



WATER RESOURCES MANAGEMENT PLAN

ANNUAL REVIEW 2017

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1 GENERAL

1.1 Introduction

The Water Act 2003 places a duty on all water companies to prepare a Water Resources Management Plan (WRMP). At each anniversary of this Plan the Company must review progress and send a statement to the Secretary of State.

Portsmouth Water published its Final Water Resources Management Plan in August 2014 and this is the second Annual Review. Guidance published in April 2016 sets out the content of the Annual Review and the submission procedure.

The Guidance specifically requires the review to include progress on actions agreed with the Agency and Defra when the Plan was finalised.

The guidance requires the Annual Review to provide an overall summary of the supply demand balance for the financial year. This document replaces Table 10B and the Environment Agency commentary previously provided in the June Return to Ofwat.

1.2 Water Resources Zones

Portsmouth Water only included one Water Resources Zone in the Final Water Resources Management Plan 2014. The distribution system includes a spine main and strategic treated water storage. The system ensures that all of Portsmouth Water's customers experience the same level of service.



The Company's boundary has not changed but some customers on new housing estates are supplied by inset appointments. These inset appointees did not comment on Portsmouth Water's Final Water Resources Management Plan 2014 or on the Final Drought Plan 2013.

1.3 Levels of Service

During the preparation of the Final Water Resources Management Plan 2014 Portsmouth Water proposed a range of levels of service relating to unrestrained demand and drought scenarios.

- Temporary Bans 1 year in 20
- Ordinary Drought Orders 1 year in 80
- Emergency Drought Orders 1 year in 300

We would only expect to require to introduce domestic customer use restrictions (e.g. hosepipe bans) one year in 20. We would only expect commercial use restrictions and further domestic restrictions one year in 80. Emergency measures, such as standpipes in the street, would only be required one year in 300.

2 SUPPLY

2.1 Deployable Output

A full review of deployable output was carried out for the Final Water Resources Management Plan 2014. The Annual Review is based on the Dry Year scenario with a return period of 1 in 20.

Yield Assessment Summary 2014

Source	Abstraction Licences (MI/d)		WRMP Yield Assessment (MI/d) 1 in 20	
	Average	Peak	Average (ADO)	Peak (PDO)
Source C	20.51	31.50	18.6	31.0
Source E	0.46	0.46	0.4	0.5
Source F	9.02	15.00	9.0	14.5
Source H	9.12	13.60	7.7	10.7
Source I	6.83	8.00	4.4	7.4
Source A	45.50	45.50	36.1	41.1
Source J	22.73	25.20	11.5	14.5
Source K	11.37	13.64	9.5	12.3
Source B	98.00	137.00	62.0	79.2
Source Group LMNOP	65.04	94.60	53.3	80.0
Source Group QRST	28.38	41.00	28.3	38.8
Company Total	316.96	425.50	245.8	330.0

There are limited opportunities for “conjunctive use” in Portsmouth Water’s area of supply because of the characteristics of the chalk aquifer. The Company has no raw water storage and cannot manage sources in the winter to provide more water in the summer.

Since the Water Resources Management Plan was published in 2014 the Source I Licence has been revised and the Source U converted to raw water augmentation. These impacts are included in tables and table commentaries.

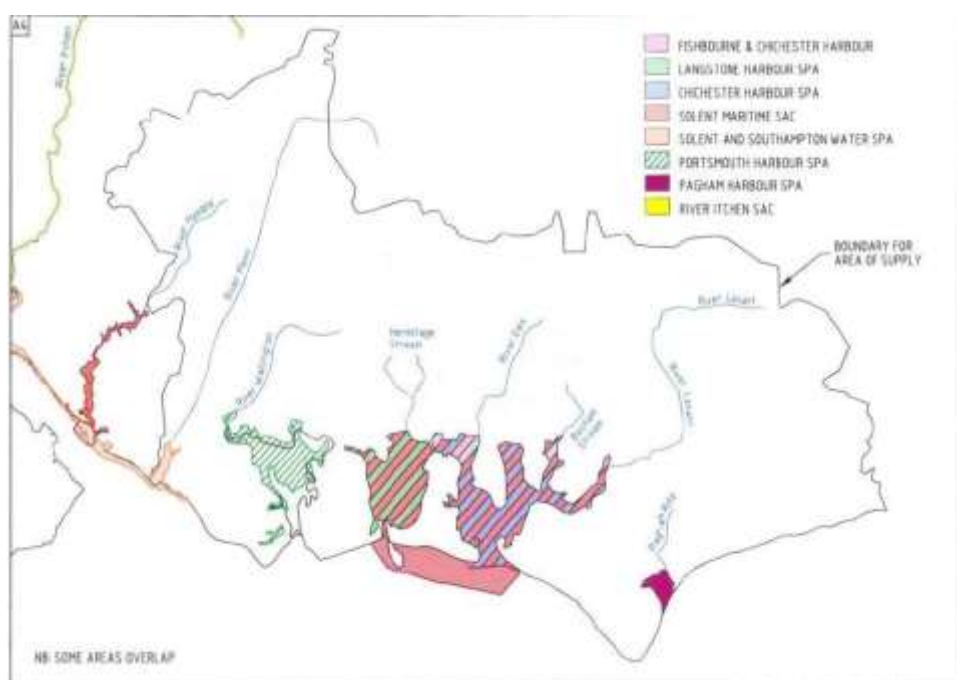
2.2 Outage

The Annual Review tables are based on actual deployable output figures calculated for 2016/17. These include long term outages at Source H and Source R, for water quality reasons. Outage is a theoretical calculation derived for the dry year and based on short term incidents.

2.3 Bulk Supplies

Portsmouth Water has a single bulk supply to Southern Water Services. This supplies water from Source S to Whiteways Lodge and on to Southern Source D. The system has a capacity of 15 MI/d with a sweetening flow of 1.0 MI/d required at all times. The original agreement, which expired in 2014, allowed for a peak supply of 15.0 MI/d and an average supply of 4.45 MI/d. The bulk supply is now available on the basis of 15.0 MI/d being available at all times.

2.4 Sustainability Schemes



Portsmouth Water's area of supply includes numerous protected rivers, harbours and coastlines. The Company has complied with all previous sustainability reductions and voluntarily reduced abstraction licences.

The following sections set out progress on the current National Environmental Programme which is due to be completed by March 2018. This is a Company commitment and the legal requirement, is for this to be completed by March 2021.

2.4.1 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.

2.4.2 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 were not keen on bankside fencing because of increased flood risks. Portsmouth Water has provided a silt trap and hard surfaced cattle crossings to improve water quality instead. Additional work is planned for 2017/18 and this will involve the removal of an existing weir.

2.4.3 Titchfield Haven

In 2015 Portsmouth Water renewed its time limited licence at Source F. This source is on the River Meon and abstraction can influence the harbour of Titchfield Haven. Although the Post Implementation Monitoring (PIM) Investigation concluded that there was no adverse effect on the harbour, at current abstraction rates, the EA imposed a new augmentation clause.

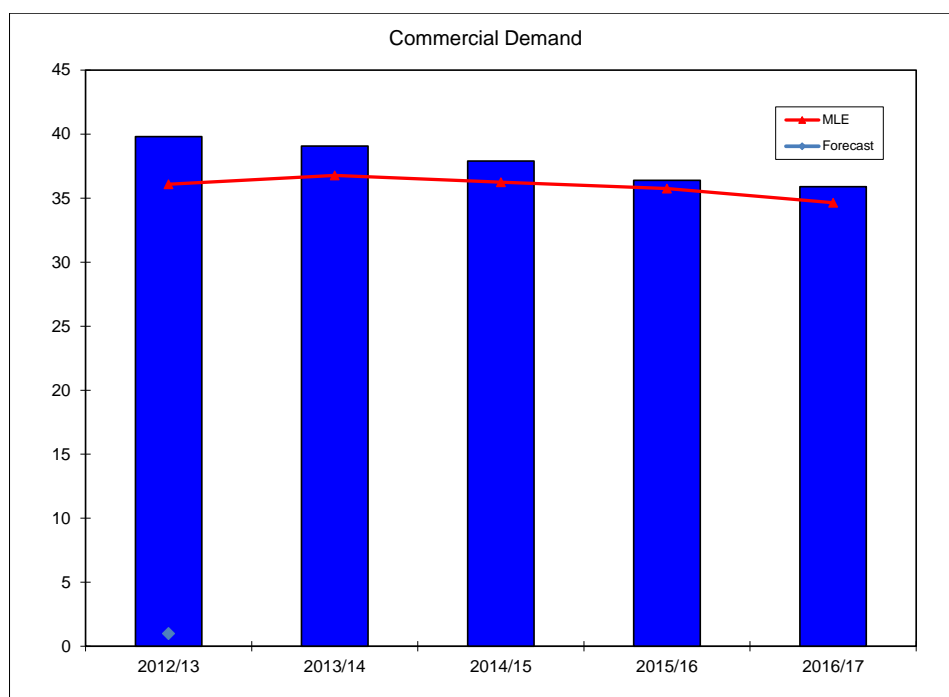
3 DEMAND

3.1 Demand Forecast

Portsmouth Water produced a range of demand forecasts for the Final Water Resources Management Plan 2014. 'Normal Year' forecasts are used for revenue forecasting and it is the 'Dry Year' forecast which is used for the supply demand balance. The population forecast was set in 2014 and will remain unchanged for each Annual Review. The only adjustment made is to the outturn household numbers, which are extracted from the billing system for the mid-year point.

The 'Dry Year' forecast was based on separate micro components and this is consistent with the additional water that is used for personal washing, clothes washing and garden use in warmer weather. The peak week forecast assumes demand based on a return period of 1 in 20 years (5% risk of failure). Fifty years outturn data was "normalised" and then statistics were used to calculate the household consumption with a 5% risk of exceedance. Non-Household demand and leakage were then added to give the overall peak demand.

Non-Household demand is based on econometrics and the outturn data over the last eight years. This outturn has been very close to the forecast, with a gradual reduction in demand. Non-Household demand in 2016/17 was 32.9 MI/d prior to adjustments for meter under registration and the Maximum Likelihood Estimation technique (MLE).



A revised Non-Household forecast was produced for the Final WRMP 2014. This used a similar approach to Water Resources Management Plan 2009 with outturn data, GDP, weather data and regression analysis.

3.2 Per Capita Consumption

Portsmouth Water use an individual household monitor to estimate unmeasured per capita consumption (PCC). In 2016/17 there were 967 properties which gave valid consumption data and this produced an occupancy adjusted per capita consumption of 151 l/h/d excluding supply pipe leakage.

Properties with consumptions above 454 litres/head/day (l/h/d) were excluded from the calculations because they are either likely to be leaking or to have changed occupancy. Properties with consumptions below 75 l/h/d are likely to be holiday homes, or to have been occupied for only part of the year, and they have been excluded from the calculations.

The outturn per capita consumption for measured properties is derived from the billing system. For 2016/17 the overall measured pcc was 125 l/h/d. The majority of measured customers are meter optants the measured pcc reflects this group of "low users". In 2016/17 measured consumption was 17% lower, on average, than unmeasured consumption.

Per capita consumption is subject to the MLE adjustment carried out as part of the overall supply demand balance. This is covered in more detail in Section 6.

3.3 Optional Metering

The metering policy remained unchanged in 2016/17 with customers offered "free" optional meters as part of the baseline provision. The Final Water Resources Management Plan 2014 does not contain any proposals to introduce compulsory metering. This is because Portsmouth Water's areas of supply is not classified as 'Seriously Water Stressed' by the Environment Agency.

The baseline provision for metering was as follows:

	2012/13	2013/14	2014/15	2015/16	2016/17
Portsmouth Water Target	5,000	5,000	5,000	5,500	5,500
Optional Meters Installed	4,857	4,873	3,544	3,344	3,154

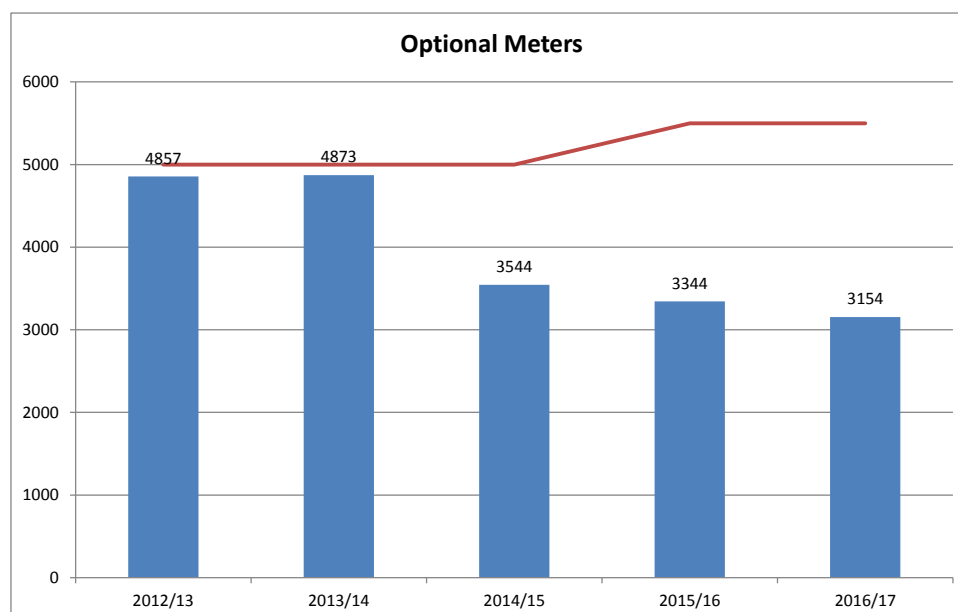
Following a drop off in the number of optional meters in 2010/11 the Company increased its publicity to promote switching to a meter. The publicity highlighted the savings that some customers are able to make through switching to a measured supply, focussing on the customers with higher than average unmeasured charges due to the size of their property. This was in addition to the usual advertising that we carry out to promote meter options; on our website, in our annual newsletter and on our charges leaflet (which is included with all unmeasured bills).

Our Business Plan commitment was to promote metering to customers who would benefit from a financial point of view. The Company proposed to install 5,500 domestic meter options per year, but in 2016/17 only 3,154 customers chose to switch to a measured supply as part of the optional metering programme.

In 2017/18 Portsmouth Water will:

- Promote metering over the phone to those customers that would benefit financially
- Send out leaflets via email to unmeasured customers promoting metering
- Put metering messages on our contractors vans
- Update the back of Portsmouth Water envelopes to promote metering
- Promote metering at events in the local area

At March 2017, domestic meter penetration for the Company was 28% of household customers, an increase of 1% from last year. The Water Resources Management Plan assumes that 70% metering penetration will be achieved by 2039/40.



New houses constructed since April 2005 have been fitted with a meter and wall mounted boxes are now used. The outturn figure for 2016/17 was 2,116 and this is close to the forecast included in the Water Resources Management Plan 2014.

3.4 Leakage

Portsmouth Water's leakage target for 2016/17 was 30.0 MI/d. The outturn leakage figure was 30.4 MI/d and this did not decrease to 28.1 MI/d following the MLE adjustment. 2016/17 was a challenging year for leakage control with cold weather and dry periods causing an increase in burst mains. Despite additional leakage control efforts the target for the year could not be reached. The three year rolling target was met and the Company is still on track to meet the five year Business Plan objective. Work has continued to refine the data and introduce 'best practice' for the assessment of leakage and further work is planned for the 2017/18 reporting year.

3.5 Water Efficiency

Portsmouth Water has an internal Water Efficiency Target of 0.29 MI/d per year based on a saving of 1 litre per property per day. The outturn figure for 2016/17 was 0.26 MI/d which was below the target.

	2012/13	2013/14	2014/15	2015/16
Portsmouth Water Target	0.29	0.29	0.29	0.29
Savings Achieved	0.35	0.32	0.24	0.27

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.

4 CLIMATE CHANGE

The Annual Review is based on outturn data and so is not affected by climate change forecasts.

5 HEADROOM

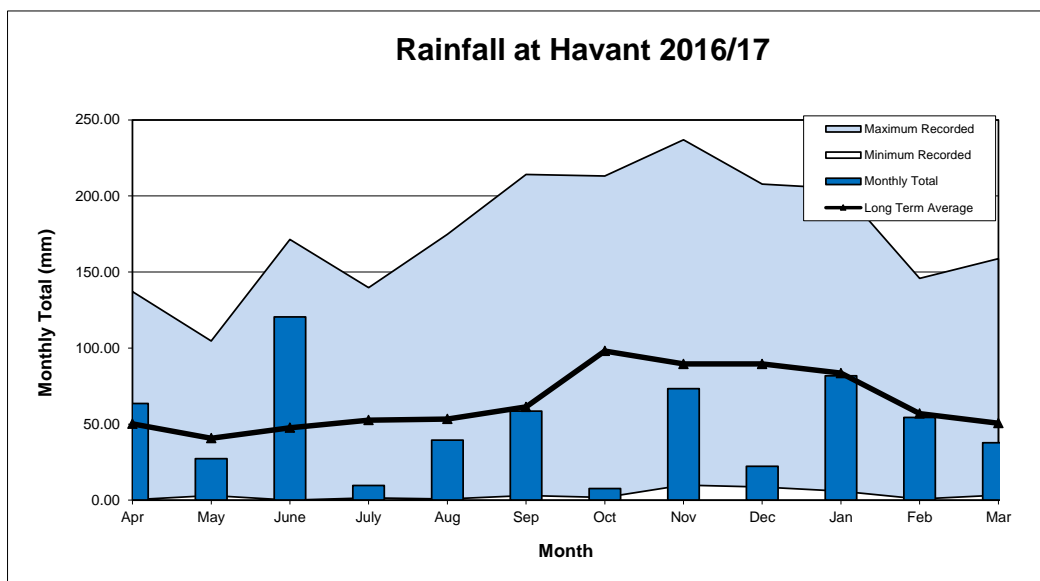
Portsmouth Water's current headroom methodology is set out in its Final Water Resources Management Plan 2014. It is a risk based methodology and the annual allowance is 9.3 MI/d and the peak week allowance is 7.0 MI/d.

6 SUPPLY DEMAND BALANCE

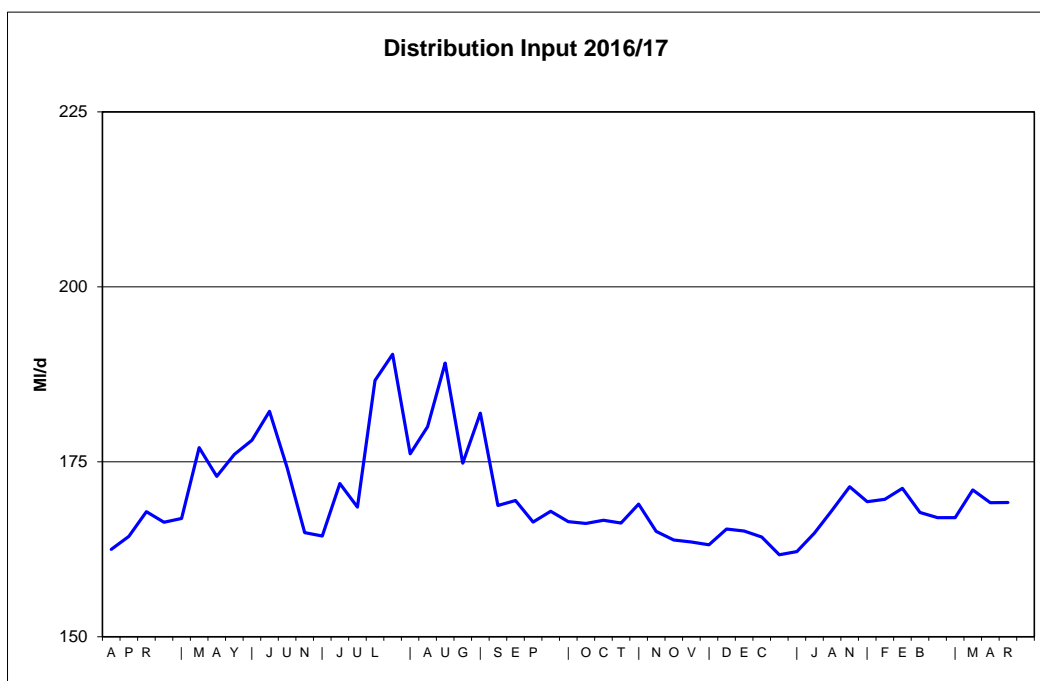
The Annual Review is based on outturn data with end of year water volumes and mid year property and population numbers.

6.1 Outturn Data

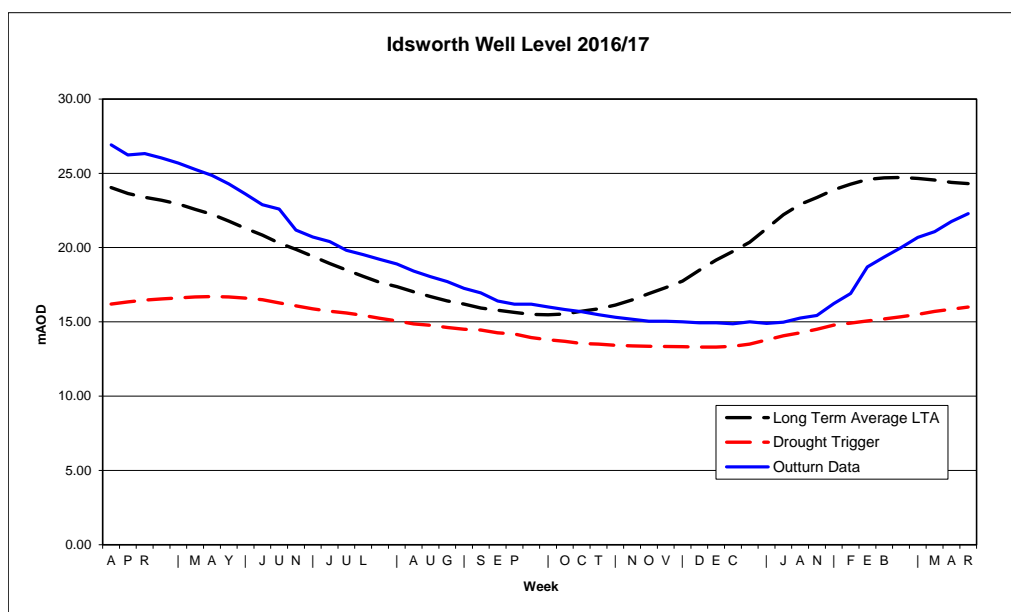
The weather during 2016/17 was unusual with a dry May and July but a very wet June. Over the winter period rainfall was only 60% of the long term average but rainfall in January, February and March was sufficient to ensure groundwater recharge.



The dry weather in May produced an early peak in demand but the wet July suppressed the summer peak. Overall demand was 'normal' with an average demand of 170 MI/d.



Groundwater levels are an indication of the water available to Portsmouth Water from the chalk aquifer. 2016/17 started with groundwater levels above the long term average but a dry July and October resulted in levels well below the long term average at the end of autumn. There was a normal recovery in the winter due to rainfall in January, February and March.



The Bulk Supply to Southern Water normally runs with a “sweetening” flow of 1.0 Ml/d. In 2016/17 the bulk supply ran slightly above this level and the annual average was 1.16 Ml/d.

6.2 Water Balance Reconciliation

For the outturn year the “macro components” of demand, such as unmeasured demand and measured demand, do not add up exactly to the Distribution Input. The Ofwat June Return required this imbalance to be “reconciled” using the Maximum Likelihood Estimation (MLE) methodology. A confidence grade is assigned to each volume depending on the source of the data and the accuracy of the readings.

The confidence grade is made up from two elements, reliability and accuracy, with reliability graded from A to D and accuracy from 1 to 4. Where an entry is zero or very small the accuracy is given as X

6.2.1 Unmeasured Household Demand

Unmeasured demand is estimated from per capita consumption (see Section 3.2) and population. This means that it cannot have a high confidence grade and the MLE calculation is based on $\pm 10\%$ so a grade of B3 is deemed appropriate. The outturn per capita consumption (pcc) was 151 l/h/d and this remained the same following the reconciliation.

6.2.2 Measured Household Demand

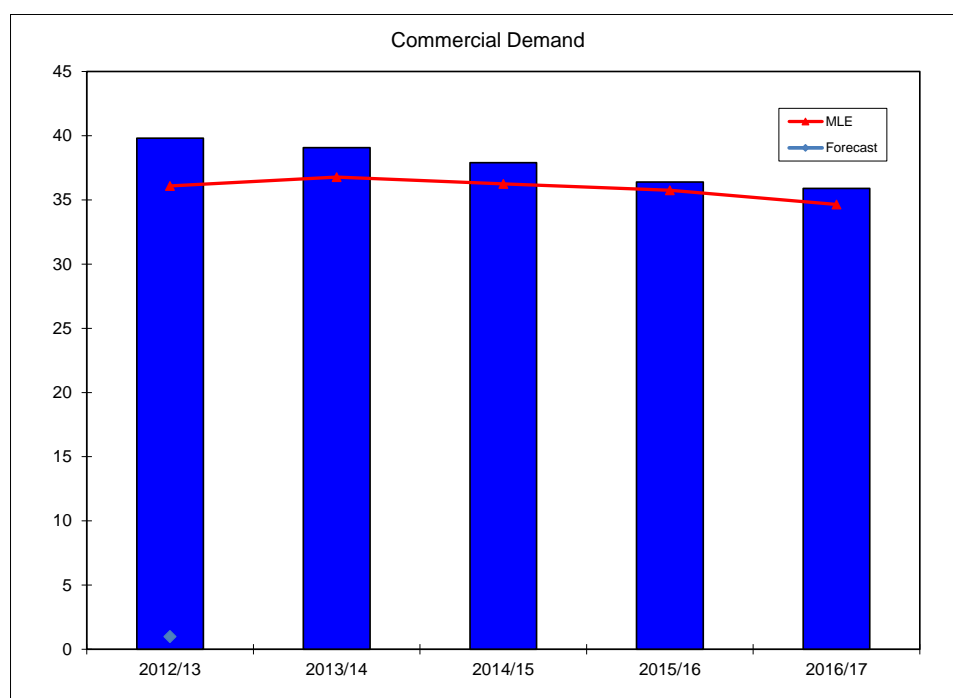
Measured household demand is taken from the outturn billing data and there is an adjustment for meter under registration. The confidence grade is A2 and the MLE calculation uses $\pm 5\%$. The outturn measured per capita consumption was 125 l/h/d (see Section 3.2). This remained the same following the reconciliation. The majority of measured households are meter optants who will on average be low users.

6.2.3 Unmeasured Non Household Demand

Unmeasured non-household demand is uncertain and is based on comparable measured non-households. Measured $\frac{1}{2}$ " meters are used to estimate the unmeasured volume and this year data came from Castle's billing system. An accuracy of $\pm 25\%$ has been set and this gives a confidence grade of B4. The volume of demand is now assumed to be 0.49 MI/d and then gives a consumption of 125 l/p/d after the reconciliation.

6.2.4 Measured Non-Household Demand

Measured non-household demand is taken from the Company's billing system for April 2016 with Castle's billing data for the remaining eleven months. In future years the billing data for commercial customers will come from the independent MOSL database. With an accuracy of $\pm 5\%$, and a confidence grade of A2, the outturn water delivered figure of 34.28 MI/d decreases to 33.69 MI/d following the reconciliation. This is close to the non-household demand forecast included in the Final Water Resources Management Plan 2014.



6.2.5 Distribution Losses

In Table 10 Ofwat separated Distribution Losses from Underground Supply Pipe Leakage (USPL). The leakage target is set for "Total Leakage" and leakage control does not make a distinction between distribution leaks and larger supply pipe leaks. The outturn figure for distribution losses is 21.86 MI/d and this increases to 21.87 MI/d following the reconciliation.

An accuracy of $\pm 10\%$ gives a Confidence Grade of A3.

6.2.6 Distribution System Operational Use (DSOU)

Operational use is a small part of the overall water balance and has a low confidence grade of B4 due to the number of assumptions made. The calculated figure for 2016/17 was 0.47 MI/d and this remained the same following the reconciliation.

6.2.7 Water Taken Unbilled

By definition water taken unbilled can only be an estimate and the initial figure of 2.39 MI/d represents less than 2% of Distribution Input. With a confidence grade of B4 the outturn figure remains the same following reconciliation.

6.2.8 Distribution Input

The outturn figure for 2016/17 was based on meter readings from reservoirs and pumping stations and this represents more than 95% of the Company's area of supply. This means that the confidence grade can be high with an accuracy of $\pm 5.0\%$ with a confidence grade of A2 for the overall balance. Distribution Input was reduced by the MLE process from 170.07 MI/d to 170.04 MI/d.

6.2.9 Overall Water Balance

The overall Water Balance is unlikely to have a confidence grade of 'A' because of the extensive monitoring systems that this would require. Portsmouth Water has allocated an accuracy of $\pm 10\%$ with a confidence grade of B3 for the overall balance.

The error in the initial water balance was 0.16 MI/d and this represents 0.1% of the outturn distribution input. This is within acceptable band for the use of the MLE methodology which is $\pm 5\%$.

6.3 Annual Average Water Balance Tables

The annual average water balance figures were used to populate the table supplied by the Environment Agency (see Section 10).

6.4 Peak Week Water Balance Table

The peak week table represents an estimate of the water balance in the peak week in July 2016. The peak week can be the critical period for the supply/demand balance (see Section 10).

The peak week balance can only be an estimate because many of the "macro components" of demand are not measured on a weekly basis. Data is available for Distribution Input, Leakage and the Bulk Supply. Several of the smaller items, such as DSOU and water taken illegally are assumed to be the same as the average balance. The peak week occurred in July and the outturn volume was 197.04 MI/d. The average distribution input was 170.04 MI/d giving an overall peaking factor of 1.16.

If the measured household peaking factor is assumed to be 5% less than the unmeasured and the unmeasured non-household factor is assumed to be 15% less than the unmeasured then it is possible to estimate what the peaking factors might have been in the peak week:

Unmeasured Household	1.24
Measured Household	1.18
Unmeasured Non-Household	1.05
Measured Non-Household	1.05
Distribution Losses	1.00
Water Taken Unbilled	<u>1.00</u>
Overall Factor	<u>1.16</u>

This assumption gives an unmeasured pcc of 191 l/h/d and a measured pcc of 149 l/h/d during the peak week.

During the peak week the bulk supply transferred 1.11 MI/d to Southern Water.

6.5 Security of Supply Index (SOSI)

The Security of Supply Index was set up by Ofwat and was reported in the June Return for many years. It represents the water balance and therefore security of supply, in a 'dry year'. If SOSI is going to be used as a 'Environmental Performance' indicator it is important to continue publishing the results for each outturn year.

6.5.1 Average Demand

If 2016/17 had been a dry year, with average demand associated with a 1 in 20 year return period, then the following average SOSI would have been calculated.

Actual Deployable Output	221.9	MI/d
Outage	9.3	MI/d
Process Losses	<u>6.6</u>	MI/d
Water Available for Use (WAFU)	<u>206.0</u>	MI/d

The outturn Distribution Input figure was 170.0 MI/d and this was representative of a 'normal' year. If it has been a 'dry' year then the WRMP 2014 forecast for 2016/17 indicates that demand would have been 181.3 MI/d.

WAFU	206.0	MI/d
Dry Year Demand	181.3	MI/d
Bulk Supply Demand	<u>15.0</u>	MI/d
Available Headroom	<u>9.7</u>	

The target headroom in the WRMP 2014 for 2016/17 was 10.4 MI/d and this gives a small deficit of 0.7 MI/d in a dry year. With a total population of 721,640 the SOSI for 2016/17 was still 100.

The temporary loss of DO from Source R and Source H, and the increase in the bulk supply from 1.0 MI/d to 15.0 MI/d, had a significant impact on Security of Supply in 2016/17.

6.5.2 Peak Demand

If 2016/17 has been a dry year and the peak week had a return period of 1 in 20 then the following peak SOSI would have been calculated.

Actual Deployable Output (July 2016)	295.0	MI/d
Outage	4.6	MI/d
Process Losses	<u>7.0</u>	MI/d
Water Available for Use (WAFU)	<u>283.7</u>	MI/d

The outturn Distribution Input Figure was 197.0 MI/d but the dry year forecast for 2016/17 peak week in the WRMP 2014 was 233.2 MI/d.

Water Available for Use (WAFU)	283.7	MI/d
Dry Year Peak Week Demand	233.2	MI/d
Peak Week Bulk Supply	<u>15.0</u>	MI/d
Available Headroom	<u>35.5</u>	MI/d

Target headroom in the WRMP 2014 at the peak week in 2016 was 14.0 MI/d and this gives a surplus of 21.5 MI/d. With a total population of 721,640 the SOSI for July 2016 was 100.

Portsmouth Water did not apply any customer restrictions in 2016/17.

7 PROGRESS ON OPTIONS

The Final Water Resources Management Plan 2014 contained the following key feasible water resources options:

- Works A Washwater Recovery
- Havant Thicket Winter Storage Review
- Bulk Supply from South East Water
- Relocating the Source A Abstraction
- Source J Licence
- Portsmouth Harbour Desalination
- Budds Farm Effluent Re-Use
- Compulsory Metering
- Water Efficiency

The Final Determination 2014 did not include any of these options because there was no overall supply/demand deficit.

As part of the development of the Water Resources Management Plan 2014 and the Business Plan 2014 Portsmouth Water reviewed the option selection process. An unconstrained list of options was developed and discussed with the Environment Agency and other Stakeholders. A Strategic Environmental Assessment (SEA) was carried out and the Environmental Report was included with the published Plan.

7.1 Works A Washwater Recovery

Washwater recovery was constructed at Farlington as part of the UV treatment scheme and was completed in March 2017.

7.2 Havant Thicket Winter Storage Reservoir

Since the Final Water Resources Management Plan 2014 was published in August 2014 the Local Councils have confirmed the reservoir site as a “Strategic Location”. This does not pre-judge the Water Resources Management Plan process, but does preserve the site from other developments. The SEA process indicated that Havant Thicket Reservoir would have a low overall impact on the environment.

7.3 Source J Boreholes

The provision of additional boreholes at the existing Source J was included in the range of options for the Final Water Resources Management Plan 2014.

The WFD Investigation concluded that more water could be abstracted from the confined chalk at this location. The existing licence would have to be varied to include satellite boreholes but the licensed volume would not need to be increased.

7.4 Other Options

The Portsmouth Desalination Option was considered to have “significant” negative impacts on the environment but was included in the 2014 WRMP range of options to satisfy the regulators.

Budds Farm Effluent re-use scheme was also considered to have “significant” impacts on the environment but was included in the 2014 WRMP range of options.

Compulsory metering is not possible in Portsmouth Water’s area of supply history because the area is not classified as “Seriously Water Stressed” by the EA.

Water efficiency activity is included in our Business Plan and the ‘Normal Year’ demand forecast in the 2014 plan assumes a fall in overall per capita consumption from 146.63 l/h/d in 2015/16 to 143.93 l/h/d in 2019/20.

Relocating Source A abstraction is no longer a feasible option. No additional fish data has been collected and the EA are preparing to modify the Woodmill Control Structure.

8 FORWARD LOOK

Portsmouth Water has nearly completed work on the next Water Resources Management Plan. This work includes a re-assessment of Deployable Output with Deepest Advisable Pumped Water Level. Headroom and outage have been re-assessed and consultants have looked at drought scenarios and the impact of climate change.

Consultants have re-assessed the options included in the WRMP and the associated SEA and HRA. This work has involved stakeholder groups and a pre-consultation process. An unconstrained list of options has been produced and this will be refined into a feasible list of options for the WRMP.

Population numbers have been derived from Government statistics and the associated property numbers checked against Local Authority Housing Forecasts. The Draft WRMP is due to be published in July 2017 with the Final WRMP submitted in April 2018.

Although the guiding principles and the WRMP guidelines have now been published there are risks associated with the late changes in the guidance.

Portsmouth Water is involved in the Water Resources in the South East modelling work and will take account of the regional solutions proposed.

Portsmouth Water has varied all its abstraction licences and this means that they are fully compliant with all current environmental legislation and have a common format. Publication of the WINEP spreadsheet confirms that there are no further sustainability reductions required.

Portsmouth Water’s WRMP 2014 contains information on multiple scenarios from the ‘dry’ year at 1 in 20 to the ‘serious drought’ at 1 in 200. The presentation of a range of resilience scenarios is a challenge and there is a need to agree a critical period and a critical scenario for each Company. Bulk supplies between companies will need to reflect the new reference level of service.

Non-household competition, in 2017, will make it more difficult to forecast commercial demand in the future. Commercial companies will need to develop drought plans and the impact of inset appointments on security of supply will need to be considered. Single points of supply to large housing developments may create problems for customers in the future.

A series of six months strategic meetings are now taking place with EA Managers and quarterly meetings are planned with local EA staff.

9 CONCLUSION

Portsmouth Water draws the following conclusions from the Annual Review 2017:

- 2016/17 was an unusual year with dry months and a very wet June.
- A surplus was retained at peak demand but at average demand the temporary loss of Source H and Source R had a big impact.
- A new bulk supply agreement was initiated in 2016 and the average flow allowance increased from 1.0 MI/d to 15.0 MI/d.
- Total leakage of 30.4 MI/d was above the Portsmouth Water target for 2016/17.

10 TABLES

The individual line definitions are not included in the EA guidance but the lines are similar to the ones covered by the former Ofwat guidance for Tables 7, 10 and 10B.

The EA tables are based on outturn data which has been adjusted using the MLE process to achieve a water balance. For this "Annual Review" tables have been provided for average or peak conditions. A full set of confidence grades has been included to help explain the MLE process and the accuracy of the "macro components" of demand.

Further table commentaries are provided to explain individual lines.

ANNUAL AVERAGE WATER BALANCE

2017 WRMP ANNUAL REVIEW - WATER BALANCE COMPONENTS - ANNUAL AVERAGE						
Water Company:	Portsmouth Water					
Number of resource zones:	One					
Year of data submission:	2017					
Row numbering in line with WRMP structure	Component	Units	DP	Data requirement	Water company total data	Confidence Grade
SUPPLY						
Resources						
1 _{AR}	Raw water abstracted	MI/d	2dp	Required	176.48	A2
2 _{AR}	Raw water imported	MI/d	2dp	Required	0	AX
3 _{AR}	Potable water imported	MI/d	2dp	Required	0	AX
4 _{AR}	Raw Water Losses and Operational Use	MI/d	2dp	Required	0	AX
5 _{AR}	Raw water exported	MI/d	2dp	Required	0	AX
5.1 _{AR}	Non potable water supplied	MI/d	2dp	Required	0	AX
6 _{AR}	Potable water exported	MI/d	2dp	Required	1.16	A2
7 _{AR}	Deployable output	MI/d	2dp	Optional	221.9	B3
Process Losses						
9 _{AR}	Treatment works losses and operational use	MI/d	2dp	Optional	5.28	B3
10 _{AR}	Outage Allowance	MI/d	2dp	Required	9.3	B3
DEMAND						
11 _{AR}	Distribution input	MI/d	2dp	Required	170.04	A2
Consumption						
23 _{AR}	Measured non household - consumption	MI/d	2dp	Required	34.01	A2
24 _{AR}	Unmeasured non household - consumption	MI/d	2dp	Required	0.44	B4
25 _{AR}	Measured household - consumption	MI/d	2dp	Required	21.11	A2
26 _{AR}	Unmeasured household - consumption	MI/d	2dp	Required	81.51	B3
29 _{AR}	Measured household - pcc	l/h/d	0dp	Required	125	B2
30 _{AR}	Unmeasured household - pcc	l/h/d	0dp	Required	151	B3
31 _{AR}	Average household - pcc	l/h/d	0dp	Required	145	B3
32 _{AR}	Water taken unbilled	MI/d	2dp	Required	2.39	B4
33 _{AR}	Distribution system operational use	MI/d	2dp	Required	0.47	B3
Leakage						
34 _{AR}	Measured non household - uspl	MI/d	2dp	Required	0.28	B3
35 _{AR}	Unmeasured non-household - uspl	MI/d	2dp	Required	0.05	B3
36 _{AR}	Measured household - uspl	MI/d	2dp	Required	1.68	B3
37 _{AR}	Unmeasured household - uspl	MI/d	2dp	Required	6.21	B3
38 _{AR}	Void properties - uspl	MI/d	2dp	Required	0.28	B4
39 _{AR}	Total mains and trunk mains leakage	MI/d	2dp	Required	21.87	A3
40 _{AR}	Total leakage	MI/d	2dp	Required	30.38	A3
41 _{AR}	Total leakage	l/prop/d	2dp	Required	96.05	A3
CUSTOMERS						
Properties						
43 _{AR}	Unmeasured household - properties	000's	3dp	Optional	206.999	A2
42 _{AR}	Measured household - properties	000's	3dp	Optional	84.212	A2
46 _{AR}	Unmeasured non household - properties	000's	3dp	Optional	1.689	A2
45 _{AR}	Measured non household - properties	000's	3dp	Optional	13.951	A2
44 _{AR}	Void household - properties	000's	3dp	Optional	6.721	B3
47 _{AR}	Void non households - properties	000's	3dp	Optional	2.628	B3
48 _{AR}	Total properties	000's	3dp	Optional	316.200	A2
Population						
50 _{AR}	Unmeasured household - population	000's	3dp	Optional	538.258	B3
49 _{AR}	Measured household - population	000's	3dp	Optional	169.494	B3
52 _{AR}	Unmeasured non household population	000's	3dp	Optional	1.500	B3
51 _{AR}	Measured non household - population	000's	3dp	Optional	12.388	B3
53 _{AR}	Total population	000's	3dp	Optional	721.64	B3
Occupancy						
55 _{AR}	Unmeasured household - occupancy rate	h/pr	2dp	Optional	2.60	A2
54 _{AR}	Measured household - occupancy rate	h/pr	2dp	Optional	2.01	A2
Metering						
57 _{AR}	Total Household Metering penetration (incl. voids)	%	2dp	Required	28.27	A2
58	Total numbers of household meters installed	000's	3dp	Required	5.270	A2

TABLE COMMENTARY**Annual Average Water Balance**Supply

Rows 1 - 7 Resources (A)

Raw Water Abstracted

2016/17 was a "normal" year with abstraction well below the dry year deployable output

Raw Water Exported/Imported

There were no raw water exports or imports.

Potable Water Exports

Potable water exported represents the Bulk Supply to Southern Water.

Deployable Output

Deployable Output is calculated for "dry" conditions and has no direct link to the outturn year water balance. An allowance has been made for the loss of the Source H, the Source R, the recent licence variation at Source I and the conversion of Source U to a raw water augmentation source.

Rows 9 - 10 Process Losses (B)

Treatment Works Operational Use

Treatment Works Operational use is related to backwash water at works which is not recycled.

Outage Allowance

Outage is now based on a full statistical analysis of recorded data including Monte Carlo simulation with up to 1,000 iterations. This risk based approach assumes that no outage events last longer than 90 days and that the peak demand period occurs during June or July.

Demand

Rows 11 - 33 Consumption (C)

Distribution Input

Distribution Input has been derived from the total measured flow minus the Bulk Supply to Southern Water.

Measured Non-Household Consumption

Measured non-household consumption is taken from Portsmouth Water's billing system and Castle Water's data with an adjustment for meter under-registration and supply pipe leakage. The outturn figure is close to the forecast included in the Water Resources Management Plan 2014.

Water Taken Unbilled

This volume represents water taken illegally in properties that Portsmouth Water believes are "void" but are actually occupied. In addition, a small amount of water is taken legally unbilled for firefighting and fire practice. It is not possible to measure these volumes so estimates are used.

Unmeasured Household Per Capita Consumption

The unmeasured per capita consumption is based on the Company's own Consumption Monitor which contains 967 individual properties. The main text explains that the results have been adjusted to exclude a number of properties with very low per capita consumptions. The outturn per capita consumption of 151 l/h/d is well below the dry year forecast in the Water Resources Management Plan 2014.

All figures used in the per capita consumption calculation are assumed to be excluding supply pipe leakage but include an allowance of 2.9% for meter under-registration.

Measured Household Per Capita Consumption

Overall Measured Household per capita consumption is lower than unmeasured household per capita consumption. This is due to the influence of meter optants who on average use less water and have a financial incentive to change to the measured tariff. Measured domestic properties have an outturn per capita consumption of 125 l/h/d based upon an occupancy of 2.01 and an underground supply pipe leakage allowance of 20 litre/property/day.

Unmeasured Non-Household Consumption

Unmeasured Non-Household Consumption is based on the measured consumption of non-household properties with ½" meters. The figure is higher this year because we have used Castle Water's data.

Distribution System Operational Use (DSOU)

Distribution System Operational Use represents water taken from hydrants for things like flushing to maintain water quality. DSOU has a low confidence grade (B3) because it is based on estimates.

Rows 34 - 41 Leakage (D)

Distribution Losses

Distribution losses are derived from the total leakage figure minus supply pipe leakage.

Total Leakage

Total Leakage has been adjusted to remove summer legitimate use and has been subjected to the MLE process. The figure of 30.4 MI/d is above the Ofwat target of 30.0 MI/d.

Customers

Rows 43 - 48 Properties (F)

Properties

The property data shown is for the mid-year but it is based on end of year data from the billing system. The number is rising gradually as new properties are added.

Rows 50 - 53 Population (G)

Population

Total population was re-calculated for the Final WRMP 2014 and the number used in the Annual Review matches this forecast.

Rows 54 - 55 Occupancy (G)

Occupancy

Occupancy will vary from year to year and this reflects changing housing trends such as more young adults staying in the parental home.

Rows 56 - 57 Metering (H)

Meter Penetration

Meter penetration continues to increase as customers opt for a 'free' meter and new properties are added to the system.

PEAK WEEK WATER BALANCE

2017 WRMP ANNUAL REVIEW - WATER BALANCE COMPONENTS - PEAK WEEK 2016						
Water Company:	Portsmouth Water					
Number of resource zones:	One					
Year of data submission:	2017					
Row numbering in line with WRMP structure	Component	Units	DP	Data requirement	Water company total data	Confidence Grade
SUPPLY						
Resources						
1 _{AR}	Raw water abstracted	MI/d	2dp	Required	203.35	A2
2 _{AR}	Raw water imported	MI/d	2dp	Required	0	AX
3 _{AR}	Potable water imported	MI/d	2dp	Required	0	AX
4 _{AR}	Raw Water Losses and Operational Use	MI/d	2dp	Required	0	AX
5 _{AR}	Raw water exported	MI/d	2dp	Required	0	AX
5.1 _{AR}	Non potable water supplied	MI/d	2dp	Required	0	AX
6 _{AR}	Potable water exported	MI/d	2dp	Required	1.11	A2
7 _{AR}	Deployable output	MI/d	2dp	Optional	295.3	B3
Process Losses						
9 _{AR}	Treatment works losses and operational use	MI/d	2dp	Optional	5.20	B3
10 _{AR}	Outage Allowance	MI/d	2dp	Required	7.00	B3
DEMAND						
11 _{AR}	Distribution input	MI/d	2dp	Required	197.04	A2
Consumption						
23 _{AR}	Measured non household - consumption	MI/d	2dp	Required	35.86	A2
24 _{AR}	Unmeasured non household - consumption	MI/d	2dp	Required	0.47	B4
25 _{AR}	Measured household - consumption	MI/d	2dp	Required	25.17	A2
26 _{AR}	Unmeasured household - consumption	MI/d	2dp	Required	102.56	B3
29 _{AR}	Measured household - pcc	l/h/d	0dp	Required	149	B2
30 _{AR}	Unmeasured household - pcc	l/h/d	0dp	Required	191	B3
31 _{AR}	Average household - pcc	l/h/d	0dp	Required	181	B3
32 _{AR}	Water taken unbilled	MI/d	2dp	Required	2.39	B4
33 _{AR}	Distribution system operational use	MI/d	2dp	Required	0.47	B3
Leakage						
34 _{AR}	Measured non household - uspl	MI/d	2dp	Required	0.28	B3
35 _{AR}	Unmeasured non-household - uspl	MI/d	2dp	Required	0.05	B3
36 _{AR}	Measured household - uspl	MI/d	2dp	Required	1.68	B3
37 _{AR}	Unmeasured household - uspl	MI/d	2dp	Required	6.21	B3
38 _{AR}	Void properties - uspl	MI/d	2dp	Required	0.28	B4
39 _{AR}	Total mains and trunk mains leakage	MI/d	2dp	Required	21.87	A3
40 _{AR}	Total leakage	MI/d	2dp	Required	30.38	A3
41 _{AR}	Total leakage	l/prop/d	2dp	Required	96.05	A3
CUSTOMERS						
Properties						
43 _{AR}	Unmeasured household - properties	000's	3dp	Optional	206.999	A2
42 _{AR}	Measured household - properties	000's	3dp	Optional	84.212	A2
46 _{AR}	Unmeasured non household - properties	000's	3dp	Optional	1.689	A2
45 _{AR}	Measured non household - properties	000's	3dp	Optional	13.951	A2
44 _{AR}	Void household - properties	000's	3dp	Optional	6.721	B3
47 _{AR}	Void non households - properties	000's	3dp	Optional	2.628	B3
48 _{AR}	Total properties	000's	3dp	Optional	316.200	A2
Population						
50 _{AR}	Unmeasured household - population	000's	3dp	Optional	538.258	B3
49 _{AR}	Measured household - population	000's	3dp	Optional	169.494	B3
52 _{AR}	Unmeasured non household population	000's	3dp	Optional	1.500	B3
51 _{AR}	Measured non household - population	000's	3dp	Optional	12.388	B3
53 _{AR}	Total population	000's	3dp	Optional	721.640	B3
Occupancy						
55 _{AR}	Unmeasured household - occupancy rate	h/pr	2dp	Optional	2.60	A2
54 _{AR}	Measured household - occupancy rate	h/pr	2dp	Optional	2.01	A2
Metering						
57 _{AR}	Total Household Metering penetration (incl. voids)	%	2dp	Required	28.27	A2
58	Total numbers of household meters installed	000's	3dp	Required	5,270	A2

TABLE COMMENTARY**Peak Week Water Balance**Supply

Rows 1 - 7 Resources (A)

Raw Water Abstracted

2016/17 was a "normal" year and the peak week occurred in July when the recreational use of water is higher. The amount of raw water abstracted reflects this.

Raw Water Exported/Imported

There were no raw water exports or imports.

Potable Water Exports

Potable water exported represents the Bulk Supply to Southern Water.

Deployable Output

Deployable Output is calculated for "dry" conditions and has no direct link to the outturn year water balance. An allowance has been made for the loss of the Source H, the Source H, the recent licence variation at Source I and the conversion of Source U to a raw water augmentation source.

Rows 9 - 10 Process Losses (B)

Treatment Works Operational Use

Treatment Works Operational use is related to backwash water at works which is not recycled.

Outage Allowance

Outage is now based on a full statistical analysis of recorded data including Monte Carlo simulation with up to 1,000 iterations. This risk based approach assumes that no outage events last longer than 90 days and that the peak demand period occurs during June or July.

Demand

Rows 11 - 33 Consumption (C)

Distribution Input

Distribution Input has been derived from the total measured flow minus the Bulk Supply to Southern Water.

Measured Non-Household Consumption

Measured non-household consumption is taken from Portsmouth Water's billing system and Castle Water's data with an adjustment for meter under-registration and supply pipe leakage.

Water Taken Unbilled

This volume represents water taken illegally in properties that Portsmouth Water believes are "void" but are actually occupied. In addition, a small amount of water is taken legally unbilled

for fire-fighting and fire practice. It is not possible to measure these volumes so estimates are used.

Unmeasured Household Per Capita Consumption

This line is based on an estimate of the peak week per capita consumption. The outturn figure of 191 l/h/d is consistent with a “normal” summer with increased recreational water use.

All figures used in the per capita consumption calculation are assumed to be excluding supply pipe leakage but include an allowance of +2.9% for meter under-registration.

Measured Household Per Capita Consumption

The peak week per capita consumption of 149 l/h/d is consistent with a “normal” summer.

Unmeasured Non-Household Consumption

Unmeasured Non-Household Consumption is based on the measured consumption of non-household properties with ½" meters.

Distribution System Operational Use (DSOU)

Distribution System Operational Use represents water taken from hydrants for things like flushing to maintain water quality. It has a low Confidence Grade (B3) because it is based on estimates.

Rows 34 - 41 Leakage (D)

Distribution Losses

It should be noted that the Total Leakage figure has a Confidence Grade of A3. This means that the estimate is only accurate to $\pm 10\%$.

Total Leakage

Leakage was 30.4 Ml/d during the peak week following the application of an adjustment for legitimate night-time use.

Customers

Rows 43 - 48 Properties (F)

Total Properties

Property numbers are based on end of year billing data but represent a mid-year calculation.

Rows 50 - 53 Population (G)

Total Population

Total population was re-calculated for the Final WRMP 2014 and the number used in the Annual Review matches this forecast.

Rows 54 - 55 Occupancy (G)

Occupancy

Given the fixed population forecast and the outturn property numbers, the occupancy will vary from year to year. This reflects changing housing trends such as more young adults staying the parental home.

Rows 56 - 57 Metering (H)

Meter Penetration

Meter penetration continues to increase as customers opt for a 'free' meter and new properties are added to the system.