South Staffs Water

Water Resources Management Plan

Annual Review (2016)

WATER RESOURCES MANAGEMENT PLAN ANNUAL REVIEW 2015/16

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EXECUTIVE SUMMARY

- **Implementation of the 2014 Water Resources Management Plan**

  The Company has separate Water Resources Management Plans for both regions of operation; Cambridge (CAM) and South Staffs Water (SSW). This annual report relates to the South Staffs region only. However, some of our performance commitments are combined across the two regions.

  The Company has achieved its 2015/16 targets and outputs published in the 2014 Water Resources Management Plan (WRMP14) for the South Staffs region and water resources zone and has not made any changes to the plan.

  The WRMP14 did not include risks to the supply demand balance associated with Water Framework Directive legislation, and the No Deterioration principle, in accordance with the guidance from the Environment Agency. However, these issues represent substantial uncertainty and introduce significant risks to the future supply demand balance and the resilience of water supplies for customers. We continue to explore them with the Environment Agency.

  We will begin consultation on our next plan, WRMP19 during 2016-17. These risks and the implications will be considered in greater detail in the preparation of the WRMP19.

- **Levels of Service**

  The Company has not imposed a temporary use ban in the SST region within the report year and does not anticipate one within 2016/17. We have made no change to the planned level of service for temporary use bans.

- **Leakage**

  The Company has achieved its Ofwat leakage target in the SST region with an outturn total leakage figure of 69.88 Ml/d against a Performance Commitment target of 70.5 Ml/d.

  Further details of our Leakage Performance Commitment outturn are published in the 2016 ‘Annual Performance Report’ submitted to Ofwat as a public document.

- **Water Efficiency**

  Water efficiency performance is measured by Per Capita Consumption. This is a performance measure which is measured as an average across the Company's two regions of operation. The average Per Capita Consumption (PCC) outturn for 2015/16 is 129.59 ltrs/head/day against a target of 130.79ltrs/h/d. This is a good start towards our AMP6 targets for reducing average Per Capita Consumption. Per Capita Consumption for measured and unmeasured households in the South Staffs region are reported separately in the data table.

  The Water efficiency target is applicable across both regions therefore the commentary is repeated in both Annual Reviews.

  Further details of the Water Efficiency ODI and performance outturn are published in the 2016 'Annual Performance Report' submitted to Ofwat as a public document.

- **Metering**

  New household connections were 2,459 compared to a WRMP14 forecast of 2,100 and non-household connections were 170 compared to a forecast of 250.

  A total of 4044 meters were installed in 2015/16 under the domestic free meter options policy against a 2014 WRMP forecast of 5,870.

  The Change of Occupier Metering policy has been suspended following a review of effectiveness in light of a slowdown in household moves.

  A total of 6,503 household meters were installed compared to a WRMP14 forecast of 9,845 for 2015/16.

  Opportunities to work with partners to target customers who would be better off on a meter are being explored.

- **Customer Demand**

  Annual average distribution input was 3.25Ml/d higher than the prior year.

  Measured non-household consumption showed an increase of 1.20 Ml/d in demand in 2015/16 in comparison to the previous year, as a result of some economic recovery and there was a net increase in household consumption of 2.01Ml/d reflecting new connections and some seasonal demand.

- **Sustainability Reductions**

  No reductions have been made to Deployable Output during 2015/16 as a result of Sustainability Changes. However, the Company is on target for implementation of its National Environment Programme (NEP) obligations.

- **Expectations for 2016/17**

  For 2016/17 annual average demand in the South Staffs region is expected to follow a similar trend as in previous years with household and non-household demand continuing to reflect an economy that is showing gradual signs of recovery. There are some areas in the South Staffs region with significant planned development such as the Black Country, Lichfield and Burton. The Company has good working relationships with planning authorities, regularly attending workshops and holding meetings with the strategic planners and will continue to do this to keep abreast of the most recent information regarding growth expectations.

  We will continue to identify opportunities to work with housing associations and registered social landlords to promote metering to those who will benefit most from it. As part of this we will continue to work with Walsall Housing Group to expand the meters installed as part of its void maintenance programmes. Further opportunities will be explored to expand the water efficiency message amongst its 30,000 housing stock.

  For summer 2016 we are running a 'Summer demand' campaign to influence customer behaviour and water using habits during the summer. We will monitor the effectiveness of this and use this to develop our water efficiency strategy for future years.

  Leakage will continue to be a key Performance Commitment and a priority for the Company. We will continue to review new technology opportunities to aide effective and efficient leakage management throughout AMP6.

- **Forward Look**

  The final approved WRMP14 plan was published in June 2014.

  The WRMP14 does not forecast a supply demand deficit within the 25 year planning horizon; therefore major resource development or increased demand management measures are not required to meet a

supply shortfall for the period 2015-2040.

The WRMP14 demonstrates that we will continue to maintain the highest levels of security of supply to our customers ensuring that all of our customers have a plentiful supply of high quality drinking water and maintaining our proud record of not having a hosepipe ban since the drought of 1976.

There are emerging risks to licences and to the surplus supply over forecast demands. These uncertainties arise from changes to Environment Agency policy and the requirements of the Water Framework Directive. These issues represent substantial uncertainty and introduce significant risks to the future supply demand balance. We continue to explore them with the Environment Agency and to minimise the impacts in future WRMPs.

We will begin consultation on our next plan WRMP19, with customers and stakeholders during 2016-17, and this will explore the risks, uncertainties and options for the long term.

Our aim is to continue to maintain the highest levels of security of supply to our customers ensuring that all of our customers have a plentiful supply of high quality drinking water.

We will also continue to work hard to maintain leakage below the economic level, and to encourage and support our customers to be water efficient in order to manage demands.

Promoting Water Efficiency and increasing the Company's engagement with customers will continue to be a high priority over the remaining years of AMP6. This will be done through increasing partnering arrangements where possible, having a high profile at community events, offering advice and devices free of charge through various forms and channels.

1. Introduction

Following the acquisition of Cambridge Water by South Staffordshire Water, and unification on 1 April 2013, South Staffordshire Water comprises 2 geographically separate and distinct Water Resources Zones, which were unaltered from those in previous Water Resources Management Plans as a result of the merger. As the Water Resources Zones are distinctly separate, each has its own Water Resources Management Plan, and an annual review is undertaken separately for each region.

South Staffordshire Water published its current Water Resources Management Plan (WRMP14) for the South Staffs Region (SST) resource zone in June 2014, and this plan came into effect from 1 April 2015 for the period 2015/16 to 2039/40. This annual review is the first review of this current WRMP.

Since 2012, annual June return data provided to Ofwat has been replaced by annual reporting against a number of Key Performance Indicators (KPIs). The annual outturn data reported in internal and external KPIs covering the period 1 April 2015 to 31 March 2016 is used to inform this review, and the data table presented in Appendix 1 on the request of the Environment Agency. This is consistent with the latest guidance from Defra and the Environment Agency.

This review is a statutory requirement of the Water Industry Act 1991 (as amended by the Water Act 2003), which states that:

Before each anniversary of the date when its plan was last published, the water undertaker shall –

(a) review its plan; and

(b) send a statement of the conclusions of its review to the Secretary of State

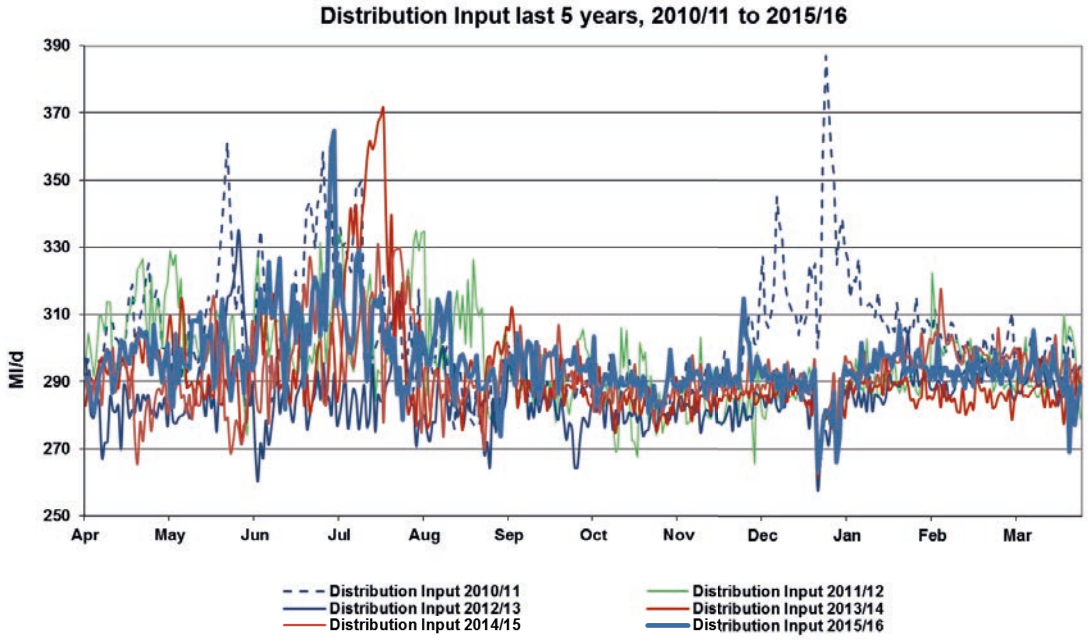
The purpose of the annual review is to identify any material changes to the WRMP, and to report on progress made in updating and implementing the plan, hence this review includes commentary on the plan effective in the reporting period and takes a forward look to what the next WRMP may include. The review has been undertaken in accordance with the latest guidance published by the Environment Agency, which advises that the following information should be contained in the annual review:

- an overall summary of the supply demand balance situation
- progress on the areas for improvement identified by Defra and the Environment Agency at the time of publication of the final WRMP

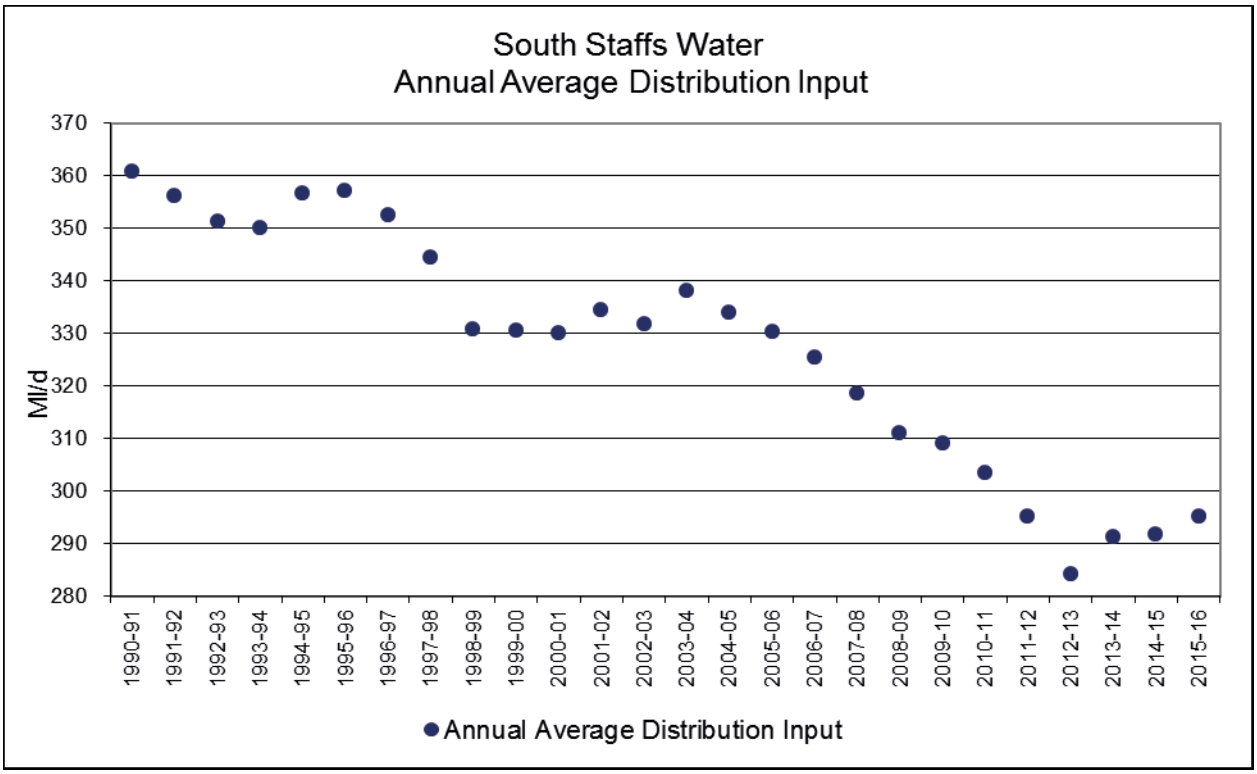
- progress with implementation of the WRMP
- changes to the components of the WRMP
- A forward look to highlight challenges, risks and milestones.
- Any new approaches or information that could affect the supply demand balance or components of the WRMP

2. Overview of 2015/16

Average distribution input for the year was 295.15Ml/d (post MLE) with a peak week demand in the week commencing 29th June 2015 of 331.31 Ml/d (MLE not applied). The daily demand profile is shown in the chart below, along with that for the previous four years. The last year with elevated summer demands was 2013/14 and that with a winter peak 2010/11. No winter peak was observed in 2015/16 as the weather was generally mild and there remained a low mains burst rate as in the previous years.



The trend in annual average distribution input between 1990 and 2016 is shown in the following chart. The significant decline over the period up to 2012 is largely as result of reductions in leakage and the economic downturn which has seen non-household demand reductions.


South Staffs Water
Annual Average Distribution Input
Ml/d
370
360
350
340
330
320
310
300
290
280
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
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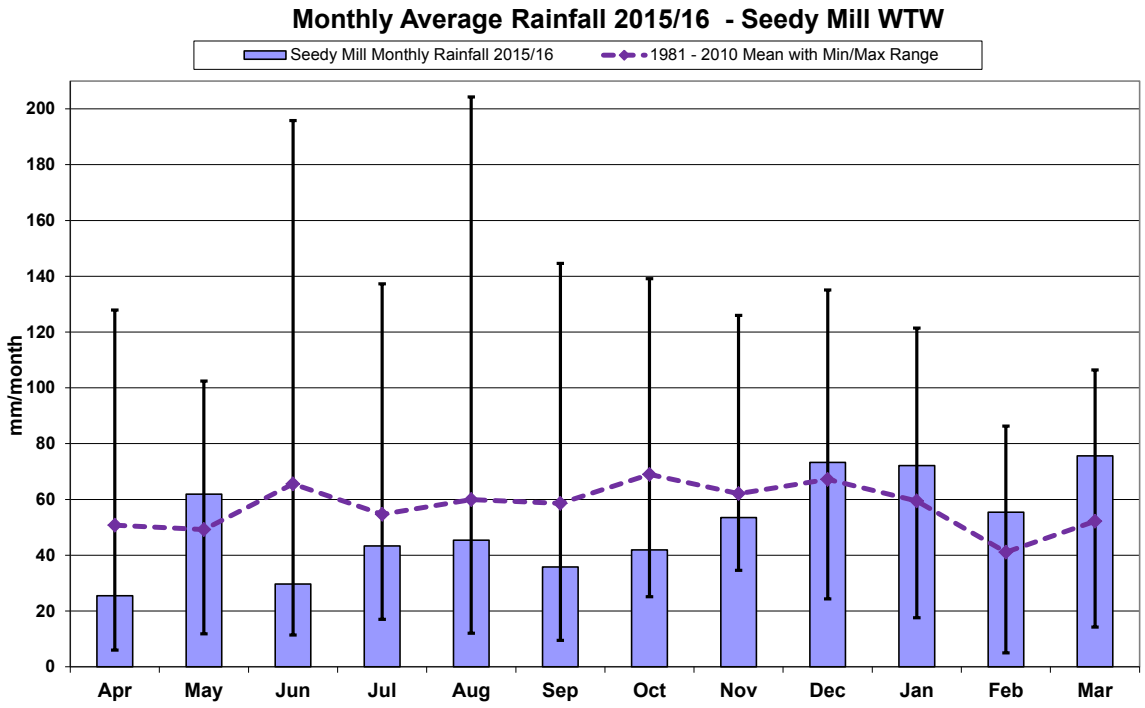
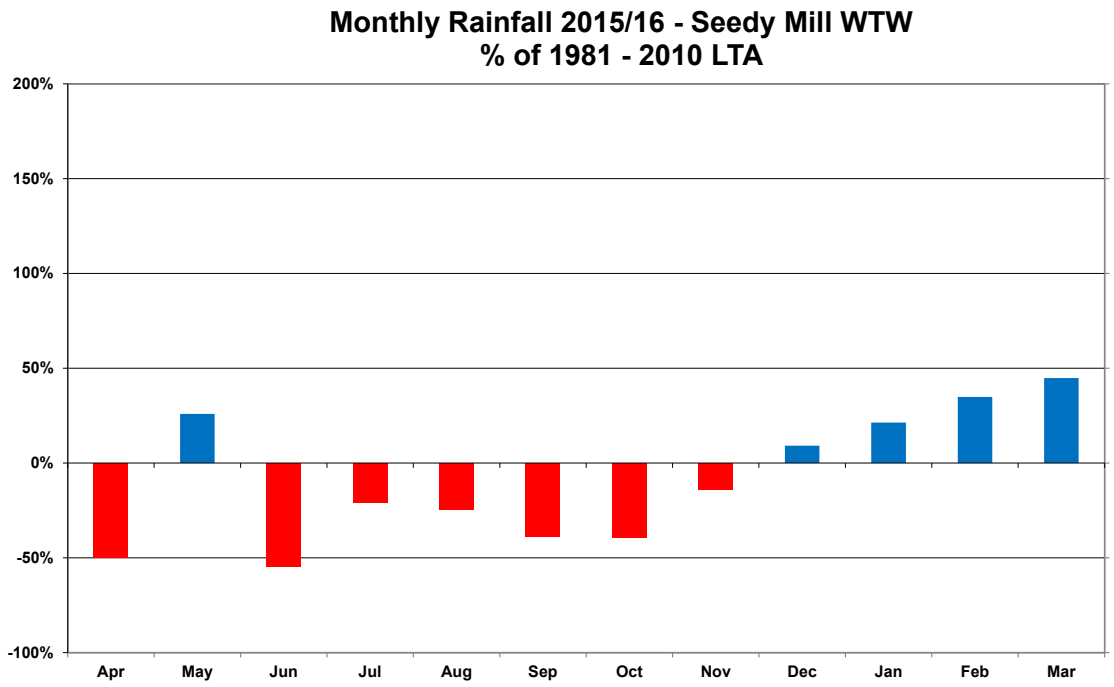
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
Annual Average Distribution Input

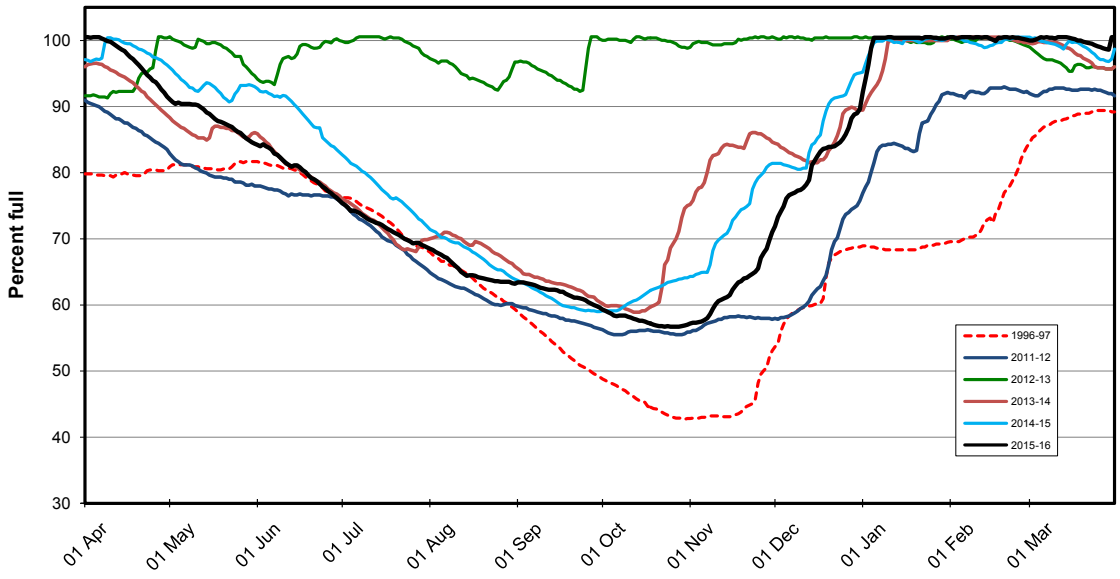

Monthly Average Rainfall 2015/16 - Seedy Mill WTW
Seedy Mill Monthly Rainfall 2015/16
1981 - 2010 Mean with Min/Max Range
mm/month
200
180
160
140
120
100
80
60
40
20
0
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar



Total annual average rainfall figures (measured at Seedy Mill WTW and shown above) show that overall rainfall for the reported year was below average with 90.8% of the long term average between 1981 and 2010. Soil moisture deficit values were generally above average over the summer and autumn. They only fell significantly in the late autumn but low SMD values persisted into the last quarter. Surface watercourses have responded rapidly to runoff from high winter rainfall. Groundwater levels have been maintained at normal or higher levels.

The graph below shows the levels in Blithfield Reservoir over the last five years together with the last severe drought in 1996/7. The recharge season for groundwater and reservoirs is generally October to March, but intense winter rainfall conditions led to the reservoir filling late and remaining full between December and March.

Blithfield levels for the last five financial years, and 1996-97



3. General Water Resources Components

The guidance from Defra and the Environment Agency suggests a format for reporting on individual items in this annual review. Items are categorised according to whether or not their reporting requirement is triggered by change. The tables below, and in following sections offer comments on all those items listed in the guidance. Additional commentary is included, where appropriate.

Item	Description	Review Criterion	Company Comment on Review
Water resource zones	Any changes to boundaries	Requirement triggered by change	The Company is a single resource zone with the risk of shortages of water being equal across the whole area of supply. There have been no changes to the Company boundary in the review period.
Levels of service	Any changes to the proposed target level of service	Requirement triggered by change	The Company forecasts a temporary use (hosepipe) ban not more than once every 40 years and an ordinary drought order (non-essential use ban) no more than once every 80 years. These levels of service were supported by customers at PR14. There have been no

			changes in the review period to these levels of service and these are confirmed in the WRMP14.
Progress against outcomes and performance commitments	Where relevant to the delivery of the WRMP, progress against achievement of customer outcomes and performance commitments of the business plan	New requirement to report on ODI progress if applicable.	The Company has a suite of performance commitments of which there are some directly related to the WRMP14; leakage and water efficiency. These are discussed in section 5.

3.1 AMP6 Performance Commitments

For the 2015-2020 business plans, the Company has agreed with the regulator Ofwat, a number of Outcome Delivery Incentives, and associated performance commitments. Of these, four are Performance Commitments relating to our outcome of environmentally sustainable operations; leakage, water efficiency (measured by household per capita consumption), biodiversity and carbon emissions.

Two of these are directly related to the WRMP, our water efficiency commitment and leakage commitment, and these are discussed in Section 5: Demand. Carbon emissions and biodiversity are indirectly linked to Supply in the WRMP as they can be impacted by water resources operations and options; and can feature as improvements that benefit flows for the NEP respectively.

The water efficiency target has been developed to apply across the 2 regions of the Company so that we are able to report on combined progress. The commitment is measured by a reducing average per capita consumption across the regions, which is the overall effect of our water efficiency and customer awareness programme. The target equates to at least the 1 litre/property /day reduction that is defined in the 2014 WRMP.

The Company leakage target is separate for each region and water resources zone, and for 2015-2020 there are financial rewards and penalties associated with achievement of the target. For this purpose, our leakage commitment in the SST region is 70.5 Ml/d, which is in line with the figure defined in the WRMP of 70.54Ml/d.

4. Supply

Item	Description	Review Criterion	Company Comment on Review
Deployable output	Any changes to deployable output	Requirement triggered by change	The Company carried out a comprehensive review of deployable output estimation in preparation for the WRMP14. The Shenstone source has been mothballed pending a strategic review of WFD requirements
Climate Change Impact on Supply	Any changes in assessment of impacts	Requirement triggered by change	Work for the WRMP14 made use of UKCP09 climate models outputs using best practice techniques. Impacts on resources have been assessed within the Aquator modelling project (Section 4.1). This indicates an increase in impacts in the most likely (baseline) scenario compared to the 2009 WRMP but the Company retains a significant supply surplus over demand which exceeds the potential impacts of climate change over the planning period to 2040. Details are in section

			4.2
Outage	Explain reasons for any outage incidents and any work being done to reduce outage	Requirement	Outage in the review period has been higher than planned and this is described in Section 4.3
Bulk supply	Explain any changes to bulk supply agreements	Requirement triggered by change	In addition to the larger Hampton Loade bulk supply the Company exports a number of small bulk supplies to Severn Trent and receives a number of very small bulk imports back across the border. There have been no changes to bulk supply agreements in the review period.
Sustainability reductions	Detail any alterations to the sustainability changes required Report on progress with implementation of sustainability changes	Requirement triggered by change Requirement	The Company has a number of sustainability reductions in its water resources management plan for AMP6. These are scheduled for agreement and/or implementation in the period and are the subject of on-going studies. Progress in the review period is described in this annual review.

4.1 Deployable Output

The Company undertook a comprehensive review of its deployable output assessment for the WRMP14 and has moved to a new Aquator software platform (previously WRAPSIM). Improvements in the new modelling approach include the incorporation of water lost during the treatment process in the model based on a revised assessment of losses.

Deployable output for the dry year annual average scenario for the WRMP14 has been estimated as 370Ml/d. This compares to 363Ml/d for the 2009 WRMP (a change of less than 2% from the last assessment). Deployable output for peak week is now assessed as 458.1Ml/d which is an increase of 7% compared to the 2009 WRMP figure. The detail of the modelling work to derive these figures is included in the WRMP14.

As part of our borehole asset maintenance programme the Company seeks to monitor the performance of its groundwater sources and to carry out works to restore site outputs and reduce outage where site performance is seen to decline. During 2015/16 improvements in site yields and reliability arising from works carried out in AMP5 were demonstrated at 4 sites. This has improved the resilience of groundwater output particularly at peak demand periods. Monitoring has indicated steady but moderate declines at 4 other sites and investigations and works have been initiated and/or scheduled to recover output. The net effect of change due to borehole asset performance is a small overall improvement in dry year annual average and peak output.

During the report year deployable output from Shenstone has been lost (6Ml/d). Water from this site requires nitrate removal. The treatment plant is at the end of its life and money was included within the Company's Business Plan to replace the plant within AMP6 along with treatment plants at Pipe Hill and Little Hay. Unfortunately, plans to proceed with this investment have been delayed due to a number of complicating factors effecting sources in this area of our supply system; as reported in last year's annual review there has been a change in the raw water quality in this area and the treatment requirements are undergoing review; and there is currently a great deal of uncertainty associated with the future allowable abstraction from some of the sources in this area due to the application of the Water Framework Directive. Therefore it is not prudent to proceed with investing several £m until these issues are clarified. As the treatment plant is unreliable it has been decided to temporarily mothball the site in the interim.

4.2 Impact of Climate Change on Supply

The Company updated its assessment of the impacts of climate change on water supply for the WRMP14. A medium to high vulnerability framework approach was adopted which involved application of Approach 2.2 (targeted sample of UKCP09 based on DI analysis).

The dry year annual average supply demand balance includes a reduction in deployable output of 5.55Ml/d by 2039/40 and 6.88Ml/d for peak week. The uncertainty around climate change impacts on supply has been included in headroom. There is no change to this assessment within the report period.

4.3 Outage

As part of the development of the WRMP14 the Company followed UKWIR best practice to assess outage allowance to be used in the supply demand balance forecasts. The dry year annual average outage allowance was modelled at 9.81Ml/d and peak week at 10.26Ml/d. Details of the outage assessment undertaken are included in the WRMP14.

Actual outage figures for the report year are reported for the average period scenario. For 2015/16 the Company has collated data from its available records of planned and unplanned outages. The reported average outage figure is 20.75 Ml/d. This compares to the planning figure of 9.81 Ml/d. This represents a continuation in elevated actual outage levels following on from the latter part of AMP5. However, levels have fallen by around 6 Ml/d since 2014/15 for two reasons. Firstly activity on planned maintenance projects fell over the year and the benefits of improvements arising from AMP5 investment were seen in fewer unplanned outage events.

As mentioned in the discussion around deployable output changes and first reported in last year's annual review, there has been a change in the raw water quality in some of our area of supply. This has led to some sources being unavailable for supply whilst treatment requirements are reviewed. In particular, Slade Heath (4.18Ml/d) is unavailable whilst treatment requirements for a previously undetected pesticide are agreed and implemented. Slade Heath is a blending source for Somerford (2.36Ml/d) and therefore this source is also temporarily unavailable. A temporary trial treatment rig is in place at Slade Heath which has undergone extensive tests to confirm compliance with water quality standards. This rig can only be used to deliver 3.5Ml/d from Slade Heath in the event of short-term elevated peak demands. Therefore, the loss of the Slade Heath and Somerford output for annual average is included within the actual unplanned outage figure.

This previously undetected pesticide was also first detected at our Pipe Hill source in 2014. The existing treatment plant there has been proven to remove this from the final water, however, all of the water must pass through the plant and it is not large enough to treat the full output from Pipe Hill. Pipe Hill is currently being operated at around 4Ml/d compared to its deployable output of 11.6Ml/d. The reduction in output is included within the actual annual average outage figure.

This pesticide problem was first detected in 2014 and its effects reported within the 2014/15 actual outage figures. These interim measures to manage and treat it during 2015/16 have led to recovery of some output from the initial loss of around 18 Ml/d.

Output from our Churchill source has also been reduced during the report year due to the requirements of a new blending scheme for the source. The output has been reduced from 10Ml/d to 7.5Ml/d as a result of this. The reduction in output is included within the actual annual average outage figure. Works are planned to restore the output within 2016/17.

Peak outage in 2015/16 was 18.3 Ml/d which also exceeds the WRMP14 planning allowance of 10.26Ml/d, although by a lesser extent than in 2014/15. The commencement of the installation of the second largest UV plant in the UK at the Seedy Mill Water Treatment Works has contributed to this by temporarily limiting the maximum output of the site. Full output is planned to be restored during AMP6.

4.4 Sustainability Reductions

The Environment Agency notified the Company of sustainability changes to include in the WRMP14, and the confirmed reductions totalling 10Ml/d were included in the plan, as indicated below.

There were no Sustainability Reductions due to be made in the reporting period. However, they will all be implemented before the end of the AMP6 period. The EA issued revised NEP tables during the period, and these include the sustainability changes which have been included in the WRMP14. The latest NEP sustainability reductions are indicated in the table below.

NEP Site Name	Sustainability Reduction	Status
Rising Brook	2.0 Ml/d	Adaptive management trial
Bourne- Black Brook (Crane Brook tributary)	2.0 Ml/d	Adaptive management trial
Checkhill Bogs	4.0 Ml/d	Likely
Blakedown Brook	2.0 Ml/d compensation release variation only	Likely

4.5 National Environment Programme

The objectives of the NEP are to confirm the extent of environmental impact of water company abstraction, identifying options for restoring good ecological status and to implement the most cost effective options. Where these exist, use is made of Environment Agency regional groundwater models. AMP6 activities include:

- Carry out further investigations to resolve uncertainty in AMP5 conclusions.
- Carry out options appraisal
- Undertake cost benefit analysis of the options
- Carry out adaptive management trials to test success of options
- Design and implement schemes
- Carry out monitoring to evaluate success of adaptive management trials and implementation schemes

The AMP6 programme has been agreed with the Environment Agency and other stakeholders based on investigations carried out in AMP5. Activities follow an agreed stage plan and are reported by the Company's hydroecological consultants via an annual progress report and/or other technical reports. Changes to the programme are agreed at annual liaison meetings. Progress has been previously reported to the EA in

April 2016 via the Environmental Performance Assessments (EPA) to align with the statutory process for sewerage companies.

The Company is studying four separate areas.

4.5.1 Rising Brook

This catchment is in the Staffordshire Trent Valley CAMS area. There are concerns over the possible influence of groundwater abstraction from Company boreholes in the Rugeley Groundwater Unit on low river flows.

The AMP5 impact assessment concluded that flow loss due to mining-related fissuring in local pond and stream beds and the depressed groundwater table frequently resulted in a dry reach, near Moors Gorse Pumping Station. This impacted on the achievement of good ecological status.

The AMP6 objectives are to carry out adaptive management trials at the Company's Moors Gorse and Slitting Mill boreholes to determine how abstraction patterns can be changed to improve flows in the upper part of the catchment whilst maintaining flows in the lower reaches.

New boreholes constructed at Slitting Mill as part of the asset replacement programme were tested in AMP5. Analysis of the pumping test results in 2015/16 indicates uncertainty around their dry year impact on Rising Brook flows. Accordingly, an additional extended (6 months) pumping test has been proposed to follow after M&E installation in the new boreholes planned for 2017/18. An alteration to the Rising Brook end date of December 2017 is being sought to enable time for the test to be completed.

An extended programme of ecological, flow and groundwater level monitoring was largely put in place in 2015/16 but land access issues have delayed installations, now expected to be completed by the end of quarter 1 of 2016/17. Plans are underway for a shut down test at Moors Gorse in Autumn 2016.

4.5.2 Bourne Brook (also known as Black Brook)

This catchment is in the Tame and Anker CAMS area. There are concerns that groundwater abstraction from Company boreholes, in the Shenstone and Lichfield Groundwater Unit, is impacting on the ecological status of the Bourne Brook water body due to baseflow depletion.

The AMP5 impact assessment concluded that flows in the Burntwood Brook and Footherley Brook are affected by the current levels of PWS abstraction but that these effects are largely compensated quantitatively by discharge from sewage treatment works (STW) within the catchment. However, the STW discharges do affect downstream water quality.

Available data suggest that the water quality of Burntwood Brook, lower Crane Brook and Footherley Brook is poor, and a reduction in water quality is observed

downstream of the STWs. High nutrient and sediment loading is also indicative of diffusive agricultural pollution in the catchment. A high level assessment performed as part of the study indicated increased groundwater-derived baseflow alone is unlikely to be sufficient to improve all water quality supporting elements to good status. In addition, accompanying measures to address point and diffuse source pollution within the catchment would be necessary to realise any benefits of additional groundwater inputs on ecology.

A technical note was also prepared in parallel for SSW for the nearby Hopwas Hayes Site of Biological Interest (SOBI) which Staffs Wildlife Trust felt could be impacted by abstraction from the Hopwas groundwater source. The EA and SSW visited the site in February 2015 with Staffs Wildlife Trust and it was concluded that none of the water features present are groundwater-dependent and so no further action was required regarding the Hopwas source.

The AMP6 objectives for the Bourne Brook catchment are to carry out adaptive management trials to augment flows and improve the ecology of the Crane Brook using groundwater from the Company's mothballed site at Sandhills. It is also planned to carry out signal tests at other sites in the catchment to determine what operational regime best avoid future deterioration of the ecological status of nearby streams.

An extended programme of ecological, flow and groundwater level monitoring was agreed and initiated in 2015/16. Land access issues have delayed installations, now expected to be completed by the end quarter 1 of 2016/17. An extended signal test was carried out at the Shenstone site during 2015/16. A flow and groundwater level monitoring network was installed around Little Hay to evaluate a signal test planned for early in 2016/17. Land access and engineering designs have been put in place for an augmentation trail of the Crane Brook in late summer 2016. This will use groundwater from boreholes at the mothballed public supply source at Sandhills.

4.5.3 West Midland Sherwood Sandstone (WMSS) groundwater body

This is included in the Worcestershire Middle Severn (WMS) CAMS area. There are concerns over groundwater abstraction from South Staffs Water and Severn Trent Water boreholes in the WMS Groundwater Unit affecting the Water Framework Directive (WFD) Status of a number of Sites of Special Scientific Interest and the good ecological status both of individual surface water bodies and of the groundwater body as a whole.

Blakedown Brook

The AMP6 impact assessment for Blakedown Brook concluded that reductions in groundwater levels are causing reductions in stream flows because of a combination of reduced baseflow and stream leakage into the underlying aquifer. Macroinvertebrate data were found to indicate that the sites on Blakedown Brook are subject to organic pollution and nutrient enrichment and water quality is now

considered a significant issue. This could partly be due to the discharges from nearby STWs particularly during low flows. There are many conflicting issues in the catchment (including crayfish, impoundments and modifications, rural and urban discharges) but improving the quality of the water in the main watercourse is likely to result in the biggest benefit.

The AMP6 objectives for the Blakedown Brook catchment are to carry out further monitoring to better understand the upper catchment, and to carry out advanced feasibility on options to improve water quality.

Further investigations were agreed and largely implemented in the upper catchment in 2015/16 although these have also been delayed by land access issues. An updated review of EA monitoring installations shows further recovery in groundwater flows and river flows across the catchment and in the Hurcott and Podmore SSSI which is encouraging. However the impact of Churchill reduced output needs to be better understood. As a consequence of sustained increase in river flows the reduced use of Hagley Sewage Treatment pumpback is to be investigated in 2016/17 and a programme of additional targeted water quality monitoring has been agreed.

Checkhill Bogs

The impact of our abstractions on **Checkhill Bogs** Site of Special Scientific Interest (SSSI) were first investigated during the AMP3 period with further monitoring during the course of the AMP4 and AMP5 periods. In AMP5, a desk study was also undertaken of the larger **Philley/Spittle Brook** catchment. The December 2014 Philley Brook report concluded that the condition of the SSSI was the principal reason for the failure of the water body as a whole. Measures taken to improve the status of Checkhill Bogs SSSI should therefore help to ensure that Philley Brook achieves Good Ecological Status.

The AMP6 objectives are to ensure a scheme is in place to enable Checkhill Bogs SSSI to achieve a favourable conservation condition (as defined by Natural England), and to ensure downstream flow measures are taken to enable good ecological status is achieved in the Spittle Brook. Also to ensure further feasibility work is used to refine the objectives, specifically identifying areas of the SSSI to focus on and identifying targets to assess the success of the scheme.

During 2015/16 the Company has trialled the use of small timber dams in Unit 1 of the site. These have been effective during the winter high flow period and will be further evaluated in summer periods during 2016/17. Further monitoring installations have been installed in Units 2 and 3 in preparation for augmentation trails in the lower part of the site over the summer period. The future use of on site timber for check dams has been discussed extensively with Natural England to determine a sustainable management regime going forward. Design work on a groundwater augmentation scheme is to commence thereafter.

4.5.4 Blithfield Reservoir and Nethertown Fish Pass

The EA undertook further investigations during AMP5 to improve the evidence supporting conclusions from an initial Stage 2 Heavily Modified Water Body Investigation. This included installation of a fish counter at Nethertown weir, further ecological and morphological surveys to look at the impacts of sediment and desk top analysis of the flow regime. This concluded that not all mitigation measures were in place to allow this water resources supply system to achieve good ecological potential.

The AMP6 programme is to carry out further investigations to understand the processes contributing to sedimentation and fish passage along the lower Blithe, to carry out feasibility studies for the necessary engineering works for changes to fish passage, and compensation flow regimes, where possible evaluated through trials. The AMP6 objective is to identify cost effective options to achieve good ecological potential for implementation at latest during AMP7.

Additional ecological monitoring has been undertaken during 2015/16 which represents the fifth year of monitoring data. In 2016/17 detailed sediment, morphology and fish habitat surveys are planned for the Lower Blithe with extended desk study analysis of this and previous datasets. This will advise the design of trials and commencement of review of options e.g. compensation regime changes.

5. Demand

Item	Description	Review Criterion	Company Comment on Review
Demand forecasting	Highlight and explain any changes to the demand forecast, including population and property forecasting.	Requirement triggered by change	Demand forecasts were comprehensively revised for the WRMP14. No revision appropriate.
Per capita consumption (pcc)	Actual PCC	Requirement	Actual PCC over the year is discussed in section 5.2
	PCC forecasts	Requirement triggered by change	The PCC forecast has been revised for the 2014 WRMP for the period from 2015. These forecasts are lower than previous. Details are included in the WRMP14 and not repeated here.
Metering	Update on progress with household metering.	Requirement	The Company has continued with its metering policies and has installed 6,711 additional meters in the report year. Progress with metering is described in this annual review.
Leakage	Update on progress with leakage management and reductions	Requirement	Total leakage for 2015/16 is 69.88 Ml/d compared to a target of 70.5Ml/d. Progress with leakage reductions is described in this annual review.

Water efficiency	Update on progress with Water Efficiency	Requirement	The water efficiency strategy is applied across both regions of operation. It is described in section 5.6

5.1 Key Demand Features

Distribution input for 2015/16 was 295.15Ml/d which is 3.25 Ml/d higher than the prior year (291.90Ml/d). The breakdown of the variance in the overall Distribution Input compared to the prior year is set out in the table below.

Component	**Variance to 2014/15**
Distribution losses	-0.42Ml/d
Billed unmeasured household consumption	-2.11Ml/d
Billed measured household consumption	+4.12Ml/d
Billed measured non-household consumption	+1.20Ml/d
Billed unmeasured non-household consumption	-0.09Ml/d
Miscellaneous	+0.55Ml/d
Overall variance in Distribution Input to 2014/15	+3.25Ml/d

Distribution losses have reduced, there has been a net increase in household consumption and a net increase in non-household consumption. Miscellaneous water use has increased as a result of an increase in reservoir cleaning activities and operational water use.

5.2 Population updates

The Company's total household population forecast was reviewed and revised using latest available census data for the WRMP14. Details of this are included in the WRMP14 and not repeated here.

For the WRMP14 the Company committed to conducting a bi-annual household water use and occupancy survey for both South Staffs region and Cambridge region. The first of these was undertaken in 2015. The next survey is planned for spring 2017.

The survey proportionally targeted measured and unmeasured customers to determine water using habits and occupancy rates for different groups of customers in both regions. The occupancy results for the South Staffs region are in the following table and are in line with previous results.

Customer Class	Flat	House	Average
Metered	1.5	2.4	2.31
Metered - Optant	1.3	1.9	1.83
All metered (metered + metered – optant)	**1.4**	**2.3**	**2.21**
Unmeasured	**1.6**	**2.6**	**2.46**

5.3 Unmeasured Per Capita Consumption

The Company's unmeasured household consumption monitor and estimating model has been developed according to industry best practice as defined in 'Best Practice for Unmeasured Per Capita Consumption Monitors' (99/WM/08/25), and 'Leakage Methodology Review: Variations in Per Capita Consumptions'. The monitor has been in use now for a number of years and gives the Company a comprehensive number of samples to ensure that unmeasured per capita consumption (uPCC) estimates are robust.

The monitor includes 105 District Metered Areas (DMAs) where more than 65% of the demand in each area is from unmeasured households and where there is minimal non-household demand. A minimum requirement of 270 days accurate flow data is required for each DMA. Where there are less than 270 days of flow data each area is reviewed to determine if the data is still valid. Where the data is found to be flawed or inconsistent it is excluded from the analysis.

A total of 88 DMAs are included in the 2015/16 estimate and each area's flow and pressure data has been checked and verified. The uPCC derived from the monitor for the report year is 132.8 l/h/d (+/- 4.47%) or 132.70 l/h/d post MLE. The Company continues to use a consultant to independently review the uPCC estimate each year.

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5.4 Metering

The Company included the following metering policies in the WRMP14:

- Change of occupier metering – Commenced in April 2010 applicable to property moves where a change of occupation has been confirmed.
- Free meter policy – domestic and commercial customers can opt for a meter free of charge with a 12 month reversion period for domestic customers

- New supply policy – all new household and non-household properties are metered.
- Sprinkler metering policy – domestic customers wishing to use unattended garden watering devices must be metered.
- Domestic customers with a swimming pool with capacity greater than 10,000 litres must be metered.

The following table compares the actual number of household meters installed against the WRMP14 forecasts.

Households	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**
Forecast No. of Optants	**5,870**	**5,850**	**5,825**	**5,755**	**5,700**
Actual no. of Optants	**4,044**				
Forecast No. of new supplies	**2,100**	**2,200**	**2,300**	**2,300**	**2,300**
Actual no. of new supplies	**2,459**				
Forecast No. of CoOM	**1,875**	**1,925**	**1,975**	**2,750**	**2,150**
Actual no. of CoOM	**0**				
Total Forecast Meters	**9,845**	**9,975**	**10,100**	**10,805**	**10,150**
Total Actual Meters	**6,503**				
Forecast meter penetration	**34.2%**	**35.9%**	**37.5%**	**39.2%**	**40.9%**
Actual meter penetration (at year's end)	**35.1%**				

Overall the number of household meters installed in the year was significantly lower than the WRMP14 forecast. This is due to the suspension of the Change of Occupier Metering policy and lower than expected optants.

Following the Company's AMP6 Determination the Company reviewed its metering strategy reflecting on the effectiveness of the change of occupier metering policy. The AMP6 proposal was for change of occupier metering to continue at modest levels throughout the period. However, in light of the reduced opportunities to implement this strategy it was decided to step back from implementing the policy in the short-term. The Change of Occupier Metering policy will be retained but will not be actively pursued.

Actual meter penetration is greater than forecast for 2015/16 despite the lower then forecast number of meter installations due to changes in the number of actual meters installed in the years between when the forecast was made and now.

The number of non-household meters installed in the period is in line with the WRMP14 forecasts as shown in the following table.

Non - Households	2015/16	2016/17	2017/18	2018/19	2019/20
Forecast No. of Optants	25	25	25	25	25
Actual no. of Optants	38				
Forecast No. of new supplies	175	175	200	200	200
Actual no. of new supplies	170				
Total Forecast Meters	200	200	225	225	225
Total Actual Meters	208				

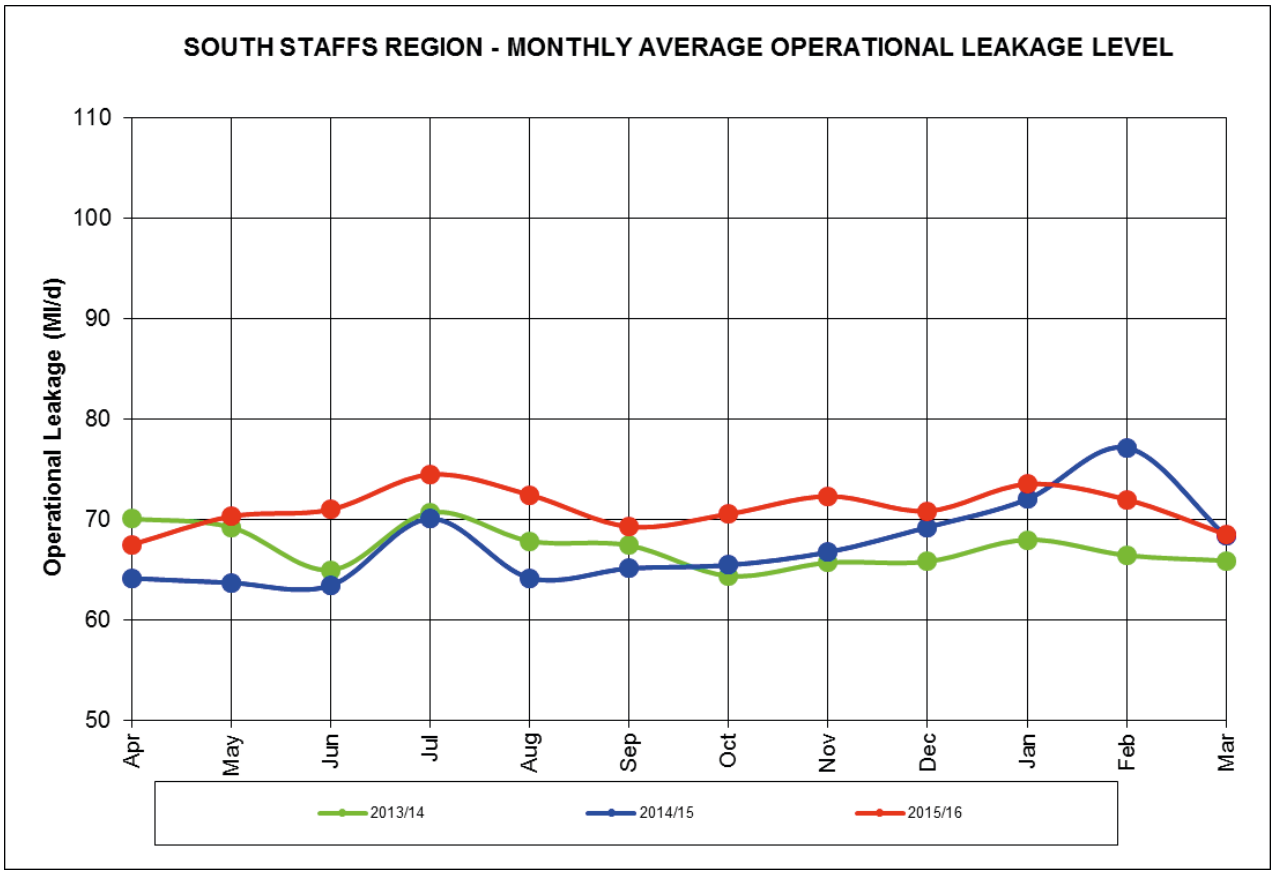
5.5 Leakage

The annual average total leakage reported for 2015/16 is 69.88 M/l/d compared to the AMP6 leakage target of 70.5Ml/d. This represents a continued strong performance to maintain leakage below the performance level.

From 2015/16 the Company has agreed a performance commitment of 70.5Ml/d for leakage, which is marginally below the leakage allowance of 70.54Ml/d included in the WRMP14.

Further details of the Leakage ODI and performance outturn are published in the 2016 ‘Annual Performance Report’ submitted to Ofwat as a public document.

Operational Leakage Levels



In addition to the above operational tracking, using distribution input meters, additional monitoring is undertaken using DMAs. These independent data sets confirm the same trends, giving improved confidence in the results.

Supply Pipe Leakage

The 2014/15 and 2015/16 allowances are shown below.

SPL	2014/15	2015/16
Underground SPL unmeasured households	36.49 l/prop/d	38.19 l/prop/d
Underground SPL ext. metered households	27.59 l/prop/d	29.30 l/prop/d
Underground SPL other metered households	36.49 l/prop/d	38.19 l/prop/d
Underground SPL void properties	36.49 l/prop/d	38.19 l/prop/d

The Company's supply pipe leakage estimates are based on UKWIR project 05/WM/08/32 (Towards Best Practice for the Assessment of Supply Pipe Leakage) produced by Tynemarch Systems Engineering Ltd.

5.6 Water Efficiency

The Company's Water efficiency strategy (WES) and delivery plan for AMP6 has been designed to build on the successes of AMP5 and to incorporate initiatives that increase the Company's customer engagement and supports customers to change water using behaviour, reduce waste and become water efficient. The WES is applied across both regions of operation with some regional variation to reflect the differing demographics and supply demand position. We continually review our WES to reflect successes and in light of developing best practice in the UK and globally.

The key aspects of the strategy for 2015/16 are summarised in the following text:

- The WES includes engaging with the Metering Strategy Group to develop initiatives to promote metering particularly targeted at those who might benefit from being on a meter.

- An informal partnering agreement has been established with Walsall Housing Group (WHG) to support mutual corporate goals. WHG are keen to achieve 'beyond compliance' in its carbon reduction targets and sees SSW as a perfect partner to support water efficiency initiatives, debt management and asset improvements. SSW is keen to maximise metering with WHG as a mutual benefit, increasing meter penetration, reducing water waste and developing a positive relationship with WHG tenants and tackling fuel poverty.

- The annual bill insert promotion has focused on the bathroom during 2015/16. The 'Bathroom Blitz' promotion began on the 1st December 2015 and continues into 2016/17. It is focused on where water and energy can be saved in the bathroom. Customers have been directed to links where how devices can be requested free of charge and where guidance and information can be accessed. The promotion has been very successful to date and is ongoing.

- A recent Company study on the volume and occurrence of loss of water from toilet cisterns (leaky loos) has reinforced previous findings by the UK Water Industry Research body. Meter Readers and Customer Liaison Officers who deal with 'high consumption' bills have been given training to investigate leaky loos as part of their customer side investigations.

- A redesign of WES literature and information to meet a variety of needs and situations is underway. For example a leaflet for meter optant installs is to be redesigned 'welcoming' the customer to their meter, giving metering information and promoting WE. The leaflets are to be re-designed internally by the 'Comms Team' and will support the wider communications strategy.

- In order to develop water efficiency and metering strategies and initiatives that focus on customers who would be most likely to be positively engaged a socio-economic and demographic household postcode data base model has been produced. This will support functions across the business to segment the customer base to better enable targeted communications.

- The Company has increased its outreach customer support by attending a number of eco/environmental awareness days with customers. This has increased the Company's exposure with its customers, raising its community profile and further promoting water efficiency.

- North West Cambridge water harvesting project is a dual supply project between SSW (Cambridge region) and Cambridge University. This project is seen as a ground-breaking project which has moved away from a trial to full role out installation. The project was runner up in the Waterwise 2016 Water Efficiency Awards 'Built' environment category and was reported on in the Water UK Demand Management publication. The project is the first of its scale and includes 3000 homes, 2000 post-graduate student rooms, a supermarket, hotel and primary school, as well as other community facilities. The 150-hectare site is self-contained and incorporates its own grey water and re-cycling system which will feed toilets, clothes washing and garden watering. The water efficiency benefit is to reduce the average per capita consumption to 80ltrs per person per day. The development will be monitored and measured to gauge if this level of consumption (Code for Sustainable Homes 5) can be achieve and if it is sustainable. This project is a key aspect of Company's WE.

- The Company has continued to record the volumetric savings from the various distributions of devices. During 2015/16 the number of devices distributed in the South Staffs region totalled 19,158 saving 0.49Ml/d and in the Cambridge region the devices distributed were 7,279 saving 0.17Ml/d, giving an overall combined total of 26,437 saving 0.66Ml/d.

The Company's water efficiency performance commitment was to deliver a reduction in PCC across both regions measured as an average overall PCC. The combined outturn for 2015/16 is 129.59 ltrs/head/day against a target 130.79 ltrs/h/d.

2016/17 will see the continuation of the majority of these initiatives and the introduction of an enhanced 'Summer Water Use' campaign aimed at raising 'brand awareness' and highlighting the importance of reducing waste in the garden during the summer when rain fall tends to be lower and discretionary demand higher. The effectiveness of this campaign will be reviewed and the outcomes used to further develop the WES for future years.

6. Headroom and Options

Item	Description	Review Criterion	Company Comment on Review
Target Headroom	Set out any changes to the target headroom forecast	Requirement triggered by change	No changes have been applied to headroom allowances for the WRMP14.
Options	Set out any changes to the options chosen.	Requirement	The WRMP14 did not require any interventions due to a supply demand deficit.
	Set out any changes to the options chosen.	Requirement triggered by change	There were no options identified in the WRMP14.

6.1 Target Headroom

A comprehensive review of the calculation of target headroom was undertaken for inclusion in the WRMP14. The 2003 UKWIR best practice methodology was followed. The detail of this assessment is included in the WRMP14.

Dry year annual average target headroom for 2015/16 taken from the WRMP14 is 7.73Ml/d. Critical period target headroom for 2015/16 taken from the WRMP14 is 8.71Ml/d. Target headroom is less than 3.5% of dry year and less than 3% of peak week demand throughout the planning period.

It should be noted that whilst target headroom values have not increased for the WRMP14 a significant element of climate change risk has been included in the baseline supply demand forecast (up to 5.6 Ml/d in a dry year and 7.0 Ml/d in a peak week by 2039/40). If this element of uncertainty were to have remained in headroom then target headroom would undoubtedly have increased.

2015/16 actual headroom remained significantly above target headroom. Accordingly there were no concerns over the supply demand situation, and the Company reported a Security of Supply Index of 100% for the period.

7. Conclusions

This annual review confirms that 2015-16 overall was a fairly average year in terms of supply and demand. Although rainfall was just below average in total for the year, peak demands in summer were relatively modest and the mild winter meant that no exceptional leakage events occurred. There were no concerns over supplies, with high groundwater levels at drought indicator sites reflecting a similar outlook across the region.

The Company has continued to work hard to meet its Performance Commitments for leakage and water efficiency within the year.

Unplanned outage has continued to exceed planned allowances as a result of significant water quality events in the previous year. Underlying trends are for a reduction in unplanned events as a consequence of asset investment in AMP5. Moreover significant investment in new treatment processes is underway to largely restore outputs by AMP7.

Deployable output has remained therefore largely as forecast when the temporary losses due to water quality issues are taken into account. There have been local increases in site resilience and reliability as a result of AMP5 maintenance as well as minor declines due to asset age at sites where maintenance is scheduled for a future date. The exception is the Shenstone site where the extent of water quality issues at the site has meant that investment at the site is no longer viable given uncertainty over enactment of the Water Framework Directive and the site has been indefinitely mothballed.

The reported actual figures included in the table in Appendix 1 for 2015/16 are in general consistent with the WRMP14 forecasts for the period, and there is no material driver to change any of the forecasts in the WRMP14 for future years.

8. Forward Look

Although 2015/16 is the first year that the WRMP14 is in effect, planning for the next plan WRMP19 has already begun, and pre consultation is expected to commence in 2016/17.

There are a number of uncertainties arising from changes to the WRMP guidelines and as a result of changes in policy and the requirements of the Water Framework Directive that will need to be addressed in the next WRMP, and could impact the available surplus in supply over forecast demand.

8.1 Uncertainty

The WRMP14 was produced in accordance with the current Water Resources Planning guidelines, which state that uncertainty around time limited licences and unknown potential sustainability changes cannot be included.

The major area of uncertainty concerns implementation of the 2000 Water Framework Directive. This process is on-going and rules and regulations are being added to or amended on an annual basis ahead of the final compliance date in 2027. Of particular concern has been the interpretation and guidance of the “No Deterioration” requirement and the interpretation that a failure of the Groundwater Body Water Balance Test constitutes failure of the requirement to achieve good status. This poses a significant risk to the resilience of public water supplies without significant investment, more so given the challenge to all water companies simultaneously and the consequent reduction to tradable resources.

We have expressed these concerns to the Environment Agency and are seeking clarity on the areas where they have genuine concern over environmental impacts to the surface water environment so that these can be addressed through the NEP process. We have also requested and not received the data underlying their assessment for groundwater body deficits. Until such time as the regulatory framework is clarified, there remains an unquantifiable long term risk to supplies.

We will continue to work with the Environment Agency to understand this and minimise the impact of this on the WRMP and will continue to review annually.

These uncertainties will be examined during the preparation of the next WRMP, and any significant changes that can be incorporated into the current plan, reported in subsequent annual reviews.

8.2 Outage

Actual outage outturn in the early years of AMP6 is likely to exceed the allowance determined for the WRMP14 largely as a result of planned works relating to nitrate and pesticide treatment plant. As noted earlier, the discovery of a previously undetected pesticide during 2014 has resulted in prolonged unplanned outages at a number of sites for which remedial plans are in the process of being developed. Contingency measures are in place to defer maintenance and install temporary treatment in advance of the permanent solution in the event of dry weather impacts on supply or demand.

8.3 Deployable Output

The indications are that our investment in borehole asset maintenance has increased the resilience of the sites where we invested in AMP5. This assessment will be reviewed in preparation for the next water resources plan (WRMP19). The drivers for this to date are turbidity and the bacteriological quality of the raw waters from these old borehole supplies and this work is projected to continue this AMP and in the medium term through AMP7 and AMP8.

The Company is currently undergoing a major review of its surface water treatment works at Seedy Mill and Hampton Loade with the aim of maintaining existing output via refurbished and/or new treatment plant.

During AMP6 we anticipate to agree and or implement a number of environmental schemes under the National Environmental Programme. The final design of these schemes is the subject of on-going intensive study as outlined in Section 4. Nevertheless we anticipate and have planned for local reductions in average abstraction with the objective of producing tangible benefits to the surface water ecology. Where possible the associated abstractions will continue to be operated in a flexible way to provide resilience in the event of short term outage events or drought but this may not always be possible without impacting the local water feature, requiring investment elsewhere.

ANNUAL RETURN - WATER BALANCE COMPONENTS

Issued April 2016

Water Company: South Staffordshire Water - South Staffs Region
Number of resource zones: 1
Year of data submission: 2015/16

(Delete/insert columns appropriate to the number of resource zones)

Row numbering in line with WRMP structure	Component	Units	DP	Data requirement	Resource zone 1 data	Water company total data	Free text
	SUPPLY						
	Resources						
1_{AR}	Raw water abstracted	Ml/d	2dp	Required	298.84		
2_{AR}	Raw water imported	Ml/d	2dp	Required	0		
3_{AR}	Potable water imported	Ml/d	2dp	Required	0.04		
4_{AR}	Raw Water Losses and Operational Use	Ml/d	2dp	Required	1.45		
5_{AR}	Raw water exported	Ml/d	2dp	Required	0		
5.1_{AR}	Non potable water supplied	Ml/d	2dp	Required	1.16		
6_{AR}	Potable water exported	Ml/d	2dp	Required	1.12		
7_{AR}	Deployable output	Ml/d	2dp	Optional	376.29		
	Process Losses						
9_{AR}	Treatment works losses and operational use	Ml/d	2dp	Optional	18.43		
10_{AR}	Outage experienced	Ml/d	2dp	Required	23.39		
	DEMAND						
11_{AR}	Distribution input	Ml/d	2dp	Required	295.15		
	Consumption						
23_{AR}	Measured non household - consumption	Ml/d	2dp	Required	50.64		
24_{AR}	Unmeasured non household - consumption	Ml/d	2dp	Required	2.61		
25_{AR}	Measured household - consumption	Ml/d	2dp	Required	51.15		
26_{AR}	Unmeasured household - consumption	Ml/d	2dp	Required	117.02		
29_{AR}	Measured household - pcc	l/h/d	0dp	Required	120.77		
30_{AR}	Unmeasured household - pcc	l/h/d	0dp	Required	132.80		
31_{AR}	Average household - pcc	l/h/d	0dp	Required	128.89		
32_{AR}	Water taken unbilled	Ml/d	2dp	Required	3.20		
33_{AR}	Distribution system operational use	Ml/d	2dp	Required	1.45		
	Leakage						
34_{AR}	Measured non household - uspl	Ml/d	2dp	Required	0.80		
35_{AR}	Unmeasured non-household - uspl	Ml/d	2dp	Required	0.11		
36_{AR}	Measured household - uspl	Ml/d	2dp	Required	5.81		
37_{AR}	Unmeasured household - uspl	Ml/d	2dp	Required	13.27		
38_{AR}	Void properties - uspl	Ml/d	2dp	Required	0.81		
39_{AR}	Total mains and trunk mains leakage (Distribution Losses)	Ml/d	2dp	Required	49.08		
40_{AR}	Total leakage	Ml/d	2dp	Required	69.88		
41_{AR}	Total leakage	l/prop/d	2dp	Required	119.46		
	CUSTOMERS						
	Properties						
43_{AR}	Unmeasured household - properties	000's	3dp	Optional	347.565		
42_{AR}	Measured household - properties	000's	3dp	Optional	185.944		
46_{AR}	Unmeasured non household - properties	000's	3dp	Optional	2.988		
45_{AR}	Measured non household - properties	000's	3dp	Optional	27.41		
44_{AR}	Void household - properties	000's	3dp	Optional	16.922		
47_{AR}	Void non households - properties	000's	3dp	Optional	4.171		
48_{AR}	Total properties	000's	3dp	Optional	584.999		
	Population						
50_{AR}	Unmeasured household - population	000's	3dp	Optional	881.208		
49_{AR}	Measured household - population	000's	3dp	Optional	423.527		
52_{AR}	Unmeasured non household population	000's	3dp	Optional	3.02		
51_{AR}	Measured non household - population	000's	3dp	Optional	14.00		
53_{AR}	Total population	000's	3dp	Optional	1,321.750		
	Occupancy						
55_{AR}	Unmeasured household - occupancy rate	h/pr	2dp	Optional	2.54		
54_{AR}	Measured household - occupancy rate	h/pr	2dp	Optional	2.28		
	Metering						
57_{AR}	Total Household Metering penetration (incl. voids)	%	2dp	Required	34.90%		
	Total numbers of household meters installed	000's	3dp	Required	6.503		