steering Group meetings have been convened with the water companies and regulators. The reports produced so far include a proposed scope for the options appraisal, which is in line with the requirements of the 2019 Environment Agency Measures Specification Forms (MSF) signed-off by the Environment Agency, Natural England and the

water companies for the investigations. This follows the traditional approach of several months of options identification, screening from a long list to short list to a preferred option, with assessment of benefits, feasibility, and costs.

We are on track to complete the work by March 2022.

6 SUPPLY OPTIONS

In this section we discuss the progress made in understanding and delivering the enhanced DO schemes identified in the final WRMP19.

Our Final WRMP19 required a number of supply-side interventions to ensure the supply of our customers and of the bulk supplies we have committed to exporting to Southern Water. Since publishing the Final WRMP19, we have made significant advancements in our understanding of the DO benefits, and have also had to update the implementation timelines of these schemes. The updated knowledge is account for within the Revised WRMP19. The differences between the 1 in 200 year benefits are provided in the table below for comparison.

Supply Side Scheme	Final WRMP19			Revised WRMP19		
	Assumed DO benefit (average) Ml/d	Assumed DO benefit (critical period) Ml/d	Implementation date	Assumed DO benefit (average) Ml/d	Assumed DO benefit (critical period) Ml/d	Implementation date
Maximising DO at Source O	1.8	1.8	2019-20	2.9	3.6	2023-24
Maximising DO at Source C	4	4	2019-20	0	6.5	Partial implementation 2023-24, full 2024-25
Maximising DO at Source H	2	2	2019-20	0.4	0	2023-24
Three GW schemes total benefit	**7.8**	**7.8**		**3.3**	**10.1**	
Drought Permit at Source S	8.5	8.5	2017-18	8.5	8.5	2020-21
Maximising DO at Source J	12.5	15	2024-25	3.1	12.5	2024-25
Havant Thicket winter storage reservoir	23	50	2029-30	21	25	2029-30
TUBS/NEUBs (at 2020-21)	20.66	43.22	All	16.5	22.6	All

Table 8: Final WRMP19 and Revised WRMP19 supply-side option benefits and implementation

The following sections provide details on current progress and updated knowledge for each of these supply-side options.

6.1 Maximising DO at Source C, Source H and Source O

6.1.1 WRMP19 assumptions

DO resilience schemes were proposed for three of our groundwater sites in our Final WRMP19 with proposed solutions to target the following improvements:

- Source O Water Treatment Works (WTW): At present, when groundwater levels drop below the adit level, turbidity issues are experienced at this site. This scheme is to mitigate that impact and therefore provide an additional 1.8 Ml/d in a 1 in 20 year drought, increasing the total output in a 1:20 to 5.5 Ml/d. The 1.8 Ml/d applies to the drought conditions on a sliding scale where the target is an ADO of 4.6 Ml/d additional yield for a 1:200 year drought.
- Source C WTW: At present, air and turbidity issues are experienced when running the larger borehole pumps; this scheme is to mitigate that impact and therefore provide an additional 4 Ml/d between 1:20 and 1:200 drought conditions.
- Source H WTW: Turbidity issues are experienced when running at higher flows. This scheme is to mitigate that impact and therefore provide an additional 2 Ml/d between 1:20 and 1:200 drought conditions.

We have undertaken detailed investigations into each of the AMP7 schemes, and although we are still not in a position to see any DO benefit from the GW Recovery AMP7 schemes in 2020-21, progress has been made in all cases. In March 2021, AECOM produced a 'Deployable Output Recovery Scheme' (DORS) report which determined the maximum 1 in 200 year deployable output from the three sources, using the current assets and treatment processes ensuring regulatory and process compliance. The investigations identified engineering solutions to maximise the resource at each site in a 1 in 200 year drought, and provided provisional figures of what that maximum resource might be. We have further progressed our understanding of the benefits obtainable from these schemes, and updated our schedule for implementation, which have been accounted for in our Revised WRMP19.

The review suggested that our Final WRMP19 assumptions needed updating, which might impact the targets for improvement, and that the schemes need to be tested within our Pywr water resource zone model.

6.1.2 Revised WRMP19 assumptions

The AECOM DORS report gave us a clearer understanding of what each of the schemes would achieve in a 1 in 200 year drought event:

- Source O: The scheme will benefit the DYAA scenario by 1.2 Ml/d in a 1 in 20 year drought event and 2.9 Ml/d in 1 in 200 year event. It will also benefit the DYCP scenario by 2 Ml/d in a 1 in 20 year event rising to 3.6 Ml/d in a 1 in 200 year event. The scheme now targets implementation within 2023/24.
- Source C: The scheme will not benefit the DYAA scenario but will improve the DYCP scenario by 6.5 Ml/d across all drought scenarios. The scheme now targets partial implementation within 2023/24 and full implementation in 2024/25. This is to recognise that the full benefit of the option may not be realised until our bulk supply to Southern Water is increased in 2024/25.
- Source H: The scheme will benefit the DYAA scenario by 0.4 Ml/d, although there is no benefit to the DYCP scenario. The scheme now targets implementation within 2023/24.

These benefits and implementation timescales are reflected within the Revised WRMP19.

We have started to test these schemes within our Pywr model, as recommended in the DORS report. However, this project is not yet complete and forms part of the further work, explained in section 12.2.

6.2 Drought Permit at Source S

The drought permit at Source S, which identifies an increase of abstraction from the currently licenced 2.5Ml/d back to an historic capacity of 11Ml/d, remains a key part of our Drought Plan. The Drought Permit would provide 8.5 Ml/d benefit to the average and critical period scenarios in droughts equivalent to, or worse than, a 1 in 125 year drought event. The option remains unchanged from our Final WRMP19. However, we have undertaken further work to demonstrate:

- that the source has operated at rates close to those required in the past.
- there is sufficient time to mobilise temporary treatment infrastructure as a drought develops.
- the environmental impact of the drought permit and the necessary monitoring and mitigation.

We are working closely with Southern Water on the environmental monitoring to maximise opportunities for joint efficiencies with a source they operate nearby and are going to be commencing this imminently. We have also provided the reports and progress updates to the Environment Agency through our regular meetings.

Further information is available within our draft 2021 Drought Plan, which is currently out to consultation.

6.3 Maximising DO at Source J

The Source J scheme is intended to provide resilience to supplies once the committed bulk transfer to Southern Water from Source A increases from 15Ml/d to 24 Ml/d in 2024-25.

The scheme had originally been intended as a straightforward increase in abstraction capability designed to allow the Source J source as a whole to increase output by 12.5 Ml/d, closer to its license limit of 22.73Ml/d under drought conditions. Currently the source Deployable Output is limited by the Deepest Advisable Pumped Water Level (DAPWL) in borehole 3, to around 8.5Ml/d under severe drought conditions.

Initial desktop review followed by discussions with the EA concluded that there were significant concerns over groundwater body deterioration under the Water Framework Directive. Additional water resources modelling was therefore required before the scheme could progress. This modelling indicated that:

- Increase to the full license is not required to support the Southern Water export. At most, 9Ml/d increased output will be required, and enhancements of around 6Ml/d should be sufficient. The increased rate would only be needed for 3-6 months at a time.
- It is possible to operate the source intermittently and in conjunction with the rest of the PW network so that there is no long term average (LTA) increase in total abstraction levels from the groundwater chalk block as a whole.

The scheme is therefore seeking to deliver at least 6Ml/d from one or more new satellite boreholes in the Source J area. We are discussing possible licensing approaches to achieve this outcome with the Environment Agency.

As the desktop review indicated that yields from individual boreholes are likely to be low (in the order of 3Ml/d) the current proposed plan is to carry out pilot test borehole drilling with initial yield testing at three sites during 2021, followed by reaming out to production borehole diameter and constant rate testing in summer 2022.

An initial Environmental Assessment Report (EAR) has been developed in order to give the Environment Agency early sight of the findings. This concluded that there is a negligible risk to

surface water bodies. However, the EAR will need to be updated once the extended testing programme has been carried on the production boreholes.

The next steps of this programme are:

1) Finalise negotiations with landowners for the three preferred drilling locations.
2) Complete the investigation application.
3) Deliver pilot borehole drilling and step testing, including water quality samples during step testing.
4) Carry out a revised feasibility assessment following the yield and water quality testing results from the pilot boreholes, including a review of available versus required treatment capacity.

The programme will then progress as appropriate to production borehole drilling, licensing and development of headworks/transfer infrastructure as required.

6.3.1 Revised WRMP19 assumptions

As described above, our Final WRMP19 assumed that this option would provide an annual average benefit of 12.5 Ml/d, and critical period benefit of 15 Ml/d under the 1 in 200 year drought scenarios. This has been revised to 3.1 Ml/d annual average and 12.5 Ml/d critical period, to reflect the findings from the work that has been undertaken, and the assumption that the scheme will only be required to operate for a few months of a drought year.

6.4 Havant Thicket winter storage reservoir

Havant Thicket Winter Storage Reservoir is a significant construction project being undertaken as a collaboration between Portsmouth Water and Southern Water. It will provide resilient water supplies to the region, supporting reduced abstraction on chalk rivers. The project has an overall biodiversity net gain and will offer a new community leisure facility for the area.

Planning permission for the reservoir has just been granted and the implementation date of this option has not been adjusted for the Revised WRMP19. However, since publication of the Final WRMP19, there is more clarity on the operational methodology of the completed reservoir and initial assumptions have been revised. The benefit of the option has been changed to reflect this, and is now 21 Ml/d average and 25 Ml/d critical period up to the 1 in 200 year drought condition, to be implemented in 2029-2030.

6.5 Temporary Use Bans and Non-Essential Use Bans

Our Drought Plan describes how we use Temporary Use Bans (TUBs) and Non-Essential Use Bans (NEUBs) to lower the demand for water and conserve supplies as a drought develops.

We have used our new Pywr simulation model to identify the supply benefit of TUBs and NEUBs. Our Revised WRMP19 now includes this benefit as a supply side option in line with our levels of service.

7 BASELINE DEMAND

In this section we discuss how we have used the latest methodologies to assess baseline demand and applied that view to this report.

Since the publication of our Final WRMP19 in 2019, we have produced an updated demand side forecast to input into the WRSE regional model for the development of the regional resilience plan, and subsequent WRMP24. We have followed the most recent methodologies and used the latest data which has been audited both internally and externally by WRSE. The forecasts included previous outturn values in order to produce forecasts starting prior to 2020. It is therefore appropriate to use this data as the basis for our Revised WRMP19. The base year for the demand forecast in the Revised WRMP19 is 2019-20 and we have used updated methodologies for calculating Per Capita Consumption (PCC) and leakage.

It is important to note that the base year outturn values were pre-covid. Therefore the forecasts do not include any effects from the change in consumption patterns due to the pandemic, which are described further in section 9.2.

As part of WRSE and in preparation for our own WRMP24 we will be running 'Covid scenarios' which will take into account the uplifts we have seen due to Covid. However, this is not ready to be used in this report at this time.

The profiles below show the baseline demand forecasts for the Final WRMP19, and how our update in approaches, which we summarise in the following sections, have amended demand forecasts for the Revised WRMP19.

NB. For illustrative purposes, in this document we have provided the annual average scenario for a 1:200 year event. The baseline demand scenario for the 1 in 20, 1 in 80 and 1 in 125 dry weather scenarios can be found in the Revised WRMP19 full report.

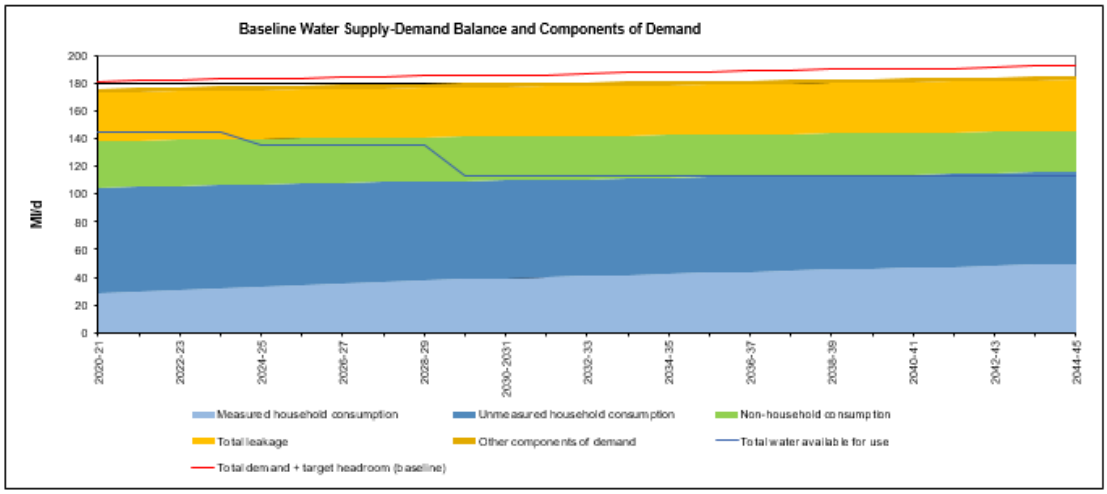

Figure 6: Final WRMP19 - Components of the baseline demand forecast (1 in 200 year)

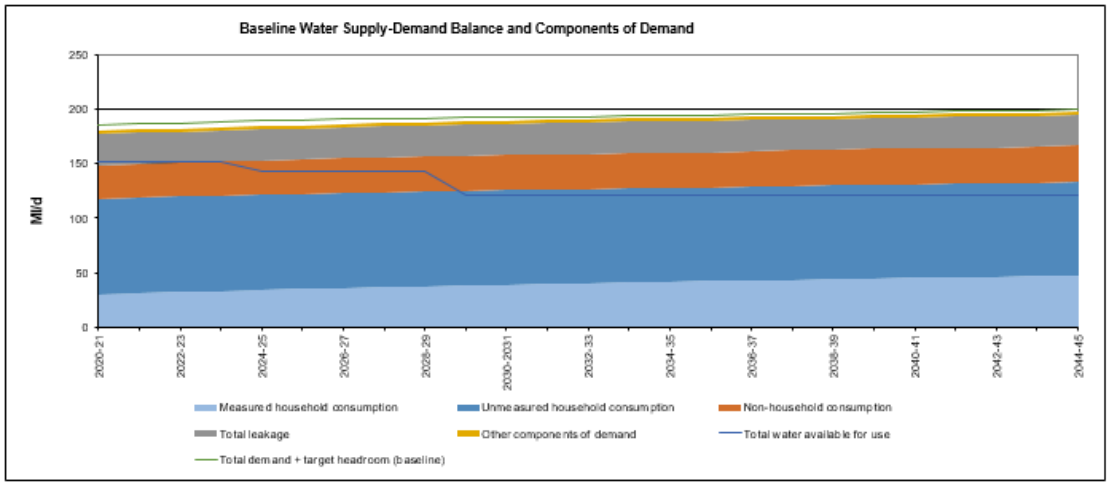

Figure 7: Revised WRMP19 - Components of the baseline demand forecast (1 in 200 year)

The profiles show;

Baseline demand forecast		
	Final WRMP19 (Ml/d)	Revised WRMP19 (Ml/d)
2020-21	175.93	189.71
2044-45	185.08	197.79

Table 9: Baseline demand forecast start and end values for Final and Revised WRMP19

The overall baseline demand forecast for our Final WRMP19 rises from 175.93 Ml/d in 2020-21 up to 185.08 Ml/d by 2044-45. Our Revised WRMP19 reflects our latest methodologies and previous outturn values, which results in a starting point of 189.71 Ml/d in 2020-21, up to 197.79 Ml/d by 2044-45.

7.1 Baseline Demand scenarios

For our Final WRMP19, we developed forecasts for Normal Year (1 in 2), Dry Year (1 in 20) and Extreme dry year (1 in 200) annual average and critical period drought events. For our Revised WRMP19, we have also derived demands for the 1 in 80, and 1 in 125 year events so that we can test our ability to meet our agreed levels of service to customers in more granularity.

To derive demand at the different return periods, we have utilised both outturn data and stochastically generated DI data. The outturn data was used to produce an estimate of the Normal Year (NY), which is the same approach as for our Final WRMP19. However the stochastic data was then used to characterise rarer events for which there is limited or no experience in our historic record. This is a key difference between the Final and Revised WRMP19 demand forecasts.

7.2 Properties and population

We have generated new forecasts for the revised WRMP19 using the Edge Analytics Bottom-Up approach which allocates local plan growth according to potential housing development sites, rather than Top-Down which allocated growth according to existing levels of growth. This approach reflects the WRSE methodology and we believe constitutes industry best practice. The methodology is particularly valuable where a local authority is shared between neighbouring water companies. For full details, please refer to the Revised WRMP19 report.

7.3 Household consumption as Baseline demand

For our Final WRMP19 we used the 'Variable Flow' (VF) method proposed in the 'WRMP19 Methods – Household Consumption Forecasting' guidance. We retain this methodology for our revised WRMP19 work, with a number of updated assumptions, including:

- Recognition of the impact of occupancy on consumption i.e if average occupancy increases, then homes become more efficient and vice versa.
- Climate change impact has been adjusted to the new base year
- We do not assume any new metering in the baseline scenario as per the revised methodology for WRSE and WRMP24. This differs from our Final WRMP19 where meter optants were included in the baseline. We believe this new approach is more transparent and presents a scenario with no company interventions

7.4 Non-household consumption as baseline demand

For the Final WRMP19 plan, the Non-household forecast was produced internally at Portsmouth Water. As part of our partnership with WRSE, this forecast has been updated by Artesia. This work, carried out for the whole WRSE region, ensures alignment with the other WRSE companies. Artesia created four core forecasts; Baseline, Low, Central and High. The Central scenario has been adopted for the Revised WRMP19. The Low and High scenario have been used to inform inputs into the headroom analysis (described in section 10).

7.5 Leakage as baseline demand

The latest Environment Agency guidance for WRMP24 states "leakage remaining static from the first year of your plan (2025-26) throughout your whole planning period (unless otherwise agreed by regulators)".

In practice, given no additional company effort, the baseline leakage might be expected to rise as the length of the network, and, the number of supply pipe connections increase with growth. In alignment with the guidance, however, we have kept all leakage flat over the entirety of the planning horizon for our Revised WRMP19, starting from 2019-20.

We have adjusted the outturn leakage for the base year of 24.36 Ml/d to the three-year average of 28.36 Ml/d. This 4 Ml/d adjustment has been made to recognise the mild conditions of the preceding winter. Without the adjustment we would be underestimating leakage and total Distribution Input (DI).

8 DEMAND MANAGEMENT OPTIONS

In this section we discuss how we have reviewed our demand options and how that has been used in our revised WRMP19 work.

8.1 Final WRMP19 options

The demand options selected for our Final WRMP19 for implementation throughout AMP7 and beyond were:

- Household water efficiency programme (partnering approach, home visit)
- Waterwise programme
- Subsidy to customers that purchase water efficient appliances (washing machines and dishwashers, showers and WCs)
- Water saving devices – Retrofitting existing toilets
- Metering on change of occupancy – existing meter pits
- Fixed network of permanent noise loggers connected to telemetry - Tranche 1

- Voids metering
- Water saving devices – spray taps
- Water saving devices – trigger nozzles for hoses
- Smart Meter MNFR Trial
- Voluntary restraint and leakage action
- Mandatory restraint
- Imposition of Drought Direction Restrictions (mandatory commercial restraint)

The demand options selected for implementation in 2025–26 and beyond were as follows:

- Fixed network of permanent noise loggers connected to telemetry - Tranche 2
- Metering on Change of Occupancy – all properties

8.2 Revised WRMP19 options

Our demand options have now been updated to reflect the new basket of options selected by WRSE towards its draft regional resilience plan, and in preparation for our WRMP24.

Our demand management options have been updated in our Revised WRMP19 to reflect our current strategies, which are based on our WRMP19 starting point (2020-21) and best available information going forwards. The options are named as follows for the Revised WRMP19:

- Optant metering
- Change of occupancy metering
- Universal metering
- Household Water Efficiency Programme
- Non-House Hold (NHH) Water Efficiency
- Leakage reduction (AMP7)
- Leakage reduction (Long Term)

The benefit of these options is included within the final supply demand balance of the Revised WRMP19.

9 DISTRIBUTION INPUT

Our distribution input (DI) is the amount of water we put into our network each day and is our headline measure of demand. In this section we detail our Revised WRMP19 final plan forecast demand against our outturn demand for water in 2020-21. We consider distribution input, and its components, including; household demand, water efficiency, non-household demand, PCC and leakage. The impact of Covid on our outturn demand is also considered.

For most outturn years the 'Macro Components' of demand; unmeasured demand and measured demand, do not add up precisely to the measured Distribution Input (DI). The Annual Review process requires any imbalance to be reconciled using the Maximum Likelihood Estimation (MLE) methodology. All outturn data provided in this review are the post MLE values and are provided in the data tables in Appendix A using the new data return guidelines[4].

Although we have produced a range of scenarios for our Revised WRMP19, we are yet to produce our Normal Year (1 in 2 year event) tables. Therefore, outturn results are compared against the Revised WRMP19 dry year (1 in 20 year) forecasts. This is also aligned with the EA guidance for the Annual Review which requires comparison against dry year values.

[4] Technical guidance for completion of WRMP annual review data return, Environment Agency, March 2021

9.1 Outturn distribution input

A summary of how our DI compared to our Revised WRMP19 forecast is shown in Table 10 below.

	Revised WRMP19 Forecast 2020-21		Outturn 2020-21	
	Annual average Ml/d	Critical Period Ml/d	Annual average Ml/d	Critical Period Ml/d
Distribution Input	175.07	216.18	179.33	222.23

Table 10: Outturn Distribution Input compared to Revised WRMP19 DI

It is clear from the outturn values that our outturn DI has exceeded that planned for in the period 2020-21. The year was not considered a 'dry year', yet the DI is higher than that forecast for a dry year. We believe this is primarily due to the impacts of Covid on customer consumption which is explained in detail below, and in the other relevant sections in this report.

9.2 Impact of the weather and Covid on distribution input

In this section we outline the conclusions of a project we have undertaken to investigate how Covid impacted demand and the various components. The 'expected' DI values stated shown in the figures refer to the expectations from our demand model, rather than in terms of the Revised WRMP19 forecast.

Figure 8 below looks across the year. we can see that actual demand was significantly exaggerated (by 6%) against our demand forecasts throughout the whole year.

The sunny spring created an increase in demand mostly due to the weather, however, the rainfall we had in June, July and August meant that demand didn't quite reach the peaks which it could have. Autumn weather was considered 'normal', and so the increase in demand over this time is mostly attributed to Covid. Therefore we estimate that the 6% overall increase is split 4% increase due to Covid restrictions, and 2% increase due to weather.

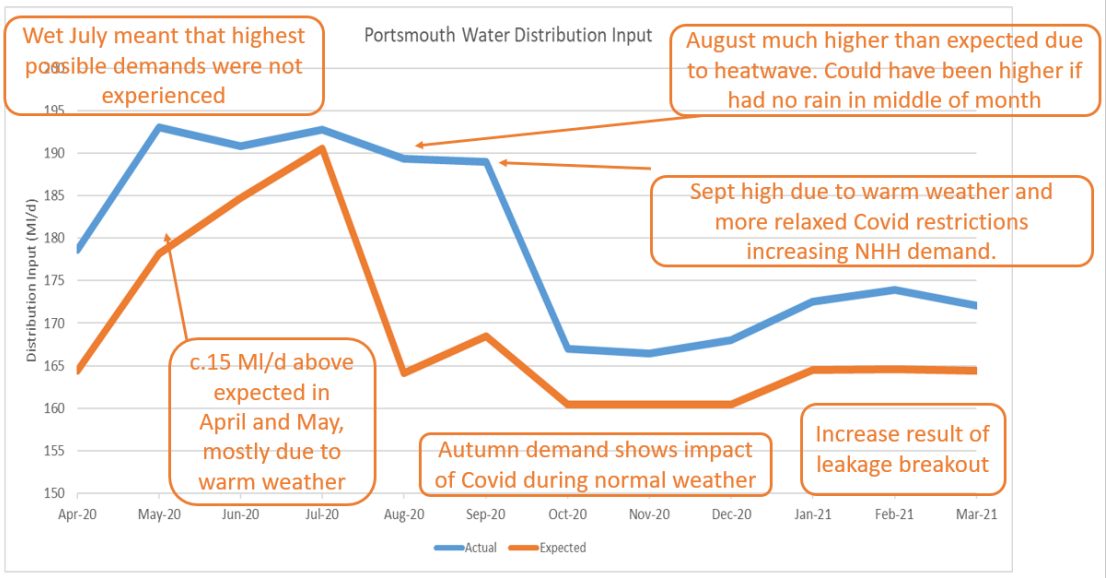

Figure 8: Outturn Distribution Input

9.3 Leakage contributing to distribution input

In this section we cover our leakage performance. Leakage is an element of demand that is mostly in control of companies, but is also subject to the impact of weather, typically extremes of weather that cause some amount of ground movement.

A summary of how our outturn leakage compared to our Revised WRMP19 forecast is shown in Table 11 below.

	Revised WRMP19 Forecast 2020-21		Outturn 2020-21	
	Annual average Ml/d	Critical Period Ml/d	Annual average Ml/d	Critical Period Ml/d
Leakage	26.66	26.66	23.55	23.55

Table 11: Outturn 2020-21 leakage compared to Revised WRMP19

This represents a very strong performance and reduces the leakage from our network to industry leading low volumes.

Our previous years outturn value was 24.36 Ml/d. Therefore, we are particularly pleased to point out that despite the disruptions to working practices caused by the pandemic, and the challenges of the winter months, we still reduced leakage by 3% from last year, and remain below our forecast Revised WRMP19 target by 3.11 Ml/d. We are in a strong position to achieve our leakage targets throughout AMP7.

Since missing our target in 2017-18, our leakage recovery plan has reduced leakage by over 13 Ml/d through improved efficiencies and additional expenditure. We are fully committed to continuing to reduce leakage, and will do so by;

- Expanding our network of acoustic monitors;
- Continuing our innovative work on micro-pressure logging and AI software; and,
- Continuing to enhance our ability to run a calm network through the creation of a company-wide Digital Twin network model.

9.3.1 Impact of the weather and covid on leakage

There have been no impacts on leakage due to covid. However, we did see a 6% overall increase in leakage compared to what we would have expected, due to the weather.

Figure 9 shows our analysis throughout the year. The harsh winter and dry summer led to a number of water companies failing leakage targets. In contrast, we have continued to reduce leakage compared to previous years and we are over 10% below our ODI leakage target.

We made a full recovery in Spring 2021 and leakage is now back to Autumn 2020 levels of c. 21Ml/d, putting us in strong position for next years reporting.

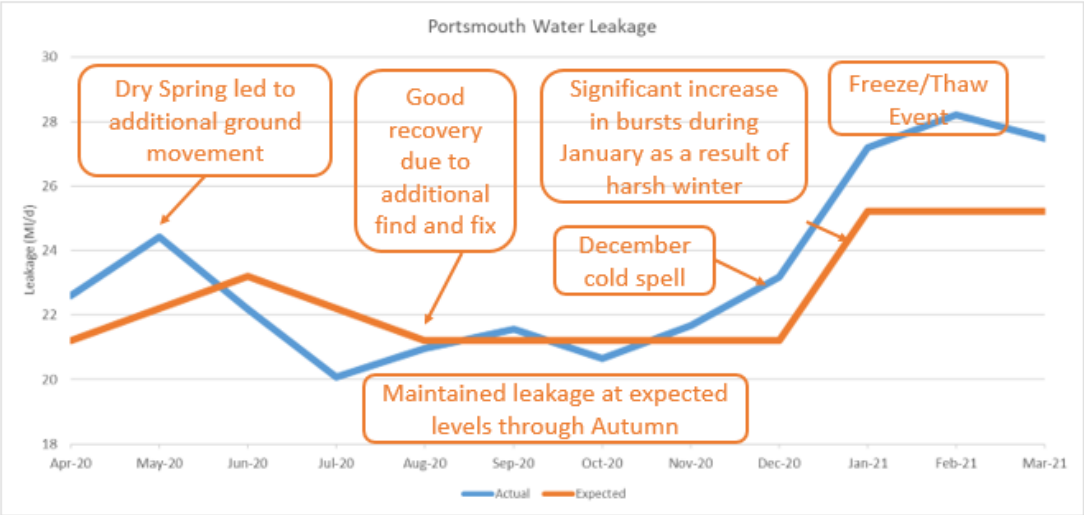

Figure 9: Impacts of weather and covid on leakage

9.4 Household Per Capita Consumption contributing to distribution input

In this section we cover our PCC performance, how it compares to our Revised WRMP19 dry year forecast for 2020-21 and the reasons for variation. Table 12 provides an overview of the figures.

Per capita consumption (l/h/d)	Revised WRMP19 Forecast		Outturn 2020-21	
	Annual	Critical	Annual	Critical
Measured Household	136	173	149.28	189.28
Unmeasured Household	164.0	228.0	179.43	245.92
Average Household	**155.4**	**211.1**	**170.54**	**229.23**

Table 12: Outturn PCC compared to Revised WRMP19 dry year

Our average measured and unmeasured PCC is between 13-16 l/h/d higher than forecast, leading to an average PCC of 15.4 l/h/d higher for 2020-21 compared to our Revised WRMP19.

Our critical period measured and unmeasured PCC is between 16-18 l/h/d higher than forecast, leading to an average critical period PCC of 18.13 l/h/d higher for 2020-21 compared to our Revised WRMP19.

Figure 10 illustrates the distribution of average PCC values throughout our supply area in 2020-21.

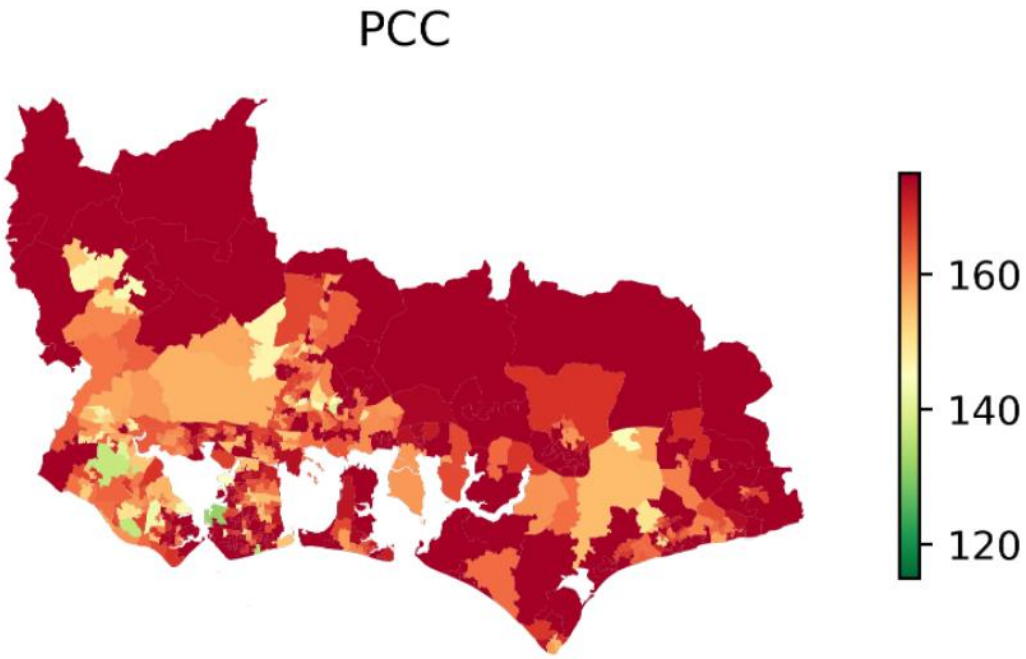

Figure 10: Geographical distribution of average PCC in 2020-21

The following sections explain why we have underperformed on our PCC targets.

9.4.1 Summary of covid impacts on PCC

We have identified PCC to be the main performance commitment which has been affected by Covid. In general, our more rural and affluent customers are located in the northern part of our supply area, and their Per Household Consumption (PHC), is typically about 400 litres per property per day, compared to those in more urban and coastal customers with demand often less than 300 litres per day per property.

In 2020-21, we saw general increases in demand, with the largest increases focussed in urban areas, Portsmouth in particular, but also Gosport and Bognor. This reflects the impacts of the Covid lockdown which prompted significant changes to the working patterns of the population. Urban areas tend to have more working aged people living in them and the lockdown saw many staying at home who would normally be at their place of work.

Figure 11 illustrates how this reporting years PHC has increased as well as geographical differences throughout our supply area.

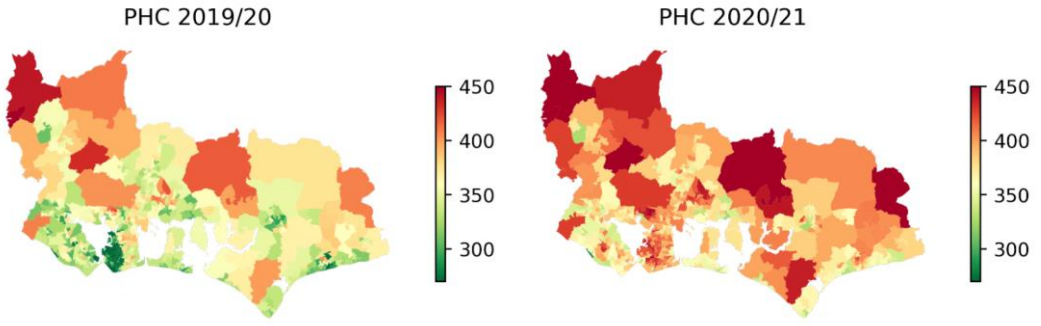

Figure 11: Geographical and volumetric difference in PHC between 2019-20 and 2020-21

We have seen a 14% increase in household demand compared to what we would have expected based on our demand model. We have attributed a 12% increase due to Covid restrictions, and 2% increase due to the weather. There has been an increase of c.15 l/p/d in normal water usage, higher during peak demands. **Error! Reference source not found.** illustrates how household demand has changed throughout the year, with last year included at the start of the graph for comparison.

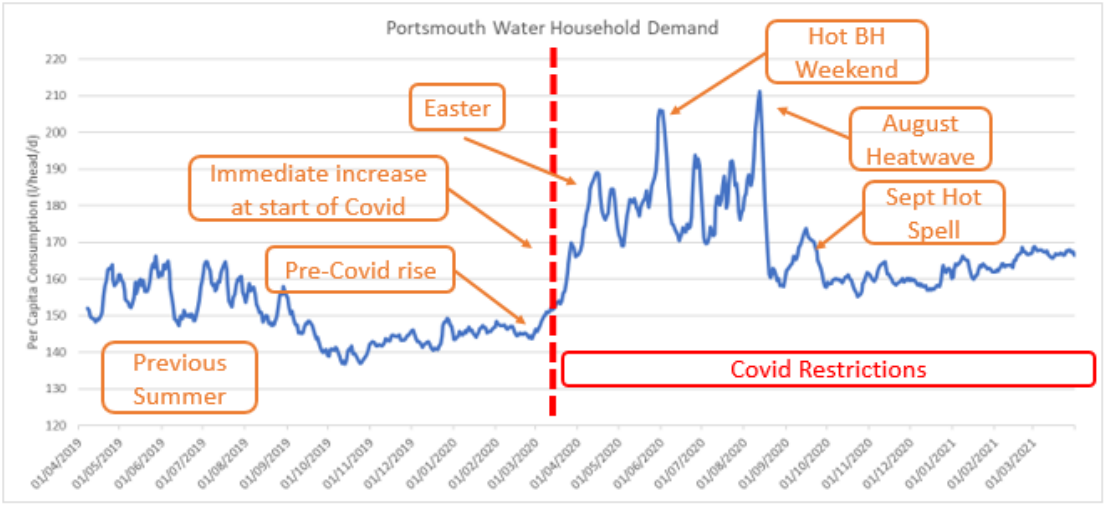

Figure 12: Household demand and the impacts of covid

We have estimated that this behavioural change driven by Covid can explain 12% of the uplift in PCC we have recorded. Our demand modelling has shown that if we had not experienced the Covid pandemic, as a result of the weather experienced in the year we would have expected PCC to increase from 149.9 l/h/d in 2019-20, to 152.9 l/h/d in 2020-21, rather than our actual reported average PCC of 170.54 l/h/d. If that had been the case, then we would have come in under target when compared to our Revised WRMP19 average PCC of 155.4 l/h/d.

We will continue to closely monitor this issue and engage with Ofwat and other stakeholders to ensure we all understand what the impacts of Covid have been.

9.4.2 Metering and water efficiency

Over 2020-21, the number of metered households on our network has risen by 3,596. We have not installed any Smart Meters during this period. Figure 13 shows how the meter optants are distributed throughout our supply area.

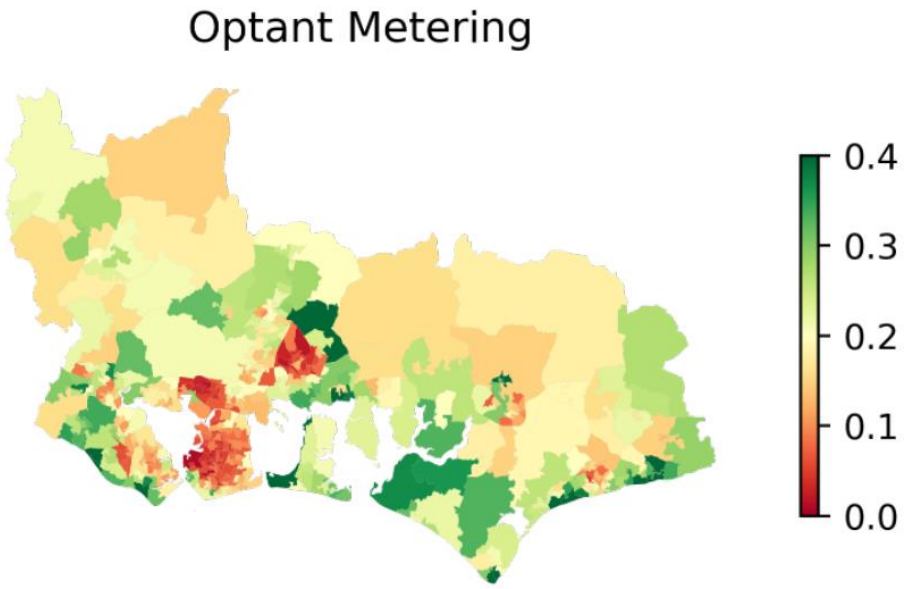

Figure 13: Meter optant uptake in 2020-21

Our plans to deliver a smart metering trial and to deliver on our Change of Occupier metering programme in 2021 were directly affected by Covid. Whilst we were able to progress with the internal preparations and engage with the supply chain to set our systems up, we did not feel it appropriate to launch these programmes.

Our concerns centred around:

- Maintaining the safety of our staff and our customers when required to make entry onto a customer's property.
- Customers concern about allowing non-essential tradespeople into their properties.
- Customer confusion around a water saving message when the principle hygiene messaging at the time was plentiful and thorough hand washing
- The capacity of our customers to engage with an initiative when the population was preoccupied with the pandemic and associated existing impacts on their lives.

The situation obviously evolved throughout the period of time relating to the report, and even more so in the time since. We feel many of the hurdles experienced in the first six months of the pandemic have now been passed. For instance, we have well established working practices that allow us to safely enter customer's properties and generally they are more willing to allow people to enter their properties. Also generally people are no longer so overwhelmed by the pandemic and feel in a position where they are more likely to be open to engaging with these initiatives and the water saving message.

In preparation for delivery in 2021-22, we have contracted Save Water Save Money to implement a water efficiency portal/app for our customers known as Get Water Fit (GWF). This is a mobile friendly platform where customers can complete a survey on their household usage, order free water saving devices and complete tailored daily challenges to help reduce consumption. On completion of these challenges, customers are rewarded with virtual coins which they can donate to a list of charities who have agreed to take part in the campaign. Other services available through GWF is virtual home audits where customers have a virtual one to one call with a member of the SWSM team who talk them through how to install their water saving devices and offer support and guidance if they have a leak in their home.

Portsmouth Water are advertising the GWF website through social media, google ad's, local publications as well as through local communities, charities and schools.

In addition to these updates to the GWF portal, we are due to launch a smart meter challenge for around 50 customers in the Portsmouth area. These customers can choose to take part in the trial to have a smart meter fitted and their consumption recorded on an hourly basis for 12 months. These customers will receive monthly updates on their usage to see if the changes in their water habits through the GWF challenges has had an impact on their consumption and potential savings on their water and waste water bills.

Therefore whilst delayed from 2020-21, these initiatives are all being delivered in 2021-22.

9.4.3 Water stress status

Portsmouth Water is in an area of 'moderate water stress' and therefore unable to pursue compulsory metering. Due to our relatively low level of meter penetration, since 2005 the Company has encouraged optional metering and required all new properties to be metered.

The Environment Agency have recently reassessed which water companies are under serious water stress, defined in the regulations as where 'the current household demand for water is a high proportion of the current effective rainfall which is available to meet that demand. Or, the future household demand for water is likely to be a high proportion of the effective rainfall which is likely to be available to meet that demand'. We are pleased that this review is taking place in light of the greater integration of our network across the Southeast, and are supportive of an expansion of metering.

Initial results from this assessment have suggested that it is likely we will move from an area of 'moderate' to 'serious' water stress. If this is the final determination, then it will allow us to target water efficiency measures in those areas of greatest need and greatest potential benefit. This would be done in our next Water Resource Management Plan through compulsory metering, if it is shown to be both supported by customers and cost beneficial.

9.5 Non-Household Consumption contributing to distribution input

We have seen a net 14% **reduction** in non-household demand compared to what we would have expected from our demand models. We have attributed a 16% decrease due to Covid restrictions, and a 2% increase due to the periods of warmer weather.

Covid has resulted in a reduction of c.10 Ml/d in demand during periods of enforced restrictions. The peak period saw an increase in demand return due to added UK based tourism prompted by the wide restrictions on international travel (staycations). Figure 14 illustrates the variations in non-household demand throughout the year.

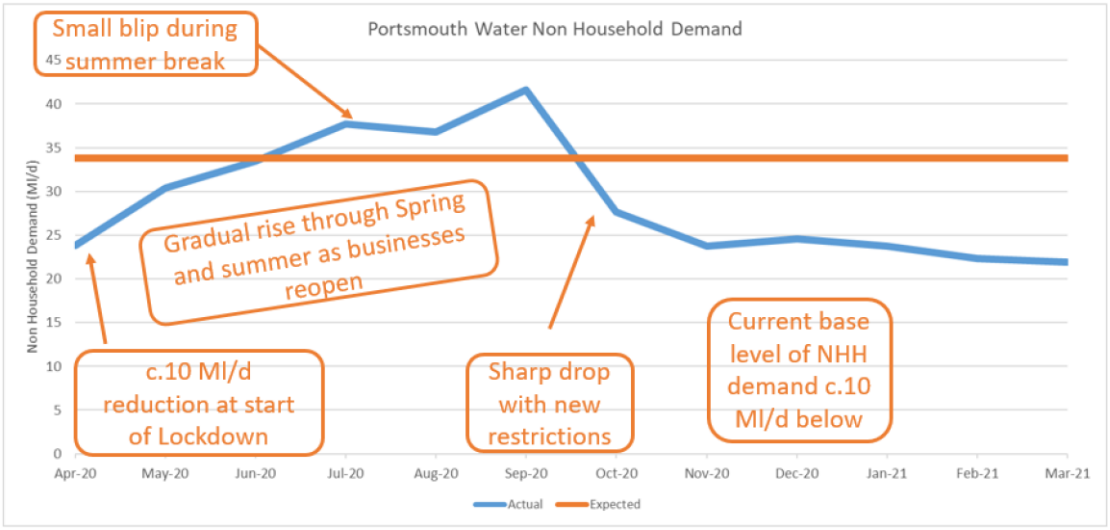

Figure 14: Non-household demand and the impacts of covid

10 HEADROOM ASSESSMENT

In this section we discuss the impact our work on the revised WRMP19 project has had on our understanding of the headroom we need to maintain.

10.1 Target Headroom

In accordance with the Water Resources Planning Guidance, the supply-demand balance includes a margin between supply and demand to allow for uncertainties inherent within the supply and demand forecasts. This margin is known as 'headroom'. The headroom value determined for each year across the planning horizon is termed the target headroom allowance. The aim of calculating a target headroom allowance is to provide a reasonable margin to cover the combined impact of factors leading to uncertainty on the supply-demand balance at a defined level of risk.

The standard methodology used for the Final WRMP19 includes 13 uncertainty factors:

- Vulnerable Surface water licences
- Vulnerable Groundwater licences
- Time Limited Licences
- Bulk Imports
- Gradual Pollution
- Accuracy of Supply-Side Data
- Single Source Dominance
- Impact of Climate Change on Deployable Output
- New Sources
- Accuracy of Sub-Component Demand Data
- Demand Forecast Variation
- Impact of Climate Change on Demand
- Demand Management Measures

We have updated the target headroom allowance for the Revised WRMP19 to take into account the new baseline demand and supply forecasts. This has been achieved using the new Python based headroom model, which includes a further three factors to enhance accuracy:

- Demand uplift Uncertainty
- Non-household consumption

- Natural Water Efficiency Variation

  As a result of this work, we have revised our view on headroom. Table 13 below illustrates the comparison between our Final WRMP19 and Revised WRMP19, for the start and end of AMP7 in a dry year for comparative purposes only. For our Revised WRMP, we have also calculated the 1 in 200 year headroom allowance, which is provided in the full report.

Headroom	WRMP 19 final Ml/d		Revised WRMP 19 Ml/d	
	2019-20	2024-25	2019-20	2024-25
Dry year annual	5.3	5.6	6	6.2
Dry year Critical Period	7.1	7.7	8.9	9.2

Table 13: Target headroom allowance final WRMP19 and Revised WRMP19

The results show that we have increased our target headroom for the Revised WRMP19. For full details on the calculation of our headroom allowance, please refer to the full Revised WRMP19 report.

11 SUPPLY-DEMAND BALANCE – 1 IN 20 DRY YEAR SCENARIO

This section describes the overall summary of the 2020-21 supply-demand balance situation for Portsmouth Water, taking into account our performance for the year and comparing this against our Revised WRMP19 **dry years** (ie 1 in 20 year drought) scenario, as per the requirements of the guidance.

11.1 Forecast Revised WRMP19 and outturn supply-demand balance – Dry Year scenario

Using the outturn values described throughout this report, the final dry year supply-demand balance has been calculated for both annual average (Table 14) and critical period (Table 15) scenarios for 2020-21. The outturn supply-demand balance shown here is using the guidance definitions for each of the components (e.g. actual bulk supply figures).

Annual Average	Revised WRMP19 Forecast 2020-21 (Ml/d)	Outturn Values 2020-21 (Ml/d)
Final Plan Deployable Output	226.39	222.99
Outage	6.70	7.70
Treatment works losses and operational use	2.40	4.07
Water Available For Use in a Dry Year	**217.29**	**211.23**
Potable water exported (bulk supplies to SWS)	30.00	5.08
Total Water Available for Use	**187.29**	**206.14**
Distribution Input	175.07	179.33
Target headroom	6.43	6.43
Supply Demand Balance	**5.79**	**20.38**

Table 14: Annual Average supply-demand balance for Revised WRMP19 and Outturn 2020-21

Critical period	Revised WRMP19 Forecast 2020-21 (Ml/d)	Outturn Values 2020-21 (Ml/d)
Final Plan Deployable Output	280.00	274.10
Outage	6.40	9.10
Treatment works losses and operational use	2.40	4.58
Water Available For Use in a Dry Year	**271.20**	**260.42**
Potable water exported (bulk supplies to SWS)	30.00	4.66
Total Water Available for Use	**241.20**	**255.76**
Distribution Input	216.18	222.23
Target headroom	9.28	9.28
Supply Demand Balance	**15.74**	**24.25**

Table 15: Critical period supply-demand balance for Revised WRMP19 and Outturn 2020-21

Table 14 and Table 15 show how our performance in 2020-21 affected our supply-demand balance, and how this compares to our Revised WRMP19. The conclusion is that we have maintained a positive supply-demand balance, so customers were not at risk in either the annual average, or critical period scenarios.

Our Annual Review normally reports on the supply-demand balance index (SDBI), previously known as security of supply index (SOSI). This metric is an indication of whether our customers would have been at risk if 2020-21 was a 'dry year', with a 1 in 20 year return period and is calculated by using the outturn values, with the forecast Revised WRMP19 dry year DI.

The impact of Covid on our DI meant that our outturn DI was in fact larger than our forecast 'dry year' DI in our Revised WRMP19. Therefore, the usual method of calculating SDBI, does not work in this instance.

12 SUPPLY-DEMAND BALANCE – 1 IN 200 YEAR SCENARIO

The Annual Review guidance does not require that we report on our 1 in 200 year supply demand balance in terms of our outturn values. However, it is important that we outline our supply-demand balance position which have presented in our Revised WRMP19, resulting from the changes to each of the components as described throughout this review. This section provides a summary of the results, Full details are in our revised WRMP19 report.

The new Revised WRMP19 analysis has confirmed that the 1 in 200 year and the 1 in 80 year events represent the most challenging scenarios. In the 1 in 80 year event (which is comparable to the worst historic drought on record) we have a small headroom deficit until our DO resilience schemes are delivered.

However the situation is different for the 1 in 200 year scenario. Figure 15 below is a snapshot of the Revised WRMP19 average final supply-demand balance for the 1 in 200 year scenario (see bottom row), showing that with the adjustments we have made due to advancements in methodologies and knowledge, we would be in deficit from 2021-22 throughout the rest of AMP7 if we experienced a 1 in 200 year drought scenario. This varies from 6.21 Ml/d deficit in 2021-22, to 7.64 deficit in 2024-25.

The orange cell colour refers to a 'headroom' deficit, where we have some available headroom, but not enough to maintain the target.

Revised WRMP19 Annual Average (Ml/d)	2020-21	2021-22	2022-23	2023-24	2024-25
Distribution input	177.89	177.34	176.49	176.93	176.30
WAFU (own sources)	206.49	206.46	206.42	209.69	212.78
Total WAFU	176.49	176.46	176.42	179.69	173.78
Target headroom	5.34	5.33	5.21	5.25	5.12
Available Headroom	-1.39	-0.88	-0.07	2.76	-2.53
Supply demand balance	**-6.74**	**-6.21**	**-5.28**	**-2.49**	**-7.64**

Figure 15: Revised WRMP19 1 in 200 average supply-demand balance

Figure 16 below is the same scenario but in the critical period. We are in deficit between 2022 and 2024, but the supply-demand balance enters surplus at the end of the AMP.

Revised WRMP19 Annual Average (Ml/d)	2020-21	2021-22	2022-23	2023-24	2024-25
Distribution input	232.93	232.64	231.77	232.07	231.28
WAFU (own sources)	257.60	257.50	257.40	264.15	279.80
Total WAFU	227.60	227.50	227.40	234.15	240.80
Target headroom	5.66	5.59	5.51	5.56	5.44
Available Headroom	-5.33	-5.14	-4.37	2.08	9.52
Supply demand balance	**-10.99**	**-10.72**	**-9.87**	**-3.49**	**4.08**

Figure 16: Revised WRMP19 1 in 200 critical period supply-demand balance

12.1 Mitigation and monitoring measures

We would like to take this opportunity to reassure our customers, regulators and stakeholders that we are doing everything within our capabilities to safeguard the service to our customers and the regional supplies to Southern Water.

We have been exploring monitoring and mitigation measures with the Environment Agency and Southern Water during 2021. These are outlined below.

12.1.1 Pywr modelling of the AMP7 schemes

As previously mentioned, we are undertaking further work to understand and optimise the benefit of our AMP7 schemes through the Pywr model. Pwyr allows us to explore the DO benefits at a network and water resource zone level to determine whether we can readily increase the DO benefits, and where in the network this would be most beneficial. It is thought that there may be some 'locked in DO', which could be released with appropriate network solutions. This would allow existing water available in the system to reach areas of the network which currently experience unsatisfied demand within the model– and therefore result in a deficit being recorded in the tables.

12.1.2 Enhanced monitoring of the drought condition

The Revised WRMP19 has demonstrated that we may be slightly more vulnerable to a severe drought than previously understood. In order to better understand the risk this posed to our customers, we undertook analysis using the new stochastic groundwater level datasets, developed through WRSE for the regional model. Examining the stochastic time series for a 1 in 200 year event, our analysis demonstrated that based on the current groundwater levels there is only a 0.5% risk of a 1 in 200 year drought occurring within the period of deficit.

We therefore do not believe the risk of the deficit revealed in the reworked tables is immediate. However despite the low risk of a severe drought developing by summer 2022, we will continue to monitor groundwater levels to understand the risks to our supply demand balance and provide updates to our environmental regulator on a frequent basis.

12.1.3 Enhanced demand management

Our Covid-delayed water efficiency efforts including Get Water Fit, Change of Occupier metering and Smart meter trial are all launched in 2021-22. In addition we are exploring further enhancements to the water efficiency programme including a partnership with Hive and our customers for the installation of web-enabled leak and consumption detectors at currently metered properties known to have a high water consumption.

We will continue to broadcast a 'use water wisely' message to our customers, particularly through the summer months and promote the Get Water fit at every engagement opportunity.

12.1.4 Explore access to additional supplies of water

We have reviewed the capability of our groundwater sources and improved our understanding of whether they could produce more water through the removal of constraints on abstraction. For example, via the transfer of licensed quantities or the implementation of additional drought permits.

We are currently seeking the Environment Agency's views on several proposals. We will then commence further work to confirm the feasibility of the proposals from an operational and environmental perspective. This type of mitigation measure will need to be tested within the Environment Agency's regional groundwater model to understand environmental impacts and also within our Pywr simulation model to identify if there are any network constraints.

12.2 Next steps

Planning for a 1 in 200 year drought event provides future resilience and, as we have committed to providing a further bulk supply to Southern Water with water available up to a 1 in 200 year event, it is appropriate to undertake planning based on this event.

The Revised WRMP19 final supply demand balances demonstrate that we do not meet our target headroom in the 1 in 200 year annual average scenario (between now and 2032-33) or the 1 in 200 year critical period scenario (between now and 2023-24).

Whilst the risk of a 1 in 200 year event occurring within the next few years is low, we are currently exploring a range of mitigation measures with the Environment Agency and Southern Water to maintain our supply demand balance.

We will continue progress on the mitigation and monitoring measures identified above, including the investigation of AMP7 schemes and mitigation measure benefits using our new Pywr simulation model.

As well as our frequent meetings with the Environment Agency, we will provide a key progress update to our regulators in December 2021, at which time we expect to fully understand the benefits of our AMP7 schemes so that we can input the results into the WRSE regional modelling in January 2022. We will provide a further update in our Annual Report in June 2022 and present conclusions, any necessary mitigation, and any further revisions made to our supply-demand balance. In addition to mitigating the AMP7 situation, these activities will ensure that our statutory WRMP24 is robust and has a realistic starting point as we look forward into AMP8.

13 FORWARD LOOK

As we look forwards, we have some challenges to resolve around our resilience in extreme dry weather events in the future. We don't perceive there to be a significant risk at this point, but we are working hard to understand the real risk with our new methodologies and models.

The specific next steps for our Revised WRMP19 are the milestones for our proposed regulatory reporting in December 2021 and June 2022.

We will continue to work closely alongside the Environment Agency, and we have already implemented weekly and quarterly meetings which provide regular opportunities to discuss our progress, to highlight any risks and concerns.

We are also committed to working with Southern Water throughout the planning process to ensure that we do everything we can to best protect the security of supply. As well as ad hoc meetings when necessary, we have regular quarterly meetings set up, where we are able to discuss progress, risks and mitigations that arise as we continue to develop our Revised WRMP19, and looking forwards to our WRMP24.

Portsmouth Water is committed to continuing full participation with Water Resources South East (WRSE) in the development of the multi-sector regional plan, which is already well under way and will shape our WRMP24.

14 DATA TABLES

The data tables are based on outturn data which has been adjusted using the MLE process to achieve a water balance. For this Annual Review, the tables have been provided in Appendix A for average and peak conditions.

APPENDIX A

WRMP ANNUAL REVIEW DATA RETURN - WATER BALANCE COMPONENTS						
ANNUAL AVERAGE						
Water Company:	Portsmouth Water					
Number of resource zones:	1					
Year of data submission:	2020/21					
Reporting against WRMP:	Revised WRMP19					
Row numbering in line with WRMP structure	**Component**	**Derivation and type of data**	**Units**	**DP**	**Data requirement**	**Water company total data**
	SUPPLY					
	Resources					
1_{AR}	Raw water abstracted	Input outturn data	Ml/d	2dp	Required	188.48
2_{AR}	Raw water imported (in the reporting year)	Input outturn data	Ml/d	2dp	Required	0.00
3_{AR}	Potable water imported (in the reporting year)	Input outturn data	Ml/d	2dp	Required	0.00
5_{AR}	Raw water exported (in the reporting year)	Input outturn data	Ml/d	2dp	Required	0.00
5.1_{AR}	Non potable water supplied	Input outturn data	Ml/d	2dp	Required	0.00
6_{AR}	Potable water exported (in the reporting year)	Input outturn data	Ml/d	2dp	Required	5.08
7_{AR}	Deployable output	Input dry year figure	Ml/d	2dp	Required	222.99
12AR	Water Available For Use (own sources)	(Deployable Output + changes to DO) - (Treatment works losses and operational use + outage experienced).	Ml/d	2dp	Required	211.22
13AR	Total Water Available For Use	WAFU own sources + (total water imported) - (total water exported). Total WAFU is based on maximum contractual volumes as stated in WRMP19.	Ml/d	2dp	Required	206.14
	Process Losses					
9_{AR}	Treatment works losses and operational use	Input outturn data	Ml/d	2dp	Required	4.07
10_{AR}	Outage experienced	Input outturn data	Ml/d	2dp	Required	7.70
	DEMAND					
11_{AR}	Distribution input (in reporting year)	Outturn data for: Total household and non-household consumption + water taken unbilled + distribution system operational losses + total leakage	Ml/d	2dp	Required	179.33
	Consumption					
23_{AR}	Measured non household - consumption	Input outturn data	Ml/d	2dp	Required	27.03
24_{AR}	Unmeasured non household - consumption	Input outturn data	Ml/d	2dp	Required	0.64
25_{AR}	Measured household - consumption	Input outturn data	Ml/d	2dp	Required	32.17
26_{AR}	Unmeasured household - consumption	Input outturn data	Ml/d	2dp	Required	92.53
29_{AR}	Measured household - pcc	Outturn data: (Measured household consumption * 1,000,000) / (measured household population * 1,000)	l/h/d	0dp	Required	149.28
30_{AR}	Unmeasured household - pcc	Outturn data: (Unmeasured household consumption * 1,000,000) / (Unmeasured household population * 1,000)	l/h/d	0dp	Required	179.43
31_{AR}	Average household - pcc	Outturn data: (Measured and unmeasured household consumption * 1,000,000) / (measured and unmeasured household population * 1,000)	l/h/d	0dp	Required	170.54
32_{AR}	Water taken unbilled	Input outturn data	Ml/d	2dp	Required	2.69
33_{AR}	Distribution system operational use	Input outturn data	Ml/d	2dp	Required	0.72
	Leakage					
34_{AR}	Measured non household - uspl	Input outturn data	Ml/d	2dp	Required	0.37
35_{AR}	Unmeasured non-household - uspl	Input outturn data	Ml/d	2dp	Required	0.06
36_{AR}	Measured household - uspl	Input outturn data	Ml/d	2dp	Required	3.11
37_{AR}	Unmeasured household - uspl	Input outturn data	Ml/d	2dp	Required	7.80
38_{AR}	Void properties - uspl	Input outturn data	Ml/d	2dp	Required	0.35
39_{AR}	Distribution Losses	Input outturn data	Ml/d	2dp	Required	11.86
40_{AR}	Total leakage	Outturn data: Total USPL + distribution losses	Ml/d	2dp	Required	23.55
	CUSTOMERS					
	Properties					
42_{AR}	Measured non-household - properties	Input end of reporting year data	000's	3dp	Required	11840.00
43_{AR}	Unmeasured non-household - properties	Input end of reporting year data	000's	3dp	Required	1464.50
44AR	Void non households - properties	Input end of reporting year data	000's	3dp	Required	2751.00
45_{AR}	Measured household - properties	Input end of reporting year data	000's	3dp	Required	99515.50
45.7_{AR}	Measured void household - properties	Input end of reporting year data	000's	3dp	Required	2180.50
46_{AR}	Unmeasured household - properties	Input end of reporting year data	000's	3dp	Required	199490.00
47_{AR}	Unmeasured void household - properties	Input end of reporting year data	000's	3dp	Required	5038.00
48_{AR}	Total resource zone properties (inc voids)	End of reporting year data : Total non-household properties + total void non-household properties + total household properties + total void household properties	000's	3dp	Required	322279.50
	Population					
49_{AR}	Measured non-household - population	Input end of reporting year data	000's	3dp	Required	12580.46
50_{AR}	Unmeasured non-household - population	Input end of reporting year data	000's	3dp	Required	1556.09
51_{AR}	Measured household - population	Input end of reporting year data	000's	3dp	Required	215495.07
52_{AR}	Unmeasured household population	Input end of reporting year data	000's	3dp	Required	515706.37
53_{AR}	Total resource zone population	End of reporting year data: Unmeasured and measured household population + Unmeasured and measured non-household population	000's	3dp	Required	745338.00
	Metering					
57_{AR}	Total measured household metering penetration (incl. voids)	Outturn data: Measured household properties exc. voids / (measured household properties exc. voids + unmeasured household properties exc. voids) + measured and unmeasured household void properties)	%	2dp	Required	32.50
57.1	Total households with a meter installed	Input outturn data (See technical annex for guidance)	%	2dp	Optional	
	Total numbers of household meters installed	Input outturn data	000's	3dp	Required	3596.00
	SUPPLY-DEMAND BALANCE					
16AR	Target headroom	Input adjusted reporting year figure or dry year WRMP	Ml/d	2dp	Required	6.43
18AR	Observed supply-demand balance (in reporting year)	(Total WAFU - DI) - target headroom	Ml/d	2dp	Required	20.38

WRMP ANNUAL REVIEW DATA RETURN - WATER BALANCE COMPONENTS

CRITICAL PERIOD

Water Company:	Portsmouth Water
Number of resource zones:	1
Year of data submission:	2020/21
Reporting against WRMP:	Revised WRMP19

Row numbering in line with WRMP structure	Component	Derivation and type of data	Units	DP	Data requirement	Water company total data
	SUPPLY					
	Resources					
1_{AR}	Raw water abstracted	Input outturn data	Ml/d	2dp	Required	212.00
2_{AR}	Raw water imported (in the reporting year)	Input outturn data	Ml/d	2dp	Required	0.00
3_{AR}	Potable water imported (in the reporting year)	Input outturn data	Ml/d	2dp	Required	0.00
5_{AR}	Raw water exported (in the reporting year)	Input outturn data	Ml/d	2dp	Required	0.00
5.1_{AR}	Non potable water supplied	Input outturn data	Ml/d	2dp	Required	0.00
6_{AR}	Potable water exported (in the reporting year)	Input outturn data	Ml/d	2dp	Required	4.66
7_{AR}	Deployable output	Input dry year figure	Ml/d	2dp	Required	274.10
12AR	Water Available For Use (own sources)	(Deployable Output + changes to DO) - (Treatment works losses and operational use + outage experienced).	Ml/d	2dp	Required	260.42
13AR	Total Water Available For Use	WAFU own sources + (total water imported) - (total water exported). Total WAFU is based on maximum contractual volumes as stated in WRMP19.	Ml/d	2dp	Required	255.76
	Process Losses					
9_{AR}	Treatment works losses and operational use	Input outturn data	Ml/d	2dp	Required	4.58
10_{AR}	Outage experienced	Input outturn data	Ml/d	2dp	Required	9.10
	DEMAND					
11_{AR}	Distribution input (in reporting year)	Outturn data for: Total household and non-household consumption + water taken unbilled + distribution system operational losses + total leakage	Ml/d	2dp	Required	222.23
	Consumption					
23_{AR}	Measured non household - consumption	Input outturn data	Ml/d	2dp	Required	27.03
24_{AR}	Unmeasured non household - consumption	Input outturn data	Ml/d	2dp	Required	0.64
25_{AR}	Measured household - consumption	Input outturn data	Ml/d	2dp	Required	40.79
26_{AR}	Unmeasured household - consumption	Input outturn data	Ml/d	2dp	Required	126.82
29_{AR}	Measured household - pcc	Outturn data: (Measured household consumption * 1,000,000) / (measured household population * 1,000)	l/h/d	0dp	Required	189.28
30_{AR}	Unmeasured household - pcc	Outturn data: (Unmeasured household consumption * 1,000,000) / (Unmeasured household population * 1,000)	l/h/d	0dp	Required	245.92
31_{AR}	Average household - pcc	Outturn data: (Measured and unmeasured household consumption * 1,000,000) / (measured and unmeasured household population * 1,000)	l/h/d	0dp	Required	229.23
32_{AR}	Water taken unbilled	Input outturn data	Ml/d	2dp	Required	2.69
33_{AR}	Distribution system operational use	Input outturn data	Ml/d	2dp	Required	0.72
	Leakage					
34_{AR}	Measured non household - uspl	Input outturn data	Ml/d	2dp	Required	0.37
35_{AR}	Unmeasured non-household - uspl	Input outturn data	Ml/d	2dp	Required	0.06
36_{AR}	Measured household - uspl	Input outturn data	Ml/d	2dp	Required	3.11
37_{AR}	Unmeasured household - uspl	Input outturn data	Ml/d	2dp	Required	7.80
38_{AR}	Void properties - uspl	Input outturn data	Ml/d	2dp	Required	0.34
39_{AR}	Distribution Losses	Input outturn data	Ml/d	2dp	Required	11.86
40_{AR}	Total leakage	Outturn data: Total USPL + distribution losses	Ml/d	2dp	Required	23.54
	CUSTOMERS					
	Properties					
42_{AR}	Measured non-household - properties	Input end of reporting year data	000's	3dp	Required	11840.00
43_{AR}	Unmeasured non-household - properties	Input end of reporting year data	000's	3dp	Required	1464.50
44AR	Void non households - properties	Input end of reporting year data	000's	3dp	Required	2751.00
45_{AR}	Measured household - properties	Input end of reporting year data	000's	3dp	Required	99515.50
45.7_{AR}	Measured void household - properties	Input end of reporting year data	000's	3dp	Required	2180.50
46_{AR}	Unmeasured household - properties	Input end of reporting year data	000's	3dp	Required	199490.00
47_{AR}	Unmeasured void household - properties	Input end of reporting year data	000's	3dp	Required	5038.00
48_{AR}	Total resource zone properties (inc voids)	End of reporting year data : Total non-household properties + total void non-household properties + total household properties + total void household properties	000's	3dp	Required	322279.50
	Population					
49_{AR}	Measured non-household - population	Input end of reporting year data	000's	3dp	Required	12580.46
50_{AR}	Unmeasured non-household - population	Input end of reporting year data	000's	3dp	Required	1556.09
51_{AR}	Measured household - population	Input end of reporting year data	000's	3dp	Required	215495.07
52_{AR}	Unmeasured household population	Input end of reporting year data	000's	3dp	Required	515706.37
53_{AR}	Total resource zone population	End of reporting year data: Unmeasured and measured household population + Unmeasured and measured non-household population	000's	3dp	Required	745338.00
	Metering					
57_{AR}	Total measured household metering penetration (incl. voids)	Outturn data: Measured household properties exc. voids / (measured household properties exc. voids + unmeasured household properties exc. voids) + measured and unmeasured household void properties)	%	2dp	Required	32.50
57.1	Total households with a meter installed	Input outturn data (See technical annex for guidance)	%	2dp	Optional	
	Total numbers of household meters installed	Input outturn data	000's	3dp	Required	3596.00
	SUPPLY-DEMAND BALANCE					
16AR	Target headroom	Input adjusted reporting year figure or dry year WRMP	Ml/d	2dp	Required	9.28
18AR	Observed supply-demand balance (in reporting year)	(Total WAFU - DI) - target headroom	Ml/d	2dp	Required	24.25