WATER RESOURCES MANAGEMENT PLAN

ANNUAL REVIEW 2020

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June 2020

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1 EXECUTIVE SUMMARY

Portsmouth Water's Water Resources Management Plan 2014 (WRMP14) assessed our ability to maintain the security of supply to our customers over a 25 year planning period from 2015 through to 2040. It seeks to ensure we are resilient up to a 1 in 20 year drought, focusing on actions to be taken in the first 5 year window (AMP6 2015 – 2020). The plan was developed throughout 2012 and published in August 2014.

Throughout AMP6 we were implementing the WRMP14 actions as well as developing our WRMP19, which saw a marked contrast as we planned for more extreme droughts, up to a 1 in 200 year drought event, and had to account for additional bulk supplies to our neighbouring company Southern Water. Our WRMP19 was subsequently published in December 2019, focusing on actions to be taken in AMP 7 (2020 – 2025).

The 2019/20 reporting year is the concluding year of our WRMP14 (2015-2020), and is the starting point of WRMP19 (2020-2025). This Annual Review explores: how our 2019/20 outturn values compare to our WRMP14 and WRMP19 values and why there are differences; why we see differences in our WRMP forecast values for the same year; how our outturn values impact our dry year supply demand balance and security of supply index; and finally, our concluding position at the end of WRMP14 and starting position of WRMP9. The key headlines are:

- Our average outturn supply demand balance for 2019/20 is 31.99 Ml/d in surplus against WRMP19
- Our critical period outturn supply demand balance for 2019/20 is 52.64 Ml/d in surplus against WRMP19
- Our Security of Supply Index (SOSI) remains at 100 against WRMP19, which means that our customers would not have been at risk if 2019/20 was a dry year
- In the year, our assumed DO has been reduced by nearly 20 Ml/d due to long term outages, the delay in three GW implementation schemes and the ongoing investigations into our Drought Permit source which have not yet concluded the yield investigations
- Our outturn value for PCC is 149.89 l/h/d which has performed well against our WRMP14 target (155 l/h/d) , but is well above the assumed level for PCC WRMP19 of 142 l/h/d. We have an ambitious metering and water efficiency plan in place over AMP7 to address this
- Our outturn leakage figure is 24.36 Ml/d which surpassed both our WRMP14 and WRMP19, beating the WRMP19 leakage forecast by over 10 Ml/d (note – this is using the new methodology to enable WRMP19 comparison. The old methodology gives an outturn figure of 23.60 Ml/d which is comparable to the AMP6 targets and still over performs against WRMP14 targets of 29.80 Ml/d)

In accordance with the guidance, this Annual Review has focussed on our resilience for a dry year scenario. Our strong leakage performance has contributed to our average outturn dry year surplus of 31.99 Ml/d, which is over 10 Ml/d more than predicted in WRMP19. This has put us in a good position as we move into AMP7 in terms of dry year security of supply and for our SOSI reporting, which is based on WRMP19 figures.

However, given that we have not yet realised the DO benefit from our AMP7 GW schemes and confirmed the drought permit yield, we may be at some risk when we assess our resilience against a 1 in 200 year drought event for 2020/21. As we go forwards into AMP7, we will assess our ongoing achievements against our WRMP19 targets with a forward look, allowing us to foresee any potential risks and impacts to our 1 in 200 year drought supply demand balance and to mitigate against them if necessary in order to maintain our resilience to our customers and the environment. This will be the focus of our subsequent Annual Reviews as we implement WRMP19 throughout AMP7.

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.

Portsmouth Water published its Final WRMP in December 2019 (WRMP19)[1] and this is the first review against this plan to establish our starting position relative to our forecast WRMP19 position. Updated guidance published in March 2020[2] sets out the content of the Annual Review and the submission procedure.

As per the guidance, this review will:

- Report on progress against our forecast data for 2019/20 in WRMP19;
- 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,
- Report on the overall summary of the supply-demand situation

Given that 2019/20 is the final year of our Water Resources Management Plan 2014 (WRMP14) implementation, we will also report our progress and achievements in delivering our WRMP14 and the impacts of any delays.

Our annual return data is used to confirm our Security of Supply Index (SoSI), an Environmental Performance Assessment measure. 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.

The structure of this report is designed to:

- Provide an overview of our WRMP14 and its components
- Provide an overview of our WRMP19 and the impacts of the additional planning requirements
- Explain how our outturn supply-demand balance for 2019/20 compares to the forecast of the balance in both WRMP14 and WRMP19
- Provide our dry year security of supply index
- Detail how our outturn supply-side components compare to our forecast WRMP14 and WRMP19 values and describe any impacts due to the differences
- Provide progress on the implementation of our supply-side schemes from WRMP19
- Detail how our outturn demand side components compare to our forecast WRMP14 and WRMP19 values and describe any impacts due to the differences
- Show our position at the conclusion of WRMP14
- Show our position as we commence WRMP19
- Provide a forward look as we implement WRMP19 and start to develop our WRMP24

[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 2020)

2.1 Water Resources Zones

Portsmouth Water included a single Water Resources Zone in the Final WRMP19. The distribution system includes a spine main that runs East to West across our Region and significant strategic treated water storage. This system ensures that all of Portsmouth Water's customers in the supply area shown in Figure 1 experience the same level of service.

Figure 1: Portsmouth Water's supply area

The Company's boundary has not changed but some customers on new housing estates are supplied by New Appointments and Variations (NAV).

2.1 Levels of Service

When drought conditions begin, Portsmouth Water will implement its drought plan. This results in a steady escalation of restrictions on demand for water, 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 (e.g. use of standpipes and rota cuts to reduce the demand for water), although these 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 the same for both the WRMP14 and the WRMP19:

- Temporary Use Bans > 1 in 20 years
- Non-Essential Use Bans > 1 in 80 years
- Emergency Drought Orders > 1 in 200 years

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 likely 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 2019/20, we have upheld our performance commitment in the Business Plan and maintained our agreed level of service.

3 WRMP14 SUMMARY

Our WRMP14 assessed our ability to maintain the security of supply to our customers over a 25 year planning period through to 2040. It seeks to ensure we are resilient up to a 1 in 20 year drought, focusing on actions to be taken in the first 5 year window (AMP6 2015 – 2020). The plan was developed throughout 2012 and published in August 2014.

Figure 2 below, from WRMP14, shows that with the assumptions made in the planning process, we had a surplus of water for the whole planning period up to a 1 in 20 year ('Dry Year') drought scenario, which was the scenario we were expected to plan for in the statutory planning guidelines at the time.

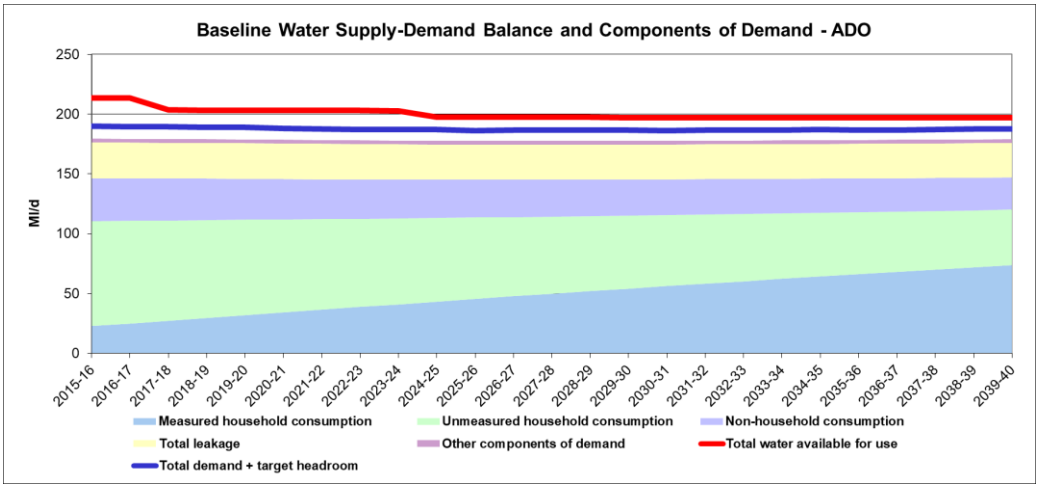

Figure 2 WRMP14 Baseline water supply-demand balance and components of Demand - ADO

This 'baseline' scenario shown in the graph is the position that we would be in if we were to do no more than undertake our business as usual activities. This takes into account the bulk supply exports to Southern Water that we had committed to at the time.

The components that make up the total demand and headroom (blue line), are;

- Properties and population
- Household consumption (measured + unmeasured)
- Non-household consumption
- Leakage
- 'Other components': includes climate change impacts on consumption and distribution input reconciliation values
- Headroom - the buffer between supply and demand that allows uncertainty and risk to be considered.

The components that make up the total water available for use (red line), are;

- Deployable output (DO)
- Climate change impacts to DO
- Raw water, treatment works and operational losses
- Bulk Supply exports to Southern Water

  Exports under annual average scenario include:

  - **SWS Sussex Zone** - 10Ml/d
  - **SWS Hampshire Zone** - 10Ml/d starting in 2017-18, increasing to 15Ml/d in 2024/25 onwards

Exports under critical period scenarios include:

- **SWS Sussex zone** - 15Ml/d, reducing to 10Ml/d in 2021/22 onwards
- **SWS Hampshire Zone** - 10Ml/d starting in 2017-18, increasing to 15Ml/d in 2021/22 onwards

Within the baseline calculations, there was an assumption we would continue our BAU activities which included a level of leakage control, metering and water efficiency activities (activities also reflected in our AMP 6 Outcome Delivery Incentives agreed with Ofwat). However, given that the baseline supply-demand balance did not forecast a deficit, no additional options were necessary to either increase available supply or reduce demand through 'enhanced' activity.

These BAU activities are identified in detail in WRMP14 and this review will provide details on: The activities we have been assessing against our WRMP14 baseline; how we have performed against the BAU activity levels during AMP6; the position we have finished in at the end of AMP6; and any impacts this may have as we move into the implementation phase of WRMP19.

4 TRANSITION INTO WRMP19

During the formulation of WRMP19 a number of elements of the statutory planning guidelines were changed. Figure 3 below, taken from WRMP19, shows the water situation with the new assumptions made in the planning process. It shows that without making interventions, we do not have a surplus of water for any of the planning period.

This is in marked contrast to WRMP14 and is primarily due to the following;

- We were required to plan for more extreme droughts up to a 1 in 200, so the water available for use is significantly less in this scenario.
- Further bulk exports to Southern Water, which have been accounted for in the baseline:

  Total exports under annual average and critical period scenarios:

  - **SWS Sussex Zone** - 15Ml/d
  - **SWS Hampshire Zone (Phase 1)** - 7.5 Ml/d in 2019/20, increasing to 15Ml/d in 2020/21 onwards
  - **SWS Hampshire Zone (Phase 2) -** Additional 9Ml/d from 2024-25 onwards
  - **SWS Hampshire Zone (Phase 3) -** Additional 21Ml/d from 2029-30 onwards

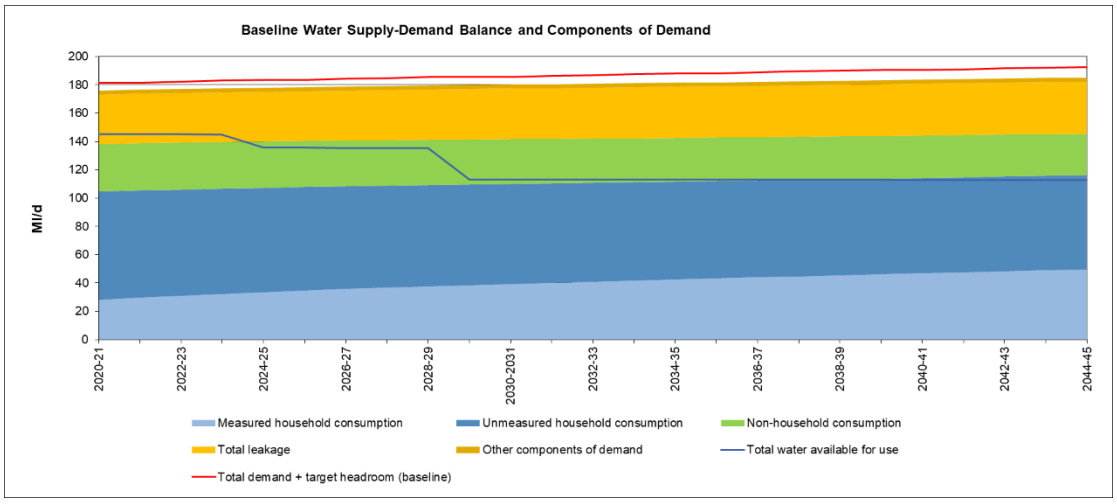

Figure 3: WRMP19 Baseline water supply-demand balance and components of Demand - ADO

Therefore a significant programme of options identified in WRMP19 needs to be delivered in AMP7. This includes continued PCC and leakage reductions, maximising deployable output (DO) from our existing sites at Source O, Source H and Source C, and developing additional resource from the Source J GW source in order to supplement our bulk supply to SWS in 2024/25.

The forecasts within WRMP19 were developed from a base year in AMP6 and projected throughout AMP7 and beyond. Therefore this review will focus on how our performance this year compared to the forecast values for 2019/20 which form our starting position as we move forward into AMP7 to deliver WRMP19.

5 SUPPLY-DEMAND BALANCE

This section describes the overall summary of the supply-demand balance situation for Portsmouth Water. We take into account our performance for the year as well as the general weather conditions and events and how this relates to our dry year forecast.

Our 2019/20 performance has been collated and subject to independent external audit from our reporters, Jacobs. We have taken both our independently verified performance figures and the actual environmental data and reported against our WRMP14 and our published WRMP19 to establish our current position relative to our forecasts. As a result of this exercise we have determined that we maintained a positive supply demand balance throughout the year and as a result have been in a resilient position to have always been able to deliver our customers the levels of service we have agreed with them.

5.1 Water resource position

In 2019/20 we saw the preceding cycle of dry weather broken by unseasonably wet weather, resulting in a speedy and full recharge of our groundwater supplies. We therefore started 2020/21 in a healthy water resource position. The following sections show the weather fluctuations, distribution impacts and groundwater levels in more detail.

5.1.1 Rainfall & Groundwater Levels

Groundwater levels are a good indicator of the water available to Portsmouth Water from the chalk aquifer from which we abstract the majority of our water for supply. We therefore monitor the levels closely.

Prior to September 2019 there was a run of three slightly drier than average winter recharge seasons which reduced our groundwater levels to within 30cms of passing our first drought trigger; the lowest levels since 2011. 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.

However, the end of September 2019 saw the beginning of an unseasonably wet period. With the exception of January 2020, we saw above average rainfall and February was the wettest on record for England (Met Office records since 1862). Storms Ciara, Dennis and Jorge contributed to exceptionally high rainfall totals for the month across much of the country and causing flooding in several areas. Whilst we were spared the worst of this in the South of England, the high levels of rain resulted in recharge of our groundwater to levels in excess of 30mAOD; a level not seen since 2016. Figure 4 shows the monthly rainfall totals, and the impact of this on groundwater levels can be seen in Figure 5.

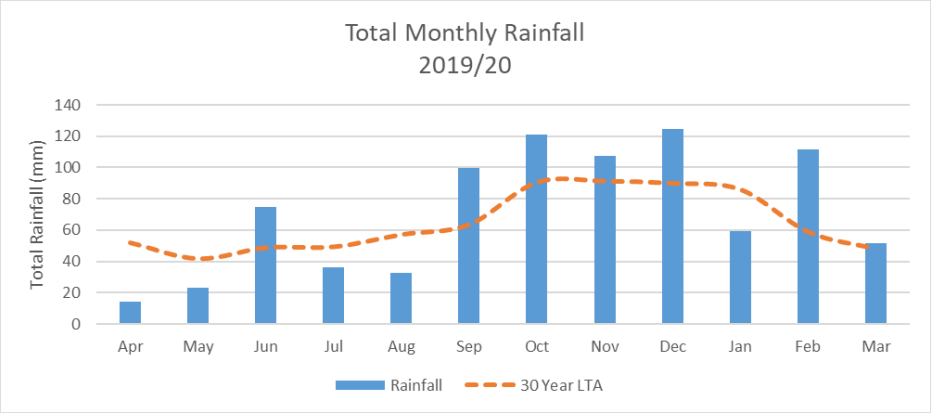

Figure 4: Total monthly rainfall 2019/20

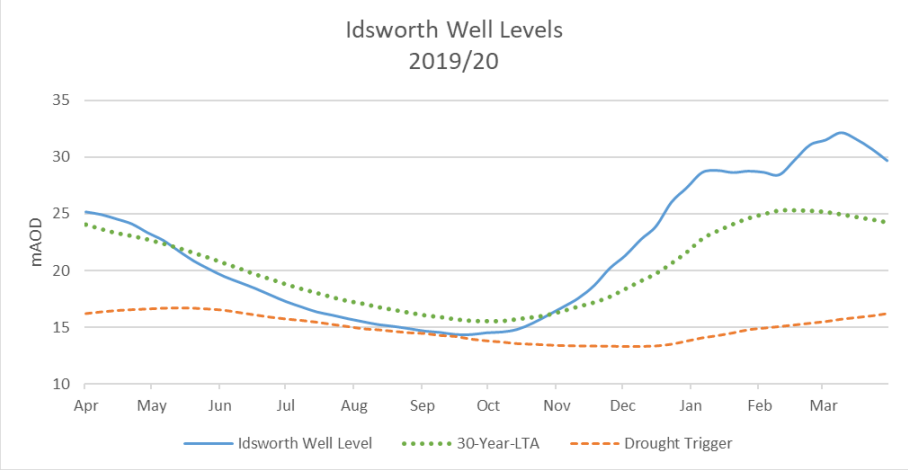

Figure 5: Idsworth Well Levels 2019/20

5.1.2 Distribution Input

Our distribution input is the amount of water we put into our network each day and is our headline measure of demand. Looking across the year in Figure 6 we can see our usual annual pattern was slightly exaggerated. Though the maximum peak summer demand was lower than recent years, we saw above average levels extending beyond August as a result of the long, dry summer. From November we have seen below average levels as a result of the wet weather and leakage management activities.

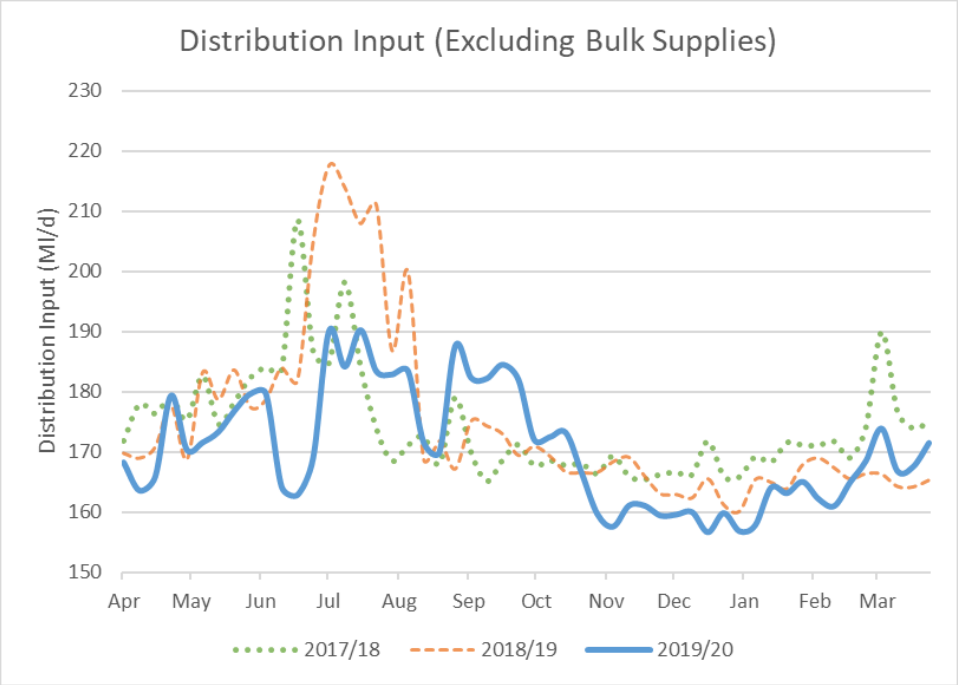

Figure 6: Distribution Input (excluding bulk supplies)

5.2 Water Balance reconciliation

For most outturn years the 'Macro Components' of demand, such as unmeasured demand and measured demand, do not add up precisely to the 'Distribution Input'. 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. These have been inputted into the tables using the new data return guidelines[3].

5.3 Forecast WRMP and outturn Supply-Demand Balance

The final supply-demand balance has been calculated for both annual average (Table 1) and critical period (Table 2) scenarios for 2019/20 using the post MLE outturn data and compared to the revised forecast balance in WRMP14 and WRMP19 **dry years**. The 'outturn' DO is actually the revised WRMP19 DO as described in section 6.1.2 and the revised WRMP14 and WRMP19 balances are calculated in sections 6.1.1 and 6.1.2 respectively. The outturn supply-demand balance shown here is using the guidance definitions for each of the components (e.g. actual bulk supply figures).

[3] Technical guidance for completion of WRMP annual review data return

Annual Average forecast and outturn SDB	Outturn figures 2019/20	WRMP14 Forecast 2019/20	WRMP19 Forecast 2019/20
Final Plan Deployable Output	223.03	239.10	242.73
Outage	7.2	9.3	13.05
Treatment works losses and operational use	2.51	6.6	2.4
Water Available For Use in a Dry Year (Own Sources) (DO-Outage-losses)	213.32	223.2	227.28
Potable water exported (bulk supplies to SWS)	6.01	20	22.5
Total Water Available for Use (WAFU-Exports)	207.31	203.2	204.78
Distribution Input	170.01	178.67	175.33
Target headroom	5.31	10.33	5.31
Forecast Supply Demand Balance (Total WAFU – DI – Target Headroom)	**31.99**	**14.2**	**24.14**

Table 1: Supply-demand balance for 2019/20 dry year - annual average

Critical Period forecast and outturn SDB	Outturn figures 2019/20	WRMP14 Forecast 2019/20	WRMP19 Forecast 2019/20
Final Plan Deployable Output	274.2	329.04	296.40
Outage	8.8	4.6	12.50
Treatment works losses and operational use	5.65	7.1	2.4
Water Available For Use in a Dry Year (Own Sources) (DO-Outage-losses)	259.75	317.34	281.5
Potable water exported (bulk supplies to SWS)	9.52	25	22.5
Total Water Available for Use (WAFU-Exports)	250.23	292.34	259
Distribution Input	190.53	232.11	218.26
Target headroom	7.06	13.77	7.06
Observed Supply Demand Balance (Total WAFU – DI – Target Headroom)	**52.64**	**46.46**	**33.68**

Table 2: Final supply-demand balance for 2019/20 - critical period

5.4 Security of Supply Index

The Security of Supply Index (SOSI) was introduced by Ofwat and was reported in the June return for many years. It is a way of representing the supply-demand balance and therefore security of supply, if 2019/20 had been **a Dry Year**.

If 2019/20 had been a dry year with a 1 in 20 year return period, then the average SOSI would have been 100 for both the annual average and critical periods as shown in Table 3. This means that our customers were not at risk.

SOSI Annual & Critical Period	Annual SOSI figures 2019/20	Critical Period SOSI figures 2019/20
Deployable Output (adjusted dry year WRMP19)	223.03	274.2
Outage (Outturn)	7.2	8.8
Treatment works losses and operational use (Outturn)	2.51	5.65
Water Available For Use in a Dry Year (Own Sources) (DO-Outage-losses)	213.32	259.75
Potable water exported (dry year WRMP19)	22.5	22.5
Total Water Available for Use (WAFU-Exports)	190.82	237.25
Distribution Input (dry year WRMP19)	175.33	218.26
Target headroom (WRMP19)	5.31	7.06
SOSI Supply Demand Balance (Total WAFU – DI – Target Headroom)	10.18	11.93
SOSI	**100**	**100**

Table 3: Annual & Critical Period SOSI against WRMP19

6 SUPPLY

In this section we review the elements of our performance that collectively account for our supply capability. We identify the performance we have achieved from our sites against the assumptions made in both WRMP14 and WRMP19, explaining any differences and their significance to WRMP19 going forward.

6.1 Deployable Output

A full review of Deployable Output (DO) was undertaken for WRMP14 and again in 2017 for WRMP19. This Annual Review is based on a comparison between the 'outturn' DO for 2019/20 against WRMP14 for information, and then against WRMP19 to assess our actual DO as we go forwards into AMP7.

6.1.1 Reductions in WRMP14 Deployable Output

The DO assessment that was undertaken for WRMP14, modelled a company DO of 245.8 Ml/d and 330 Ml/d for annual average and peak respectively during a Dry Year (1 in 20) drought scenario.

Since the plan was published, two of our sources (Source U and Source G) have been converted to raw water augmentation and so are no longer included in the DO values. Two of our sources (Source I and Source E) are currently experiencing long term outages[4] since 2017 for water quality reasons, and so these are also included as reductions in WRMP14 DO. The totals are shown in Table 4.

	Annual Average DO (ML/d)	Critical Period DO (ML/d)
Final Plan 2019/20 Dry Year DO in WRMP14	**239.10**	**329.04**
Source G: Raw water augmentation	1.7	3.4
Source U: Raw water augmentation	3	3.9
Source I: Long term outage	4.4	7.4
Source E: Long term outage	0.4	0.5
Total DO reductions	**9.5**	**15.2**
Revised 2019/20 Dry Year DO in WRMP14	**229.6**	**313.84**

Table 4: Revised Dry Year WRMP14 DO for 2019/20

These reductions take the revised WRMP14 DO totals during a dry year for 2019/20 to 229.6 Ml/d and 313.84 Ml/d for Annual Average and Critical Period respectively. These adjusted values have been included in the supply-demand balances in Tables 1 and 2.

6.1.2 Reductions in WRMP19 Deployable Output

DO was reassessed in 2017 for WRMP19. We explored 'conventional plus event-based DO or time-series' in line with Risk Composition 2 within the UKWIR guidance[5], which allowed us to consider implications of alternative/more severe droughts through the consideration of stochastic data. Full details of this method are provided in WRMP19 and the DO Assessment.

The modelled company Dry Year DO values for 2018/19 were 226.5 Ml/d and 280.30 Ml/d for Annual Average and Critical Period, respectively.

Source U was not included within these DO numbers, however, Source G was given a DO of 1.50 Ml/d Annual Average and 3.30 Ml/d Critical Period. The two sources mentioned above (Source I and Source E) that are currently experiencing long term outages since 2017 will be removed from the expected DO for 2019/20. The total adjustments made to the WRMP19 DO values are shown in Table 5.

[4] As per the draft WRP24 guidelines which state that if the loss of supply is longer than 6 months, then the DO should be written down appropriately unless your mitigation plan has been agreed by regulators

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

	Annual Average DO (Ml/d)	Critical Period DO (Ml/d)
Final Plan 2019/20 Dry Year DO in WRMP19	**242.73**	**296.40**
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
Source O: DO not yet realised	1.8	1.8
Source H: DO not yet realised	2	2
Source C: DO not yet realised	4	4
Source S: DO not yet confirmed	8.5	8.5
Total DO reductions	**19.7**	**22.2**
Revised 2019/20 Dry Year DO in WRMP19	**223.03**	**274.2**

Table 5: Revised Dry Year WRMP14 DO for 2019/20

These reductions take the revised WRMP19 DO totals during a dry year for 2019/20 to 223.03 Ml/d and 274.2 Ml/d for Annual Average and Critical Period respectively. These adjusted values have been included in the supply demand balances in Tables 1 and 2.

The following section describes how we will be improving our DO assessments in the development of the next WRMP. Furthermore, section 6.2 reports on the progress of the WRMP19 schemes that we assumed would have been contributing to the DO by 2019/20.

6.1.3 Further work identified by Defra/Environment Agency

Defra included the following extract in a letter to Portsmouth Water related to the publication of our WRMP19.

"The company has committed to increase the data quality for its deployable output assessments. The company should work with the Environment Agency to improve this data and provide updates through the annual review process. The company should also take action prior to WRMP24 to develop its models / tools to allow it to consider a full 15,600 year stochastically generated weather record in its supply side modelling, rather than being restricted to a subset of that full stochastic series. It is important that the company is confident in its deployable output assessments as this defines how much water the company has to supply."

As a result of this recommendation and the intrinsic links that we will have with the WRSE regional plan, there is a step-change in how we are undertaking the next round of planning. Portsmouth Waters simulation model will be developed as part of the regional model, which will include the full stochastically generated weather record. Our methods and modelling processes will be consistent with the other companies within the WRSE group, which will bring benefit in terms of alignment with SWS assumptions in particular, and enable greater confidence in our DO assessments.

Furthermore, we have undertaken a review of our WRMP19 DO assessment methods and the spreadsheet-based behavioural model that was used to generate our DO values previously. The purpose of this was to understand how we could better represent our sources, and to enable the key concepts and actions that were required to translate the information and

algorithms contained within the WRMP19 model into the new regional model. This was especially important given the introduction of Havant Thicket reservoir and the need to conjunctively model supply capability with Southern Water as part of WRSE.

As a result of this review, the following key aspects will be addressed in the new model for WRMP24:

- We are assigning each source to one of five representative sub-aquifer units rather than solely using Idsworth Well to be reflective of the risks to all sources.
- We will be running additional DO scenarios to obtain a robust assessment of abstraction impacts on all sources rather than solely Idsworth Well.
- We will be accounting for the antecedent 12-month average abstraction impacts.
- We will be evaluating seasonal variability in groundwater levels.
- We will allow for the impact of varying abstraction on Havant Spring flows.
- We will use a coherent demand profile which dynamically varies over time according to the climatic conditions. This approach differs from previous assessments, where a fixed profile was assumed. This is particularly important as the WRMP19 analysis showed that the timing of the peak inherently influences DO.

Through the development of our new model and incorporation of the above, we are confident that our WRMP24 DO assessment, which is to take place this year, will provide us with a reflective indication of how much water we would have to supply in all events up to a 1 in 500 year drought event, which will be the new planning level required.

6.2 Progress on options

There were no supply-side options included in WRMP14 due to the surplus of water available throughout the planning horizon.

However, as previously mentioned, WRMP19 requires a number of interventions throughout AMP7 to ensure the supply of our customers and of the bulk supplies we have committed to exporting to Southern Water. These were:

- Maximising DO at Source C by 4 Ml/d by 2019/20
- Maximising DO at Source H by 2 Ml/d by 2019/20
- Maximising DO at Source O by 1.8 Ml/d by 2019/20
- Drought Permit at Source S by 8.5 Ml/d by 2017/18
- Maximising DO at Source J by 12.5 Ml/d (15Ml/d Peak) by 2024/25

Although we are not in the position to see any DO benefit from these schemes in 2019/20, progress has been made in all cases and there has been no negative affect to our SOSI or current supply-demand balance, as evidenced in Tables 1 and 2.

The following sections provide details on current progress.

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

The three schemes to maximise DO are currently undergoing an assessment to indicate any engineering, delivery and operability challenges. This will enable us to understand whether the suggested schemes are the most appropriate in terms of engineering solutions to delivering the proposed improvements for WRMP19.

Although the schemes will not involve any increase in licenced quantity, there is some uncertainty due to Environmental Agency concerns regarding sustainability in the catchment. Portsmouth Water would have to provide evidence that the options are sustainable and to address any environmental concerns. Therefore, we are including these schemes in the new

conjunctive modelling and design stage which is described further in the generalised programme below in section 6.2.3.

6.2.2 Maximising DO at Source J

In early 2020 we commissioned a consultant to undertake a desk study to understand the existing conditions at Source J and to determine the initial feasibility of drilling and constructing new public water supply boreholes to meet the projected demand for water. The report has been shared with the Environment Agency and a meeting was held to discuss the findings. The implications of these findings and discussions mean that if the enhancements would result in any long-term average increase in abstraction, there is a significant risk that the schemes would not be viable under the Water Framework Directive (WFD). The same may be true of all of the AMP7 groundwater schemes. Therefore, an amendment to the general concept for all of these schemes is proposed, with the inclusion of a water resource modelling and design stage.

6.2.3 Water resource modelling and design stage

The generalised programme for **all AMP7 GW schemes** is, therefore to use the new conjunctive use model (developed for WRMP24 through WRSE) to assess whether the schemes would result in an increase in long term abstraction. If it concludes that they do not, then we will carry out an operational review to confirm the feasibility and potential infrastructure requirements associated with such operation. Where required, we will carry out groundwater modelling and risk assessments of impacts on surface water bodies and then liaise with the Environment Agency to determine next steps based on the findings of the modelling.

6.2.4 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 the original capacity of 11Ml/d, remains a key part of our Drought Plan. During the 2019/20 reporting year, we carried out an initial desk-based review to confirm the capability of the source to yield the 11Ml/d proposed in the Drought Plan.

Our investigations, which have included discussions with Southern Water, have not found any records of the original yield testing at Source S. However, historic abstraction data confirm that the source has been pumped at over 10Ml/d for extended periods in the past. Most significantly, records show that the source was operated at an average abstraction of 9.9Ml/d for 85 days over the period July to September 1992. Monitoring records at Idsworth Well indicate that this drought was one of the most severe in the historic record, with minimum groundwater levels very similar to the 1973 groundwater drought.

The weekly minimum pumped water levels obtained during the 2005 drought event have also been used to generate a yield drawdown curve for lower levels of abstraction as part of the source DO assessment. This indicates that the yield/drawdown curve is very flat, dropping by around a metre for the first 2.5Ml/d of yield. The difference in rest water levels is also relatively insensitive to drought severity, with a reduction of around 1-2m between the worst recorded operational event (2005) and the worst historic event (1973). The drop between the worst historic event and the 1 in 200 event should be of a similar magnitude. Given that the pumped water levels at 2.5Ml/d only reach -10mAOD at 2.5Ml/d abstraction under the worst historic event, compared with a DAPWL (pump cutoff) of -25mAOD, it is considered highly likely that the source could achieve the yield quoted in the Drought Permit, unless there is a notable increase in the rate of drawdown at higher abstraction rates. It would only be possible to investigate this by carrying out a pump test, which would need to be carried out under reasonably low groundwater conditions at a rate of at least 7.5Ml/d to 10Ml/d (i.e. 3-4 times the licenced allowance) before this risk could be evaluated. The next steps of this project will be discussed with the Environment Agency.

6.3 Outage

In the new draft WRP guidance, 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 the figures represented here, but have been accounted for in reductions to the DO detailed above.

Only our Source H source falls under one of these categories as a long term outage. The site had been off for 3.5 months before the end of 2019/20 (since December 2019) due to water quality concerns. Turbidity detection and rainfall instrumentation is being installed at the site and it is planned to return to service by the end of July 2020.

The actual Outage for 2019/20 is therefore 7.2 Ml/d Average, and 8.8 Ml/d peak week when compared to WRMP19, and 7.7 Ml/d average and 10.7 Ml/d peak week when compared to WRMP14.

Typically, the Company has had a reactive approach to managing outage, reflecting the historic surplus of water and treatment capacity we had available. Following the submission of our Annual Review 2019, the Environment Agency expressed their expectation for us to reduce Outage going forwards.

We understand the need to manage this issue carefully is an important component of our plans to confidently provide Southern Water with additional bulk supplies in the period 2020-2030, whilst maintaining the service to our customers.

Finally, we have identified that our most significant outage risk is posed by a pollution event or oil spill happening in one of our catchments. To mitigate this risk, we have a proactive programme with customers in our higher risk zones to survey and subsidise the replacement of domestic fuel storage tanks, where necessary. Furthermore, we have installed VOC monitors at our strategic sites which will allow early warning of oil contamination and for the works to be turned off before the oil contaminates the site.

6.3.1 Business Plan reporting

In AMP7, there is a common performance commitment associated with an outcome delivery incentive that looks to Outage. Whilst the methods of calculating Outage used by the ODI is not directly comparable with the WRMP guidelines, it serves as an indication of intent by Portsmouth Water to make improvement.

Unplanned Outage in the context of ODI reporting is the temporary loss of peak week production capacity (PWPC) weighted by the duration of the loss (in days). Unplanned Outage for each water production site is calculated separately and then summed over the reporting year to give a total actual unplanned outage value for the water resource zone. The Company weighted Outage is then summed and normalised based on the overall peak week production capacity and reported as a percentage.

Specifically, under this context, we had 23 three unplanned outage events in the year equating to a loss of 2.642 Ml/d relative to our PWPC of 259.191 Ml/d or 1.02%

6.4 Bulk Supplies

Portsmouth Water currently has two bulk supplies to Southern Water (SWS). One is feeding into their Sussex Zone, with a capacity of 15Ml/d which is available as 'best endeavours' with a sweetening flow of 1 Ml/d required at all times. In WRMP14 2019/20 this export was assumed as 10Ml/d in an average year and 15 Ml/d during peak. These assumptions were increased to 15 Ml/d in both cases in WRMP19 planning.

Our second bulk supply to SWS is from our Source A into their Hampshire Zone. To reflect that the detail of this supply was still under negotiation at the time of planning for WRMP19 (the bulk supply agreement was finalised in 2019/20) WRMP19 assumed a 7.5Ml/d export during 2019/20, increasing to 15 Ml/d from 2020/21 onwards for both average and peak week.

The forecast WRMP total combined exports to SWS throughout 2019/20 are shown in Table 6 alongside the total outturn values of the exports for comparison.

	Outturn value 2019/20	WRMP14 2019/20	WRMP19 2019/20
Average	6.01	10	7.5
Peak	9.52	15	7.5

Table 6: Total Bulk Supply exports to SWS

It is evident that we have exported less to SWS than we had planned for in the annual average scenario; however, the opposite is true for the peak period outturn values compared to WRMP19. This has not negatively impacted our supply-demand balance due to the over-performance in other areas of the plan.

6.5 Sustainability schemes

Portsmouth Water's area of supply includes numerous protected rivers, harbours and coastlines, highlighted in Figure 77.

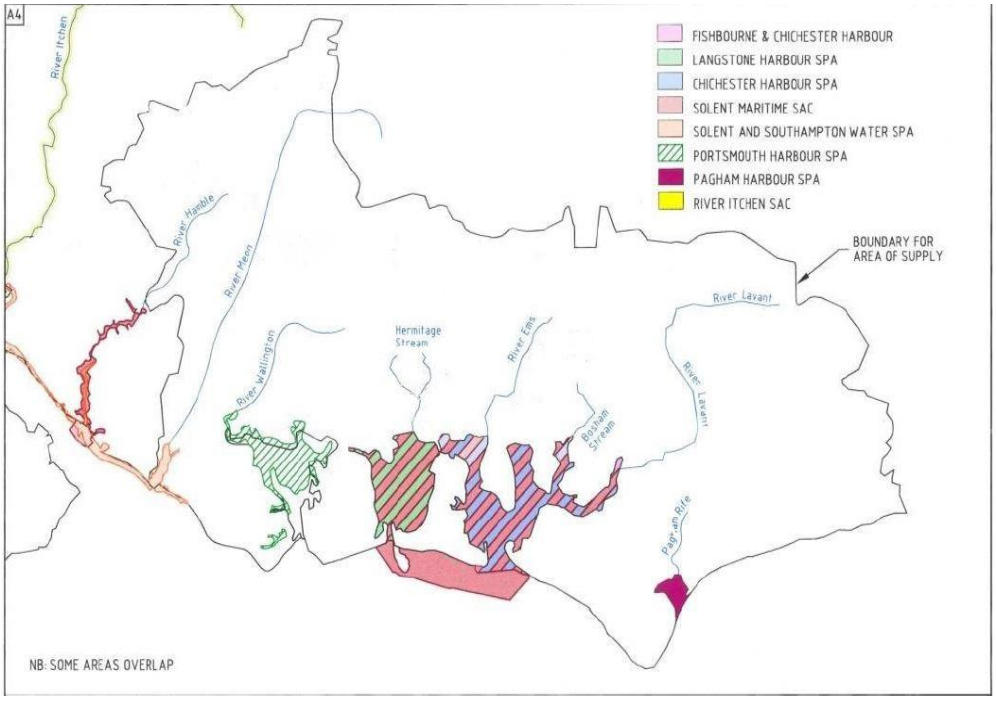

Figure 7: Protected areas within Portsmouth Water's area of supply

The Company has complied with all previous sustainability reductions and voluntarily reduced abstraction licences.

The following sections set out what activities were included in the Water Industry National Environmental Programmes (WINEP) which were carried out over AMP6 and AMP7.

6.5.1 AMP6 WINEP schemes

The following schemes were completed in June 2017, significantly earlier than the legal requirement which was for completion by March 2021. The results of these are compared against WRMP14. Any reductions made as a result of these schemes impact on the WRMP14 assumptions of DO.

The River Ems Restoration Scheme

Portsmouth Water has completed a river restoration scheme on the River Ems. This scheme included revisions to the abstraction licence in relation to the volume and location of the river augmentation. The original restoration scheme, as proposed by the Environment Agency, was modified to reflect the ecology found on site. An off-line pond was de-silted to enhance water vole habitat and high flows were diverted to the main river to enhance the chalk stream habitat. With further downstream modifications this section should be suitable for migratory fish.

The River Hamble Restoration Scheme

The restoration brief for the River Hamble scheme was provided by the EA in February 2015. The original scheme included cattle fencing and channel modifications. Unfortunately, the landowners did not want bankside fencing because of increased flood risks. Portsmouth Water provided a silt trap and hard-surfaced cattle crossings to improve water quality instead. Additional work was carried out in 2017/18 which involved the removal of an existing weir.

Titchfield Haven

In December 2015 Portsmouth Water renewed its time-limited licence at Source F. This source is on the River Meon and abstraction may also influence the harbour at Titchfield Haven. Although the Habitats Regulations Investigation concluded that there was no adverse effect on the harbour the EA imposed a new augmentation clause on Source F based on the use of raw water from Source G. This reduction in deployable output from the WRMP14 assumptions is considered in section 6.1.1.

6.5.2 AMP7 WINEP Schemes

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 phases, and so have no impact on the DO forecasts of 2019/20. However, they are outlined in the following sections.

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 source. In June 2020 we appointed a consultant, Wood, to undertake this WFD No Deterioration investigation on our behalf. We have had an initial inception meeting with Wood and the Environment Agency to confirm scope.

Phase 1 of this project will be complete by the end of the summer, but the final conclusion of the investigation will be dependent upon the publishing of updated WFD classifications by the Environment Agency, currently programmed for the Autumn.

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.

As fellow water companies with abstractions in or on the River Itchen catchment, we are undertaking these investigations in partnership with Southern Water and South East Water. We are currently in the process of recruiting a delivery partner for this piece of work.

7 DEMAND

In this section we review the elements of our performance and our customer's consumption behaviours that collectively account for demand in the plans. We contrast this understanding with the assumptions made in both WRMP14 and WRMP19, explaining any differences and their significance to WRMP19 going forward.

Whilst we report demand in this document as the performance of a number of individual factors accounted for in the WRMP, in reality, we believe evidence from around the world and other companies in this country shows us that the most effective influence of demand can only be achieved through a number of mutually supportive interactions.

For that reason we planned an integrated approach towards influencing demand for the duration of our plan, outlined in the following sections.

7.1 Demand forecast review

The ability to accurately predict demand is obviously critical to a successful WRMP. In this section, we contrast the demand forecasting from both WRMP14 and WRMP19 with the actual demand experienced in 2019/20 and account for the variances.

The outturn annual average Distribution Input (DI) for 2019/20 was 170.3Ml/d. This is 8.7 Ml/d lower than the WRMP14 dry year forecast of 178.67Ml/d and 5.3 Ml/d less than the same WRMP19 forecast of 175.33Ml/d. These figures are summarised in table 7 below.

Data table component	Outturn figures 2019/20	WRMP14 Forecast 2019/20	WRMP19 Forecast 2019/20
Distribution Input (WRMP Dry Year figures)	170.01	178.67	175.33

Table 7: Outturn and WRMP forecast Distribution Input figures

The difference of 3.34 Ml/d between the WRMP14 and WRMP19 dry year assessments of DI can be attributed to two changes in the calculation; The WMP19 forecast started at a reduced baseline reflecting our performance in reducing leakage and, the company undertook a more advanced approach to understanding dry year demands which resulted in a reduced uplift from the normal year.

We would characterise the outturn demand in 2019/20 as being close to the predicted normal year value in WRMP19. In the WRMP19 baseline, the difference in DI between Normal and Dry Year scenarios is 3Ml/d with normal year being 172.33Ml/d – a variance of 1.4%. We are therefore content that at this point in time that our demand forecasting work for WRMP19 is robust.

7.2 Per Capita Consumption

This section provides detailed information on why the 2019/20 forecast PCC figures are different for the WRMP14 and WRMP19, and how our outturn figures compares to these.

As a measure of the individual water consumption of a customer, per capita consumption (PCC) is not a measure under the direct control of a water company and is a challenge to influence. Research has shown PCC to have a complex relationship with weather and socio-economic factors. There is recently published research that identifies interventions that can be made in order to seek to help customers make informed choices around their water use. The most effective of these actions, mandatory water labelling of white goods and universal metering are not available to us at Portsmouth Water this time. However, we have substantial water efficiency programme seeking to influence PCC in the course of WRMP19 which we detail in the sections below.

Table 8 shows our outturn PCC value for 2019/20 which is comparable to a normal year value, alongside both the dry and normal years for the two WRMPs.

Data table component	Outturn figures 2019/20	WRMP14 Forecast 2019/20	WRMP19 Forecast 2019/20
Average Household PCC (**Dry Year** No Restrictions)	N/A	155.05	143.4
Average Household PCC (**Normal Year** Annual Average)	149.89	155	142

Table 8: Outturn and WRMP PCC figures

The outturn PCC figure shown here is using the new convergence methodology. This is the first time that Portsmouth Water has reported PCC using this methodology. At the time of producing WRMP19, the convergence leakage figure was well under development and indeed was presented in the plan, but the pre-convergence methodology was used for PCC.

The Company has since improved the PCC methodology and water balance approach in alignment with the Ofwat guidance. Though the PCC and Water Balance methodology has been revised, it is broadly comparable with the WRMP19 plan due to the agreement on new methodology leakage. However, if we had used the old methodology to calculate outturn PCC for 2019/20, then it is 153.6 l/h/d. In both cases, we have delivered on our WRMP14 assumptions but have a challenge to close the gap with WRMP19, the reasons for which are below.

There have been data improvements in both leakage and PCC reporting since the WRMP19 plan was published. Though PCC and leakage will have both moved slightly as a result of these methodology changes, this only influences the overall water balance. They do not inherently change the plan, as the implemented options provide 'real' volume savings.

7.2.1 Differences in WRMP forecasts

This section explains the changes we made through the WRMP19 planning process that resulted in the WRMP19 plan having a 13 l/h/d lower PCC forecast than WRMP14 for the same year. This is primarily because;

- We used a more advanced analysis technique to apply normalisation and dry year adjustments to the outturn data to derive the baseline WRMP19 PCC values. This meant that the adjustment factors increased the outturn value by 3 l/h/d as opposed to the previously used 10 l/h/d. Both methods were audited and approved and based on the best evidence and techniques we had at the time.
- The new leakage methodology was introduced at the start of AMP7 which contributed to the reduction in WRMP19 baseline of nearly 6 l/h/d.

The two tables below show how the base year outturn values have been adjusted to derive the WRMP baseline values for the base year.

Calculating WRMP14 Base year (2012/13)	Adjustments	PCC
Outturn reported PCC 2012/13		**148.52**
'Peaking factor' uplift to give base year value	10.08	158.6
Projected forecast 2019/20 WRMP14 DYAA		**155.05**

Table 9: Adjustment factors applied to the WRMP14 base year to obtain dry year PCC

The forecast 2019/20 WRMP14 value is lower than the base year values owing to the BAU activities that would have taken place to reduce PCC.

Calculating WRMP19 Base year (2017/18)	Adjustments	PCC
Outturn reported PCC 2017/18		**147.5**
WRMP19 population update	-1.4	146.1
New leakage methodology adjustment	-5.7	140.4
Normalised adjustment	0.4	140.7
Dry year adjustment to give base year value	2.6	143.4
Projected forecast 2019/20 WRMP19 DYAA		**143.4**

Table 10: Adjustment factors applied to the WRMP19 base year to obtain dry year PCC

These values are the starting point for the WRMP baselines which are then subsequently projected throughout the planning horizon based on the assumptions used within the plans. It is therefore inevitable that with such differing starting points, the two plans will have different predictions for 2020/21.

Since WRMP19 was derived, the company has made significant improvements to the PCC methodology to align with the Ofwat consistent approach to reporting PCC.

Notable data improvements to the PCC and MLE methodology include:

- A movement away from the company Individual Household Monitor (IHM) to a logged Small Area Monitor (SAM) for the unmeasured Per Household Consumption estimation. This allows the effective removal of leakage as well as an improved understanding of peak household consumption and inter-day use.
- Company-specific estimates of Meter Under Registration (MUR), Supply Pipe Losses (SPL) and Plumbing Losses (PL)
- The introduction of company-specific transient population estimates to align with much of the industry
- An improved process for updating company population-based on ONS mid-year estimates.
  The explicit allocation of uncertainty to sub-components of the MLE

7.2.2 Impact of new reporting methodology

As a result of implementing the consistent approach to reporting, as published by Ofwat in March 2018, we have seen a relatively small reduction in PCC of 3.8 l/h/d, from 153.6 (AMP6) to 149.9 (AMP7).

This impact was most notably caused by the convergence leakage methodology resulting in an increase of 5.14 Ml/d in leakage. The subsequent adjustment to the distribution of DI made in the "Most Likely Estimate" (MLE) calculation saw a fall in PCC as a result.

It is important to note that had the 5.14Ml/d uplift to leakage been applied like for like with the 2019/20 baseline, the resulting PCC would be 149.50l/h/d and therefore very close to the outturn 2019/20 figure in the table above.

7.2.3 Progress against Performance targets

The PCC performance commitment we have made to our customers and reported to Ofwat, is calculated differently to the PCC targets in the WRMP and therefore the two numbers are not directly comparable. The AMP 6 (Year 5) ODI target for company average PCC was 143.9l/h/d. The AMP6 2019/20 outturn PCC is 153.6 (using the old methodology) and therefore the company has not achieved its target and will pay the maximum associated ODI penalty.

We have reaffirmed our performance commitment with our customers for AMP7 and are committed to reducing PCC by 6.3% (based on three-year rolling average values) by 2025. Again this target is not directly comparable to the targets in WRMP19.

Figure 8 below shows our recent PCC outturn performance linking to our WRMP19 normal year performance assumptions. WRMP19 assumes a starting PCC figure of around 142 l/h/d (for a normal year, 143.4 for a Dry Year).

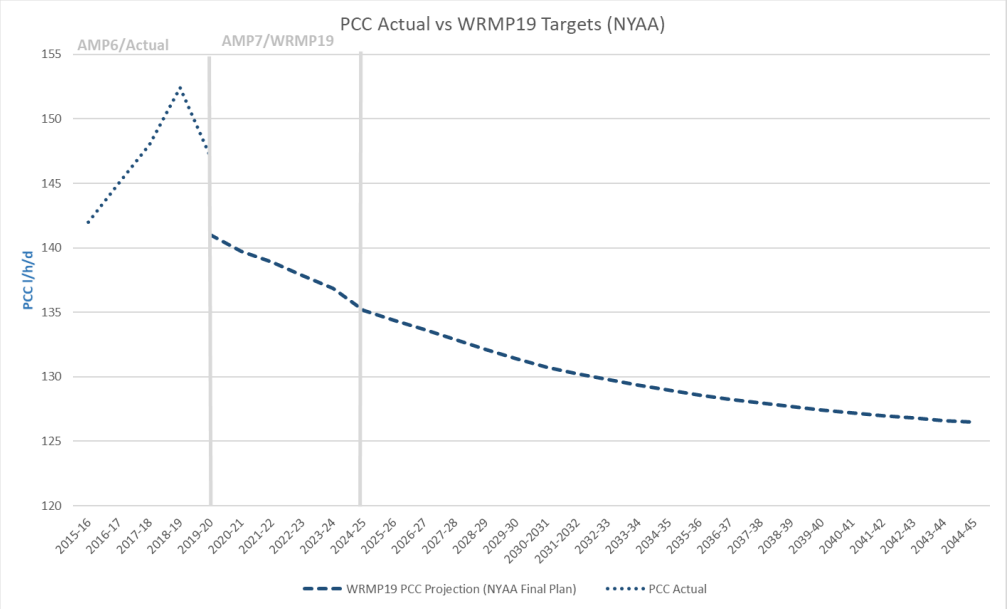

Figure 8: AMP6 PCC figures compared to WRMP19 forecasts

We will be working hard throughout the duration of WRMP19 to close this gap. We are taking a holistic view to approaching water efficiency with our customers that are described in section 7.3 and 7.4 below.

7.3 Metering

Portsmouth Water is in an area of 'moderate water stress' and therefore unable to pursue compulsory metering. We feel that this status is a decision that needs reviewing in the light of greater integration of our network across the Southeast. Due to our relatively low level of meter penetration, since 2005 the Company has encouraged optional metering and metered all new properties. This was the baseline position for the Final WRMP14.

7.3.1 WRMP14 comparison

Figure 9 below shows our actual optant meter numbers over the WRMP14 period.

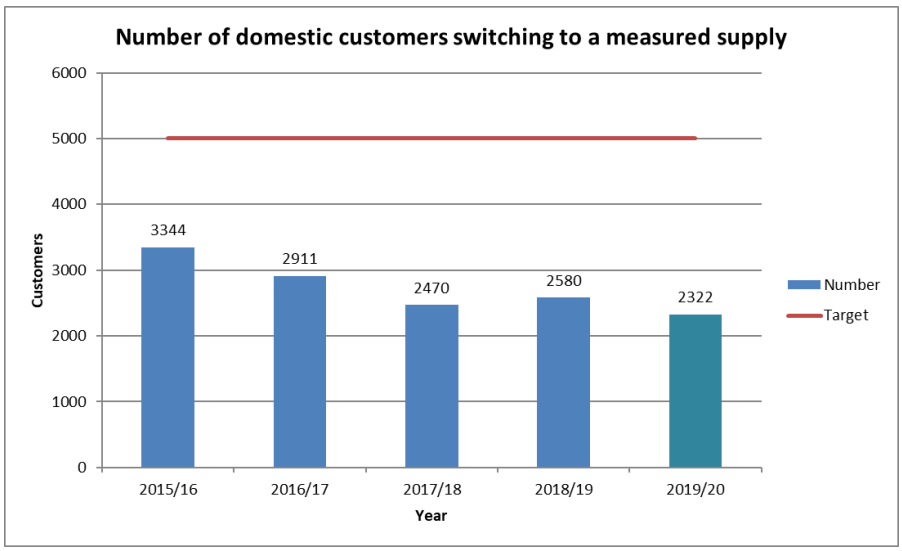

Figure 9: Number of domestic customers switching to a measured supply in AMP6.

Given our level of meter penetration at the time of writing WRMP14, it was considered a reasonable BAU level of activity to expect an uptake of 5,000 optant meters per year until 2024, with the uptake then reducing post 2024/25 as the unmeasured base diminished.

In reality, this has not proved to be the case. Throughout the period of WRMP14 we have made significant efforts to generate more optants; through a number of advertising campaigns, roadshows, attendance at community events and targeting groups whom we felt would benefit financially from a meter. But success was limited and the efforts proved costly, with promotion costs working out at £25 for each new optant generated – against an annual bill income of c.£100.

With this in mind and in a forward-thinking move acknowledging a changing world, in 2018 the company invested in a 500 unit Smart metering trial. This trial, the first of its kind in the country to use "Internet of Things" (IoT) technology, sought to test the effectiveness of this new protocol and to test its appeal to customers. It also looked to examine a potentially more efficient operating model for our increasing network of customer revenue meters. The trial concluded in March 2020, and the conclusions have shaped our water efficiency strategy going forwards.

Whilst not entirely satisfied with how our metering assumptions help up throughout the planning period, we have maintained a positive supply-demand balance and our service levels to customers.

7.3.2 WRMP19 undertaking

Metering forms an integral part of our WRMP19 plans. With industry experience and global research indicating the meters are the cornerstone of any successful initiative to influence customer consumption down, we have expanded our metering programme beyond optants, to include some customers who change addresses and a not for revenue metering programme.

This metering will work in combination with other water efficiency interventions, described in more detail below.

7.4 Water efficiency

This section provides detail on activities and initiatives we have with customers to influence their water consumption habits and how our 2019/20 performance compares to our WRMP targets.

7.4.1 WRMP14 comparison

In WRMP14 Portsmouth Water has an internal water efficiency target of 0.29 Ml/d per year based on a saving of 1 litre per property per day. We sought to deliver this target primarily through measures, such as distributing water-saving devices, made up the majority of the total with a smaller allowance for educational initiatives. Promotion of the free 'Water Saving Pack' provides the biggest saving and is run in conjunction with the "Save Water Save Money" website.

The graph below shows our performance against this target. The outturn figure for 2019/20 was 0.18 Ml/d, which was below the target.

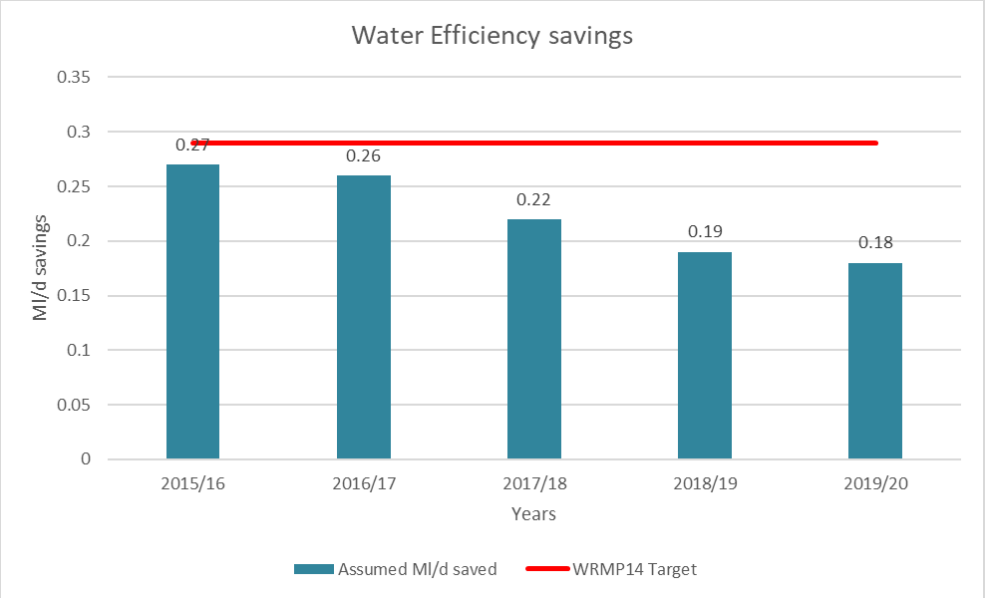

Figure 10: Water efficiency savings throughout AMP6

7.4.2 WRMP19 undertaking

In WRMP19, we have selected a number of water efficiency options that in combination deliver a 0.8Ml/d demand saving in the first year of the plan being implemented (2020/21).

Since publishing the plan we have been working on the details of a holistic approach to water efficiency, taking learning from the rest in the industry and looking to build upon it.

Our approach, blends metering with personalised advice, home visits and the installation water efficiency devices. It allows us to incorporate customer benefits such as leak alarms and repair whilst incentivising water-efficient activity through charitable donations dictated by the water efficiencies made.

There is a modular design to our approach which means there are opportunities for all our customers to benefit from it in some form, with our primary focus in the first instance being customers in our not for revenue metering initiatives and existing metered customers with high consumption.

A breakdown of how we image the elements of the programme will work across our customer base is shown in the table below.

	Proactive		"Passive"		
Intervention	Not for revenue metering	Currently metered high volume households	Change of Occupier	Optants	Non metered customer
Dumb meter	✗	N/A	✓	✓	N/A
Smart meter	✓	✗	✗	✗	N/A
Reading frequency	Monthly	Twice yearly	Twice yearly	Twice yearly	N/A
Online water challenge	✓	✓	✓	✓	✓
Online progress tracking	✓	✓	✗	✗	✗
Water efficiency devices	✓	✓	On request	On request	On request
Water efficiency home assessment	✓	✓	✗	✗	✗
Household Leak alarms	✓	✓	✓	✓	✗

Table 11: Water efficiency plan

We will be progressing this approach to a full trial phase to test our target operating model in Q3 this year. That will inform a full roll out of our plans in years 2-5 and beyond into WRMP24.

7.4.3 Impact of Covid-19 on our plans

Throughout these unprecedented times we have been tracking the effect of Covid-19 on our operations. We have clear evidence that a combination of people being confined to their houses during the lock down and increase in handwashing and other sanitation activity has resulted in an upturn in base household demand.

In practical terms, this upturn in household demand has been offset by a reciprocal decrease in non-household demand as many businesses scaled back or closed their operations. This meant the overall change in DI was not significant and our supply to customers was never at risk.

Figure 11 below clearly illustrates the average distribution input against household and non-household demand profiles.

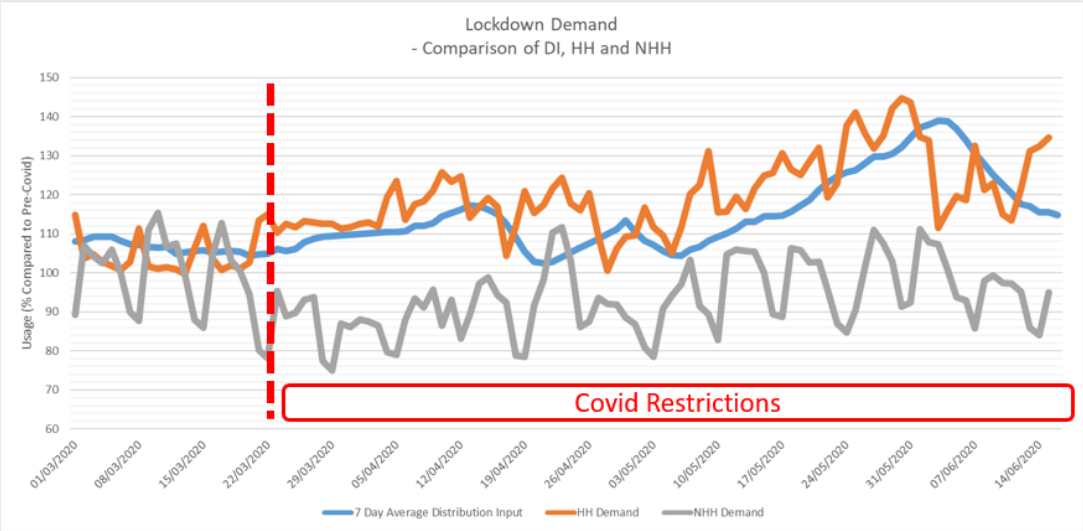

Figure 11: Impacts of Covid-19 on distribution input

However, our operations and planned programmes were significantly impacted by Covid-19 restrictions;

- In order to protect both our customers and employees, all customer meter activity was suspended from April and is not due to recommence until July 2020 (subject to risk assessment)
- The development and trialling of the water efficiency programme have been delayed.

Every effort will be made to recover these delays within the period of WRMP19.

The impacts of Covid-19 did not significantly affect the outturn data for 2019/20, however, the reporting of PCC for 2020/21 will be heavily influenced by the Covid-19 demand patterns and will need to be carefully considered when assessing a company's security of supply.

7.5 Leakage

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 level of soil movement.

7.5.1 Outturn performance

Portsmouth Water's post-MLE outturn leakage figure for 2019/20 is 23.6 Ml/d, using the old methodology so that it can be compared to the rest of the AMP6 performance. This equates to 73 litres/property/day, lower than all other water companies in the UK performance for 2018/19 and likely to be industry-leading in 2019/20.

The drop in leakage equates to a 4.5 Ml/d, or 19% reduction, the biggest year-on-year reduction in recent industry history. It is also the lowest end-of-year leakage figure on record at Portsmouth Water. Portsmouth Water's 5-year average is 28.5 Ml/d, 1.4 Ml/d below the Ofwat regulatory target of 29.9 Ml/d.

Since missing its target in 2017/18, Portsmouth Water's recovery plan has reduced leakage by over 12 Ml/d through improved efficiencies and additional expenditure.

Enhanced activity in the recovery plan included;

- additional fixed noise correlators;
- flow and pressure logging and software to improve network understanding;
- additional detection technician resources
- Making improvements in leakage repair processes.

7.5.2 WRMP14 comparison

Our Leakage Action Plan detailed how we would reduce leakage to meet the targets which were used within the WRMP14 planning assumptions. Baseline leakage activities include pressure management, find and fix activities, and improved data for leakage targeting. The forecast took into account the increase in leakage from growth in the distribution network, against the reduction in leakage from metering and gains in efficiency and technology

Figure 12 below shows that we have not hit leakage targets for all years, but following the significant increase in investment in 2018 we significantly surpassed this years' WRMP14 target of 29.80 Ml/d by 6.20 Ml/d.

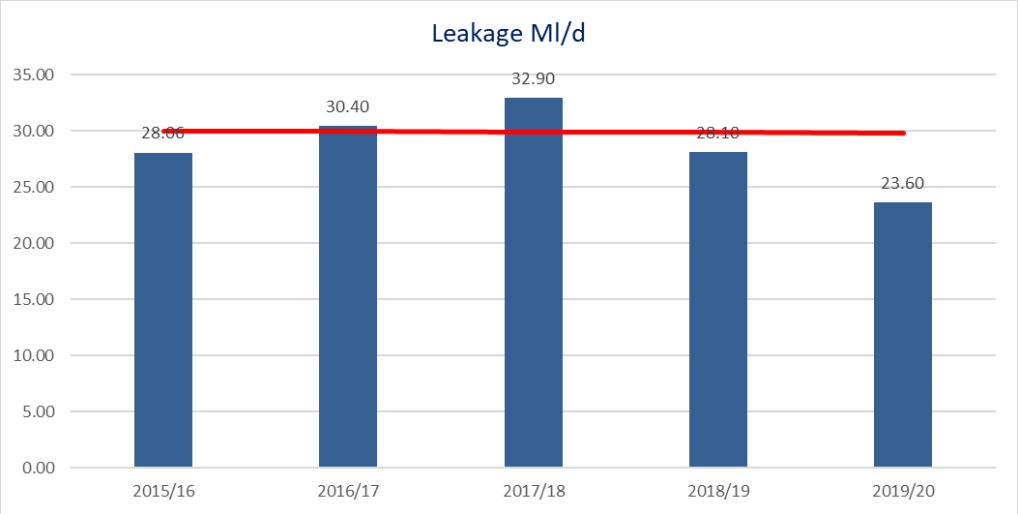

Figure 12: AMP6 Leakage

7.5.3 WRMP19 comparison

The outturn leakage figure using the new convergence methodology for AMP7 is 24.36 Ml/d which is reported when comparing against WRMP19 forecasts and in the data tables as per the guidance.

Figure 13 below shows our recent leakage outturn performance linking to our WRMP19 performance assumptions. WRMP19 is assuming a starting point for leakage of 34.87Ml/d using the new methodology. Portsmouth Water therefore, start 2020/21 in a very strong position to achieve our leakage targets throughout AMP7.

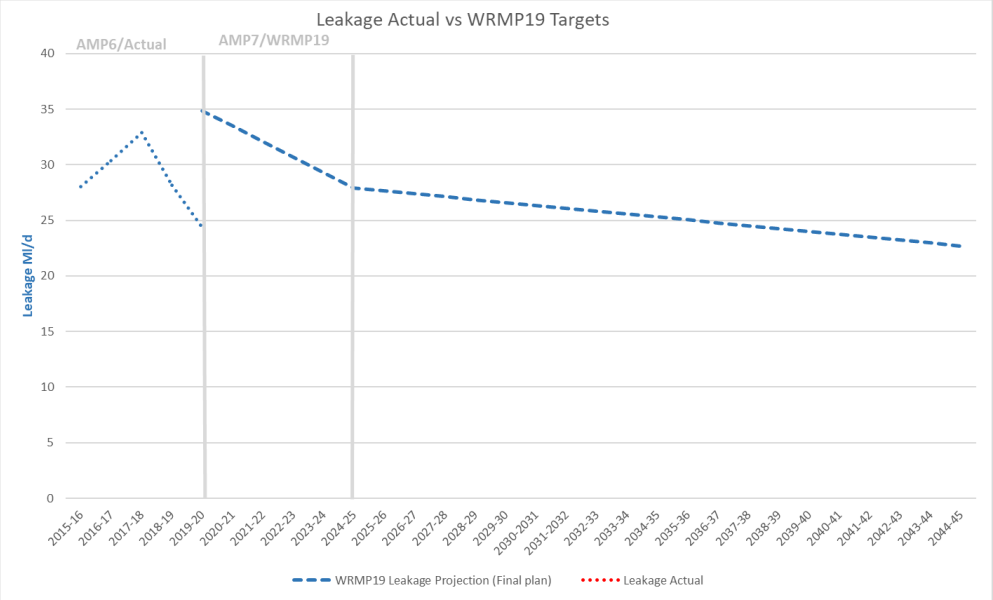

Figure 13: AMP6 leakage figures compared to WRMP19 forecasts

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.

8 POSITION AT THE CONCLUSION OF WRMP14

We end the WRMP14 cycle having maintained our dry year surplus by an average of 31.99 Ml/d, which is nearly 18 Ml/d more than we forecast for WRMP14 2019/20. This has been achieved through a strong leakage performance, despite not hitting our metering and water efficiency performance targets. The risk to supply for customers over the period has been mitigated.

However, our finishing position for water efficiency in general and PCC, in particular, is a risk to us. Currently, this risk is offset by a strong leakage performance, and we need to maintain this in order to buy us time to reinvigorate our water efficiency efforts. Performance for both leakage and PCC reduction (water efficiency) is more important to us than ever before and will be a key focus as we progress into WRM19 through AMP7.

9 POSITION AT THE COMMENCEMENT OF WRMP19

Our strong leakage performance has contributed to our average outturn dry year surplus of 31.99 Ml/d, which is over 10 Ml/d more than predicted in WRMP19. This has put us in a good position as we move into AMP7 in terms of dry year security of supply and for our SOSI reporting, which is based on WRMP19 figures as per the guidance.

However, we are required to ensure that we can maintain customers supply up to a 1 in 200 year drought event, which is what we planned for in WRMP19. Although this review has focussed on dry years, it is imperative to bear in mind how our progress affects our 1 in 200 year resilience to more extreme droughts, and commitments to supplying our neighbours with their bulk supply exports as we go forwards.

The final plan WRMP19 supply-demand balance in a 1 in 200 for 2019/20 is 9.07 Ml/d in surplus, assuming that we have already completed our three GW recovery schemes, and that we would be able to get the assumed yield from our Source S Drought Permit. However these schemes are still underway and not yet available for the assumed 16.3 Ml/d of DO.

The 9.07 Ml/d surplus provides some level of protection against this, along with our over performance of leakage which was 10.51 Ml/d under the WRMP19 forecast. Accounting for these factors, we would still end with a surplus of 3.28 Ml/d in the 1 in 200 year drought scenario.

It should be noted that this WMRP19 2019/20 position also assumes that we hit our PCC target of 126 l/h/d, which would include the restrictions imposed in a 1 in 200 year drought, such as TuBs and NEUBs. Given that 2019/20 is also not the official starting year of WMRP19, not all of the water efficiency options from WRMP19 were assumed to have been implemented at this point. It is therefore difficult to quantify the exact level of PCC that would have been required in 2019/20 to ensure that we maintained our starting level of resilience for WRMP19.

We have developed a tool that enables us to track this position as we start WRMP19 in 2020 so that we can assess our ongoing achievements against our targets with a forward look. This will allow us to foresee any potential risks and impacts to our 1 in 200 year drought supply demand balance and to mitigate against them if necessary in order to maintain our resilience to our customers and the environment. This will be the focus of our subsequent Annual Reviews as we implement WRMP19 throughout AMP7.

10 FORWARD LOOK

Portsmouth Water will continue to work closely alongside the Environment Agency, and we have already implemented quarterly meetings which provide regular opportunities to discuss our progress, to highlight any risks and concerns, and to work together to decide the best steps forwards.

We are also committed to working with Southern Water (SWS) throughout the planning process to ensure that the security of supply is protected. We have set up quarterly meetings with SWS to identify and mitigate any risks that arise as we both work towards developing our WRMP24 submissions.

Portsmouth Water is committed to participating in full to 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.

11 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						
AR Data Table Annual Average						
Water Company:	Portsmouth Water					
Number of resource zones	1					
Year of data submission:	2019/20					
Reporting against WRMP:	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	178.53
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	6.01
7_{AR}	Deployable output	Input dry year figure	Ml/d	2dp	Required	223.03
12AR	Water Available For Use (own sources)	(Deployable Output + changes to DO) - (Treatment works losses and operational use + outage experienced).	Ml/d	2dp	Required	213.32
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	207.31
	Process Losses					
9_{AR}	Treatment works losses and operational use	Input outturn data	Ml/d	2dp	Required	2.51
10_{AR}	Outage experienced	Input outturn data	Ml/d	2dp	Required	7.20
	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	170.01
	Consumption					
23_{AR}	Measured non household - consumption	Input outturn data	Ml/d	2dp	Required	32.62
24_{AR}	Unmeasured non household - consumption	Input outturn data	Ml/d	2dp	Required	0.53
25_{AR}	Measured household - consumption	Input outturn data	Ml/d	2dp	Required	27.75
26_{AR}	Unmeasured household - consumption	Input outturn data	Ml/d	2dp	Required	79.67
29_{AR}	Measured household - pcc	Outturn data: (Measured household consumption * 1,000,000) / (measured household population * 1,000)	l/h/d	0dp	Required	132.24
30_{AR}	Unmeasured household - pcc	Outturn data: (Unmeasured household consumption * 1,000,000) / (Unmeasured household population * 1,000)	l/h/d	0dp	Required	156.99
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	149.89
32_{AR}	Water taken unbilled	Input outturn data	Ml/d	2dp	Required	2.45
33_{AR}	Distribution system operational use	Input outturn data	Ml/d	2dp	Required	0.48
	Leakage					
34_{AR}	Measured non household - uspl	Input outturn data	Ml/d	2dp	Required	0.43
35_{AR}	Unmeasured non-household - uspl	Input outturn data	Ml/d	2dp	Required	0.07
36_{AR}	Measured household - uspl	Input outturn data	Ml/d	2dp	Required	3.00
37_{AR}	Unmeasured household - uspl	Input outturn data	Ml/d	2dp	Required	7.87
38_{AR}	Void properties - uspl	Input outturn data	Ml/d	2dp	Required	0.37
39_{AR}	Distribution Losses	Input outturn data	Ml/d	2dp	Required	12.98
40_{AR}	Total leakage	Outturn data: Total USPL + distribution losses	Ml/d	2dp	Required	24.36
	CUSTOMERS					
	Properties					
42_{AR}	Measured non-household - properties	Input end of reporting year data	000's	3dp	Required	11.87
43_{AR}	Unmeasured non-household - properties	Input end of reporting year data	000's	3dp	Required	1.45
44AR	Void non households - properties	Input end of reporting year data	000's	3dp	Required	2.76
45_{AR}	Measured household - properties	Input end of reporting year data	000's	3dp	Required	96.36
45.7_{AR}	Measured void household - properties	Input end of reporting year data	000's	3dp	Required	2.00
46_{AR}	Unmeasured household - properties	Input end of reporting year data	000's	3dp	Required	200.25
47_{AR}	Unmeasured void household - properties	Input end of reporting year data	000's	3dp	Required	5.79
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	320.48
	Population					
49_{AR}	Measured non-household - population	Input end of reporting year data	000's	3dp	Required	12.61
50_{AR}	Unmeasured non-household - population	Input end of reporting year data	000's	3dp	Required	1.53
51_{AR}	Measured household - population	Input end of reporting year data	000's	3dp	Required	209.87
52_{AR}	Unmeasured household population	Input end of reporting year data	000's	3dp	Required	521.19
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	745.19
	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	0.32
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	2322.00
	SUPPLY-DEMAND BALANCE					
16AR	Target headroom	Input adjusted reporting year figure or dry year WRMP	Ml/d	2dp	Required	5.31
18AR	Observed supply-demand balance (in reporting year)	(Total WAFU - DI) - target headroom	Ml/d	2dp	Required	31.99

WRMP ANNUAL REVIEW DATA RETURN - WATER BALANCE COMPONENTS

AR Data Table Critical Period

Water Company:	Portsmouth Water
Number of resource zones	1
Year of data submission:	2019/20
Reporting against WRMP:	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	205.69
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	9.52
7_{AR}	Deployable output	Input dry year figure	Ml/d	2dp	Required	274.20
12AR	Water Available For Use (own sources)	(Deployable Output + changes to DO) - (Treatment works losses and operational use + outage experienced).	Ml/d	2dp	Required	259.75
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	250.23
	Process Losses					
9_{AR}	Treatment works losses and operational use	Input outturn data	Ml/d	2dp	Required	5.65
10_{AR}	Outage experienced	Input outturn data	Ml/d	2dp	Required	8.80
	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	190.53
	Consumption					
23_{AR}	Measured non household - consumption	Input outturn data	Ml/d	2dp	Required	33.73
24_{AR}	Unmeasured non household - consumption	Input outturn data	Ml/d	2dp	Required	0.55
25_{AR}	Measured household - consumption	Input outturn data	Ml/d	2dp	Required	31.60
26_{AR}	Unmeasured household - consumption	Input outturn data	Ml/d	2dp	Required	95.09
29_{AR}	Measured household - pcc	Outturn data: (Measured household consumption * 1,000,000) / (measured household population * 1,000)	l/h/d	0dp	Required	150.56
30_{AR}	Unmeasured household - pcc	Outturn data: (Unmeasured household consumption * 1,000,000) / (Unmeasured household population * 1,000)	l/h/d	0dp	Required	186.59
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	176.24
32_{AR}	Water taken unbilled	Input outturn data	Ml/d	2dp	Required	2.57
33_{AR}	Distribution system operational use	Input outturn data	Ml/d	2dp	Required	0.48
	Leakage					
34_{AR}	Measured non household - uspl	Input outturn data	Ml/d	2dp	Required	0.43
35_{AR}	Unmeasured non-household - uspl	Input outturn data	Ml/d	2dp	Required	0.07
36_{AR}	Measured household - uspl	Input outturn data	Ml/d	2dp	Required	3.00
37_{AR}	Unmeasured household - uspl	Input outturn data	Ml/d	2dp	Required	7.87
38_{AR}	Void properties - uspl	Input outturn data	Ml/d	2dp	Required	0.30
39_{AR}	Distribution Losses	Input outturn data	Ml/d	2dp	Required	0.37
40_{AR}	Total leakage	Outturn data: Total USPL + distribution losses	Ml/d	2dp	Required	24.36
	CUSTOMERS					
	Properties					
42_{AR}	Measured non-household - properties	Input end of reporting year data	000's	3dp	Required	11.87
43_{AR}	Unmeasured non-household - properties	Input end of reporting year data	000's	3dp	Required	1.45
44AR	Void non households - properties	Input end of reporting year data	000's	3dp	Required	2.76
45_{AR}	Measured household - properties	Input end of reporting year data	000's	3dp	Required	96.36
45.7_{AR}	Measured void household - properties	Input end of reporting year data	000's	3dp	Required	2.00
46_{AR}	Unmeasured household - properties	Input end of reporting year data	000's	3dp	Required	200.25
47_{AR}	Unmeasured void household - properties	Input end of reporting year data	000's	3dp	Required	5.79
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	320.48
	Population					
49_{AR}	Measured non-household - population	Input end of reporting year data	000's	3dp	Required	1.53
50_{AR}	Unmeasured non-household - population	Input end of reporting year data	000's	3dp	Required	12.61
51_{AR}	Measured household - population	Input end of reporting year data	000's	3dp	Required	209.87
52_{AR}	Unmeasured household population	Input end of reporting year data	000's	3dp	Required	521.19
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	745.19
	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	0.32
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	2322.00
	SUPPLY-DEMAND BALANCE					
16AR	Target headroom	Input adjusted reporting year figure or dry year WRMP	Ml/d	2dp	Required	7.06
18AR	Observed supply-demand balance (in reporting year)	(Total WAFU - DI) - target headroom	Ml/d	2dp	Required	52.64