

AFW Delivering Outcomes for Customers

Appendices

March 2019



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Appendix OC.A1.1

**Action refs AFW.OC.A1; AFW.OC.A2; AFW.OC.A3,
AFW.OC.A6**

**PR19 resilience & environmental bespoke commitments working
group minutes (Nov 17)**



PR19 Resilience and Environment Bespoke Commitments - working group			
Date	20th Nov 2017		
Time	10.30 – 13.00		
Venue	G7, Hatfield		
Purpose of meeting	<ul style="list-style-type: none"> Σ To review the PR14 performance commitments and challenge whether considered as bespoke commitments or in the areas of resilience and environment Σ To discuss options for “new” bespoke commitments for resilience and the environment. 		
Attendees	<table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;"> Affinity Water Σ Sarah Clark Σ Anne Scutt Webber Σ Arnaud David Σ Becky Pointer Σ Mike Pocock () Σ </td> <td style="vertical-align: top; padding-left: 20px;"> CCG members: Σ Jon Sellars Σ David Cheek Σ Caroline Warner (by phone) </td> </tr> </table>	Affinity Water Σ Sarah Clark Σ Anne Scutt Webber Σ Arnaud David Σ Becky Pointer Σ Mike Pocock () Σ	CCG members: Σ Jon Sellars Σ David Cheek Σ Caroline Warner (by phone)
Affinity Water Σ Sarah Clark Σ Anne Scutt Webber Σ Arnaud David Σ Becky Pointer Σ Mike Pocock () Σ	CCG members: Σ Jon Sellars Σ David Cheek Σ Caroline Warner (by phone)		
Apologies	<ul style="list-style-type: none"> Σ James Jenkins, Richard Haynes, John Rumble, Scott Oram, Chris Offer Σ 		
Circulation	As above		
Date of next meeting	Tbc		

Minutes

ID	Agenda item / subject / note / action	Responsible for Action
1.	<p><u>Welcome and introductions</u> DC and CW were welcomed to the group and introductions were made around the table.</p> <p>MP opened the meeting, re-iterating the Company’s strategy to keep a simple suite of performance commitments.</p> <p>ASW asked if there were any queries on the progress/actions from the last meeting, in particular from those who were unable to attend. DC was happy, CW would like to have had more time to read the minutes but was happy to carry on and ask for any clarification along the way.</p> <p>ASW confirmed that the outcome of the previous meeting had been fed back to the Director of Asset Strategy (Mike Pocock) and the Director of Regulation and Corporate Affairs (Chris Offer) and both were in full support of the approach being taken and the development of a commitment around pilot projects.</p> <p>Ofwat expect PR14 commitments to be carried forward. AWL would like to explore which may be duplicated by Ofwat’s PR19 common commitments and which could fit with Ofwat’s expectations of bespoke commitments. AWL presented this in the paper and would like members’ views on those which should be continued into PR19.</p> <p>CW felt that there were some measures (security of supply) that AWL were currently</p>	



ID	Agenda item / subject / note / action	Responsible for Action
	<p>failing and therefore Ofwat would expect these to be continued as they would want to see evidence that things have been put in place to improve.</p>	
<p>2.</p>	<p><u>Metrics</u></p> <p>AWL took an action to review the current metrics reported in the categories of resilience and the environment. It was clear that there are many measures currently reported and many more not listed in the tables presented at the meeting.</p> <p>It was agreed that the breadth of the term resilience made this a complex area to review. DC mentioned the 4 R's model. A discussion was held around how such a wide scope could potentially lead to a composite score which was something that Ofwat did not want.</p>	
<p>3.</p>	<p><u>Review of PR14 Performance Commitments</u></p> <p>SC took the group through section 3 – 14 of the paper. The PR14 commitments relating to resilience and the environment were identified. These were then mapped to Ofwat's common commitments for PR19.</p> <p>Resilience</p> <p>The two commitments which do not map exactly to the PR19 common commitments were discussed in detail.</p> <p><u>Supply interruptions > 12 hrs</u></p> <p>The PR14 performance commitment was based on customer feedback, that shorter interruptions were easier to cope with but when they became longer then this caused much more disruption. AWL have failed to meet the target under this performance commitment in AMP6 to date, therefore there was consensus that this should be maintained to drive improvement and would run alongside the common commitment of minutes/property. This will also be tested again with customers.</p> <p>CW noted that AWL had presented a plan for improvement to CCW with 45 action points, however it was felt that the report lacked content, MP assured that this is being addressed.</p> <p><u>Water Available for Use</u></p> <p>Ofwat's common commitment in this area is unplanned outage. The calculation to determine the water available for use is influenced by the outage and sustainability reductions. It was therefore agreed that if both measures are reported as PCs the calculation was not going to add any more value and therefore could be dropped.</p> <p>Discussions were held around some of Ofwat's common commitments:</p> <ul style="list-style-type: none"> ∑ Leakage - Ofwat are driving for 15% reduction in PR19, however analysis shows that 11% achieves the economic level, therefore the cost to increase to 15% will be tested with customers. CW mentioned that Ofwat is expecting the Companies to demonstrate value beyond 2025. ∑ Average Water Use – this is the same measure as PR14, however there is some uncertainty as to whether Ofwat will continue to use the normalised figure. CW asked why the Company thought that AWL had the highest PCC in the UK. It was felt to be generally due to some areas of affluence, customer research from Phase 0 supports this, where customers find water cheap and feel that they could not use less. AWL is involved with the Artesia project run by Anglian Water which looks at understanding the variability in consumption and the social demographics. MP to circulate report. ∑ MP advocated that the issue was a societal problem and that the government and other bodies should support a national campaign to raise awareness and encourage reduced consumption. AD confirmed that in other European countries, a reduction 	<p>MP</p>



ID	Agenda item / subject / note / action	Responsible for Action
	<p>in PCC had followed a national campaign.</p> <p>CW raised the issue of IT outages as a measure of resilience of the IT network, in particular when the outage impacts customer services. AD confirmed that this is something that is tracked, MP agreed that this is something that will be considered.</p> <p>Environment Abstraction Incentive Mechanism (AIM) is a bespoke commitment proposed by Ofwat. AWL report against AIM in AMP6, with 2/3 sources currently compliant. Sustainable Abstraction Reductions is a programme which has been completed ahead of schedule in AMP6 and continues into PR19. JS asked if targets would be stretched for AMP7, this will be offered as part of the acceptability testing.</p>	
<p>4.</p>	<p><u>Proposal for Bespoke Commitment – Resilience</u></p> <p>SC talked through AWL’s proposal for a bespoke commitment around low pressure. Operational data shows that this is one of the main causes of operationally related unwanted customer contact. Low pressure is currently monitored following the DG2 directive, measurements tend to be focussed on loggers situated in the field. There are other variables that will influence low pressure such as new developments in an area. The impact of single source supply was also identified as making customers more vulnerable to receiving low pressures. The group agreed that this was a separate resilience measure. AD confirmed that AWL already has a programme of work to review single sources feeding greater than 2000 properties. This will be reviewed for PR19 and agreed to overlay customer contact on to the map. JS asked which commitments would have a financial incentive. SC confirmed that Ofwat requires all common commitments to have financial incentives. ASW confirmed that this will be discussed at the CGG meeting on the 13th.</p> <p>A further discussion was held on the communications around driving reduced water consumption. BP suggested that this type of communication coming from the water companies was not always well received and was better received from a neutral third party such as Hubbub. DC remarked that there was a lot of blank space on the bill that he had recently received following installation of a meter. He suggested that this could be used to provide a useful visual view of the comparison between water consumption between the two bills. (This was a very useful image when used to advocate the advantages of metering)</p> <p><u>Environment</u></p> <p>The proposal from the last working group meeting for a commitment around pilot projects promoting reduction in water use, customer education around water and the environment and improved environmental status was given full support by the Director of Asset Strategy (Mike Pocock) and the Director of Regulation and Corporate Affairs (Chris Offer).</p> <p>It is proposed to tailor a pilot project to the needs of each the 8 communities. CW was very supportive of this as it aligned to the Company’s vision to be community focussed, developed in PR14. As synopsis of some proposed projects were provided. It was agreed that the pilots should be of small scale. A metric for measuring success of</p>	



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	<p>each project would be required. It was recognised that the affects of any successful pilots would not be realised until AMP8.</p> <p>AD provided a plan showing some of the proposed projects and partners in each of the communities. The group was very keen that partners should be involved and help promote these projects. JS mentioned that Anglian incentivise developers by waiving the infrastructure charge for installing water saving devices. DC proposed that some of the smaller local developers such as Jarvis may be more interested in partnering for a pilot project.</p> <p>AWL to review the projects and agree to prioritise</p> <p>JS requested more information on the proposed pilot “rivers in active management”. This was a suggestion from JR at the last group meeting, ASW will invite him to follow up.</p> <p>CW thought the pilot project would be an acceptable commitment to Ofwat as it going above and beyond business as usual, will be low value, keeping customers top of mind with the potential to be innovative.</p>	<p>ASW/JR</p>
<p>5.</p>	<p><u>Next Steps</u></p> <p>Resilience AD to overlay customer contact from low pressure on map with DG2 low pressure areas. Review data and agree if a commitment appropriate. Metric and baseline will then be developed.</p> <p>AD to review work done to date on single source of supply and investigate with the asset strategy team whether this could be developed in to a commitment for PR19.</p> <p>AD to review current reporting around IT outages and investigate with business views on developing this as a metric/commitment.</p> <p>SC to feedback on customer engagement around loss of supply and low pressure</p> <p>Environment AWL to organise a workshop to develop a prioritised list of pilot projects based on community characteristics and potential partner involvement.</p> <p>Propose metrics for each project and agree an overall measure for the pilot project commitment.</p> <p>Develop short business plans for each project and costings. Project cost to be reviewed and agreed as part of overall Business Plan. Develop the top projects into detailed business plans.</p> <p>Present overall plan to Business and CCG working group in February.</p> <p>Ensure proposed commitments are fed into WTP research</p> <p>Agree any further customer engagement to support the above.</p>	<p>AD</p> <p>AD</p> <p>AD</p> <p>SC</p> <p>AD/ASW/BP</p> <p>AD/BP</p> <p>AD/BP</p> <p>ALL</p> <p>ASW</p> <p>EM</p>
<p>6.</p>	<p><u>Next meeting – tbc at Hatfield</u></p> <p>Proposal for bespoke commitments for Resilience with metrics, baseline and potential targets.</p> <p>Proposal for the Pilot Projects, outline of agreed projects, metrics and overall target.</p>	<p>AD</p> <p>AD/BP</p>



ID	Agenda item / subject / note / action	Responsible for Action
	Plans/feedback from any additional customer engagement	EM
7	<p>On a more personal note:</p> <p>As you know Sarah will shortly be going on maternity leave (5th December). Ed Mallam (EM) will be taking over responsibility for the market research programme, which includes consultation on our draft Water Resources Management Plan and Business Plan. Lauren Schogger will take overall responsibility for managing the contract with Arup and Ipsos MORI, as well as our operational data approach.</p> <p>I would like to thank Sarah on behalf of the group for the fantastic support and contribution that she has given the group in developing this work to form bespoke commitments.</p>	



Appendix OC.A1.2

Action ref AFW.OC.A1; A2; A3; A15; A41

CCG update on bespoke commitments (13 Dec 17)

AFFINITY WATER LIMITED Customer Challenge Group	
Date of Meeting: 13 December 2017	Agenda Item No. 5.2
Agenda Subject: PR19	
Document: Update on Bespoke Commitments	
Action: The CCG is asked to Note progress to date and Consider actions proposed to derive scoped commitments	
Prepared by: Anne Scutt Webber	

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PURPOSE OF THE REPORT

The purpose of this report is to ask the CCG to

- NOTE the summary of the development of the bespoke commitments
- CONSIDER the actions outlined to scope the proposed bespoke performance commitments

Background

In its Draft Methodology, Ofwat expects companies to develop bespoke commitments in the following areas:

- Vulnerability;
- Resilience;
- The environment; and
- Abstraction, using the Abstraction Incentive Mechanism. (already reported at PR14)



These bespoke commitments are specific to the individual company in that they should reflect their own circumstances and their customers' particular preferences.

It was agreed at the September CCG meeting that working groups would be formed with CCG members to develop the bespoke commitments. Terms of reference were agreed and groups formed during September. One group has been formed to develop commitments for vulnerability (inc affordability) and one to develop commitments on Resilience and the Environment.

Both groups have met twice, the paragraphs below summarise the development to date and a forward look at the scoping work needed to define the final commitments.

Outcomes from the sessions have been fed back to the relevant company directors to gain support before developing further.

Vulnerability and Affordability

AWL does not have a commitment for vulnerability in AMP6, therefore the group started with a blank canvas.

Options for a commitment for vulnerability were discussed at the first group meeting and very quickly led to a general view that this would be best measured by a reflection of customers' satisfaction with the service received. This should be measured through a customer satisfaction survey. Work to support this is being done by the customer relations team in their involvement with industry wide projects (eg. Water UK) to improve the experience for vulnerable customers and through sharing experiences from the energy sector. Insight has been gained from in-depth interviews with vulnerable customers and further insight is to be gained from a workshop with partners/stakeholders such as CAB, Stepchange.

The next steps are to develop the satisfaction survey with the Business, agreeing the process, determining frequency and how many customers to survey as well as developing questions. The input from the CCG members of the group has provided some useful thoughts around what should be considered in this development.

The group has recognized that there are many initiatives that are on-going which will support this performance commitment. AWL will develop this programme of work and reflect it in the Business Plan.

Ofwat proposed 3 categories of affordability to be considered in its Draft Methodology. It was agreed by the Directors that the affordability under consideration by this group was the affordability for vulnerable customers.

AWL currently has a generous social tariff (LIFT) supporting some 47,000 customers. This is enabled by the value of the cross subsidy which was tested through customer engagement for PR14. A survey on cross subsidy for PR19 is under development and will be carried out in the New Year. The results of this will underpin the social tariff for AMP7. A wider range of options are being considered by the customer relations team to provide for different circumstances, and again the teams are working with partners to develop this.



Discussions at the working group led to the view that affordability and the communication of the assistance available should also be measured through a satisfaction survey. In developing the satisfaction survey on vulnerability, thought will be given to whether this is incorporated, or if a specific survey is carried out.

Resilience and Environment

Many of the common commitments proposed in Ofwat's Draft Methodology cover the area of resilience. AWL also currently reports against performance commitments at PR14 which can be categorized as resilience and/or environmental. An exercise was carried out to compare the PR19 common commitments to the PR14 commitments and the group was asked for its view on those commitments which were significantly different and therefore should be maintained into PR19. It was proposed to maintain the following:

- Supply interruptions > 12 hours (Resilience)
- Sustainable Abstraction Reductions (Environment)

Customer feedback from the engagement carried out in Phase 0 reflects that received at PR14, that customers do not relate their water supply to the environment. Any engagement on the topics of resilience and the environment is therefore very difficult without "leading the witness".

• Environment – Pilot Projects

Following discussions at the first meeting a commitment was proposed around pilot projects which would promote a reduction of water use, promote customer education on the link between water and the environment and improve environmental status. This has received full support from Directors and endorsed by the group. To lead on AWL's community focus, it is proposed that pilots will be undertaken within each community, associating each one to a specific feature of the region. This would be of small scale during AMP7, however any success may then be rolled out during AMP8. It was agreed that partnering with other organisations such as the county councils/river groups, will help support and promote such initiatives. It will also be an opportunity to work in more depth with Hubbub.

The team is to agree the pilots and develop a schedule, a cost will also have to be agreed before finalising. Also to be agreed is how to measure the commitment, it was proposed that metrics for each pilot will be needed to feed in to an overall measure of success.

Due to the lack of customer insight in this area, customer contacts were reviewed to understand any common cause of concern to the service received. Supply interruptions and low pressure were the top causes. Since commitments are already in place for interruptions to supply a commitment around low pressure was investigated.

• Resilience – Low Pressure

Standards (DG2) are already set by Ofwat for reporting low pressure (reportable under asset health long list) and AWL maintains a register of properties that fail to meet these criteria. The failures are primarily captured through loggers in the field. Further work could be done with customer data to better understand the issues. Solutions are and will continue to be developed to improve the customer experience to maintain a steady pressure. It was also felt that customers were particularly vulnerable if on a single source of supply. However the group agreed that this was a separate issue. Work is



being done by asset strategy to look at single source of supply and the team will review and consider whether this has potential to be a performance commitment.

The impact of IT failures and their implications on customers' ability to contact the Company was raised at the group, this is another aspect of resilience to be considered. There had been some significant failures in the recent past. The team will take this away to develop further.

- Conclusion

To summarise, the following bespoke commitments have been proposed and will be developed over the next few months. Levels and ODIs around these commitments will be considered as part of the overall engagement and analysis being done.

- Proposed Bespoke Commitments for PR19
 - Customer Satisfaction Survey for Customers in a Vulnerable Situation (to include a section on affordability) Vulnerability
 - Pilot Schemes for improving the environment and reducing water consumption Environment
 - Low Pressure –reducing the number of contacts Resilience
- Bespoke Commitments Continued from PR14
 - Supply interruptions > 12 hrs Resilience
 - Sustainable Abstraction Reduction Environment
 - Abstraction Incentive Mechanism (AIM) Environment
- Potential additional Bespoke Commitments under review
 - No. properties with a single source of supply Resilience
 - Customers impacted by IT failures Resilience

Appendix OC.A1.3

Action ref AFW.OC.A1; A2; A3

PR19 SteerCo: Bespoke Commitments Resilience Paper (Feb 18)

<p>AFFINITY WATER LIMITED</p> <p>PR19 Steer Co</p>		
Date of Meeting:	27 February 2018	<p>Agenda Item No.</p>
Subject:	Bespoke Commitment - Resilience	
Prepared by:	Anne Scutt Webber, Arnaud David	
Sub group:	Arnaud David, Patrick Campbell, David Beesley, Chris Reichl	

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Resilience Bespoke Commitments

Although resilience has always been a key issue for customers and our industry, in recent years the focus has shifted from the traditional views of infrastructure, operational and financial resilience onto new challenges - climate change, population growth, sector skill gaps, supply chain failure and cyber threat. Ofwat have introduced the term of 'Resilience in the round' for PR19 to capture these threats and to ensure customers and the natural environment are at the heart of resilience proposals.. The water industry defines resilience as the ability to cope with and recover from disruption and anticipate trends and variability, in order to maintain services for people, protect the natural environment now and in the future.

1.0 Resilience Commitment Overview

Ofwat sets out its expectations for the basis of the bespoke commitments from the Delivering Water 2020 report as:

"Companies have the freedom to engage widely with their customers and local stakeholders, to propose bespoke performance commitments that reflect their customers' particular preferences. Bespoke performance commitments also enable companies to be innovative, and to propose commitments relating to particular issues that affect their operating area."

Ofwat's Rationale for Resilience Bespoke Commitments is shown in the table below with example metrics.



Rationale	Example Metrics	AWL review
Resilience is one of the four themes of PR19. While we have a number of common performance commitments relating to resilience, we recognise that resilience has many facets. We expect companies to reflect the resilience issues that are most relevant to their region and customers, in their bespoke performance commitments.	<i>UKWIR published a report in July 2017 on resilience performance metrics. The metrics included:</i> Expected average number of customers affected by large scale interruptions > 12 hours (number per year).	<i>Included as Water Supply Interruptions (greater than 3 hours expressed in minutes per property)</i>
	Percentage of population supplied by single supply system >25,000.	See Item 4.0
	Unprotected works within flood risk zones (number or population served).	See Item 5.0

We have reviewed options for Bespoke Performance Commitments on

- ∑ Single Supply system
- ∑ Unprotected works in flood risk zones

Due to the emphasis on developing commitments to reflect customer issues, we have reviewed our customer contact data as summarised below. This has led to an investigation into a bespoke commitment around low pressure (Item 3.0)

2.0 Customer Engagement

2.1 What our Customers are contacting us about

To understand what customers would support in terms of a commitment under resilience a review was done of our customer data. The top causes of unwanted customer contact relating to our operational activities are pressure / flow problems and interruptions to supply. Unwanted contacts negatively affect our Service Incentive Measure score. Customer contacts about interruptions to supply represent a customer receiving ‘no water’ and are generally related to incidents such as bursts. We have PCs related to interruptions to supply. Customers contacting us about pressure or flow problems do have a water supply, but it may be insufficient to meet their expectations e.g. running a washing machine and their bathroom tap at the same time.

Further research is needed to understand the individual circumstances surrounding these contacts as a number of factors could influence customers’ water pressure and flow, one of which may be due to the customer service pipe or internal plumbing.

The results from in-depth interviews undertaken with customers already experiencing low pressures show customers have little understanding of the causes of low pressure and that many come “resigned” to the fact that their pressure is low.

2.2 Work with CCG Sub Group

The outcomes of the meetings with the CCG to develop bespoke commitments in the area of Resilience was to have a “better connected” network to improve supply to those at the extremities of the network or with a single source of supply and, in response to customer contact, improve pressure to those “living with” low pressure. Sub groups were formed within the Business to review the options and develop proposals for commitment(s).



3.0 Pressure Commitment

3.1 Ofwat Definitions for DG2

Properties at risk of receiving low pressure We currently report pressure under the DG2 serviceability indicator metric which is reported through Discover Water. The Discover Water tables which can be found through the Ofwat website compares results of this and other indicators across all water companies. This will be continued in AMP7 as a water indicator on the Asset Health Long list which companies can select to report on.

The definitions from the **Ofwat Guidance: Delivering Water 2020 Appendix 3: Outcomes technical definitions** (section 2.1.1) is summarised below:

The aim of the Indicator is to identify the number of properties that have received and are likely to continue to receive pressure below the reference level when demand is not abnormal. This is reported on an annual basis.

Reference level: a flow of 9l/min at a pressure of 10m head on the customer side of the main stop tap (mst). (single property)

Due to the difficulty of measuring pressure and flow at the mst, companies may measure against a surrogate reference level. Companies should use a surrogate of 15m head in the adjacent distribution main unless a different level can be shown to be suitable. In some circumstances companies may need to use a surrogate pressure greater than 15m to ensure the reference level is supplied at the customers' side of the mst (for example in areas with small diameter or shared communication pipes).

Allowable exclusions

There are a number of circumstances under which properties identified as receiving low pressure should be excluded from the reported figure. The aim of these exclusions is to exclude properties which receive a low pressure as a result of a one-off event and which, under normal circumstances (including normal peaks in demand), will not receive pressure or flow below the reference level.

Companies must maintain verifiable, auditable records of all the exclusions that they apply in order to confirm accuracy and validity of their information. All properties identified as having received pressure or flow below the reference level must be reported, unless it can be confirmed that they are covered by one of the following exclusions:

- ∑ Abnormal Demand: up to 5 days per year of abnormal peak demand
- ∑ Planned Maintenance
- ∑ One-off incidents
 - Mains bursts
 - Failure of company equipment (PRV, booster pumps)
 - Fire fighting
 - Action of 3rd party

If problems of this type affect a property frequently they cannot be classed as one-off events and further investigation will be required before they can be excluded.

In locations where continuous low pressure logging is carried out, low pressure incidents of less than one hour may be excluded.



3.2 AWL Current Reporting against DG2

AWL currently reports against the DG2 indicator against the following definition:

No. properties receiving less than 15m in the distribution main for a continuous duration of greater than one hour on more than 5 occasions in the year.

Pressures falling below the standard as a result of network/supply incidents are excludable. 5 days of highest demand are also excluded. Currently there are around 2000 properties on the DG2 register. AWL is an outlier against other companies.

The reported figure is audited through the regulatory audit process each year by WS Atkins.

3.2.1 Reporting Process

The DG2 measure is reported through specified DG2 loggers installed at high points across the network. (304 loggers) This does not provide full coverage.

The DG2 working group reviews the register on a monthly basis and monitors progress of schemes to increase pressure to failing areas. The aim is to reduce this to 900 (currently 2000) by the end of the year.

Critical point loggers are being installed in every DMA and most unmeasured areas. This will provide 100% coverage and will add a further 800 reportable loggers, as a result this is likely to identify additional areas of properties receiving low pressure next year.

The company currently does not have a commitment against DG2 but is aiming to have 100 properties on the register at the end of AMP6. A capital budget of £1.25m was approved for investments required to increase the pressure to properties on the register and schemes are underway where minor improvements to the distribution and pumping infrastructure are necessary. There are also a small but significant poor pressure locations that have been a direct result of new developments in the area. These are being addressed through strategic infrastructure schemes with contributions from the Infrastructure Charge. The Strategic Infrastructure programme of work allows us to plan forward for those areas where new developments will affect our current customer's pressure.

3.3 Development of a Pressure Commitment for PR19

DG2 will continue to be reported during AMP7. A budget of £1.25m has been included in the Business Plan to resolve issues through minor works. We are currently examining the new logger data to understand if there are new areas of poor pressure that have come to light that might require significant infrastructure improvements to solve. This may need a re-evaluation of the current £1.25M budget.

3.3.1 Option Review

The sub group has discussed and reviewed several options around a pressure commitment. The following options were discussed:

- a) To increase the standard required level of pressure in the distribution main eg. to 20m
- b) To provide a minimum but more stable pressure at all times



- Maintaining pressure during high demand (no exclusions for high demand periods)
- Reducing number of incidents by restoring water during a burst
- c) To improve pressure to those areas which receive repeated and longer instances of low pressure
- d) To improve the overall average pressure across the network

Assessment

Σ To increase the standard required level of pressure in the distribution main eg. to 20m

- × High investment
- ? Would this benefit customers - evidence?
- × Detrimental to leakage
- × In many cases it is the customer supply pipe that is the issue in receiving a poor pressure at the point of use. An increase in 5m may not be enough to provide a noticeable improvement.
- ×

Rejected

Σ To provide a more stable pressure during peak demand

- × A study looking at PRVs during the peak demand in June 2017 has shown a large number were fully opened and pressures received were still low but within the threshold for the number of instances of peak demand ie below 5 times in year. . This would conclude that the capacity of the mains are not sufficient to maintain the pressure at these exceptional peak demand times. During most of the year pressures in these areas are good. – high investment would be needed and risk of failing due to isolated high demands not easily predicted.
- Reducing the number of incidents is reported through the mandatory commitments against interruption to supply and burst mains. Measures are being put in place to improve our performance in this area.

Rejected

Σ To improve pressure to those areas which receive repeated and longer instances of low pressure

- ✓ We know through logging results, customer contact and PR19 customer engagement research that there are customers who continuously receive low pressure, particularly during daytime peak demand periods. They are often resigned to the fact. The current DG2 measure does not reflect this repeat poor pressure impact.
- ✓ By including incidents and periods of high demand this will identify any areas which are subject to repeat operational failures.
- ✓ Would focus on those who are most disrupted by the low pressure

Develop Further

Σ To improve the overall average pressure across the network

- ✓ Easy to measure
- × No exclusions – would therefore include the impact of supply disruptions . This is dealt with to some degree by our interruptions measure
- × Would not identify any areas to target for improvement



Rejected

3.4 Proposal for Commitment - To improve pressure to those areas which receive repeated and longer instances of low pressure

The DG2 indicator does not differentiate those properties that suffer from repeated low pressure as it does not report the frequency or duration of the failures. It therefore does not take into account properties that experience chronic low pressure issues throughout the year of varying duration and not only at high demand periods, these could be in short durations during the day caused by say large commercial users filling tanks.

This proposed commitment will prioritise pressure improvement schemes to target those properties which currently receive the most frequent drops in mains pressure.

3.4.1 Measure

The use of the surrogate **15m head** in the distribution main will be used as the reference level. The source of the data to measure this will be:

- CP/DG2 loggers reported through Waternet
- Customer complaints – repeat low pressure calls, reviewed to be a network* issue
*(see 2.6 Risks)

Pressures recorded below the 15m surrogate head for a duration of **greater than 1 hour** will be reportable under this commitment (this aligns to DG2).

Consideration on whether to exclude the 5 peak demand days from this measure (currently excluded under DG2)

The measure will follow that for Supply Interruptions, resetting to zero at the start of each year:

ie. Cumulative Property Minutes normalised by total number of properties.

The number of properties will be taken off GIS based on ground level difference from the logger. An exercise is being completed to create a look up table to enable this assessment.

Unlike DG2, it is proposed to not exclude incidents due to operational activity. This will highlight those areas which are subject to frequent operational failures and therefore target investigations and solutions to these issues. This also reduces the time and resource needed to report this measure.

3.4.2 Baseline and Level

We are unable to provide an accurate baseline for the proposed PC as it will be at the start of PR19 as the logger coverage is not complete. The critical point loggers have been installed throughout the year. They are not reported through the DG2 process (via Waternet). A decision was taken that they would be converted once all loggers had been installed, ie from 1st April 2018.

It is therefore proposed to use analysis from our current DG2 loggers to create a baseline and target for the Business Plan submission. The normalised figure will be based on the number of properties covered by the DMAs in which the DG2 loggers are situated. Assuming a similar failure rate across the DMAs that will be added to the baseline from the Critical Point loggers, it is assumed that the



baseline in PR19 will be similar. However, if shown to be different once a full set of data is available, a re-baseline of these figures will then be submitted to Ofwat.

Baseline

The results of the assessment of drops in pressure below the 15m threshold reported by DG2 loggers between 1st April 2017 and 19th Feb 2018 are:

Minutes pressure below 15m (for > 1 hour) **3,609,570**

Assumption – 50 properties affected per logger

Cumulative total **180,478,500** property minutes

No. properties in DMAs **259,937**

Normalised – **694** minutes/property over calculated duration

Extrapolated for year = 780 minutes/property or 13 hours/property

An exercise still needs to be undertaken to map customer calls and review if there are any additional areas not reported. (see Risks)

Target

To be agreed – a % reduction in baseline

3.5 Risks

Baseline

We do not currently know the level of failures using the extensive base of logger reporting that will be available in PR19. 2018/19 will provide the first annual baseline figure. (see 3.4.2)

Customer contact data has not been used to date and is not easily analysed to enable a targeted operational follow up. This will be reviewed for 2018/19 and process in place for 2020 (see below).

Budget

The capital budget for low pressure improvements is only £1.25m over the 5 year period. Solutions to improve pressures in the worst areas may be higher than this budget, this may impact the success of the commitment. Operational solutions will be prioritised, and where pressures have been impacted by new developments, infrastructure charge may be used.

Process

Various processes must be in place and maintained in order to ensure that the data feeding this commitment is accurate. Failure to do this could result in over inflation of the figure and failure to meet the commitment.

1. Logger failures

A regular review of the reporting loggers to ensure they are correctly calibrated. Any under reporting or logger failures will be reflected as low pressure failures, if not detected quickly these have a risk of significantly increasing the failures reported.

2. Low Pressure calls for investigation and reporting



In order to effectively use the information received from the customer contacts a process for identification of customer contact on low pressure is required, in particular to distinguish between incidents.

Repeat calls (outside incidents) will require a site visit by operations on whether the low pressure is below the 15m reference level in the main. Adopt a process to log and report through the pressure commitment.

3. Maintenance of the data and reporting
A regular review of the data received and challenge of figures to ensure that the reporting remains accurate.
4. Management of the Improvement Programme
In order to meet the commitment of a reduction in properties receiving pressure below the reference level, operational and capital solutions must be designed and implemented.

Communication

Results from customer contact and the Phase 1 interviews demonstrate that there is little understanding of pressure and whether it is the responsibility of the water company or the customer. Awareness of the boundary between the customer and network needs to be provided (website etc) to support this commitment and reduce customer contact. Part of any communication needs to include an awareness for plumbers to ensure that they are installing the correct diameter internal pipework to support the lowest possible pressure received as advised by AWL.

4.0 Single supply systems

We have carried out an extensive investigation on single supply systems and assessed that

- ∑ less than 2% of our customers (24,000 properties) receive water from a single source
- ∑ about 8% (118,000) receive water from a single system (covering single site and single pipe).

We are putting plans in place to mitigate the risks of losing supply to properties served by a single source (rezoning and mitigation plans).

The likelihood of those areas to be impacted is very low and therefore the focus is on response and recovery to bring the supply back as soon as possible rather than investing in redundant infrastructure which would not be required the majority of the time.

Some of those single points of failures will be addressed by our AMP6 trunk main mitigation programme, where they affect more than 2,000 properties at once.

The notional resilience of our supply system is high by design compared to industry benchmark, we are not planning to develop specific schemes in AMP7 to reduce the number of properties supplied by single systems. The key focus will be on minimising short-term interruptions

5.0 Unprotected works within flood risk zones

We invested £3m to protect 30 key sites during AMP5 to required standard – i.e. protected to 1 in 100 year event plus climate change impact plus 300mm freeboard (which is in fact equivalent to a 1 in 200 year event).



Following a review of critical infrastructure for PR19, we identified a further 5 key sites in flood risk zones that are not currently protected to the same standard:

- Therfield Heath
- Σ Essendon & North Mymms
- Hadham Mill
- Rye Hill
- Debden Road

These sites serve a combined 58,000 properties, corresponding to 4% of our customers

The decision was made to remove the resistance mitigations from the AMP7 portfolio, since protection will be addressed through reactive measures (response and recovery), due to low likelihood of event.

Appendix OC.A1.4

Action ref [AFW.OC.A1](#); [A2](#); [A5](#); [A6](#); [A7](#); [A8](#); [A9](#); [A10](#); [A11](#); [A12](#); [A13](#); [A14](#); [A15](#); [A16](#); [A17](#); [A18](#); [A19](#); [A20](#); [A21](#); [A23](#); [A24](#); [A25](#); [A26](#); [A27](#); [A28](#); [A29](#); [A30](#); [A31](#); [A36](#); [A37](#); [A38](#); [A39](#); [A40](#); [A41](#); [A42](#); [A43](#); [A45](#); [A46](#); [A47](#); [A48](#)

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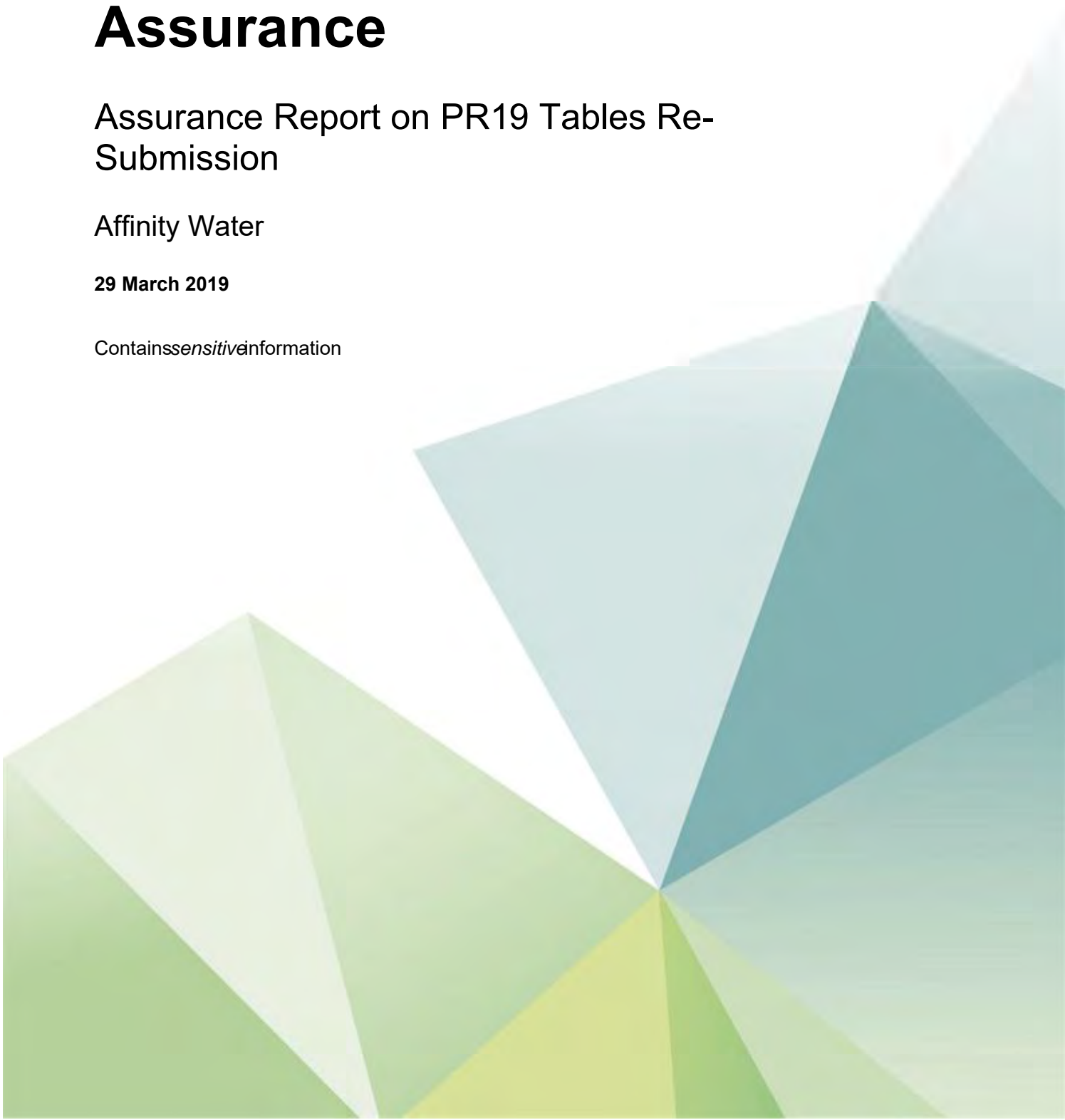
AMP6 Technical Assurance

Assurance Report on PR19 Tables Re-Submission

Affinity Water

29 March 2019

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This document has 19 pages including the cover.

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Rev 2.0	Final report	JPA	JAJ	BA	JPA	29/03/19

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Tables

Table 2-1 Tables and Information Blocks Include in our Audits including comparison with scope from September 2018 submission

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1. Introduction

1.1. Background

Atkins has been engaged by Affinity Water to provide technical assurance on its regulatory reporting and submissions to Ofwat, including its Annual Performance Report and PR19 Business Plan.

Ofwat has released its initial assessment of Affinity Water's Business Plan. As part of its assessment, the regulator identified a number of data quality issues with Affinity Water's submission, of which the data tables were a significant part.

Alongside the publication of the initial IAP assessment, Ofwat has issued a new business plan table template and a new financial model. Companies categorised as slow track and significant scrutiny, which includes Affinity Water, have been required to complete these tables and use this new financial model for their submission of revised plans by 1st April 2019.

Based on the Ofwat feedback actions assigned to the Company as well as other areas identified by the Company itself for strengthening, Affinity Water has revised many of the data tables, evidence base supporting its data and associated commentaries, which contributes to strengthening the overall Plan.

The scope and coverage of Atkins' audits is intended to provide a third-party assurance process that integrates with the financial auditor activities to cover all tables within the PR19 submission.

1.2. Report Structure

A summary of our scope of work for the PR19 audits is provided in **Section 2**.

Our key findings are detailed in **Section 3**, separated into:

- **Section 3.1** which summarises our audit findings for the PR19 Table submissions
- **Section 3.2** which provides assurance commentary on the links between the Performance Commitment targets and the Company management of the risks contained in the Outcome Delivery Incentive rewards and penalties.

2. Scope of Work

The scope of our technical assurance activities was discussed and agreed with Affinity Water during a series of conference calls and email exchanges between 11th and 20th February 2019. Our general remit was to carry out a technical review of the Business Plan Tables (along with a separate stream of work to revisit the investment proposals to evaluate the reasonableness of the proposed activities and costs in light of the PC targets that are being proposed).

Specifically, this includes the following three key assurance objectives:

1. A check on the data tables contained within our scope of work, to comment on whether they are:
 - Reliable, Accurate and Complete (based on our review and given the uncertainties in the base data)
 - Compliant with the table guidance in terms of Methodology (including cost allocations between drivers and price controls)
 - Supported by commentary that complies with Ofwat guidance and reconciles with the technical cases as audited

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2. A review of the process used to set Performance Commitments and associated rewards/penalties for the Outcome Delivery Incentives (ODIs) to confirm whether:
- The definition of the metrics, targets and threshold for the proposed PCs and ODIs are clear and transparent in accordance with Ofwat's stated expectations.
 - The proposals contained within the totex Investment Programme align with the PC targets that are proposed, and Affinity Water has reasonably considered the uncertainties and marginal cost risks when setting ODI rewards/penalties
 - Affinity Waters' modelling of the impact that PC targets and ODIs could have on return on regulatory equity (RoRE) contains risk and uncertainty ranges that are reasonably reflective of the data, processes and investment outputs that were used to generate the ODIs.

As per item 2, in general terms we were engaged to assist in confirming that there is a 'line of sight' between the Performance Commitment (PC) targets that were agreed with the CCG and the totex investment that has been proposed in the Business Plan. The derivation of the PCs themselves and the customer aspects of the ODIs (preferences, willingness to pay etc) have been challenged separately by the Customer Challenge Group, and in line with our activities during the original submission in September 2018, they are not included within our scope of works.

Our audits relate to the technical, rather than financial, aspects of the Business Plan so only covered a specific number of tables and lines. These are summarised in Table 2-1 below, which also highlights variations compared with the scope from the September 2018 submission.

Table 2-1 Tables and Information Blocks Include in our Audits including comparison with scope from September 2018 submission

Table	Block/Line Reference	Observations
App 1 - Performance commitments	All blocks and all lines	Changed the outcomes tables to reflect some of the actions from the IAP assessment, including further information about the P10 and P90 performance levels
App1a - Outcome delivery incentive (ODI) - additional information	All blocks and all lines	New table
App2 – Leakage additional information and old definition reporting	Block A Block B Block C Block D	
App 3 – AIM	All blocks and all lines	Changed the outcomes tables to reflect some of the actions from the IAP assessment, including further information about the P10 and P90 performance levels
App 4 – Affordability	All blocks and all lines	Table substantially revised to incorporate Affordability data table submission requested after original September 2018 submission and also including some previously unreported additional data lines.
App 5 - PR14 Reconciliation: Performance Commitments	All blocks and all lines	Updated to take account of revised forecasts for 2018/19.
App 27 - ODI PR14 reconciliation	All blocks and all lines	
App 30 – Voids	All blocks and all lines	
App 31 - Past Performance	All blocks and all lines	Not applicable in re-submission

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R1 – Properties	Block B only	
R2 - Special cost factor data and R8 - PR14 reconciliation	All blocks and all lines	Not applicable in re-submission
R3 - Customer metrics	Block C (17-28)	Not applicable in re-submission
R10 – PR14 Service incentive mechanism	All Blocks	
WS1 - Capex	Block B (12-17, 19, 21))	Split grants and contributions into opex and capex
WS2 – Capex	Block A (1-39)	
Table	Block/Line Reference	Observations
WS2a – Capex	Block A (1-39)	
WS3 - Water populations and properties	All blocks and all lines	
WS4 - Explanatory variables	All blocks and all lines	
WS10 – Capex	Block A (1-42)	
WS17 - Water trading incentive	All blocks and all lines	Not applicable in re-submission
WS18 - Explaining the 2019 FD	Block A Block C Block D Block E Block F Block G Block H	Some lines/blocks not applicable in resubmission.
WR1 – Water resources explanatory factors	All blocks and all lines	
WR6 – Water resources capacity forecasts	All blocks and all lines	
WR7 - Cost of water resources capacity	All blocks and all lines	
WR8 - Wholesale water resources special cost factors	All blocks and all lines	Not applicable in re-submission
WN1 - Wholesale water treatment (explanatory variables)	All blocks and all lines	
WN2 - Wholesale water distribution (explanatory variables)	All blocks and all lines	
WN6 - Wholesale water network plus special cost factors	Block A	

3. Key Findings

3.1. PR19 Data Tables

Our audits of the data tables concentrated on confirming whether the data that have been entered satisfy the three criteria detailed in Section 2 (reliable, accurate, complete; compliant with guidance and supported by commentary). Where table entries link through to PCs and ODIs, we have made comment on whether the tables have been accurately completed in accordance with the guidance and calculations generated from the Business Plan process. Commentary on the PC/ODI targets and rewards/penalties is provided in Section 3.2.

There were 181 issues identified during the course of the audit and assurance activities. All issues in the Issues Log were responded to and action taken by the Company where appropriate. We were therefore able to close off all issues.

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The Company's use of a Central Change Log provided a generally effective and efficient mechanism to track changes between the 28th September 2018 and 1st April 2019 submissions in the data tables and commentaries.

The Company has also significantly enhanced its internal quality assurance by producing methodologies which capture how the tables have been populated, capturing data sources, assumptions, internal checks and controls, etc. The main issue that we noted in the methodologies, which was a systemic weakness, was that the section on Ofwat definitions was limited to capturing the relevant line guidance for populating the tables. The methodology did not capture where there was wider PR19 guidance on completing the business plan tables (latest version: May 2018 update v2) or relevant Ofwat responses to Q&As.

We also identified some errors in the table entries which were all subsequently corrected. The commentaries also often did not provide visibility on the changes and the drivers for those changes compared with the previous submission. These were subsequently addressed.

In addition, the Central Change Log either did not capture all the changes, or where it did so, did not always capture effectively the drivers for the changes. Again, the areas we highlighted were subsequently addressed by the Company.

Summaries of the individual findings, by table, are provided below. The RAG classifications are as follows:

- Green – No risks or issues identified, or risk or issue addressed as a result of assurance process
- Amber – A minor risk or non material issue, e.g. guidance open to different interpretation, non material failure of process or weaknesses in dataset
- Red - A critical risk or material issue, e.g. failure to comply with statutory requirements or guidance, failure of process, failure to disclose, failure to report accurately

Table and Block <i>App 1 - Performance Commitments</i>	Comments	RAG Status
Performance Commitments and Outcome Delivery Incentives	Table satisfactory following audit challenges and resulting changes.	Green

Table and Block <i>App 1a - Performance Commitments</i>	Comments	RAG Status
Outcome Delivery Incentives Additional Information	Table satisfactory following audit challenges and resulting changes.	Green

Table and Block <i>App 1b - Performance Commitments</i>	Comments	RAG Status
PC and ODI supplemental measurement information	The Company has assessed that completion of this table is not required.	N/A

Table and Block	Comments	RAG Status
App 2 – Block A – Leakage new definition reporting	Table satisfactory following audit challenges and resulting changes.	Green

Table and Block	Comments	RAG Status
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App 2 – Block B – Leakage PR14 definition reporting	Table satisfactory following audit challenges and resulting changes.	Green
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Table and Block	Comments	RAG Status
App 2 – Block C – PCC old definition	Table satisfactory following audit challenges and resulting changes.	Green

Table and Block	Comments	RAG Status
App 2 – Block D – Supply Interruptions old definition	Table satisfactory following audit challenges and resulting changes.	Green

Table and Block	Comments	RAG Status
App 3 – AIM	No significant issues to method. Forecasts have been set to zero in accordance with App 1, and links to the performance commitments plus ODIs are explained in the commentary.	Green

Table and Block	Comments	RAG Status
App 4 – Block A – Affordability	Table satisfactory following audit challenges and resulting changes.	Green
App4 – Block B - Vulnerability	Table satisfactory following audit challenges and resulting changes.	Green

Table and Block	Comments	RAG Status
App 5 - PR14 Reconciliation: Performance Commitments – R-A1 SIM service score	SIM score in App 5 for 2018/19 forecast (81) is an earlier forecast and does not reconcile with the R10 entry (82), the latter of which is the best central estimate. The Company has noted this discrepancy in its App 5 commentary.	Red
App 5 - PR14 Reconciliation: Performance Commitments – Other Lines	Table entries satisfactory following audit challenges and resulting changes.	Green

Table and Block App 27 - ODI PR14 reconciliation	Comments	RAG Status
Block A - In-period ODI revenue adjustments by PR14 price control units (2012-13 prices)	Table satisfactory following audit challenges and resulting changes.	Green
Block B -End of period ODI revenue adjustments by PR14 price control units (2012-13 prices)	Table satisfactory following audit challenges and resulting changes.	Green
Block C - End of period ODI RCV adjustments by PR14 price control units (2012-13 prices)	Table satisfactory following audit challenges and resulting changes.	Green
Block D - In-period ODI revenue adjustments allocated to PR19 price controls (2012-13 prices)	Table satisfactory following audit challenges and resulting changes.	Green
Block E - End of period ODI revenue adjustments allocated to PR19	Table satisfactory following audit challenges and resulting changes.	Green

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price controls (2012-13 prices)		
Block F - End of period ODI RCV adjustments allocated to PR19 price controls (2012-13 prices)	Table satisfactory following audit challenges and resulting changes.	Green
Block G - In-period ODI revenue adjustments input to PR19 financial model (2017-18 prices)	Table satisfactory following audit challenges and resulting changes.	Green
Block H - End of period ODI revenue adjustments input to PR19 financial model (2017-18 prices)	Table satisfactory following audit challenges and resulting changes.	Green
Block I - End of period ODI RCV adjustments input to PR19 financial model (2017-18 prices)	Table satisfactory following audit challenges and resulting changes.	Green

Table and Block	Comments	RAG Status
App 30 – Void Properties	Table satisfactory following audit challenges and resulting changes.	Green

Table and Block	Comments	RAG Status
R1 – Block B - Customer numbers	The Company is reallocating 7,000 from business customers to residential customers in 2020/21. It would be incorrect to report these 7k customers as new as they are already Affinity Water residential customers. The Company has decided to treat these as business customers in the water balance calculations. The Company decided not to update the associated R1 table or dependency lines to reflect this reallocation in this submission.	Green

Table and Block	Comments	RAG Status
R10 – PR14 Service incentive mechanism	Table satisfactory following audit challenges and resulting changes.	Green

Table and Block	Comments	RAG Status
WS1- Block B - Capital Expenditure (excluding Atypical expenditure) 2, 2a and 10 Capex Tables	Table satisfactory following audit challenges and resulting changes.	Green

Table and Block	Comments	RAG Status
WS2 – Block A - Enhancement expenditure by purpose ~ capital	Table satisfactory following audit challenges and resulting changes.	Green

Table and Block	Comments	RAG Status
WS2a – Block A - Cumulative capital enhancement expenditure by purpose	Table satisfactory following audit challenges and resulting changes.	Green

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Table and Block	Comments	RAG Status
WS3 Wholesale water populations and properties	Table has been updated following audit challenges and resulting changes. There remains a discrepancy between the implied void business properties in WS3 and those directly reported in App30. The Company has exposed this anomaly in the commentary. The Company is reallocating 7,000 business customers to residential customers in 2020/21. It would be incorrect to report these 7k customers as new as they are already Affinity Water residential customers. The Company has decided to treat these as business customers in the water balance calculations. The Company decided not to update the associated R1 table or dependency lines to reflect this reallocation in this submission.	Green

Table and Block	Comments	RAG Status
WS4 Wholesale water other (Explanatory variables)		
Line 1 – Number of lead communication pipes replaced for water quality	We challenged why AMP7 forecasts did not include the balance of the under delivery of the AMP6 obligations. This was a risk of DWI enforcement action against the Company for any failure to deliver on its AMP6 obligations. The Company has demonstrated that plans are in place in order to deliver the programme by the end of AMP6.	Green
Lines 2 to 5 - Total supply and demand side enhancements	2 MI/d was added to Runleywood Lower Greensand option yield postsubmission of the revised WRMP because the current available yield was originally overestimated (thus the option provides an extra 2 MI/d). While the WRMP EBSD figures therefore do not reconcile with WS4 and WR6, they are correct.	Green
Lines 6 to 8 Energy consumption	Revised as a result of challenges made through the audit process and resulting analysis	Green
Line 9 – Mean zonal compliance	No issues identified.	Green
Line 10 – Compliance Risk Index	Changes made as a result of challenges made at audit.	Green
Line 11 – Event Risk Index	Changes made as a result of challenges made at audit.	Green
Line 12 - Volume of leakage above or below the sustainable economic level	Table satisfactory following audit challenges and resulting changes.	Green

Table and Block	Comments	RAG Status
WS10 – Block A - Transition capital expenditure purposes	We have not been informed of any decisions to bring forward AMP7 expenditure into 2019/20	Not applicable
WS10 – Block B - Transition summary totals		

Table and Block	Comments	RAG Status
WS18 Explaining the 2019 FD		
Block A – Customer service	Line 1 updated in line with historic APR reporting. Line 2 revised in line with actual reporting for 2018/19.	Green
Block C – Affordability	Changes made as a result of challenges made during audit process.	Green
Block E – Environmental	Greenhouse gas emission revised to be based on historic trend data and incorporate company energy policy / planned energy efficiency	Green

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	activities.	
Block F – Bill Impacts	No issues.	Green
Block G - Total expenditure (real prices ~ 2017-18 FYA CPIH deflated)	No issues.	Green
Block H – Customer engagement	No issues.	Green

Table/ Block	Comments	RAG Status
WR1 Water resources explanatory factors	2017/18 figures were confirmed as part of the APR audits. Forecasts were reviewed against the latest version of the revised WRMP and these reconcile.	Green

Table and Block	Comments	RAG Status
WR6 Water resources capacity forecasts	Figures reconcile with WRMP modelling outputs.	Green

Table and Block	Comments	RAG Status
WR7 Cost of Water resources capacity	The schemes that are listed reconcile with the WRMP model outputs and costs contained in the investment programme. We note that the majority of costs are associated with the initial development of the Abingdon reservoir scheme. One line was changed as a result of the audit process.	Green

Table and Block	Comments	RAG Status
WN1 - Wholesale network plus raw water transport and water treatment (explanatory variables) & 2 Network plus explanatory variables	Table numbers and commentaries have been updated following audit challenges and resulting changes.	Green

Table and Block	Comments	RAG Status
WN2 - Wholesale water network plus water distribution (explanatory variables)	Table numbers and commentaries have been updated following audit challenges and resulting changes.	Green

Table and Block	Comments	RAG Status
WN6 - Wholesale water network plus special cost factors – Block A Special cost claim 1: Regional Wages	Table numbers and commentaries have been updated following audit challenges and resulting changes.	Green

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3.2. Performance Commitments and Outcome Delivery Incentives

Our draft findings were presented at the Board Meeting on 27th March 2019. In general terms, our audits were aimed at confirming that there is a 'line of sight' between the Performance Commitment (PC) targets and the totex investment that has been proposed in the Business Plan. The derivation of the PCs themselves and the customer aspects of the ODIs (preferences, willingness to pay, etc.) have been challenged separately by the Customer Challenge Group, and in line with our activities during the original submission in September 2018, they were not included within our scope of works.

Our audits relate to the technical, rather than financial, aspects of the Business Plan so they only covered a specific number of tables and lines. These are summarised above.

We discuss our findings from our review of the resubmitted Performance Commitments and associated rewards/penalties for the Outcome Delivery Incentives (ODIs) in the sections below.

3.2.1. Definition of metrics, targets and threshold for the PCs and ODIs

We reviewed the detail of the preparation of the entries to Table App1 and found the definition of metrics, targets and threshold for the PCs and ODIs proposed to be clear and transparent in accordance with Ofwat's stated expectations. The Company has in general accommodated the required changes from Ofwat in the IAP and has provided explanations where it has not done so. Targets and thresholds are aligned with the Company's assessment of their achievability.

We note a particular target that may attract attention is the burst rate. The Company has elected to target the maintenance of stable performance across AMP 7, by continuing at the end-AMP6 level. We believe this to be reasonable in the context of increased burst identification due to the ambitious AMP7 leakage reduction programme, an aging asset stock and the need to resolve low pressure issues.

3.2.2. Totex Investment Programme alignment with proposed PC targets

We reviewed the Totex Investment Programme and found it to align with the proposed PC targets. We believe that Affinity Water has reasonably considered the uncertainties and marginal cost risks when setting ODI rewards/penalties.

We reviewed the proposed Investment Portfolio, which is broken down into Capex and Opex, and includes Base Capex, Enhanced Capex and Enhanced Opex and Contributions. The Investment Portfolio does not include most components of Base Opex, other than some of the overall Leakage expenditure. We considered both the Base Programme and the Enhancement Programme.

We reviewed the enhanced programme and reviewed the larger elements of the programme where the Company had considered Ofwat's IAP challenges in detail. The Company had considered the detailed breakdown of costs and whether efficiencies could be achieved. We saw how the Company was challenging itself to achieve efficiencies through changed operational practices and lessons learned through similar work in AMP6.

For lead communication pipes (CPs) and service pipe replacement, we noted a potentially low unit rate, which will need clear definition of scope, as the rates appear to be based upon more conventional CP and (garden) service pipe replacement, rather than considering work up to the internal stop tap.

For Pesticides Monitors, we noted that costing was based upon the manufacturers price, which will need supply efficiencies to be achieved.

We note that leakage is considered by Ofwat as Base and that this is subject to challenge by the Company. We considered leakage as a block of totex and found that the Company was making assumptions about future efficiency gains through innovation and improved operational practices that are costed and understood.

We reviewed the Investment Portfolio to seek line of sight between PCs and expenditure. We found that each PC had expenditure against it or that it was included in the consideration of other PCs. We also

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considered the expenditure portfolio and confirmed the reason why each element was included. Overall, we were content that all bases were covered, but achieving the performance with the included expenditure will rely on cross PC synergies, holistic thinking, good operational practice and effective management.

3.2.3. Impact of PC targets and ODIs on RoRE

We reviewed the make-up of the Return on Regulated Equity (RoRE), with the main focus on the penalties and rewards associated with Performance Commitments. We went through the Company's P10 and P90 assessments made for each Performance Commitment and considered the assessed P10 scenario and the impact of PC targets and ODIs on RoRE. We confirmed that the processes applied contain risk and uncertainty ranges that are reasonably reflective of the data, processes and investment outputs that were used to generate the ODIs.

We noted that the proposed RoRE for the "P10 scenario" was less than 3% and that the RoRE proposals are very skewed towards penalty and there is a limited scope for reward. The P10 for individual PCs has been determined through expert judgement. We considered each and found them to be reasonable, based upon historic performance. A particular PC which received our attention was leakage which had a P10 value significantly below the 2018/19 outturn. The P10 figure appears reasonable against historic leakage. The higher 2018/19 value is a "one-off" caused by a single long running burst trunk main, which has triggered internal actions to avoid a recurrence. The suite of PC performance levels coinciding with the overall "P10 scenario" appeared reasonable and possible.

Appendix

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Appendix A. Audit and Meeting Schedule

Table	Section	Auditor	AW contacts	Data Lead	Date
App2	Section D - Old Definition Supply Interruptions	Jonathan Archer	Ben Gough, Tim Charlesworth	Martin Hall	11-Mar
App2	App2 line 9 Potable mains	Jonathan Archer	Alex Rigby, Patrick Campbell	Allan Winkworth	11-Mar
Leakage - App2 and App5	App2 and App5 - Leakage	Jonathan Archer	Ritchie Carruthers, Mumin Islam Tony Summerscales, Patrick Campbell	Allan Winkworth	11-Mar
Wn1	Wholesale water treatment (explanatory variables) - All	Simon Ingall	Jon Weaver, Mike Collin, Richard Box, Eldos Then, Alex Rigby, Alice Elder, Natalie Fitzpatrick, Karinn Locke, Patrick Campbell	Allan Winkworth	11-Mar
Wn2	Wholesale Water Distribution (explanatory variables)- ALL	Simon Ingall	Alex Rigby, Natalie Fitzpatrick, Richard Box, Eldos Then, Kiran Ruda, Mike Collin, Mumin Islam, Patrick Campbell	Allan Winkworth	11-Mar
WS4	WS4 - Wholesale water other (explanatory variables) 12	Jonathan Archer	Ritchie Carruthers, Mumin Islam	Allan Winkworth	11-Mar
App1, 1a and 1b	All Sections - Performance commitments (PCs) and outcome delivery incentives (ODIs)	Jonathan Archer	Ben Gough , Tim Charlesworth	Martin Hall	12-Mar
App30	Voids	Julian Jacobs	Martin Hall, Jackie Welsh	Pragya Ahikari	12-Mar
App4	App4 – Common metrics for affordability and vulnerability	Julian Jacobs	Liz Freitas, Jackie Welsh, James Tipler, Katy Taqvi	Pragya Ahikari	12-Mar
R1	R1 - Residential retail - All section B	Simon Ingall	Ben Drake, Michael Calabrese	Ratna Unalkat	12-Mar
WS18	WS18 - Explaining the 2019 Final Determination for the water service - Section C	Julian Jacobs	Liz Freitas, Jackie Welsh	Pragya Ahikari	12-Mar
WS3	Wholesale water properties and population	Simon Ingall	Ritchie Carruthers, Mumin Islam	Allan Winkworth	12-Mar
App27	App27 - Financial outcome delivery incentives summary	Jonathan Archer	Martin Hall , Tim Charlesworth	Martin Hall	13-Mar

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Wn6	Wholesale water network plus special cost factors	Jonathan Archer	Martin Hall , Tim Charlesworth	Martin Hall	13-Mar
Wr8	Wr8 - Wholesale water resources special cost factors	Jonathan Archer	Martin Hall , Tim Charlesworth	Martin Hall	13-Mar
WS18	WS18 - Explaining the 2019 Final Determination for	Julian Jacobs	Eddie Lintott and Fiona Waller	Martin Hall	13-Mar

Table	Section	Auditor	AW contacts	Data Lead	Date
	the water service - Section A Line 2				
WS18	WS18 - Explaining the 2019 Final Determination for the water service - Section A Line 1	Julian Jacobs	Ritchie Carruthers, Mumin Islam	Allan Winkworth	13-Mar
WS18	WS18 - Explaining the 2019 Final Determination for the water service - Section B	Julian Jacobs	Alister Leggatt, Ellie Powers	Allan Winkworth	13-Mar
WS18	WS18 - Explaining the 2019 Final Determination for the water service - Section E 7	Julian Jacobs	David Watts, Ellie Powers	Allan Winkworth	13-Mar
WS4	WS4 - Wholesale water other (explanatory variables) 1 + 9-11	Julian Jacobs	Eddie Lintott and Fiona Waller	Martin Hall	13-Mar
WS4	WS4 - Wholesale water other (explanatory variables) 6 - 8	Simon Ingall	Charlotte Sutton, Graham Turk	Allan Winkworth	13-Mar
App3	App3 – Abstraction Incentive Mechanism - surface and ground water abstractions under the AIM threshold	Monica Barker	Ilias Karapanos, Dan Yarker, Affie Panayiotou, Max Gamrat, Dina Pope	Allan Winkworth	17-Mar
App5	App5 - PR14 reconciliation – performance commitments - WA4 (Sustainable Abstraction Reduction) and WA5 (AIM)	Monica Barker	Ilias Karapanos, Dan Yarker, Affie Panayiotou, Max Gamrat, Dina Pope	Allan Winkworth	17-Mar

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Wr1	Wr1 - Wholesale water resources (explanatory variables) - All	Monica Barker	Richard Box, Eldos Then, Jon Weaver, Natalie Fitzpatrick, Alex Rigby, Mike Collin, Nick Honeyball, Patrick Campbell, Karinn Locke, Max Gamrat, Dina Pope	Allan Winkworth	17-Mar
Wr6	Wr6 - Water resources capacity forecasts	Monica Barker	Ritchie Carruthers, Mumin Islam, Max Gamrat, Dina Pope	Allan Winkworth	17-Mar
Wr7	Wr7 - New water resources capacity ~ forecast cost of options beginning in 2020-25 - All lines except 15	Monica Barker	Andrea Farcomeni, Mumin Islam, Max Gamrat, Dina Pope	Allan Winkworth	17-Mar
WS4	WS4 - Wholesale water other (explanatory variables) 2-5	Monica Barker	Andrea Farcomeni, Mumin Islam, Max Gamrat, Dina Pope	Allan Winkworth	17-Mar
R3	R3 - Residential retail ~ further information on bad debt (Block C)	Julian Jacobs	Ben Drake, Michael Calabrese, Dina Pope	Ratna Unalkat	18-Mar

Table	Section	Auditor	AW contacts	Data Lead	Date
WS1	Wholesale water operating and capital expenditure by business unit - PART B lines 1216 and PARTD Line 25	Jonathan Archer	Sarah Sayer, Gerald Doocey, Ratna Unalkat, Michael Calabrese, Dina Pope	Allan Winkworth	18-Mar
WS10	WS10 - Transitional spending in the wholesale water service	Jonathan Archer	Sarah Sayer, Gerald Doocey, Max Gamrat, Dina Pope	Allan Winkworth	18-Mar
WS18	WS18 - Explaining the 2019 Final Determination for the water service - Section D	Julian Jacobs	Martin Hall, Tim Charlesworth, Dina Pope	Martin Hall	18-Mar
WS18	WS18 - Explaining the 2019 Final Determination for the water service - Section E 8	Helen Gavin	Georgina Howell, Grant Wordsworth, Dina Pope	Martin Hall	18-Mar
WS18	WS18 - Explaining the 2019 Final Determination for the water service - Section F	Julian Jacobs	Chris Stavrou, Tim Charlesworth, Dina Pope	Martin Hall	18-Mar

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WS18	WS18 - Explaining the 2019 Final Determination for the water service - Section G	Julian Jacobs	Martin Hall, Tim Charlesworth, Dina Pope	Martin Hall	18-Mar
WS2	WS2 - Wholesale water capital and operating enhancement expenditure by purpose	Jonathan Archer	Sarah Sayer, Gerald Doocy, Max Gamrat, Dina Pope	Allan Winkworth	18-Mar
WS2a	WS2a - Wholesale water cumulative capital enhancement expenditure by purpose	Jonathan Archer	Sarah Sayer, Gerald Doocy, Max Gamrat, Dina Pope	Allan Winkworth	18-Mar
App5	App5 - PR14 reconciliation Performance commitments - WA3 (WAFU)	Jonathan Archer	Charlotte Sutton, Graham Turk, Dina Pope	Dina Pope	19-Mar
App5	App5 - PR14 reconciliation Performance commitments - WA2 (Ave Water Use)	Jonathan Archer	Andrea Farcomeni, Kiran Rude, Mumin Islam, Max Gamrat, Dina Pope	Allan Winkworth	19-Mar
Investment Portfolio - Enhancements		Jonathan Archer, Ellie Derbyshire	Marie Whaley, Tim Charlesworth, Gerald Doocy		25-Mar
App1, App2, App5 and PC/ODI linkages		Jonathan Archer, Ellie Derbyshire	Ben Gough, Tim Charlesworth, Gerald Doocy		26-Mar
Table	Section	Auditor	AW contacts	Data Lead	Date
Full investment portfolio		Jonathan Archer, Ellie Derbyshire	Sarah Sayer, Marie Whaley, Patrick Campbell, Tim Charlesworth, Gerald Doocy		27-Mar
Board Meeting		Jonathan Archer	Board members and Exec members		27-Mar
Board Meeting		Jonathan Archer	Board members and Exec members		29-Mar

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Appendix OC.A1.5

Action ref [AFW.OC.A1](#); [A12](#); [A43](#)

Verve Customer Research Report March 2019



Affinity Water

PR19 Bill Profiling: Acceptability Testing

Online survey

Research Report

March 2019

PR19 Bill Profiling: Acceptability Testing

Report – 11th March 2019

1.1 Background to report

- Verve was commissioned by Affinity Water to undertake survey research as part of a series of work being undertaken to support PR19 and the development of Affinity Water's Business Plan for the period 2020-25 and 2025-30.
- This report is a summary of research into the Acceptability and Affordability; variations for the final plan, with & without inflation and with & without charges for sewerage were tested in the survey.

1.2 Methodology and Sample

- Independent market research agency Verve conducted an online survey of 1,000 Affinity Water customers aged 16+, sourced via an external access panel.
- Fieldwork was conducted between Friday 1st and Friday 8th March 2019.
- Recruitment quotas targeted a representative sample of adults aged 16 and over resident in Affinity Water's eight service areas. The achieved sample profile and the effects of weighting are outlined in the Appendices of this report.
- The survey was designed to provide a representative sample of customers across all areas served by Affinity Water; quotas were placed and weighting was applied to ensure representation from Affinity Water's eight regional Water Resource Zones (WRZ) and across core customer demographics.
 - Please note the survey was designed to provide a representative sample of customers across all areas served by Affinity Water, rather than a representative sample of customers of the three sewerage providers covering the Affinity Water area (Thames Water, Anglian Water, Southern Water) or within each of Affinity Water's eight Water Resource Zones.
 - The number of customers served by the three sewerage providers and within each WRZ is proportional to the size of the population within each area.

1.3 Considerations for study design and interpretation of data

- The study was designed in conjunction with Verve and Affinity Water to ensure alignment with accepted best practice and guidelines for conducting social research.
- The required timelines for delivery of results naturally drove some pragmatic decisions as to study design; these are discussed below.
- Verve is an independent market research agency, member of the MRS Society and is ISO27001 certified.
 - Verve adheres to MRS Code of Conduct in research - the professional standards that all research practitioners must maintain.
 - This is a comprehensive set of guidelines which has been established for c. 60 years, last updated in 2014 (currently being updated in wake of GDPR for April '19).
 - While provided guidelines are not definitive, they set out accepted best practice across the research lifecycle from inception to design and execution to final use and interpretation.
 - The Code of Conduct is designed to be relevant for all market, social and opinion research.
- The study was designed to take into consideration a number of guideline areas set out by the MRS where surveys are used for consultation (i.e. where seeking the views of the public on an issue of local concern, such as the provision of new services or amenities, or a planning proposal) which we have summarised below:
 - **Independence**
 - The survey was created in an independent and neutral manner.
 - Where information was provided to inform people's responses it was clearly delineated from the rest of the questionnaire, delivered in neutral language and set out as fact rather than opinion.
 - **Clarity**
 - The layout and design of the questionnaire was structured clearly with clear sections and introductory text for new information / areas.
 - The questions themselves were designed to be clear and avoid jargon - where technical terms were included, explanatory text was provided.
 - **Fairness**
 - The survey was designed to provide a representative sample of customers across all areas served by Affinity Water (please see note below on vulnerability).

- **Respondent rights**
 - The survey explained to respondents the purpose of the survey and how the information would be used.
 - The questionnaire was kept to 15 minutes in length; the expected length of the survey was outlined in advance, so participants knew what was expected of them.
 - Survey filters and sample cells were used to help to reduce survey length / repetition for individual respondents, whilst also help to provide independent analysis on key areas (i.e. the sample was split into separate cells for the two bill profiles, therefore allowing for a monadic view on each profile).
 - Information collected in the survey was treated anonymously and confidentially.
- **Presenting results**
 - This report presents the facts and results from the survey in a clear and neutral manner. Opinion and inference has been minimised for the purposes of the report.
- The guidelines for consultation work state that all customer groups who will be affected by the decision are included in the sample. For pragmatic reasons of scheduling and efficiencies, the deliberate decision was made to use an online sample for the survey.
 - An online survey may, by its nature, exclude certain cohorts of customers, specifically a proportion of those classified as living in vulnerable circumstances.
 - The definition of vulnerability is a complex and dynamic one, as it includes permanent, fluctuating and short-term vulnerabilities. This makes inclusion of all groups a challenge for any research.
 - However, the nature of the online approach inevitably means the exclusion of customers who do not have access to internet services.
 - Figures from 2016 indicate that 93% of UK population are currently online, so while the majority of customer profiles are included - the survey was designed to ensure representation from across social grades / income and captured disability at a high level - there are a percentage of customers who will have been omitted by the nature of the methodology.
 - Additional work using alternative methodologies (i.e. face to face interviewing) would
 - be required to include the opinions of these groups.
 - In addition, the survey was also provided in English only and therefore did not specifically cater for groups for whom English is not their first language. However, customers would have been able to translate via their browser to overcome this.

- Finally, we should note that any survey will only ever generate estimates of the 'truth'; the latter of which would only be available if a complete census of customers was undertaken.
 - As a result, findings are subject to sampling tolerances and statistical confidence intervals, shown in the Appendices.
 - Any regions with a base size of under 100 have not been used for analysing the results of the survey.
 - Survey data has been weighted to match the profile of the population living in Affinity Water areas by age and WRZ, based on 2011 Census data.
 - Where percentages do not sum to 100, this is due to rounding of figures.
- Despite the above limitations which have been called out above, Verve and Affinity Water agreed that an online survey was the most suitable methodology to achieve a representative sample within the set timescale.

1.4 Survey Structure

- The survey was designed to capture customer's views on two different bill profile plans for 2020-2025 (AMP7) and 2025-30 (AMP8).
 - The survey presented half of the participants (500) with bill profile 1 and the other half (500) with profile 2. The sample was split on a 'least fill' basis to ensure consistency of profile within each cell. The achieved sample for each profile so far is outlined at the end of this document.
 - Each cell saw, in order:
 - A Clean Water plan & bill context for 2020-25 (AMP7) over the five-year billing period, with and without inflation.
 - A Clean Water plan & bill context for 2025-30 (AMP8) over the five-year billing period with and without inflation.
 - A combined Clean & Waste water bill profile, with and without inflation – as appropriate for the individual's sewerage provider.
 - Each bill profile was rated for acceptability and affordability.

2. Executive Summary

- The survey data indicates that both Profile 1 and Profile 2 are rated highly on the acceptance and affordability metrics across the 2020-2025 (AMP7) clean water plan and the 2025-2030 (AMP8) clean water plans.

- All were rated 'very' or 'fairly' acceptable (top 2 box from 5 point scale) by between 74% and 81% of customers and 'very' or 'fairly' affordable (top 2 box from 5 point scale) by between 72% and 78% of customers.
 - Although not directly comparable with previous surveys conducted in these areas this level of acceptability is broadly in line with plans tested with Ipsos MORI in 2018.
- When looking at AMP7 (2020-25), Profile 1 and Profile 2 scores are consistent across acceptability and affordability, no significant differences are identified
- When looking at AMP8 (2025-30) Profile 2 is significantly more acceptable and slightly more affordable than Profile 1.
 - Please note the Profile 2 positive scores for AMP8 (2025-30) may be due to the ordering of the stimulus and the curvature of the graph. The AMP7 (2020-25) Profile 2 stimulus, where the line graph visually shows a steady increase over time, is shown to customers first. The AMP8 (2025-2030) Profile 2 stimulus, where the line graphic visually shows more of a flat line, is shown to customers second.
- After inflation is added, acceptability and affordability falls significantly, this results in similar levels of acceptability for both AMP7 (2020-25) and AMP8 (2025-30) across both profiles (between 49% and 54%).
- The 2020-2025 combined clean and waste water plans generally experience lower acceptance and affordability than the clean water plans, with around two thirds of customers rating the plans as very or fairly acceptable and affordable.
 - Looking again at the two individual profiles, profile 1 scores significantly more highly in terms of affordability (67% vs 59% for profile 2).
 - The impact of inflation is also evident for the combined clean and waste water plans with acceptability and affordability falling significantly across both profiles once inflation is added.

3.1 Response to Clean Water plan & bill profile - 2020-25 (AMP7)

- Respondents were given a description of the household water bill business planning process:
 - *Household water bills are set every five years. They are based on an agreement between each water company and Ofwat, the Government regulator.*
 - *In setting future water bills, Affinity Water and Ofwat take customer views on board and also ensure that legally required standards for water services are met e.g. ensuring tap water is safe to drink.*
- The survey then presented customers with a business clean water plan overview including details of projected annual average household bills over the 2020-25 five-year billing period. The survey presented half of the participants (500) with bill profile 1 and the other half (500)

with profile 2. The sample was split on a ‘least fill’ basis to ensure consistency of profile within each cell. Customers were then asked whether or not they found the presented plan to be acceptable and whether they thought the plan was affordable. Section 3.1 reviews the findings of these questions.

- The details of the plan given to participants were as follows:

Figure 1: Clean Water Plan 2020-2025 (No Inflation) – Profile 1 Stimulus

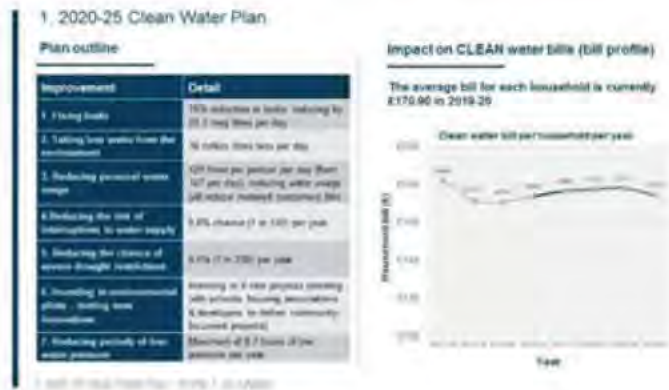
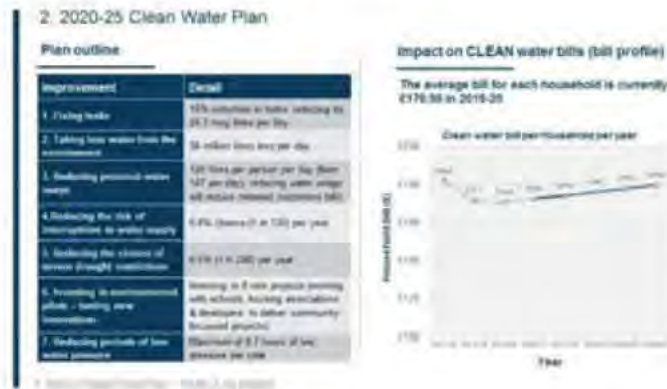


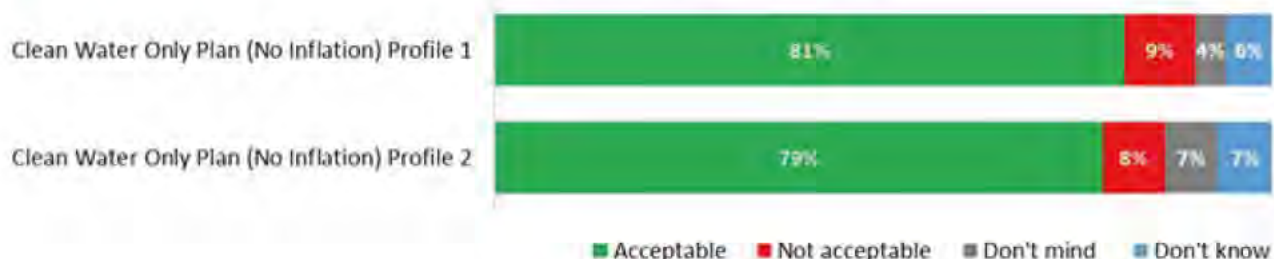
Figure 2: Clean Water Plan 2020-2025 (No Inflation) – Profile 2 Stimulus



- Both tested AMP7 Clean Water plans / bill profiles score highly on acceptability with customers.
 - Profile 1 scores very slightly higher for acceptability when compared to Profile 2 but the difference was not significant.
 - Over eight in ten (81%) rate profile 1 as very or fairly acceptable and just under eight in ten (79%) rated profile 2 very or fairly acceptable.
 - In terms of top box scores, just under a quarter (21%) of customers felt that both profile 1 and profile 2 were ‘very acceptable’.

- Reminder: customers were only exposed to one bill profile throughout the survey; they did not see the other profile and could therefore not compare bill profiles directly.

Figure 3: Clean Water Only Plan 2025-2030 (No Inflation) - Acceptability



Base: 1000 /1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

- Among those that thought the Clean Water Plans 2020-2025 (AMP7) were not acceptable the following reasons were given:
 - Customers who were shown Profile 1 thought it was too expensive and believe the cost of improvements should not be passed down to them.
 - Customers who were shown Profile 2 also thought the plan was too expensive, especially when considering the target of reducing leaks is only 15%.
- Acceptability of Clean Water Plan 2020-2025 (AMP7) Profile 1 is consistent across demographics, no significant differences identified. (shown in table 4 below).

Table 4: Clean Water Only Plan 2020-2025 (No Inflation) - Profile 1 Acceptability

Clean Water Only Plan 2020-25 P1 (No Inflation)	Very acceptable	Fairly acceptable	Not very acceptable	Not acceptable at all	Don't mind	Acceptable (NET)
Total	21%	59%	8%	1%	4%	81%
<i>Male</i>	20%	60%	10%	2%	4%	80%
<i>Female</i>	23%	59%	6%	0%	4%	82%
<i>Aged 16-34</i>	24%	59%	9%	0%	3%	82%
<i>Aged 35-54</i>	19%	62%	7%	2%	5%	81%
<i>Aged 55+</i>	23%	57%	9%	2%	4%	80%
<i>ABC1</i>	21%	61%	7%	1%	4%	82%
<i>C2DE</i>	22%	57%	9%	2%	4%	80%
<i>Benefits</i>	23%	55%	8%	2%	2%	78%
<i>No Benefits</i>	21%	62%	7%	1%	5%	82%
<i>Have meter</i>	24%	61%	5%	1%	4%	85%
<i>No meter</i>	21%	58%	11%	1%	4%	78%
<i>Main bill payer</i>	22%	59%	8%	2%	4%	81%
<i>Joint bill payer</i>	19%	61%	7%	0%	4%	81%
<i>Colne</i>	18%	55%	15%	0%	1%	73%

<i>Lee</i>	24%	57%	7%	0%	5%	82%
<i>Pinn</i>	21%	58%	10%	2%	3%	79%
<i>Wey</i>	20%	63%	3%	3%	7%	83%

- Acceptability of Clean Water Plan 2020-2025 (AMP7) Profile 2 is consistent across most demographics, however, when looking at Water Zones, those living in the Wey find the plan significantly less acceptable than the total; 66% fairly or very acceptable compared to the total 79%. Instead, those living in the Wey water zone are significantly more likely to fall into the 'don't mind' group (16% vs 7% total) (shown in table 5 below).

Table 5: Clean Water Only Plan 2020-2025 (No Inflation) - Profile 2 Acceptability

Clean Water Only Plan 2020-25 P2 (No Inflation)	Very acceptable	Fairly acceptable	Not very acceptable	Not acceptable at all	Don't mind	Acceptable (NET)
<i>Total</i>	21%	58%	6%	2%	7%	79%
<i>Male</i>	21%	61%	7%	2%	5%	81%
<i>Female</i>	21%	56%	4%	2%	8%	76%
<i>Aged 16-34</i>	20%	64%	5%	1%	6%	84%
<i>Aged 35-54</i>	18%	58%	6%	2%	6%	75%
<i>Aged 55+</i>	24%	53%	6%	2%	9%	78%
<i>ABC1</i>	21%	57%	8%	3%	6%	78%
<i>C2DE</i>	21%	60%	2%	0%	8%	81%
<i>Benefits</i>	29%	46%	9%	1%	9%	75%
<i>No Benefits</i>	19%	62%	4%	2%	6%	81%
<i>Have meter</i>	19%	63%	6%	2%	5%	82%
<i>No meter</i>	24%	54%	6%	2%	8%	78%
<i>Main bill payer</i>	23%	58%	5%	2%	6%	81%
<i>Joint bill payer</i>	16%	58%	6%	1%	8%	74%
<i>Colne</i>	21%	62%	2%	5%	6%	84%
<i>Lee</i>	22%	63%	3%	2%	7%	85%
<i>Pinn</i>	16%	62%	4%	1%	6%	79%
<i>Wey</i>	24%	41%	10%	1%	16%	66%

- Customers were then asked whether or not they found the presented plan to be affordable, and Profile 1 also scored slightly higher in terms of affordability when compared to Profile 2 but the difference was not significant.
 - Just under three quarters (76%) rate profile 1 very or fairly affordable, compared to 72% rating profile 2 very or fairly affordable.

Figure 6: Clean Water Only Plan 2020-2025 (No Inflation) - Affordability



Base: 1000 /1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

Σ Affordability of Profile 1 is consistent across most demographics. However, the results suggest that the bill is considered significantly less affordable for customers who do received benefits; 63% agreed it was a fairly or very affordable proposal, compared with 76% overall. In comparison the bill is significantly more affordable for those living in Lee; 85% agreed it was a fairly or very affordable proposal compared with 76% overall.

Table 7: Clean Water Only Plan 2020-2025 (No Inflation) - Profile 1 Affordability

Clean Water Only Plan 2020-25 P1 (No Inflation)	Very affordable	Fairly affordable	Not very affordable	Not affordable at all	Don't mind	Affordable (NET)
Total	17%	59%	13%	3%	3%	76%
Male	22%	58%	10%	3%	2%	80%
Female	13%	59%	16%	2%	3%	72%
Aged 16-34	10%	67%	11%	3%	3%	77%
Aged 35-54	19%	52%	17%	2%	3%	71%
Aged 55+	22%	59%	9%	3%	2%	81%
ABC1	18%	59%	11%	3%	3%	76%
C2DE	16%	59%	16%	2%	2%	75%
Benefits	10%	53%	19%	3%	3%	63%
No Benefits	19%	60%	11%	2%	3%	80%
Have meter	19%	57%	13%	3%	2%	77%
No meter	16%	60%	13%	2%	4%	76%
Main bill payer	18%	59%	13%	2%	3%	76%
Joint bill payer	16%	59%	13%	5%	1%	74%
Colne	22%	52%	12%	4%	3%	74%
Lee	21%	64%	8%	1%	1%	85%
Pinn	16%	60%	16%	1%	1%	76%
Wey	19%	59%	9%	1%	6%	78%

Σ For Profile 2 affordability is consistent across different groups of customers (shown Table 8 below). No significant differences identified across sub groups.

Table 8: Clean Water Only Plan 2020-2025 (No Inflation) - Profile 2 Affordability

Clean Water Only Plan 2020-25 P2 (No Inflation)	Very affordable	Fairly affordable	Not very affordable	Not affordable at all	Don't mind	Affordable (NET)
Total	18%	54%	14%	3%	3%	72%
Male	18%	56%	14%	4%	2%	74%
Female	18%	51%	15%	3%	4%	69%
Aged 16-34	21%	50%	18%	1%	3%	70%
Aged 35-54	15%	53%	16%	5%	4%	68%
Aged 55+	19%	57%	10%	4%	2%	76%
ABC1	20%	50%	14%	4%	4%	70%
C2DE	15%	59%	15%	2%	1%	74%
Benefits	21%	48%	19%	3%	4%	69%
No Benefits	18%	56%	14%	3%	3%	73%
Have meter	19%	52%	14%	4%	3%	71%
No meter	19%	59%	14%	3%	1%	78%
Main bill payer	20%	51%	16%	3%	3%	71%
Joint bill payer	14%	60%	11%	3%	2%	74%
Colne	22%	58%	11%	3%	0%	80%
Lee	23%	46%	18%	3%	3%	70%
Pinn	20%	54%	17%	2%	2%	74%
Wey	11%	62%	10%	1%	7%	73%

3.2 Response to Inflation Clean Water plan & bill profile - 2020-25 (AMP7)

- After respondents were shown the pre-inflation clean water plan and bill profile for 2020-25 (AMP7) they were shown the profile again but this time with inflation. Respondents were given a description of inflation first:
 - *Inflation is the rate of increase in prices for goods and services. It is expected that there will be a 2% increase to household water bills each year due to inflation. This increase is in line with expectations on inflation rates for goods and services in general, not just for water.*
 - *When considering the impact of inflation on bills please bear in mind that incomes and pensions can also rise in line with inflation, which can offset the increase in the cost of goods and services.*
- Again, the survey presented half of the participants (500) with bill profile 1 and the other half (500) with profile 2. Customers were then asked again whether or not they found the presented plan to be acceptable. Section 3.2 reviews the findings of these questions.

The details of the plan given to participants were as follows:

Figure 9: Clean Water Plan 2020-2025 (Inflation) – Profile 1 Stimulus

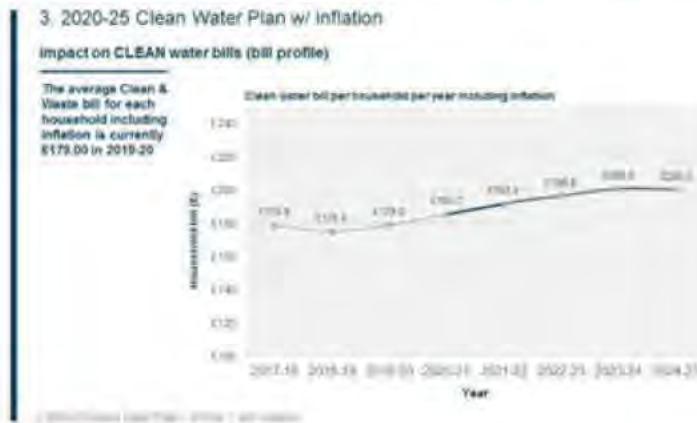
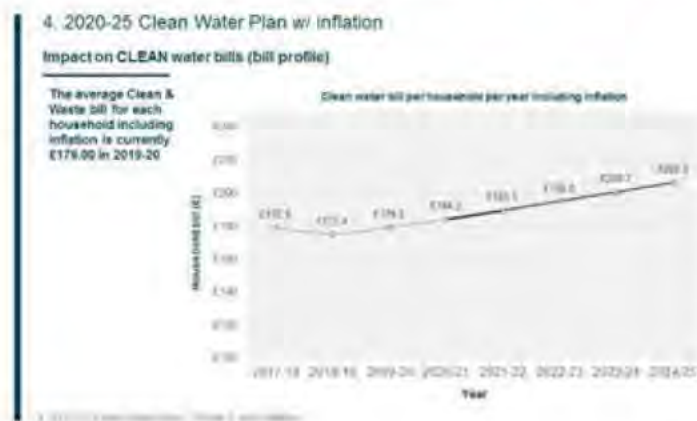
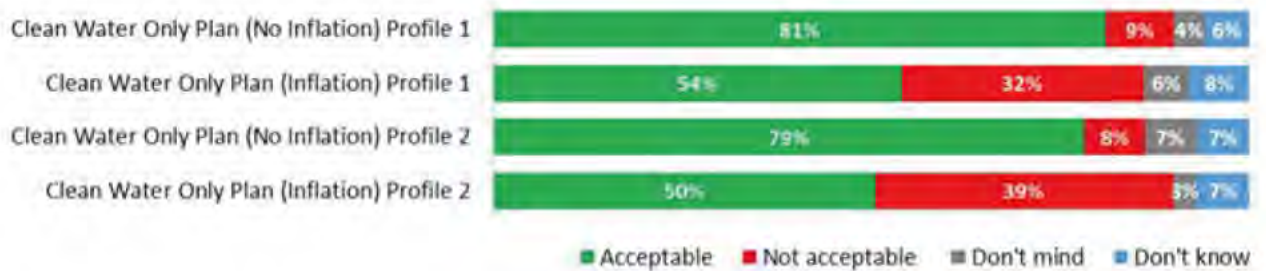


Figure 10: Clean Water Plan 2020-2025 (Inflation) – Profile 2 Stimulus



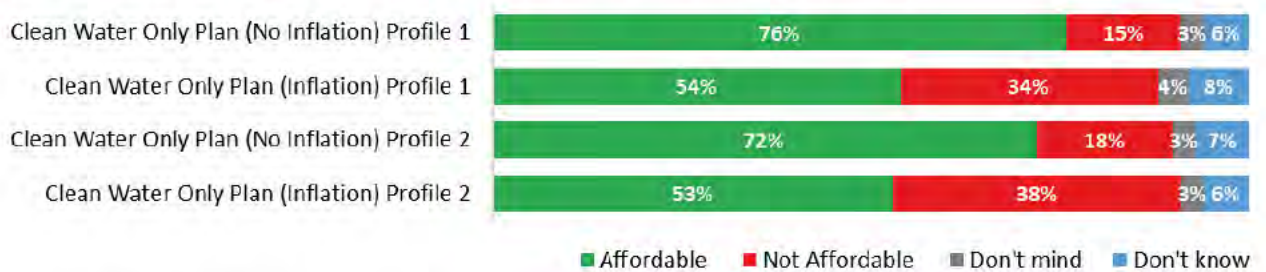
- As seen in previous research, there is a significant drop in stated acceptability and affordability when the bills including inflation were shown, suggesting the term ‘inflation’ continues to have a negative impact; this drop puts responses to the two profiles at similar levels for acceptability and affordability.
 - 81% rating Profile 1 pre-inflation acceptable, significantly dropped to 54% acceptability when inflation is added (-27%).
 - 76% rating Profile 1 pre-inflation affordable significantly dropped to 54% affordability when inflation was added (-22%).
 - 79% rating Profile 2 pre-inflation acceptable significantly dropped to 50% acceptability when inflation was added (-29%).
 - The 72% who found profile 2 pre-inflation affordable significantly dropped to 53% affordability when inflation was added (-19%).

Figure 11: Clean Water Plan 2020-2025 (No Inflation vs Inflation) – Acceptability



Base: 1000 /1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

Figure 12: Clean Water Plan 2020-2025 (No Inflation vs Inflation) – Affordability



Base: 1000 /1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

4.1 Response to Clean Water plan & bill profile - 2025-30 (AMP8)

- Next the survey then presented customers with a business clean water plan overview including details of projected annual average household bills over the 2025-30 five year billing period. The survey presented half of the participants (500) with bill profile 1 and the other half (500) with profile 2. The sample was split on a 'least fill' basis to ensure consistency of profile within each cell. Customers were then asked whether or not they found the presented plan to be acceptable. Section 4.1 reviews the findings of these questions.

The details of the plan given to participants were as follows:

Figure 13: Clean Water Plan 2025-2030 (No Inflation) – Profile 1 Stimulus

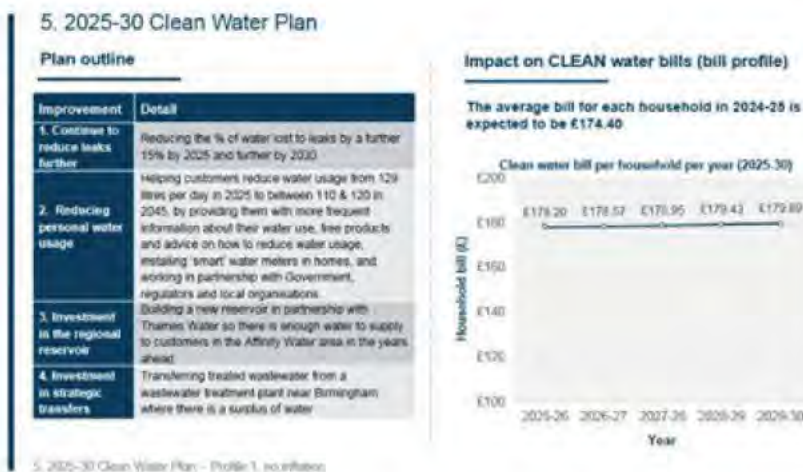
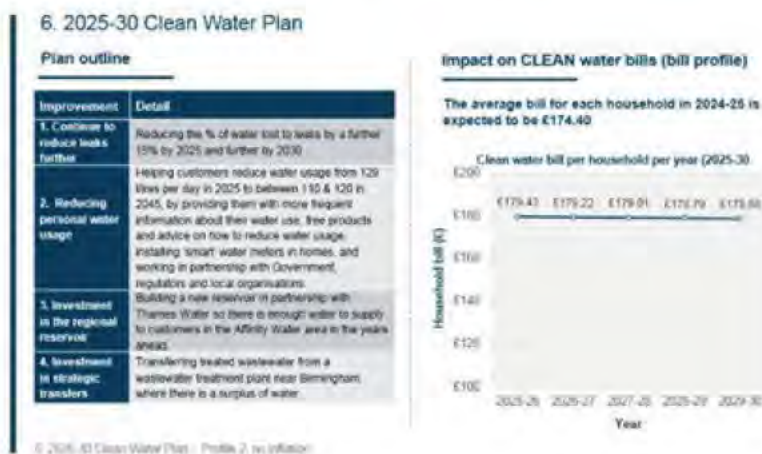
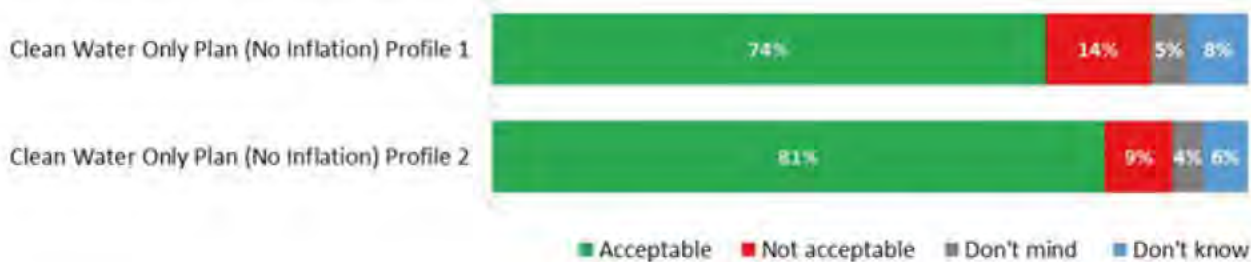


Figure 14: Clean Water Plan 2025-2030 (No Inflation) – Profile 2 Stimulus



- Both tested AMP8 Clean Water plans / bill profiles score highly on acceptability and affordability with customers, however Profile 2 was considered to be significantly more acceptable than Profile 1.
 - 74% found Profile 1 to be very or fairly acceptable and 81% found profile 2 to be very or fairly acceptable.
- Customers also found Profile 2 to be more affordable than profile 1 but not significantly so.
 - Just under three quarters (73%) found Profile 1 to be very or fairly affordable and 78% found Profile 2 to be very or fairly affordable.
- Reminder: customers were only exposed to one bill profile throughout the survey; they did not see the other profile and could therefore not compare bill profiles directly.

Figure 15: Clean Water Plan 2025-2030 (No Inflation) – Acceptability



Base: 1000 /1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

- Among those that thought the Clean Water Plans 2025-2030 (AMP8) were not acceptable the following reasons were given:
 - Customers who felt Profile 1 was not acceptable thought the increased price of the water bill was not justified when water leakage rates are still high. Customers also react negatively to the proposition they will have to reduce their water usage.
 - Customers who felt Profile 2 was not acceptable were concerned that water leakages are only slightly reduced when the costs of the water bill remain high.

Figure 16: Clean Water Plan 2025-2030 (No Inflation) – Affordability



Base: 1000 /1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

- For Profile 1 acceptability is relatively similar across different groups of customers (shown Table 17 below). However, customers living in the Pinn Water Zone are significantly less accepting of the bill, 62% find Profile 1 fairly or very acceptable compared to 74% total.

Table 17: Clean Water Only Plan 2025-2030 (No Inflation) - Profile 1 Acceptability

Clean Water Only Plan 2025-30 P1 (No Inflation)	Very acceptable	Fairly acceptable	Not very acceptable	Not acceptable at all	Don't mind	Acceptable (NET)
Total	22%	52%	11%	3%	5%	74%
Male	26%	51%	9%	3%	4%	77%
Female	18%	52%	12%	2%	7%	70%
Aged 16-34	18%	52%	13%	2%	6%	69%
Aged 35-54	22%	52%	9%	3%	5%	75%
Aged 55+	25%	51%	12%	3%	4%	77%
ABC1	22%	50%	11%	2%	6%	71%
C2DE	22%	55%	11%	4%	3%	77%
Benefits	21%	50%	5%	8%	4%	71%
No Benefits	23%	52%	13%	1%	6%	75%
Have meter	23%	50%	12%	3%	4%	73%
No meter	23%	56%	9%	1%	5%	78%
Main bill payer	23%	49%	11%	3%	6%	72%
Joint bill payer	19%	58%	12%	1%	3%	77%
Colne	31%	44%	14%	2%	3%	75%
Lee	25%	56%	4%	0%	5%	81%
Pinn	18%	44%	18%	5%	5%	62%
Wey	17%	55%	12%	3%	6%	72%

- For Profile 2 acceptability is consistent across different groups of customers (shown Table 18 below). No significant differences identified across sub groups.

Table 18: Clean Water Only Plan 2025-2030 (No Inflation) - Profile 2 Acceptability

Clean Water Only Plan 2025-30 P2 (No Inflation)	Very acceptable	Fairly acceptable	Not very acceptable	Not acceptable at all	Don't mind	Acceptable (NET)
Total	24%	56%	7%	2%	4%	81%
Male	25%	55%	7%	3%	5%	81%
Female	24%	57%	7%	1%	3%	81%
Aged 16-34	27%	62%	4%	3%	1%	89%
Aged 35-54	23%	55%	7%	2%	4%	78%
Aged 55+	24%	52%	11%	1%	7%	76%
ABC1	27%	56%	6%	3%	4%	83%
C2DE	21%	57%	9%	0%	4%	78%
Benefits	23%	55%	8%	2%	7%	78%
No Benefits	25%	57%	7%	2%	3%	83%
Have meter	26%	58%	5%	2%	4%	84%
No meter	25%	56%	9%	1%	5%	81%
Main bill payer	24%	56%	7%	2%	5%	80%
Joint bill payer	25%	56%	6%	0%	3%	82%
Colne	26%	58%	5%	5%	4%	84%
Lee	33%	51%	5%	2%	6%	85%
Pinn	22%	56%	11%	0%	2%	78%

- | | | | | | | | |
|--|------------|-----|-----|----|----|----|-----|
| | Wey | 20% | 57% | 5% | 3% | 8% | 77% |
|--|------------|-----|-----|----|----|----|-----|
- For Profile 1 affordability is relatively similar across different groups of customers (shown Table 19 below). No significant differences identified across sub groups.

Table 19: Clean Water Only Plan 2025-2030 (No Inflation) - Profile 1 Affordability

Clean Water Only Plan 2025-30 P1 (No Inflation)	Very affordable	Fairly affordable	Not very affordable	Not affordable at all	Don't mind	Affordable (NET)
Total	21%	52%	13%	3%	5%	73%
Male	26%	53%	11%	3%	1%	79%
Female	16%	51%	15%	3%	8%	67%
Aged 16-34	17%	50%	14%	3%	8%	67%
Aged 35-54	21%	53%	12%	3%	5%	75%
Aged 55+	24%	52%	13%	3%	2%	77%
ABC1	21%	51%	11%	4%	6%	72%
C2DE	21%	54%	16%	1%	3%	74%
Benefits	20%	43%	21%	3%	3%	62%
No Benefits	22%	54%	11%	3%	5%	77%
Have meter	27%	47%	13%	4%	4%	74%
No meter	15%	60%	11%	2%	5%	76%
Main bill payer	23%	50%	13%	2%	4%	73%
Joint bill payer	16%	56%	12%	6%	7%	72%
Colne	23%	48%	10%	5%	3%	71%
Lee	19%	62%	6%	2%	5%	81%
Pinn	26%	40%	21%	4%	3%	66%
Wey	24%	51%	12%	1%	7%	75%

- As with Profile 1, Profile 2 affordability is relatively similar across different groups of customers (shown Table 20 below). No significant differences identified across sub groups.

Table 20: Clean Water Only Plan 2025-2030 (No Inflation) - Profile 2 Affordability

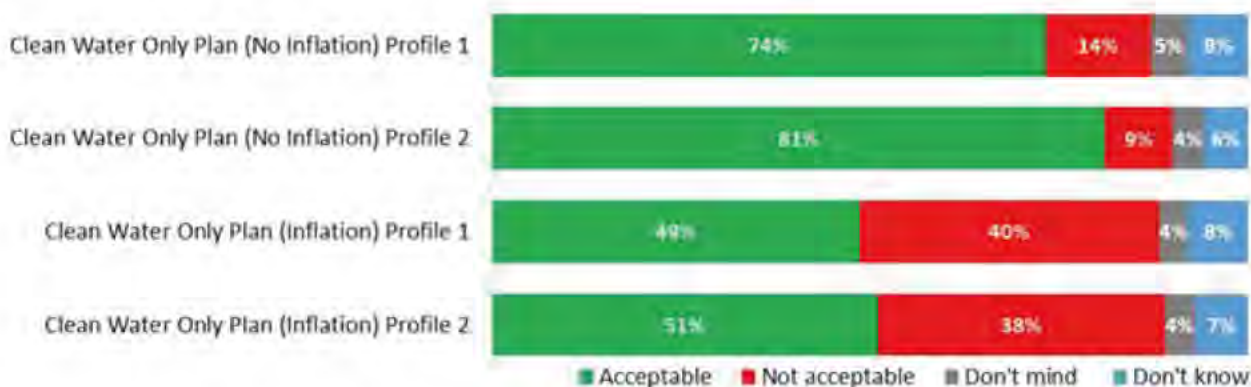
Clean Water Only Plan 2025-30 P2 (No Inflation)	Very affordable	Fairly affordable	Not very affordable	Not affordable at all	Don't mind	Affordable (NET)
Total	25%	54%	9%	3%	3%	78%
Male	26%	54%	8%	5%	3%	80%
Female	23%	54%	9%	2%	3%	77%
Aged 16-34	28%	53%	6%	4%	2%	81%
Aged 35-54	23%	54%	11%	2%	2%	77%
Aged 55+	23%	53%	9%	3%	4%	76%
ABC1	28%	50%	8%	3%	4%	78%
C2DE	19%	60%	10%	3%	1%	79%
Benefits	23%	49%	14%	2%	4%	72%
No Benefits	25%	56%	8%	3%	3%	81%
Have meter	28%	50%	9%	4%	3%	78%
No meter	23%	61%	6%	3%	3%	84%
Main bill payer	27%	51%	10%	3%	3%	78%

<i>payer</i>						
<i>Joint bill</i>	19%	61%	5%	3%	3%	80%
<i>payer</i>						
<i>Colne</i>	34%	48%	9%	6%	2%	81%
<i>Lee</i>	34%	44%	10%	2%	5%	78%
<i>Pinn</i>	20%	62%	8%	0%	1%	83%
<i>Wey</i>	21%	55%	6%	5%	3%	76%

4.2 Response to Inflation Clean Water plan & bill profile - 2025-30 (AMP8)

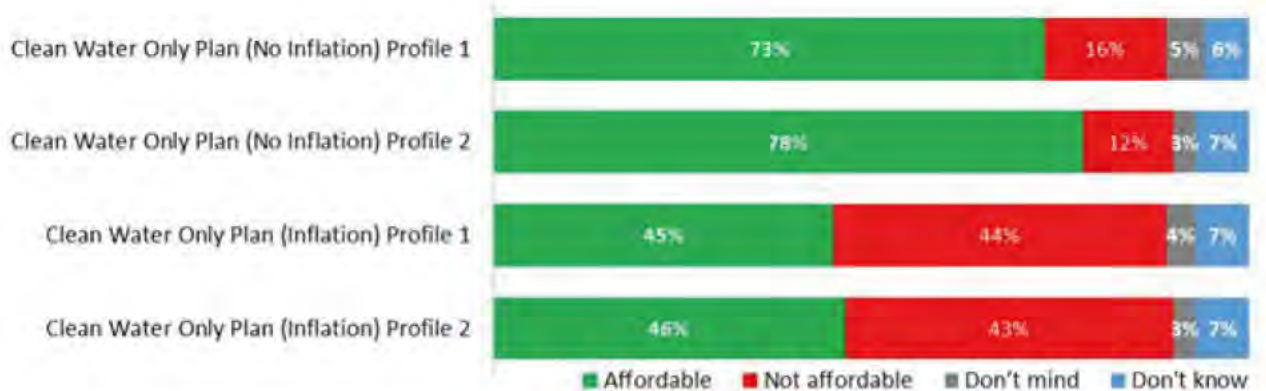
- As with the 2020-25 plan, the bill including inflation was presented to participants. Again, results show a significant drop in perceived acceptability and affordability:
 - 74% rating profile 1 pre-inflation acceptable significantly dropped to 49% acceptability when inflation was added (-25%).
 - 73% rating profile 1 pre-inflation affordable significantly dropped to 45% affordability when inflation was added (-28%).
 - 81% rating profile 2 pre-inflation acceptable, significantly dropped to 51% acceptability when inflation was added (-30%).
 - 78% rating profile 2 pre-inflation affordable significantly dropped to 46% affordability when inflation was added (-32%).

Figure 21: Clean Water Plan 2025-2030 (No Inflation vs Inflation) – Acceptability



Base: 1000 /1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

Figure 22: Clean Water Plan 2025-2030 (No Inflation vs Inflation) – Affordability



- Base: 1000 /1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

5.1 Response to Clean and Waste Water Bill Profiles

- Respondents were given a description of waste water services and fit with the household water bill business planning process
 - *You pay Affinity Water for WASTE water services, but they pass this part of the bill on to Thames/ Anglian/ Southern. The bills they set are also based on an agreement with Ofwat, the Government regulator.*
- Respondents were shown a combined clean and waste water bill from 2020 to 2025 dependant on their waste water provider. The survey presented half of the participants (500) with bill profile 1 and the other half (500) with profile 2. The sample was split on a 'least fill' basis to ensure consistency of profile within each cell. Customers were then asked whether or not they found the presented plan to be acceptable. Section 5.1 reviews the findings of these questions.
- The details of the plan given to participants were as follows:

Figure 23: Complete Water Bill Information (No Inflation) – Profile 1 (Thames Water)

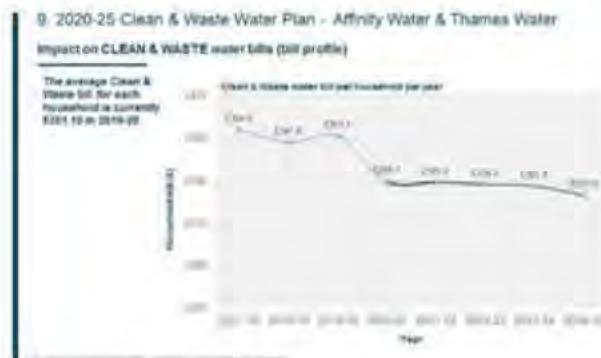


Figure 24: Complete Water Bill Information (No Inflation) – Profile 1 (Anglian)



Figure 25: Complete Water Bill Information – Profile 1 (Southern)

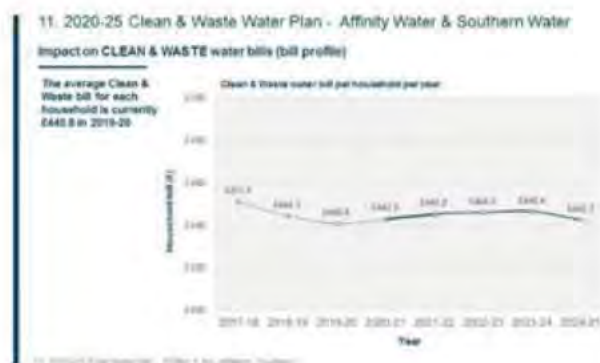


Figure 26: Complete Water Bill Information (No Inflation) – Profile 2 (Thames Water)



Figure 27: Complete Water Bill Information (No Inflation) – Profile 2 (Anglian)

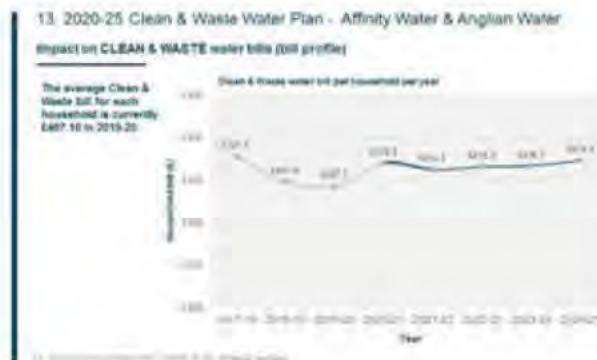
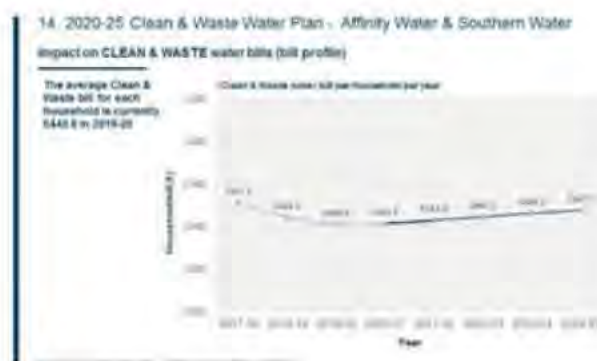


Figure 28: Complete Water Bill Information – Profile 2 (Southern)



- Levels of stated acceptability for combined clean and waste water bills from 2020-2025 are generally lower, but, **both profiles receive similar levels of acceptance rating by customers** with each plan rated very or fairly acceptable by around two thirds overall. Profile 1 is considered to be slightly more acceptable but not significantly so.
 - 67% rate Profile 1 as very or fairly acceptable.
 - 65% rate Profile 2 as very or fairly acceptable.
 - Reminder: customers were only exposed to one bill profile throughout the survey; they did not compare bill profiles directly.

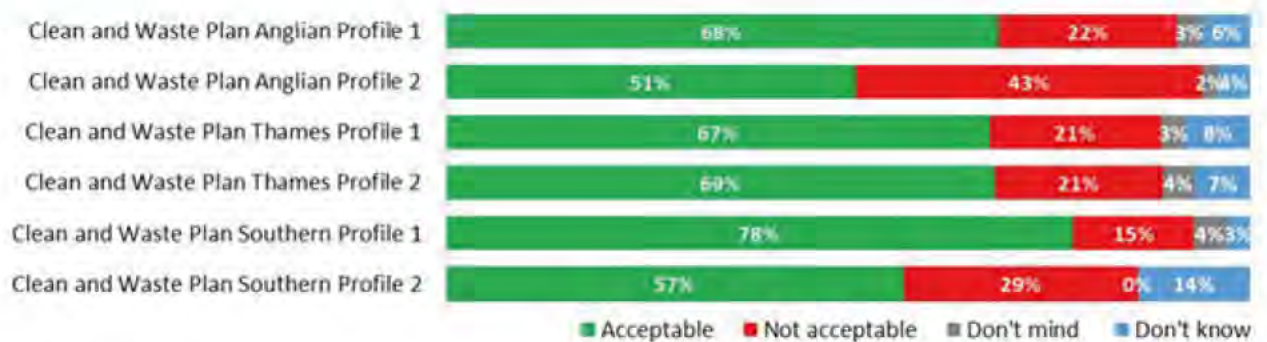
Figure 29: Clean and Waste Water Plans (No Inflation) – Combined Acceptability



Base: 1000 /1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

- When comparing results by sewerage provider acceptability is consistent for Profile 1:
 - 67% of Thames customers feel that Profile 1 is very or fairly acceptable, 68% of Anglian feel that Profile 1 is very or fairly acceptable.
- But profile 2 tells a different story with Thames customers significantly more accepting of the combined clean and waster bill than Anglian customers.
 - 69% of Thames customers feel that Profile 2 is very or fairly acceptable, but only just over half (51%) of Anglian customers feel that Profile 2 is very or fairly acceptable.
- Please not that due to low base sizes for Southern we were unable to comment on the results but have included the data in figure 30 as a reference.

Figure 30: Clean and Waste Water Plans (No Inflation) – Acceptability by Sewerage Company



Base: Thames P1 381 /1000, Thames P2 385/1000, Anglian P1 67/1000, Anglian P2 64/1000, Southern P1 32/1000, Southern P2 23/1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

- For Profile 1 clean and waste water acceptability is relatively similar across different groups of customers (shown Table 31 below). However, customers aged 35-54 are significantly less accepting of the bill, 59% find Profile 1 fairly or very acceptable compared to 67% total.

Table 31: Clean & Waste Water Plans (No Inflation) – Profile 1 Acceptability

Clean & Waste Water Only Plan P1 (No Inflation)	Very acceptable	Fairly acceptable	Not very acceptable	Not acceptable at all	Don't mind	Acceptable (NET)
<i>Total</i>	26%	41%	13%	8%	3%	67%
<i>Male</i>	32%	38%	12%	7%	4%	70%
<i>Female</i>	20%	44%	14%	9%	3%	65%
<i>Aged 16-34</i>	28%	46%	8%	8%	3%	74%
<i>Aged 35-54</i>	23%	35%	20%	7%	4%	59%
<i>Aged 55+</i>	27%	45%	10%	9%	2%	72%
<i>ABC1</i>	28%	43%	12%	6%	3%	71%
<i>C2DE</i>	23%	39%	16%	10%	3%	63%
<i>Benefits</i>	15%	43%	15%	11%	1%	58%
<i>No Benefits</i>	30%	42%	11%	7%	4%	71%
<i>Have meter</i>	29%	43%	13%	8%	2%	72%
<i>No meter</i>	24%	40%	14%	7%	3%	65%
<i>Main bill payer</i>	24%	41%	14%	8%	4%	65%
<i>Joint bill payer</i>	31%	42%	10%	7%	1%	74%
<i>Colne</i>	38%	31%	13%	5%	1%	70%
<i>Lee</i>	22%	46%	10%	7%	7%	69%
<i>Pinn</i>	20%	47%	8%	15%	3%	67%
<i>Wey</i>	28%	42%	8%	8%	1%	71%

- For Profile 2 clean and waste water acceptability is relatively similar across different groups of customers (shown Table 32 below). No significant differences identified across sub groups.

Table 32: Clean & Waste Water Plans (No Inflation) - Profile 2 Acceptability

Clean & Waste Water Only Plan P2 (No Inflation)	Very acceptable	Fairly acceptable	Not very acceptable	Not acceptable at all	Don't mind	Acceptable (NET)
<i>Total</i>	23%	42%	16%	8%	3%	65%
<i>Male</i>	24%	44%	14%	8%	5%	68%
<i>Female</i>	21%	41%	19%	7%	2%	62%
<i>Aged 16-34</i>	23%	42%	21%	4%	4%	64%
<i>Aged 35-54</i>	22%	41%	17%	7%	4%	63%
<i>Aged 55+</i>	23%	44%	12%	11%	2%	67%
<i>ABC1</i>	26%	45%	15%	6%	2%	70%

<i>C2DE</i>	18%	39%	18%	9%	6%	57%
<i>Benefits</i>	21%	36%	21%	11%	1%	58%
<i>No Benefits</i>	24%	44%	16%	6%	4%	67%
<i>Have meter</i>	25%	41%	17%	8%	3%	65%
<i>No meter</i>	22%	50%	15%	7%	3%	72%
<i>Main bill payer</i>	23%	41%	17%	7%	3%	64%
<i>Joint bill payer</i>	20%	46%	13%	8%	4%	67%
<i>Colne</i>	29%	39%	14%	7%	7%	68%
<i>Lee</i>	27%	39%	21%	7%	1%	65%
<i>Pinn</i>	21%	46%	16%	6%	3%	67%
<i>Wey</i>	25%	49%	5%	6%	8%	74%

- Levels of stated affordability for combined clean and waste water bills from 2020-2025 are again generally lower than the clean water only plans. When comparing the two clean and waste water profiles, Profile 1 is considered to be significantly more affordable than Profile 2;
 - 67% rate profile 1 as very or fairly affordable compared to the 59% rating profile 2 very or fairly affordable.

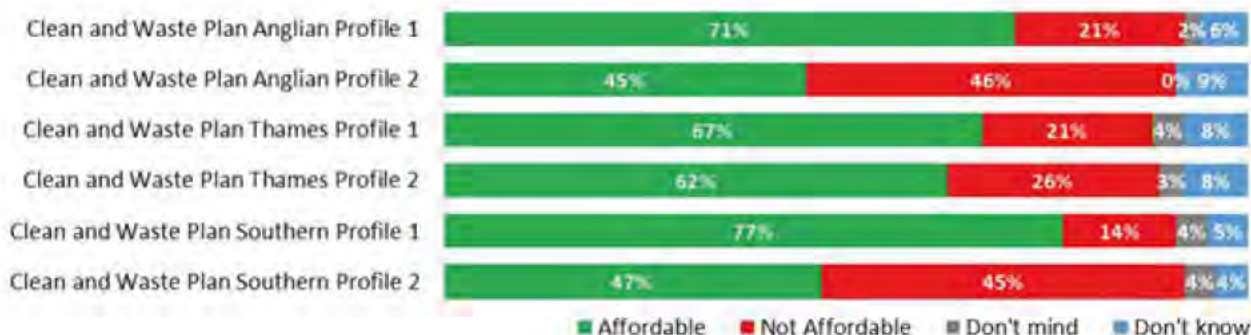
Figure 33: Clean and Waste Water Plans (No Inflation) – Combined Affordability



Base: 1000 /1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

- When comparing results by sewerage provider, just like acceptability, affordability is consistent for Profile 1:
 - 67% of Thames customers feel that Profile 1 is very or fairly affordable, 71% of Anglian feel that Profile 1 is very or fairly affordable.
- But profile 2 tells a different story with Thames customers feeling like the combined clean and waste water bill is significantly more affordable compared to Anglian customers.
 - 62% of Thames customers feel that Profile 2 is very or fairly affordable, but under half (45%) of Anglian customers feel that Profile 2 is very or fairly affordable.
- Please not that due to low base sizes for Southern we were unable to comment on the results but have included the data in figure 30 as a reference.

Figure 34: Clean and Waste Water Plans (No Inflation) – Affordability by Sewerage Company



Base: Thames P1 381 /1000, Thames P2 385/1000, Anglian P1 67/1000, Anglian P2 64/1000, Southern P1 32/1000, Southern P2 23/1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

- For Profile 1 clean and waste water affordability is relatively similar across different groups of customers (shown Table 35 below). However, customers receiving benefits feel that the bill is significantly less affordable; 49% find Profile 1 fairly or very affordable compared to 67% total.

Table 35: Clean & Waste Water Plan (No Inflation) - Profile 1 Affordability

Clean & Waste Water Only Plan P1 (No Inflation)	Very affordable	Fairly affordable	Not very affordable	Not affordable at all	Don't mind	Affordable (NET)
Total	22%	44%	13%	9%	4%	67%
<i>Male</i>	31%	42%	9%	8%	2%	72%
<i>Female</i>	15%	47%	16%	9%	5%	62%
<i>Aged 16-34</i>	25%	46%	6%	8%	4%	71%
<i>Aged 35-54</i>	20%	39%	19%	10%	4%	60%
<i>Aged 55+</i>	23%	49%	11%	7%	2%	72%
<i>ABC1</i>	23%	51%	10%	7%	2%	73%
<i>C2DE</i>	22%	35%	17%	11%	6%	57%
<i>Benefits</i>	14%	35%	19%	16%	5%	49%
<i>No Benefits</i>	25%	47%	10%	7%	3%	72%
<i>Have meter</i>	26%	45%	11%	10%	2%	71%
<i>No meter</i>	20%	44%	15%	7%	4%	64%
<i>Main bill payer</i>	21%	43%	14%	8%	4%	64%
<i>Joint bill payer</i>	25%	48%	10%	10%	2%	73%
<i>Colne</i>	35%	39%	8%	7%	1%	74%
<i>Lee</i>	18%	49%	12%	8%	6%	67%
<i>Pinn</i>	20%	41%	16%	11%	3%	61%
<i>Wey</i>	21%	53%	8%	11%	1%	74%

- For Profile 2 clean and waste water affordability is relatively similar across different groups of customers (shown Table 36 below). However, male customers feel that the plan is significantly more affordable than the total; 67% of males find Profile 2 fairly or very affordable compared to 59% total.

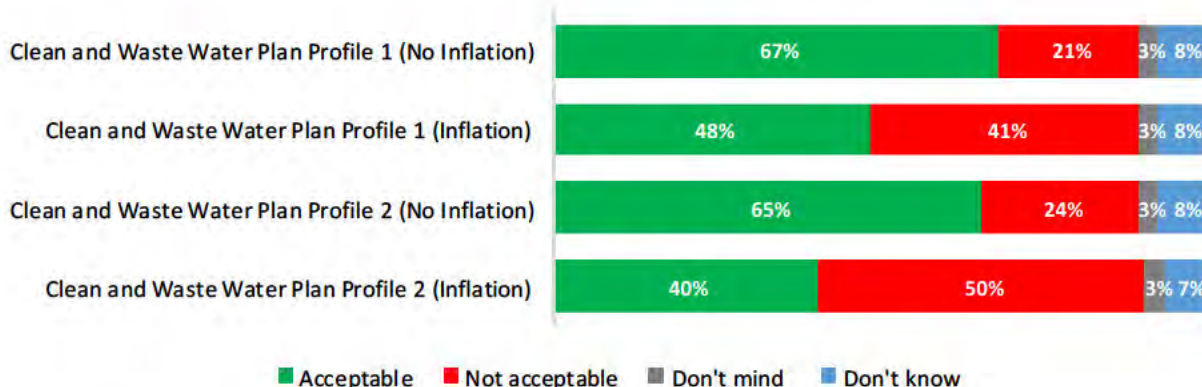
Table 36: Clean & Waste Water Plan (No Inflation) - Profile 2 Affordability

Clean & Waste Water Only Plan P2 (No Inflation)	Very affordable	Fairly affordable	Not very affordable	Not affordable at all	Don't mind	Affordable (NET)
Total	19%	40%	18%	10%	3%	59%
Male	19%	48%	14%	11%	3%	67%
Female	19%	33%	23%	10%	3%	52%
Aged 16-34	22%	36%	21%	9%	2%	58%
Aged 35-54	16%	43%	17%	11%	4%	59%
Aged 55+	18%	41%	17%	10%	3%	60%
ABC1	24%	40%	19%	8%	2%	64%
C2DE	11%	40%	18%	14%	5%	52%
Benefits	17%	36%	22%	18%	2%	53%
No Benefits	20%	42%	18%	8%	3%	62%
Have meter	22%	41%	18%	9%	3%	63%
No meter	17%	42%	19%	12%	3%	59%
Main bill payer	21%	40%	17%	11%	3%	61%
Joint bill payer	13%	42%	22%	9%	2%	55%
Colne	22%	46%	11%	11%	6%	68%
Lee	24%	35%	22%	10%	2%	58%
Pinn	20%	40%	14%	12%	4%	60%
Wey	18%	45%	23%	3%	3%	63%

5.2 Response to Clean and Waste Water Bill Profiles with inflation

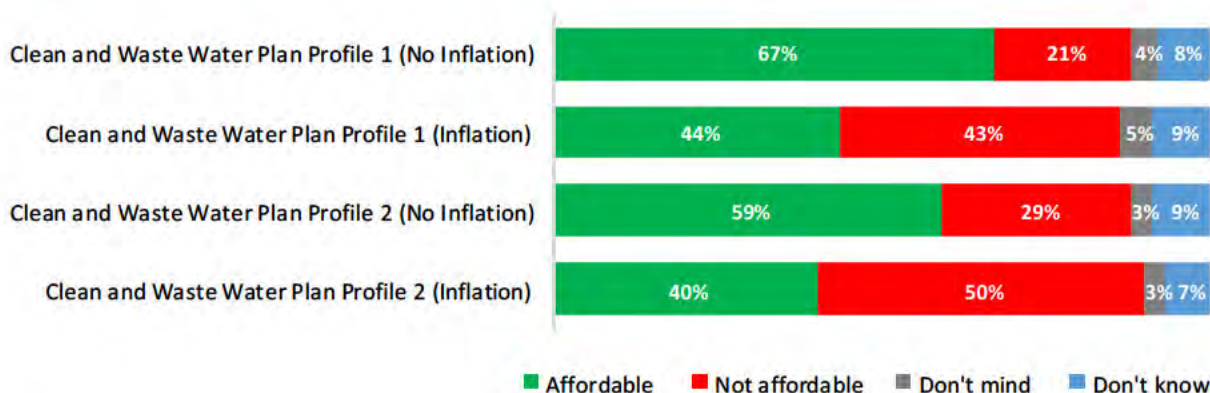
- Again, there is significant drop in stated acceptability and affordability when inflation is added for both profiles, similar decreases are seen as for the AMP7 and AMP8 clean water plans.
 - 67% rating profile 1 pre-inflation acceptable, significantly dropped to 48% acceptability (-19%).
 - 67% rating profile 1 pre-inflation affordable significantly dropped to 44% affordability (-23%).
 - 65% rating profile 2 pre-inflation acceptable significantly dropped to 40% acceptability (-25%).
 - The 59% who found profile 2 pre-inflation affordable significantly dropped to 40% affordability (-19%).

Figure 37: Clean and Waste Water (No Inflation vs Inflation) Combined Acceptability



Base: 1000 /1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

Figure 38: Clean and Waste Water (No Inflation vs Inflation) Combined Affordability

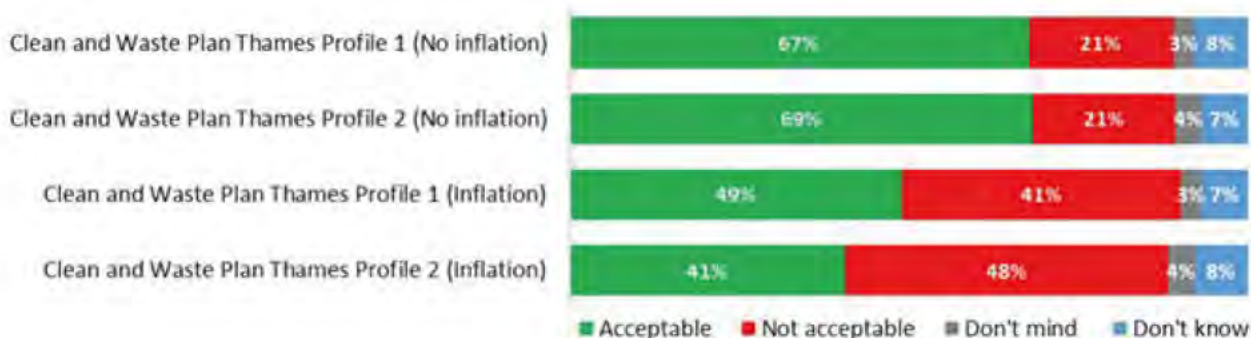


Base: 1000 /1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

- Due to low base sizes for Southern we were unable to compare results by all three waste providers. However, again, there is significant drop in stated acceptability and affordability when inflation is added for both Thames and Anglian across both profiles.
 - Acceptability
 - 67% of Thames customers feel that Profile 1 is very or fairly acceptable, significantly dropped to 49% acceptability (-18%).
 - 69% of Thames customers feel that Profile 2 is very or fairly acceptable, significantly dropped to 41% acceptability (-28%).
 - 68% of Anglian customers feel that Profile 1 is very or fairly acceptable, significantly dropped to 40% acceptability (-28%).
 - 51% of Anglian customers feel that Profile 2 is very or fairly acceptable, significantly dropped to 32% acceptability (-19%).
 - Affordability
 - 67% of Thames customers feel that Profile 1 is very or fairly affordable, significantly dropped to 43% affordability (-24%).

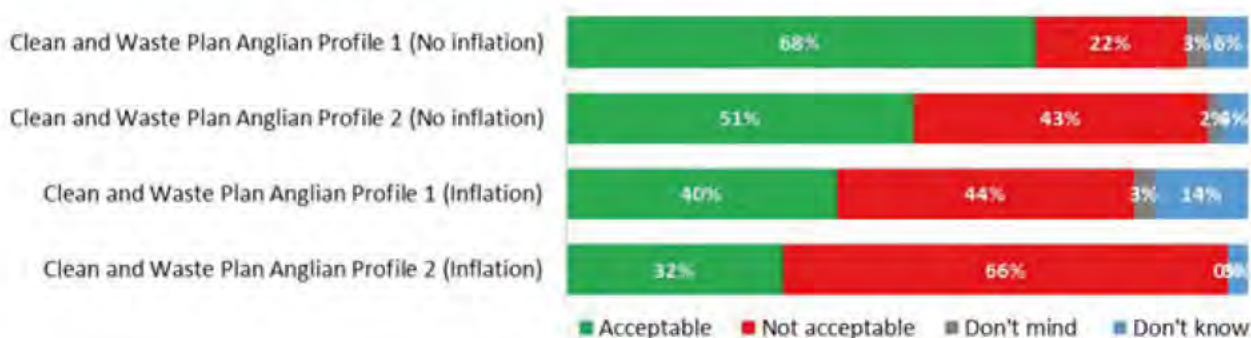
- 62% of Thames customers feel that Profile 2 is very or fairly affordable, significantly dropped to 41% affordability (-21%).
- 71% of Anglian customers feel that Profile 1 is very or fairly affordable, significantly dropped to 45% affordability (-26%).
- 45% of Anglian customers feel that Profile 2 is very or fairly affordable, significantly dropped to 35% affordability (-10%).

Figure 39: Clean and Waste Water Plans (No Inflation vs Inflation) – Acceptability Thames



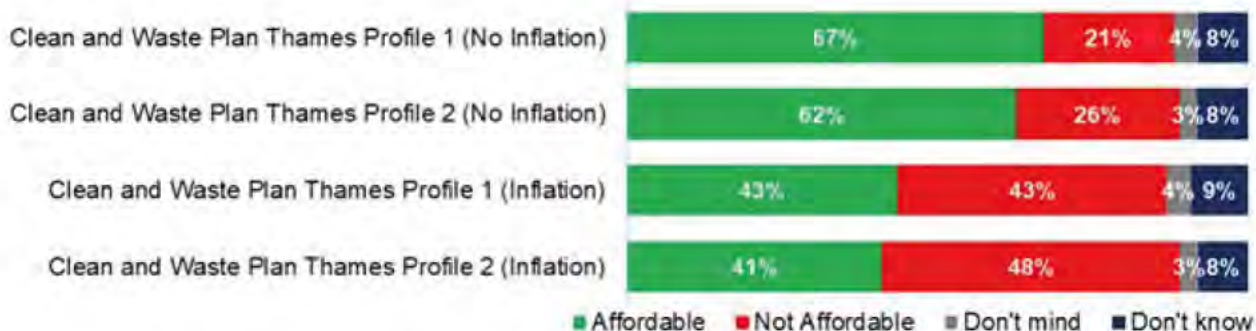
Base: Thames P1 381 /1000, Thames P2 385/1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

Figure 40: Clean and Waste Water Plans (No Inflation vs Inflation) – Acceptability Anglian



Base: Anglian P1 67/1000, Anglian P2 64/1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

Figure 41: Clean and Waste Water Plans (No Inflation vs Inflation) – Affordability Thames



Base: Thames P1 381 /1000, Thames P2 385/1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

Figure 42: Clean and Waste Water Plans (No Inflation vs Inflation) – Affordability Anglian



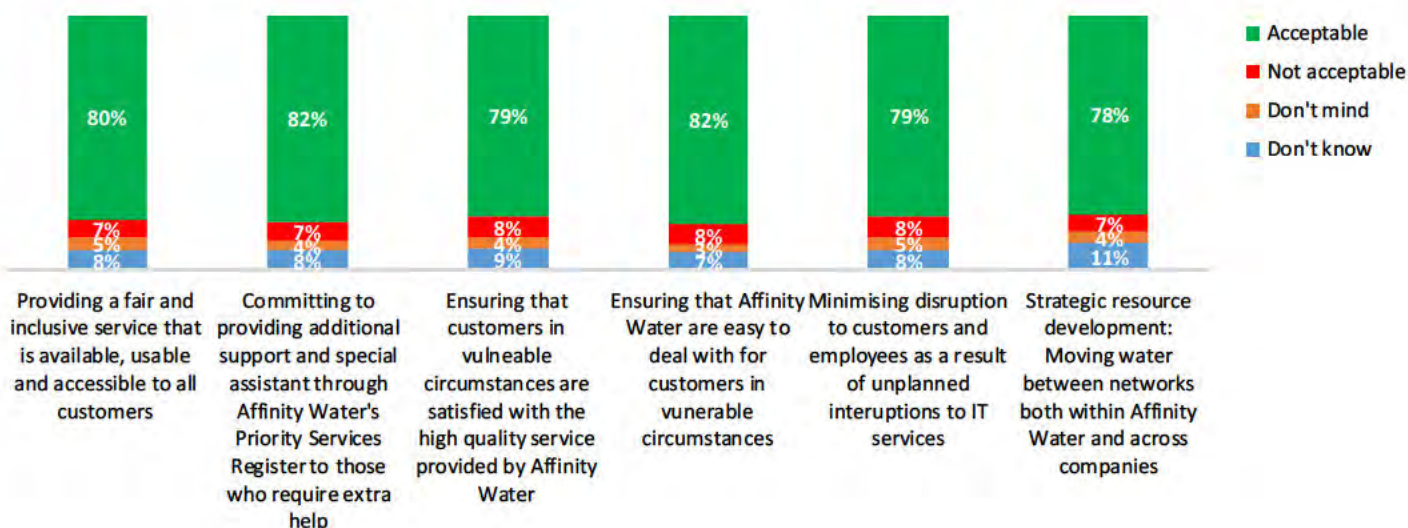
Base: Anglian P1 67/1000, Anglian P2 64/1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

6.1 Affinity Water Targets

- Six long-term targets were tested for acceptability in the survey:
 - Providing a fair and inclusive service that is available, usable and accessible to all customers equally regardless of personal circumstances (“**BSI certification for Inclusive Services**”).
 - Committing to providing **additional support and special assistance** through Affinity Water’s Priority Service Register to those who require extra help in the way that they receive water services, regardless of age, health, disability or lack of disability (e.g.

- o providing bills and other literature in accessible formats, delivering water to customers who cannot fetch water in the event of a 'no water' incident).
 - o Ensuring that customers in vulnerable circumstances (for example, those requiring special assistance or in financially vulnerable circumstances) **are satisfied with the high quality of service** provided by Affinity Water.
 - o Ensuring that Affinity Water **are easy to deal with**, particularly for customers in vulnerable circumstances (for example, those requiring special assistance or in financially vulnerable circumstances).
 - o Minimising disruption to customers and employees as a result of **unplanned interruptions to IT services** (including digital platforms, email, infrastructure and telephone systems etc).
 - o **Strategic resource development:** Moving water between networks both within Affinity Water and across companies (e.g. reservoirs and transfers) to better ensure a continuous supply.
- All of the above long-term targets scored consistently for acceptability, with high scores ranging from 78% to 82% of customers rating each target as 'very' or 'fairly' acceptable.

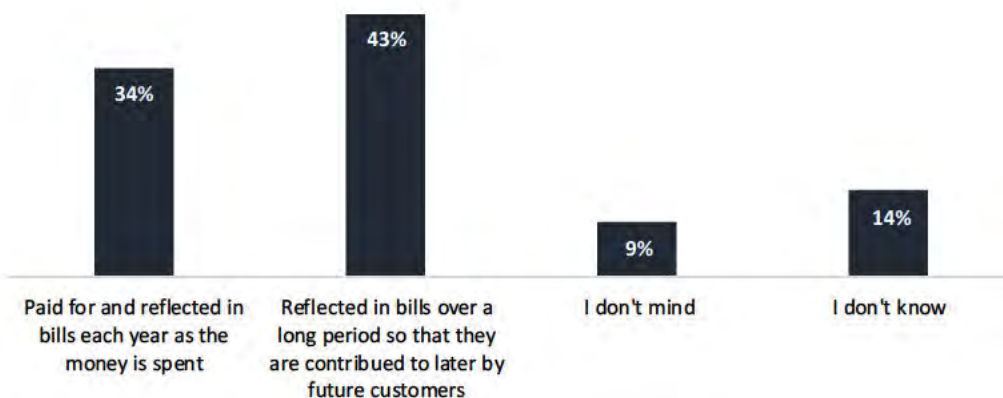
Figure 43: Affinity Water Long-Term Targets



- When asked about the investment Affinity Water makes in order for a better longer-term water supply:

- 43% of customers would prefer that the investment is reflected in bills over a longer period so that they are contributed to later by future customers.
- 34% of customers would prefer the investment is paid for and reflected in bills each year as the money is spent.

Figure 44: Affinity Water Bills



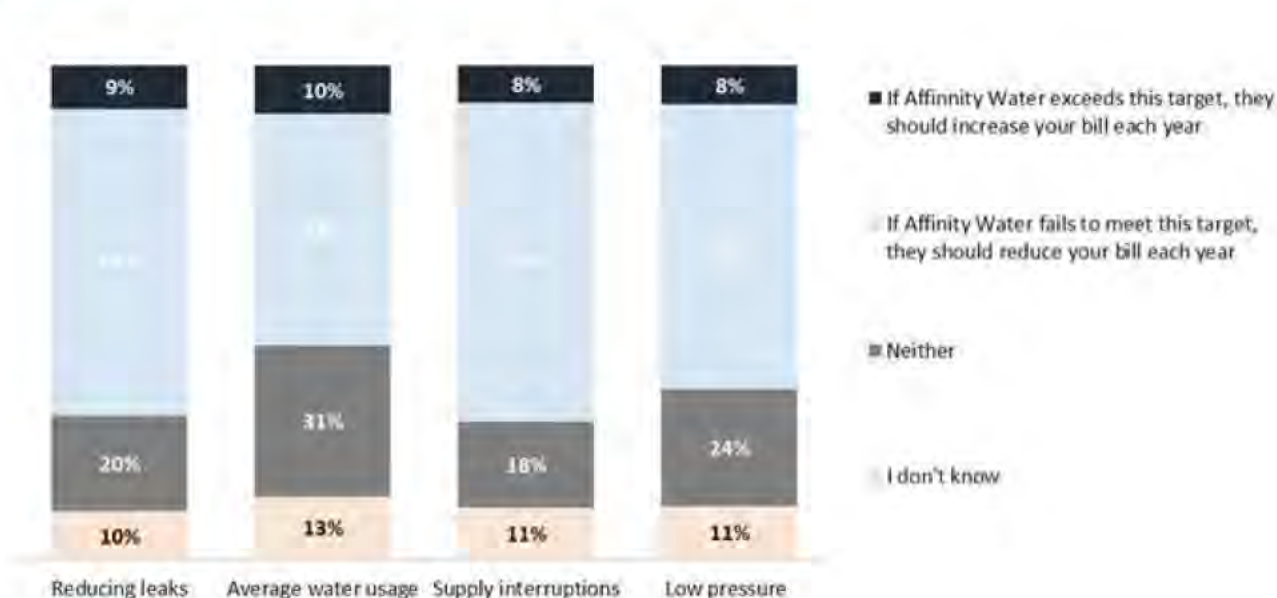
Base: 1000 /1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

6.2 Performance Commitments

- Three sets of Performance Commitments were tested from the 2020-25 Business Plan. Customers were asked to respond to possible incentives or penalties for delivering against these targets. Throughout section 6.2 please keep in mind that customers were able to select more than one answer from the following options:
 - “If Affinity Water exceeds this target they should increase your bill every year”
 - “If Affinity Water fails to meet this target they should reduce your bill every year”
- However, the majority of respondents chose to only select one option, this may be due to the set up of the questionnaire and customers assuming it was an ‘either-or’ question type.
- *PCs directly related to customer service*
 - Customers respond most strongly to ‘Supply interruptions’; 67% believe that Affinity Water should reduce the customer’s bill if failing to meet supply interruption reduction targets.
 - Just below this was the response to ‘reducing leaks’ and ‘low pressure’.
 - 64% of customers felt that Affinity Water should reduce customer’s bill if they failed to meet their ‘reducing leaks’ target.
 - 59% of customers felt that Affinity Water should reduce customer’s bill if they failed to meet their ‘low pressure’ targets.

- Customers responded significantly less strongly to ‘average water usage’, just over half (48%) believed Affinity Water should reduce the customer’s bill if they failed to meet the average water targets.

Figure 45: PCs directly related to customer service

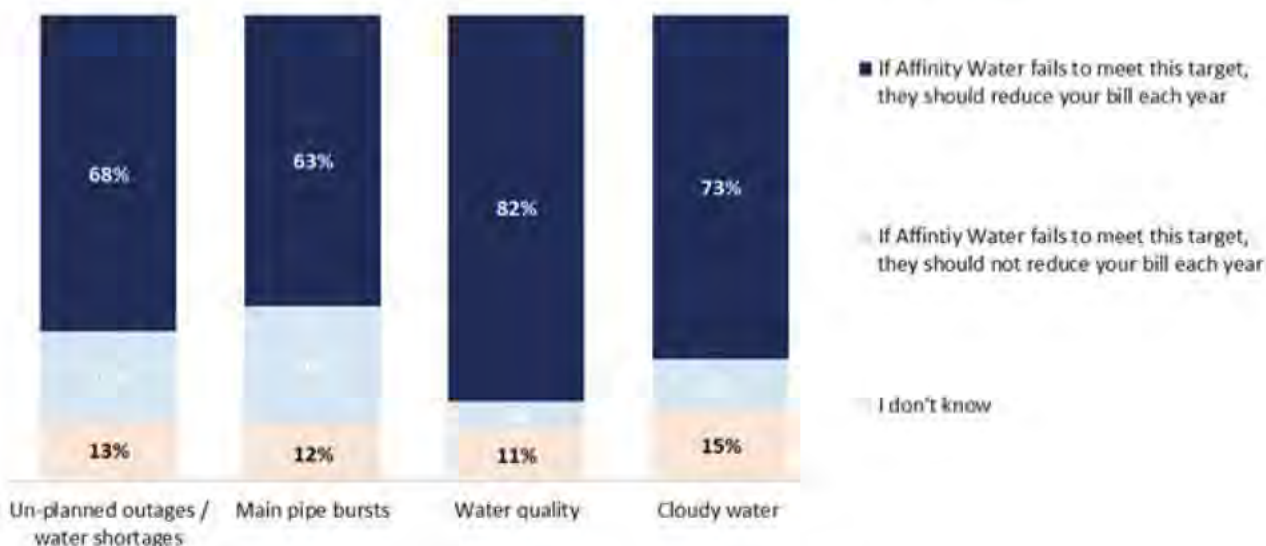


Base: 333 adults aged 16+ from across the Affinity Water customer areas, March 2019

- PCs directly related to environment
 - Customers respond less strongly to the environment related targets, with a consistent response shown across the PCs; between 44% and 50% of customers feel that if Affinity water fail to meet each of the natural environment targets they should reduce the customer bill each year.
 - Half (50%) feel that if Affinity Water fails to meet their ‘sustainable abstraction’ targets they should reduce their customer’s bill, however, 22% did not feel this should result in a change to the customer’s bill.
 - Just under half (48%) feel that if Affinity Water fails to meet their ‘abstraction incentive scheme’ targets they should reduce their customer’s bill, however, 26% did not feel this should result in a change to the customer’s bill.
 - The same amount (48%) feel that if Affinity Water fail to meet ‘environmental projects’ targets they should reduce their customer’s bill, however, 31% did not feel this should result in a change to the customer’s bill.

- **[PCs directly related to customer service where AWL would only be penalised]**
 - Customers react most strongly to the PC related to water quality;
 - 82% feel that Affinity Water should reduce the customer bill if they fail to meet water quality targets and 73% of customers felt that Affinity Water should reduce customer’s bill if they failed to meet their ‘cloudy water’ target.
 - Customers responded significantly less strongly to ‘un-planned outages/ water shortages’ and ‘mains pipe burst’ targets;
 - 68% of customers felt that Affinity Water should reduce customer’s bill if they failed to meet their ‘un-planned outages/ water shortages’ target.
 - 63% of customers felt that Affinity Water should reduce customer’s bill if they failed to meet their ‘mains pipe burst’ target.

Figure 47: PCs directly related to customer service where AWL would only be penalised



Base: 333 adults aged 16+ from across the Affinity Water customer areas, March 2019

- If Affinity Water fails to meet its targets and is penalised, 64% of customers feel that a reduction of up to £5 a year is very or fairly acceptable, only around a third of customers would feel satisfied with £1 reduction.

Figure 48: Yearly acceptable reduction if Affinity Water fails to meet targets



Base: 476 adults aged 16+ from across the Affinity Water customer areas, March 2019

- If Affinity Water were to exceed its targets and is rewarded, three quarters of customers feel that up anything up to £1 is acceptable as an increase to their bill.
- Once the increase steps over the £1 price mark, stated acceptability starts to fall significantly (63% for £1.50 and 57% for £2).

Figure 49: Yearly acceptable reward if Affinity Water exceeds targets



Base: 1000 adults aged 16+ from across the Affinity Water customer areas, March 2019

Appendix.

Sample Profile

		% breakdown	Completes N=1,000	Profile 1 % breakdown N=500	Profile 2 % breakdown N=500
Community_Zone (WRZ) WATER ZONE	Misbourne	9%	90	9%	9%
	Colne	12%	120	11%	13%
	Lee	20%	200	21%	19%
	Pinn	27%	270	26%	28%
	Stort	8%	80	9%	7%
	Wey	15%	150	15%	15%
	Dour	5%	50	6%	4%
	Brett	4%	40	4%	4%

Gender [Q1]	Male	49%	490	49%	49%
	Female	51%	510	51%	51%

Age [SAGE]	16-24	6%	57	5%	6%
	25-34	25%	253	25%	25%
	35-54	36%	360	39%	33%
	55+	33%	330	31%	35%

Socio-economic group [Q5]	ABC1	60%	600	60%	60%
	C2DE	40%	400	40%	40%

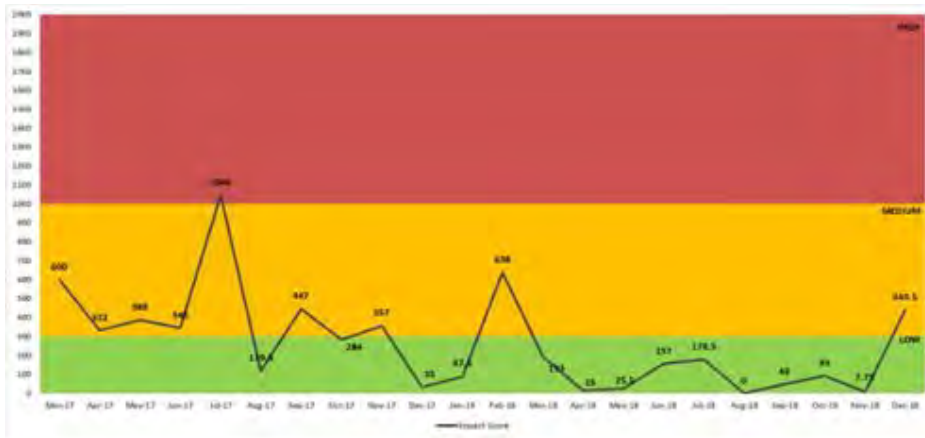
Appendix OC.A1.6

Action ref AFW.OC.A1

Cyber Security and Resilience PC Definition

Cyber Security and Resilience PC

PC Definition	<ul style="list-style-type: none"> Σ Minimising the disruption to customers and employees because of unplanned interruptions to IT Services. This includes the IT Network, Telephony Services, Infrastructure and Applications that support the Business and wider Customer interactions. 																								
Unit	<ul style="list-style-type: none"> Σ Total annual IT Impact Score. 																								
Target	<ul style="list-style-type: none"> Σ 29.41% reduction in Impact Model total over AMP7, and sustained year on year impact reduction. Σ Our forecast 2019/20 position is an annual impact score of 1700, and we are targeting an overall annual impact score of 1200 in 2024/25. 																								
Detailed description	<ul style="list-style-type: none"> Σ IT Incident Impact Score has been measured since March 2017. Σ IT Impact Score is a calculation that applies to any Priority 1 or Priority 2 Incident raised by IT. Σ Impact is calculated based on our Impact Model. This considers Business Impact, Customer Impact, Type of impacted Service, Time of impact and ability to restore services in a timely manner to provide a total view of impact through unplanned interruptions to IT Services. Σ Each Incident has a total impact score of between 5 and 50. With a multiplier calculated based on the number of hours the service is unavailable. Each measure is based on a 1, 5 or 10. Σ An example model with the highest impact, for a service out for 24 hours would total a single overall impact of 1200. <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th>Criteria Factor</th> <th>Option</th> <th>Score</th> <th>Impact Score</th> <th>Unavailable Hours</th> <th>Overall Impact</th> </tr> </thead> <tbody> <tr> <td>Who is impacted</td> <td>Full Company</td> <td></td> <td rowspan="5" style="background-color: red; color: white; text-align: center; vertical-align: middle;">50</td> <td rowspan="5" style="text-align: center; vertical-align: middle;">24</td> <td rowspan="5" style="text-align: center; vertical-align: middle;">1200</td> </tr> <tr> <td>Reputation Factor</td> <td>External/Customer facing - risk</td> <td></td> </tr> <tr> <td>What is impacted</td> <td>Multiple Gold/Platinum Service</td> <td></td> </tr> <tr> <td>When did it happen</td> <td>Inside core hours</td> <td></td> </tr> <tr> <td>Speed of ability to return to normal</td> <td>High Impact - Significant likelihood of additional</td> <td></td> </tr> </tbody> </table> <ul style="list-style-type: none"> Σ Our Impact Score is measured monthly and reported to EMT and the Board as a key performance measure. 	Criteria Factor	Option	Score	Impact Score	Unavailable Hours	Overall Impact	Who is impacted	Full Company		50	24	1200	Reputation Factor	External/Customer facing - risk		What is impacted	Multiple Gold/Platinum Service		When did it happen	Inside core hours		Speed of ability to return to normal	High Impact - Significant likelihood of additional	
Criteria Factor	Option	Score	Impact Score	Unavailable Hours	Overall Impact																				
Who is impacted	Full Company		50	24	1200																				
Reputation Factor	External/Customer facing - risk																								
What is impacted	Multiple Gold/Platinum Service																								
When did it happen	Inside core hours																								
Speed of ability to return to normal	High Impact - Significant likelihood of additional																								
ODI type	<ul style="list-style-type: none"> Σ Non-financial. 																								
Evidence that target is stretching	<ul style="list-style-type: none"> Σ Our target is to achieve a 29.41% reduction over AMP7, targeting a <u>score</u> of 1200. This also constitutes a 69.7% reduction from 2017, when we started measuring the Impact Score. <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 50%;">Year</th> <th style="width: 50%;">Impact Score</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">2017</td><td style="text-align: center;">3955</td></tr> <tr><td style="text-align: center;">2018</td><td style="text-align: center;">1884</td></tr> <tr><td style="text-align: center;">2019</td><td style="text-align: center;">1700</td></tr> <tr><td style="text-align: center;">2020</td><td style="text-align: center;">1600</td></tr> <tr><td style="text-align: center;">2021</td><td style="text-align: center;">1500</td></tr> <tr><td style="text-align: center;">2022</td><td style="text-align: center;">1400</td></tr> <tr><td style="text-align: center;">2023</td><td style="text-align: center;">1300</td></tr> <tr><td style="text-align: center;">2024</td><td style="text-align: center;">1200</td></tr> <tr><td style="text-align: center;">Total Annual Reduction over AMP7</td><td style="text-align: center;">500</td></tr> <tr><td style="text-align: center;">Reduction over AMP7 %age</td><td style="text-align: center;">29.7%</td></tr> <tr><td style="text-align: center;">Reduction since measurement began</td><td style="text-align: center;">69.7%</td></tr> </tbody> </table>	Year	Impact Score	2017	3955	2018	1884	2019	1700	2020	1600	2021	1500	2022	1400	2023	1300	2024	1200	Total Annual Reduction over AMP7	500	Reduction over AMP7 %age	29.7%	Reduction since measurement began	69.7%
Year	Impact Score																								
2017	3955																								
2018	1884																								
2019	1700																								
2020	1600																								
2021	1500																								
2022	1400																								
2023	1300																								
2024	1200																								
Total Annual Reduction over AMP7	500																								
Reduction over AMP7 %age	29.7%																								
Reduction since measurement began	69.7%																								



Appendix OC.A2.1

Action ref AFW.OC.A2

Ofwat, “Delivering Water 2020: consultation on PR19 methodology, Appendix 3: Outcomes technical definitions”, 11 July 2017

11 July 2017

Trust in water

Delivering Water 2020: consultation on PR19 methodology Appendix 3: Outcomes technical definitions

**Appendix to chapter 4:
Delivering outcomes to
customers**

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Appendix 3: Outcomes technical definitions

Purpose of this appendix

In this appendix we provide more detail on definitions for:

- the 14 common performance commitments we are proposing for PR19; and
- the long list of asset health metrics we are proposing companies should choose from if they are selecting asset health performance commitments that are very similar to ones on the list.

We are seeking feedback on all the definitions below. Further information on our proposed approach to the common performance commitments and the long list of asset health metrics is in the Delivering outcomes for customers chapter of the main consultation document and Appendix 2 on Outcomes.

Context

As explained in the main consultation document we have taken these definitions from a number of sources. We want to emphasis a few points of context.

In relation to the consistent definitions for leakage, supply interruptions and sewer flooding we have supported companies working together, co-ordinated by Water UK, and working with UKWIR to review the consistency of reporting for three key measures. They have assessed whether the consistency of reporting for these metrics could be improved, including reviewing previous reporting guidance for clarity and completeness in the light of improvements in the technology and techniques available for reporting. [UKWIR is publishing the new definitions and an accompanying report today.](#)

We have included a definition from the DWI on its new measure for water quality compliance, the Compliance Risk Index (CRI). The DWI is continuing to work with its stakeholders on the full definition of the CRI.

We have also used some of the work of the Water and Wastewater Resilience Action Group (WWRAG) Task & Finish sub-group and UKWIR and companies to propose some options for resilience metrics.

1. Definitions for the common performance commitments

1.1 Customer measure of experience (C-MeX)

C-MeX is an incentive mechanism to encourage water companies in England and Wales to provide an excellent service experience to residential water customers. We are currently consulting on the design of C-MeX. Our preferred option combines financial and reputational incentives and measures the following aspects of service delivery:

Customer service: A customer's satisfaction with the water company's handling and resolution of a matter. This is measured by surveying customers who have contacted their water company with a recent matter.

Customer Experience: A customer's satisfaction with the overall service provided by their water company. This is measured by surveying bill payers who have not directly contacted their company.

C-MeX replaces SIM. **WaterworCX** is the umbrella term for the C-MeX and D-MeX incentives.

We provide more details on our preferred option and the other options for C-MeX in Appendix 2 on Outcomes.

1.2 Developer measure of experience (D-MeX)

D-MeX is the incentive mechanism to encourage water companies in England and Wales to provide an excellent service experience to developer services customers. It combines financial and reputational incentives and measures the satisfaction of developer services customers with the customer service and experience provided by their water company.

D-MeX is a new measure we will introduced for PR19. **WaterworCX** is the umbrella term for the C-MeX and D-MeX incentives.

As explained in Appendix 2 on Outcomes our preferred approach is to set up a D-MeX Task and Finish Group of developer services customers and water companies to explore how best to develop and implement a six-monthly satisfaction survey that could be compared across companies.

1.3 Water quality compliance – Compliance risk index

Compliance risk index (CRI) is a new measure being developed by the drinking water inspectorate (DWI) in consultation with water companies. CRI will replace the current Mean Zonal Compliance (MZC) index to accommodate upcoming drinking water quality regulations amendments, and to adopt a risk-based monitoring methodology to assess compliance. Broadly speaking, CRI will be calculated by taking into account the significance of the parameter failing the standards in the Regulations, the cause of the failure, the company's handling and managing of the failure, and the location of the failure within the supply system taking into account the proportion of the company's consumers who are affected.

Definition

The Compliance Risk Index (CRI) is a measure designed to illustrate the risk arising from treated water compliance failures, and it aligns with the current risk based approach to regulation of water supplies used by the Drinking Water Inspectorate (DWI).

This is a new measure developed in consultation with water companies. Some details are still to be finalised by DWI, but the following outlines the broad principles of the measure.

CRI includes elements relating to:

- the significance of the parameter failing the standards in the Regulations (the Parameter score);
- the cause of the failure; the manner of the investigation of the failure by the company; and any mitigation put in place by the company (the Assessment score); and
- the location of the failure within the supply system taking into account the proportion of the company's consumers affected.

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The formula for the calculation of the index is as follows:

$$\text{CRI} = \frac{\text{For compliance failures in water supply zones} \quad \sum \text{SCP}}{\text{Total company population served}} + \frac{\text{For compliance failures at water treatment works or designated supply points} \quad \sum \text{SCV}}{\text{Total volume of water supplied daily by the company (m3/day)}} + \frac{\text{For compliance failures at service reservoirs} \quad \sum \text{SCR}}{\text{Total Service Reservoir capacity of the company (m3)}}$$

Where: S = Parameter score (see (i) below)

C = Assessment score (see (ii) below)

P = Population affected - for compliance failures in water supply zones

V = Volume affected - for compliance failures at treatment works or designated supply point

R = Service Reservoir capacity affected - for compliance failures at service reservoirs

i. Parameter score

Compliance failures for different parameters do not pose equal risk to consumers. The standards in the Regulations are based on different criteria: whilst some are set on a human health basis, others are based on aesthetic concerns, as indicators or for other reasons. This means that the risk posed from non-compliance with a parameter standard varies depending on the reason for the standard.

The CRI Parameter score reflects this difference and scores are as follows

Basis for standard	Score
Health Risk	5
Health Risk Indicator	4
Aesthetic	3
Regulatory Impact	2
Non Health Risk Indicator	1

ii. Assessment score

All compliance failures are assessed by DWI to ensure that the wellbeing and interests of consumers were protected by best practice in management of compliance failures. Obviously, a well-managed compliance failure with appropriate and speedy mitigation action poses a lower risk to consumers. The DWI also considers the root cause of the failure and whether the company's actions led to or increased the likelihood of the failure, and whether further remedial action is necessary.

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Therefore the DWI Inspector's assessment has been assigned a score for CRI shown below:

DWI Inspector assessment	Score
Enforce	5
Covered by legal instrument	4
Enforcement considered	4
Recommendations made	3
Suggestions made	2
Satisfactory investigation did not identify cause	1
Trivial	1
Unlikely to recur	1
Incorrect data	0
Outside operational limits	0

1.4 Water supply interruptions

The definition of supply interruptions which follows is identical to the one [published on UKWIR's website](#).

Reporting Guidance - Supply Interruptions

1. Objective

The purpose of this document is to derive a metric for supply interruptions that consistently calculates the performance of water companies in terms of the average number of minutes lost per customer for the whole customer base for interruptions that lasted 3 hours or more.

This guidance seeks to enable companies to monitor and compare consistently derived and common performance measures for Supply Interruptions.

2. Key Principles

There are several key assumptions made in the compilation of the guidance.

- Reporting of supply interruptions shall be subject to each company's assurance process which is applied to all measures reported annually.
- Companies have a methodology or procedure in place for reporting on supply interruptions. This procedure is reviewed as part of their assurance process.

There is an assumption that there will be continued improvement by all companies in the short and medium term through innovation, new technology, data quality improvements and staff training.

- The measure assumes a clear and simple approach that can be understood by customers and regulators.
- The essential reporting requirements for reporting on supply interruptions are set out.
- The focus of the guidance is on annual reporting of supply interruptions. It is not intended as a definitive guide to managing the risk of supply interruption.
- The company shall apply the precautionary principle, using the start and finish times and the properties affected that will give the highest supply interruption value in the event of uncorroborated or conflicting data.

Applying this guidance is likely to mean that comparisons of historical performance between companies, and of individual company's previous performance, may not necessarily be valid. However, it is anticipated that future individual company year on year trends in performance will be possible.

The adoption of this metric across the industry does not preclude any company electing to have other supply interruption Performance Commitments with company specific definitions or continued reporting against the previously reported DG3 or KPI Dashboard (post 2011) metrics.

3. Exclusions

The default position is that the water company manages the risk of supply interruptions and there are no exclusions. The cause of the interruption is not relevant to the calculation of the reported figure. That is, asset failure caused by third parties would be treated the same as the failure of the company's assets and planned or unplanned interruptions are the same.

Companies may make a representation to Ofwat for an exception to be granted on the basis of a civil emergency under the Civil Contingencies Act 2004, where the supply interruption is not the cause of the emergency.

4. Measure Definition

- **Calculation of the Performance**

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$$\sum \frac{((\text{properties with interrupted supply} \geq 180 \text{ minutes}) \times (\text{full duration of interruption}))}{\text{Total number of properties supplied (year end)}}$$

- **Component Definitions**

To ensure consistency of reporting, the following regularly used terms are defined below:

Properties shall include billed mains pressure fed household and non-household properties connected to the distribution system. This includes properties that are connected, but not billed (for example temporarily unoccupied), but should exclude properties which have been permanently disconnected. A group of properties supplied by a single connection shall be considered as several properties. They should only be considered as a single property if a single bill covers the whole property. The total connected properties figure shall be those connected at the end of the report year.

Supply interruptions are defined as when properties are without a continuous supply of water. The property shall be considered as without a supply when water is lost from the first cold water tap – taken as being operationally equivalent to $\leq 3\text{m}$ pressure at the main (adjusted for any difference in ground or property level). This can be inferred from local logging, network modelling or a customer contact indicating a loss of supply which was caused by the company operation and has not been demonstrably restored. Multiple-storey buildings shall be considered on a case-by-case and floor by floor basis, with properties on a particular floor being considered as receiving the same pressure.

Duration is defined as the length of time for which properties are without a continuous supply of water. The duration shall only be considered in the calculation of the metric where the duration is 3 hours or greater.

Start time is when water is lost from the first cold water tap at a property – taken as being operationally equivalent to $\leq 3\text{m}$ pressure at the main (adjusted for any difference in ground or property level). In the event of applicable telemetry data or logging being unavailable, the time should be determined from the earliest of:

- as advised by “no water” contact from customer (where not due to a customer side issue);
- indications from flow or pressure monitoring to infer a change in supply; or

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- verified modelled data (calibrated, maintained, reflective of the network at the time of the incident and validated with contemporaneous flow and/or pressure data).

The company shall gain confirmation by consulting complainants (if any) and/or customers at high points on the system.

Stop time is when water is restored to the first cold water tap at a property – taken as being operational equivalent to >3m head of pressure at the main. In the event of pressure logging being unavailable, the time should be determined from the latest of:

- as advised by notification from customer;
- indications from flow or pressure monitoring to indicate return to normal supply conditions; or
- verified modelled data (calibrated, maintained, reflective of the network at the time of the incident and validated with contemporaneous flow and/or pressure data).

It is the responsibility of the company to demonstrate that supply conditions have been restored and available to all previously affected customers from the time determined from the above. In the absence of physical evidence, the company shall gain confirmation by consulting complainants (if any) and/or customers at high points on the system.

The company shall apply the precautionary principle, using the start and finish times and the properties affected that will give the highest supply interruption value in the event of uncorroborated or conflicting data.

5. Property counts

Property counts shall use the best available information. This should be from the GIS, but paper records and DMA or similar data can be used where recently connected properties have not yet been input to the GIS. Properties shall count as having lost supply whether or not occupied. Properties permanently disconnected will be excluded from the count.

Attention should be paid to the incremental nature of supply loss. For example, for a burst when supply is lost progressively across an affected area, the time/properties affected relationship should be established. Where the loss is gradual, the supply interruption should be considered incrementally.

6. Properties affected by more than one interruption during the report year

Properties which are affected by more than one interruption during the report year should be reported separately for each interruption. This means, for example, that a property affected by three supply interruptions would be reported three times, once for each interruption.

7. Short term restoration of supply

For the cumulative effect of an interruption to be ignored and interruptions to be treated as separate occurrences, properties must have supplies restored for a minimum period of 1 hour. When shorter gaps occur the duration is counted from the start of the first interruption until the last restoration of supply.

8. Records

It should be possible to correlate and reconcile the company's reported figures for asset health and customer services data relating to reports of and complaints about interruptions to supply.

Evidence for subsequent challenge shall as a minimum be stored where the loss of supply has lasted greater than 150 minutes and for split time events, with the purpose of being available for assurance audit. Water companies should store supporting evidence for the quantification of the supply interruption metric for a minimum period of 10 years. This will start with the report year 2017/18 and companies will need to report on an indicative basis for 2016/17.

Companies must maintain records of all reportable incidents of supply in the form of a supply interruptions dataset. The aim of the dataset is to allow verification and audit of the reported information and to enable the identification of the properties affected. It should contain information on the timing, duration and sufficient information to enable all properties affected by interruptions lasting three hours or more to be identified. The dataset should include:

- properties affected (by name and location or number and street or GIS polygon);
 - date and time of interruption(s);
 - duration of each interruption and time supply restored; and
-

- the name of the person responsible for entering records in the system.

The information in the supply interruptions dataset should be available for verification of incidents and evaluation of ODI penalties and rewards.

9. Compliance Check List

The Compliance checklist in Annex A shall be completed and presented with the reported figure.

10. References

This document is based upon the Ofwat Guidance in place for the June Return 2011 submissions of water companies, Chapter 2, Key Outputs, Water Service – 2. The information pertaining to DG2, Population and DG4 has been removed and the DG3 narrative adjusted to reflect the deliberations of the Water UK Convergence in Performance Measures – Water Supply Interruptions Practitioners Group (SIPG) and the assembled view of stakeholders.

1.5 Leakage

The definition of leakage which follows is identical to the one [published on UKWIR's website](#).

Reporting Guidance – Leakage

1. Objective

The guidance has been developed to enable all companies to report annual average leakage for the defined year following good practice and a reasonable level of accuracy, applying consistent and reliable methods and common assumptions. This is to facilitate consistency of reporting by companies and comparisons of performance by customer representatives, regulators and other companies with reasonable confidence.

2. Key Principles

There are several key principles applied in the compilation of the guidance, which we set out below.

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- Reporting of annual average leakage forms part of each company's assurance process applied to all measures reported annually by companies.
- A company needs to have a written methodology or procedure in place for reporting total leakage. This procedure is reviewed annually and updated as required.
- The reporting guidance for annual average leakage reporting is set out as a consistent good practice baseline for the industry which companies should achieve now or in the short and medium term.
- The guidance sets out the good practice concepts of a consistent approach companies are expected to comply with, a focus on data quality and application of valid statistical approaches. They are not intended to prescribe approaches to leakage reporting. Where a company is not able to meet any part of the good practice methods then it is required to explain any shortfalls and its plans to address this.
- The measure assumes a clear approach to be applied through defined regulatory periods.
- There is an assumption of continuing improvement in analysis by all companies in the short and medium term through innovation, new technology and data quality improvements. The context of consistency of reporting for this measure does not preclude companies from applying more innovative measures based on improving data quality. Some areas of reporting including the calculation process can be addressed now or in the short term. Improving data quality is likely to be achieved over a longer period.
- The established water balance concept is applied to balance estimated leakage with the other components. Re-balancing is applied to close any gap in the sum of components.
- The focus of the guidance is on annual average leakage reporting. It is not intended as a definitive guide to leakage operational management, targeting or in-year reporting although many elements of the guidance would be applicable so there are 'no surprises' between operational and annual reporting.

Applying this methodology is likely to change reported leakage and comparisons of historic data may no longer be valid.

Background information on preparing this guidance is included in the UKWIR Report 'Consistency of Performance Reporting Measures'¹.

3. Measure Definition

¹ Consistency of Performance Reporting Measures, UKWIR 2017

Annual average leakage is defined as the sum of distribution system leakage, including customer supply pipe leakage, service reservoir losses and trunk main leakage. It is reported as the annual arithmetic mean (referred to as 'average' in the guidance) daily leakage expressed in mega-litres per day (Ml/d).

A company is required to report against this definition and:

- report a post-MLE average leakage value expressed as Ml/d to one decimal places;
- disclose where its methodology does not comply with this guidance using the checklist in Annex A;
- explain the reasons for any non-compliance;
- set out its plans and programme to comply with the guidance; and
- disclose any other factors which have an impact on the methodology for reporting leakage.

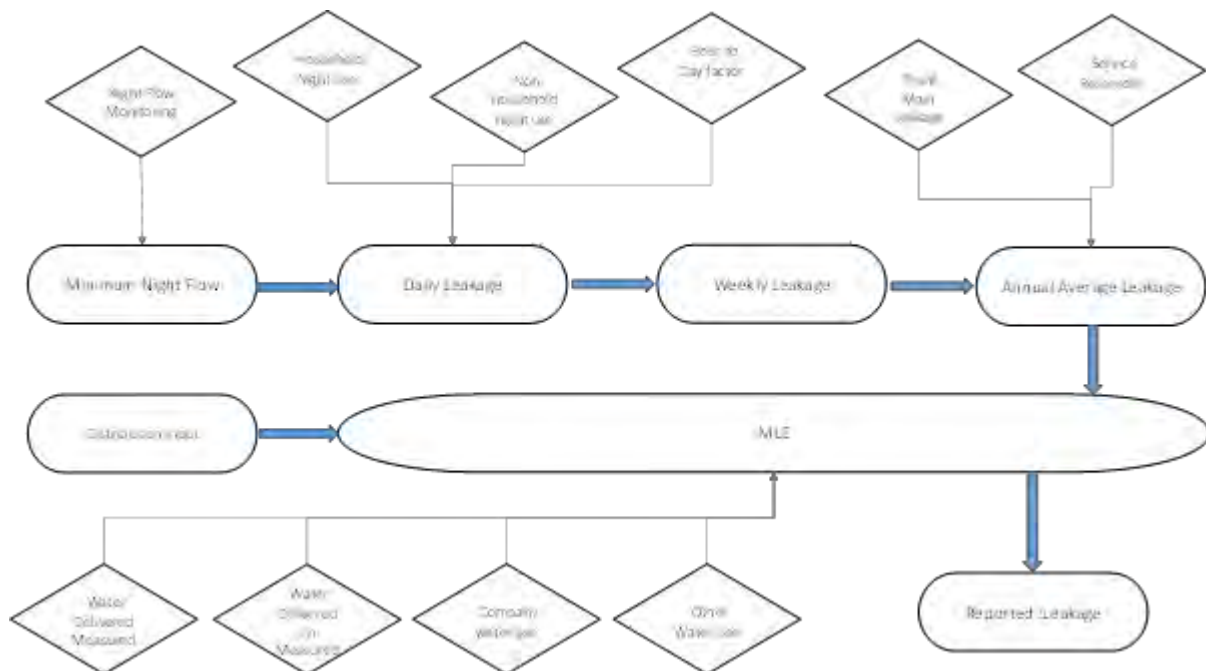
4. Reporting Process

The guidance is structured in the way that leakage is normally estimated and comprises the following.

- Components of leakage estimation (commonly referred to as bottom-up) in Section 5.
- Components of the water balance (commonly referred to as top-down) in Section 6.
- The water balance reconciliation using the MLE methodology and adjustments in Section 7.

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The process is shown in the following diagram.



5. Components of Leakage Estimation

5.1 Night Flow Monitoring

Reporting of leakage from water networks is based on the concept of monitoring flows at a time when demand is at a minimum which is normally during the night. Allowance is made for legitimate night use for household and non-household customers. Companies have configured their networks to be able to continuously monitor night flows using district meters. Flow data is recorded on meters and normally transmitted daily to a data centre. Data is analysed to confirm its validity and used to derive continuous night flow in each monitored area. Software systems have been developed to analyse this data, apply adjustments for legitimate night use and report daily leakage. Companies are able to set assumptions for this analysis within the software packages.

A company is expected to comply with the essential principles of the leakage reporting process for estimates of annual average leakage.

- At least 95% coverage of all properties served by a company within networks having continuous night flow monitoring through the year.

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- At least 90% of all properties within continuous night flow monitoring networks shall be available for reporting night flow data through the year.
- Valid data for reporting leakage shall be derived using available night flow data and estimates of legitimate night use and a company's own validity assessments.
- Assessments of legitimate night use for households and non-households shall be applied as detailed in Sections 5.5 and 5.6.
- The statistical assumptions for determining night flows, legitimate night use and hence leakage shall be based on good practice statistics and consistently applied.
- The components of reporting shall be based on a company's own data.

To apply these principles, definitions of 'Coverage' and 'Availability' need to be applied.

Coverage is defined as:

'The percentage of a Company's billed households and non-households within designated network areas where night flows can be continuously monitored and reported on a regular frequency. Coverage is measured as an annual average for the whole company.'

This represent the extent of the coverage of networks with designed import and export meters, boundary valves, counts of households and non-households and other asset and performance data.

Availability is defined as:

'Where the designated network area is available to report a reliable estimate of night flow for leakage reporting; the installed meters and loggers are working correctly, the boundary is watertight and continuous data is provided. Availability is measured as a property-weighted annual average for the whole company.'

A company is expected to apply its own automated validity checks, or Operability tests, within its leakage analysis software to accept or reject data for reporting. This is expected to be supported with manual detailed checks to detect any data inconsistencies on at least a weekly basis.

Operability is defined as:

‘Where leakage data derived from night flow monitoring and the application of legitimate night use data is within a company’s accepted validity criteria for use in leakage reporting.’

Where a company is not able to meet the Availability measure because, for example, of DMA or zone remodelling or capital works then it is to disclose this in its supporting statement.

An estimate of leakage in areas not covered by continuous monitoring can be extrapolated using leakage per property from the adjacent monitored area on the assumption that a similar level of leakage management activity is applied in these areas; otherwise a separate assessment is needed. Leakage in monitored areas failing validity checks is expected to be infilled using guidance defined in Section 5.4.

5.2 Reporting level

The main objective is to achieve and maintain a high level of operability as defined in Section 5.1 to report a statistically valid measure of annual average leakage.

A company can select to report leakage at:

- district Meter Area (DMA) using district meters;
- water resource zone level using distribution input meters; or
- an intermediate zone level using meters installed on reservoir outlets or trunk mains within the distribution network.

It is for a company to decide the level of reporting based on its own network characteristics and risk of meeting operability targets.

The subsequent sections of the guidance are addressed mainly to DMA monitoring although the principles apply equally to reporting at zone level.

5.3 Properties

Household and non-household properties are used in the estimation of total night use in any DMA or zone. Properties are also used as a denominator in leakage comparisons and for data infilling where DMAs or zones are not operable. Any inconsistencies could impact on DMA or zone operability and hence reliable reporting.

A company is expected to:

- map all properties to defined zones or DMAs using geo-location or similar methods available in the industry;
- check the consistency of property numbers contained within DMAs or zones against its company's billing system to ensure there is no under- or over-counting. Valid differences shall be explained;
- exclude properties that are defined as void from night use allowances unless a company can evidence any use or losses from illegal occupation;
- apply leakage allowance for properties not within DMAs or monitored zones consistent with other leakage estimates;
- update property data at least annually.

5.4 Night Flow and Leakage

Night Flow Period

There is a requirement to analyse night flow at a time when it is possible to apportion flow with confidence between leakage and customer use using consistent and valid statistical methods. This analysis can be achieved at a time during the night when customer use is predictable and relatively low. This may not necessarily be at a time of minimum night flow into a DMA or zone.

Estimates of DMA or zone night inflow and household (HHNU) and non-household (NHHNU) customer night use need to be aligned. The UKWIR Report 'Managing Leakage 2011'² recommended using a fixed hour period. This approach allows average flows to be compared with average night use. While this may give rise to exceptional low or high values of leakage in particular periods, over the reporting year these are expected to average out.

For current good practice, the only practical way is to use a fixed-hour statistic for both night flow and HH and NHH night use. This was confirmed in a UKWIR Report³. A company may extend this period to two hours.

A company is expected to derive night flow data using the following criteria.

- Night flow data frequency shall be at least every 15 minutes.

² Managing Leakage 2011, 10/WM/08/42: UKWIR 2011

³ Improved Household Night Use Allowances; 14/WM/08/53: UKWIR 2014

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- Leakage shall be derived from a fixed period during the night of at least a one hour period although up to two hours may be used.
- The fixed period can be varied during the year for some or all DMAs or zones to address significant changes to night use patterns such as during Ramadan.

Night Flow Analysis

The analysis of night flow needs to be carried out using a consistent and valid statistical methodology. Both household and non-household night use are used to derive estimates of daily leakage. The estimates of HHNU and NHHNU night use are based on average (arithmetic mean) values over time and applied to night flows. Night flows therefore also need to be average (arithmetic mean) values to derive statistically valid estimates of leakage. The use of any alternative percentile assumption is not statistically valid.

A company is expected to apply the following assumptions for night flow analysis.

- The average values of night flow data over the period defined above shall be used with average values of HHNU and NHHNU data for the same time period to derive an estimate of leakage representative for the DMA or zone.
- The value of HHNU shall be derived using methods set out in Section 5.5 and the number of properties defined within the DMA or zone.
- The value of NHHNU shall be derived from estimates of night use by group and the number of properties in each group defined as within the DMA or zone as set out in Section 5.6.
- Apply leakage allowance for properties not within DMAs or monitored zones consistent with other leakage estimates.

The analysis will derive values of leakage for each DMA or zone expressed as leakage per hour for every day of the year. Leakage is then expressed as leakage per day following the methodology set out in Section 5.6.

Data Infilling

Where a DMA or zone is inoperable a software package will normally infill data following defined rules using historic data from the same DMA or zone or average data from adjacent DMAs. To achieve a high operability target, infilling of weekly values shall be limited to short periods of preferably no more than a month and certainly no greater than six months. While rules vary across companies, for consistency a company is expected to follow the following guideline or disclose where it has not been able to comply.

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- Data infilling for a single DMA or zone shall not use more than six months of historic data before moving to area average.
- Data infilling taking the area average in which the DMA is located is valid if historic data is not available.
- When a DMA is restored to operability, for the purposes of annual average reporting, the subsequent leakage data should be used to update retrospectively the data infilling interpolating between pre- and post- data over at least one month. This is because a non-operable DMA is unlikely to be subject to detection processes and there is likely to be a natural rise in leakage over time. It is recognised that this may take time to achieve, as and when leakage software packages are updated. There is one exception where a DMA is inoperable at the end of a reporting year where alternative data infilling may be used.
- Where NHH properties are continuously monitored, the actual values of flow over the night flow period shall be used in place of estimates within the night flow analysis.

Seasonal Variation in Night Use

Fixed night use allowances are not appropriate for many companies who observe rising night flows during warm summer periods or spring planting. There is clear evidence that customer night use increases over these periods due to a small proportion of households using overnight sprinklers or night time irrigation of golf courses and plant nurseries. A fixed night use allowance through the year is not appropriate in capturing variations in night flow.

Some companies may use advanced modelling or enhanced logging methods to improve estimates of night use although this is not a requirement for current good practice.

A company is expected to make allowance for seasonal variance in night use.

- The night use allowance shall be adjusted regularly through summer months to allow for variable customer night use based on sample logging over the period or night use models.
- Weekly leakage estimates shall be used for annual reporting with no exclusions for summer months.

Negative Leakage Values

Average customer night use is normally applied equally to all DMAs although actual use can be higher or lower than across individual DMAs. The impact, particularly in

small or low-leakage DMAs, is that negative calculated leakage values may be reported. While this may appear anomalous, combining leakage values at zone or company level will offset these negative values while maintaining the overall value of average household use. It is therefore appropriate to include negative leakage in collating leakage data to area or company level. Capping leakage to zero would artificially reduce the resulting average value of night use and is not appropriate. This issue is not observed in larger DMAs or zones.

A company is expected to make allowance for negative leakage values.

- Where average night use values are applied across all DMAs, it is appropriate to include negative leakage values when compiling values of annual average leakage.
- The reasons for any prolonged periods of negative leakage need to be investigated and explained.

5.5 Household Night Use

Estimates of household night use are deducted from measured night flows in estimating of leakage using the method described in Section 5.4. A company can estimate night use using either an Individual Household Monitor (IHM) or a Small Area Monitor (SAM) or a combination of both. The choice of method is related to the preferred method for deriving estimates of per capita consumption (PCC) or per household consumption.

A Company shall use its own data and application of national default values is not valid. This is because these default values were derived from limited data over 25 years ago. In addition, 'Socrates' loggers are no longer maintained or supported and hence are not best practice.

The IHMs were originally designed to derive estimates of per capita consumption and comprise about 1000 selected properties. This is a relatively small sample for night use assessments given the likely frequency and flow of intermittent and high volume large night use customers. The IHM needs to be continually monitored to ensure any failed meters are replaced and periods of continuous night flow are quickly identified and resolved to minimise any supply pipe leakage.

SAMs normally provide a larger household sample size than IHMs and are appropriate for night use and PCC assessments. SAMs may be part or full DMAs; whatever size, they shall be selected and designed to give substantial coverage of households and minimise non-household properties. A company using SAMs for the

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estimation of HHNU should apply the recommendations of the recent UKWIR *report*⁴ on the application of a fast logging methodology for continuing monitoring and maintenance.

The HHNU survey needs to have a sufficient number of samples, representative of a company's demographic factors, to identify both continuous and a significant number of intermittent flow events. The sample size of an IHM is unlikely to be sufficient to capture intermittent use with sufficient frequency. This is because intermittent use could be attributable to a small number of customers.

A company is expected to derive weekly or monthly values of HHNU and shall retrospectively recalculate leakage each week or month as new data becomes available. Some software systems automate this process within their existing leakage data analysis.

HHNU has a significant impact on reported leakage. There is a need to continually improve the coverage of properties with a focus on the factors having greatest impact on night use; for example the impact of season variations in use, increasing SAMs coverage and use of enhanced metering methods.

A company is expected to derive an estimate of average (arithmetic mean) household night use applying the following criteria.

- The values of HHNU night flow shall be used with values of night flow and NHHNU for the same time period and on the same statistical basis to derive an estimate of leakage representative for the DMA or zone.
- It shall use its own data or shared data with proximate companies. National default values are not valid.
- Plumbing losses shall be included and based on the company's own data;
- It shall demonstrate that its survey is representative of the company as a whole; disaggregation of the sample by demographic factors, property type or similar represents good practice.
- It shall demonstrate that the sample size is sufficient to capture continuous and intermittent night use with reasonable confidence.
- The application of IHMs, SAMS or a combination of both. It is unlikely that the IHM on its own will be of sufficient size to capture a valid sample of intermittent use.
- Continual monitoring and maintenance of IHM and SAMs monitors.

⁴ Fast Logging for improved estimation of household night use, UKWIR 2017

- HHNU shall be derived daily with regular, adjustment of values on a weekly or monthly frequency to reflect actual seasonal use. This may need to be done retrospectively.

5.6 Non-Household Night Use

Estimates of non-household night use are deducted from measured night flows in estimating leakage using the method described in Section 5.4. Most companies use the 1999 UKWIR methodology⁵ which sets out a methodology for deriving relationships between average night use and annual billed volume (ABV). Some companies are reviewing the form of this relationship to improve the confidence of this methodology.

The methodology stratifies non-household customers by groups of industry types and range of consumption. A representative sample of the variable characteristics of non-households by group and consumption shall be identified. Data logging of these sample customers shall be carried out for at least two weeks to derive model coefficients for each group.

Continuous monitoring of some non-households is carried out although companies apply varying thresholds of consumption above which they will install continuous monitoring. The objective for leakage reporting is to take full account of water use in the night flow analysis where total flow is significant in relation to DMA night flows or the likely variation in flow has a significant impact on DMA analysis and presents a risk to deriving valid data. The target threshold for continuous monitoring is where average demand of an individual non-household is greater than 24 to 48 m³/day (or night flow >1000 to 2000 l/hr) or 25% of a DMA night flow. A company should define its criteria, reflecting the impact of night use on the ability of a DMA to produce consistent and valid leakage estimates.

For water and sewerage companies, the 1999 UKWIR methodology shall also be applied to sewage treatment works and other company sites using significant water volumes. The guidance for continuous monitoring of non-households shall be similarly applied to these sites.

The introduction of competition in the non-household market may impact on the source and availability of measured volumes.

⁵ Estimating Legitimate Non-household Night Use Allowances, 99/WM/06/26: UKWIR 1999

A company is expected to derive estimates of non-household night use applying the following criteria.

- The values of NHHNU night flow shall be used with values of night flow and HHNU for the same time period and on the same statistical basis to derive an estimate of leakage representative for the DMA or zone.
- It shall use its own data or shared data with proximate companies. National default values are not valid.
- Application of the 1999 UKWIR methodology with the appropriate time window as used for the night flow and the published outcome of further methodology development.
- It shall demonstrate that the stratification of non-households to a number of groups and consumption bands is representative of the varying characteristics of commercial and industrial properties.
- It shall demonstrate that the sample size is sufficient to capture night use by stratification with reasonable confidence.
- Development of a reliable and representative average billed volume (ABV) model based on data logging of the representative sample sufficient to capture demand variations with further seasonal logging where relevant. Continuously logged properties are unlikely to form part of the sample as these generally have greater consumption than the stratified samples.
- Direct linkage of the ABV model to a company's billing system or replacement database of billed volumes. Update the average billed volumes at least annually.
- Continuous monitoring of selected non-households shall be carried out where average demand of an individual non-household has a material impact on the ability for a DMA or zone to provide valid and consistent data within operability limits.
- For water and sewerage companies, apply the same ABV methodology as a separate group and continuously monitor sewage treatment works and other sites using the same criteria as for non-households.

5.7 Hour to Day Conversion

An hour to day correction is required to take account of diurnal pressure variation in each DMA or zone. Leakage is monitored during the night when actual pressure is normally greater than other parts of the day. Daily leakage is estimated from night flow when actual pressure is likely to be greater than the average for a defined DMA unless pressure management is in place. Night leakage therefore needs a correction factor to convert to the average daily leakage rate. As leakage varies with pressure, the daily leakage flow needs to reflect the diurnal variation in flow.

A company shall take into account the findings from the UKWIR Report 'Assessment of Key parameters for Leakage Analysis'⁶ which addresses average zone pressure, average zone night pressure (AZNP) and hour to day factor (HDF).

A company is expected to derive the hour to day conversion using the following criteria.

- The hour-to-day factor shall be derived separately for each DMA or zone using pressure logging within each DMA. The factors shall be updated at least annually or where there are any significant changes to pressure regimes.
- As an alternative, hydraulic models can be used provided they have been updated to reflect the latest network reconfiguration and any pressure changes, and provided it is dis-aggregated in sufficient detail at sub-zone level.
- An N1 value of 1.0 to 1.2 in the leakage – pressure power law relationship⁷ unless a company is able to demonstrate a higher or lower value would be more appropriate using its own data.

5.8 Annual Distribution Leakage

Annual average distribution leakage expressed in MI/d shall be derived from operable data with minimal data infilling. Historically there have been various rules used to derive annual average leakage expressed as MI/d using a variety of statistical assumptions applied to weekly or monthly data. The approach set out below is to make best use of operable data. It takes into account variable daily data, captures weekly trends and minimises the extent of statistical adjustments. The weekly leakage value is used as the base measure taking an average value of daily data in the week. There may be outliers in the data which is expected in taking average values. Over the reporting year these outliers should be balanced and not impact on average annual leakage. The method captures the variance in weekly data through an average of the 52 weekly values. Monthly reporting may be appropriate for internal reporting but has no value in moving from weekly to annual average values.

A company is expected to derive the annual average distribution leakage using the following criteria.

- The average weekly data shall be derived from valid daily values of leakage using data points which are representative of the week. Where valid data is

⁶ Assessment of Key Parameter for Leakage Analysis, 17/WM/08/59, UKWIR 2017

⁷ Leakage (L) is proportional to pressure P^{N1} where N1 can vary locally between 0.5 and 1.5, but at DMA level is typically between 1.0 and 1.2.

not available from three or more data points then the weekly data should be backfilled using the methods described in Section 5.4 – night flow analysis.

- The annual value of leakage expressed as MI/d shall be derived from an average of the 52 week data.

5.9 Trunk Main and Service Reservoir Losses

Trunk Mains

A proportional approach in estimating leakage shall be applied. A company with a relatively high proportion of trunk main losses to total leakage should take a proactive leakage monitoring approach with a combination of field inspections, analytical techniques, and flow balancing methods. Other companies with relatively low proportions of estimated trunk main leakage (<5% of total leakage) may apply less intensive methods but all should use their own data and not rely on national default values. It is recognised that trunk main leakage is difficult to measure; the relatively low confidence of this estimate shall be reflected in the confidence intervals applied in the MLE methodology.

Compilation of flow balances within sections of the trunk mains network is an important element to the proactive approach. Flow balances may identify either meter error or unknown connections, but in some instances they may identify significant trunk mains leakage. Flow balances should be carried out between upstream and downstream meters or groups of meters, where:

- the upstream meters may be distribution input meters or trunk main network meters, or groups of such meters; and
- the downstream meters may be trunk main network meters or district meters, or groups of such meters.

A company should have sufficient meters installed to allow flow balances to be calculated over 95% by volume of the trunk main network.

Companies should follow the advice given in UKWIR report ‘Leakage Upstream of District Meters’⁸, which describes two alternative methods for quantification of trunk main leakage.

(i) A flow balance approach, as described above. This method is dependent on sufficient operational meters being installed. The disadvantage of this method is that

⁸ Leakage Upstream of District Meters, 15/WM/08/55, UKWIR 2015

it is using the difference between two or more meters with potential meter inaccuracies; or

(ii) A BABE component approach, using data on numbers of leakage with estimated flow rates and durations, together with an estimate of background leakage.

The choice between these two methods depends on what data is available to a company. If one of these methods can be applied meaningfully on a sample of the trunk mains network, this can be extrapolated to the whole network. Company-specific data shall be used to assess the value of trunk main leakage; national default values should not be used.

For some companies who monitor leakage at zone level, trunk main losses are included in reported leakage. A separate assessment of trunk main losses is therefore not required.

A company is expected to derive values of trunk main leakage using the following criteria.

- Company-specific data shall be used to assess the value of trunk main leakage.
- A proactive leakage monitoring approach shall be applied where trunk main losses form a significant element (>5%) of total leakage or the MLE water balance gap is greater than +/-2%. This approach shall be a combination of field inspections, analytical techniques, and flow balance methods. A company should have sufficient meters installed to allow flow balances to be calculated over 95% by volume of the trunk main network. The selection of methodology and level of leakage monitoring activities shall reflect the proportion of estimated losses in relation to total leakage and the characteristics of the network.
- Companies with trunk main losses greater than 5% of total leakage shall review and refresh estimates annually.

Service Reservoir Losses

A proportionate approach to estimating losses is appropriate. Leakage can occur through the structure and valves; overflows may be passing water. Losses are generally less than other areas of leakage; hence the lower frequency of leakage surveys. Drop tests have been used for many years as an acceptable and proportionate method for identifying any material leakage.

A company is expected to estimate service leakage using the following criteria.

- Company-specific data shall be used to assess the value of service reservoir losses.
- Reservoirs with known high leakage, structural deficiencies or are at risk of water quality failures shall be investigated on an individual basis.
- Drop tests are an appropriate approach and normally carried out every five or ten years in parallel with ongoing routine reservoir inspection programmes. Drop tests shall be carried out for at least 12 hours depending on the size of the reservoir. All valves should be checked to ensure they are closed tight.
- The extent of losses through reservoirs overflows should be investigated. Where reservoirs are shown to be at risk of overflowing, appropriate monitoring arrangements shall be put in place to control and minimise overflow events.

5.10 Annual Average Leakage

Annual average leakage is reported as the sum of distribution leakage from continuous DMA or zone monitoring, areas not covered by continuous monitoring, trunk main leakage and service reservoir leakage. These values shall be applied with differing confidence intervals in the MLE methodology.

6. Water Balance Components

6.1 Distribution Input

Distribution input (DI) is a measure of the volume of potable water input to the distribution network at treatment works, boreholes and bulk supply locations. DI is reported as an annual average MI/d.

A company is expected to report Distribution Input using the following criteria.

- Distribution input to the system shall be metered with at least daily readings at all defined locations.
 - Meters shall be an appropriate size for the flow to be measured and located at appropriate inputs to the network confirmed by record plans. Any treatment works take-off downstream of a meter shall be excluded from the DI calculations.
 - Data validity checks shall be carried out at least monthly.
 - Any missing data shall be infilled using both pre- and post- data for the location over at least one month, extrapolated from pump hours or use of upstream or downstream meters.
-

- The data transfer systems from meter output to central database shall be checked and validated on a risk-based frequency from one up to two years.
- Flow checks shall be carried out on DI meters consistent with the principles of the document 'EA Abstraction Good Metering Guide'⁹ and in particular the frequency of flow checking defined in Table 6.2 of the EA guide.

6.2 Water Delivered Measured

Water delivered measured shall include for household and non-household volumes. Include estimates of under-registration and supply pipe leakage for internally metered properties. Measured data shall be derived from the meter readings within the company's billing system including estimated reads.

Meter under-registration can be applied to measured volumes. A company is expected to use its own data on under-registration. Where a metering programme has recently been completed or ongoing, a company is expected to revise its assumptions. It is recognised that information on under-registration is limited and there is a need for further work to derive statistically representative values. To ensure that estimates of water delivered measured are not unduly biased by indicative assumptions of meter under-registration, a company should not assume a value greater than an average of 3% unless it can demonstrate a higher value.

New guidance on the estimation of unmeasured household consumption¹⁰ proposes a measured household monitor to enable the nature of consumption patterns to be better understood.

For non-households all water delivered is assumed as consumption and is billed by the wholesaler to the retailer. No allowance is made for any supply pipe losses.

A company is expected to report water delivered measured using the following criteria.

- Metered data as derived from a company's own billing system or from CMOS for non-households.
- An estimate of supply pipe losses shall be included for internally metered properties consistent with the company's current assumption of supply pipe losses.
- Inclusion of any leakage allowance can be included where a rebate has been applied to a customer's bill.

⁹ EA Abstraction Good Metering Guideline, EA February 2002

¹⁰ Future Estimation of Unmeasured Household Consumption, 17/WR/01/16, UKWIR 2017

- Meter under-registration shall be applied consistent with a company's own estimates. A company shall assume a meter under-registration not exceeding an average 3% unless it can evidence a higher value.
- Meter replacement consistent with a company's replacement programme.

6.3 Water Delivered Unmeasured

Water delivered unmeasured has historically been derived from a combination of population, properties, occupancy and per capita consumption. The relationships are not linear in that as occupancy increases, per capita consumption reduces. Supply pipe losses are included. This is a significant component of the water balance and therefore needs continual focus to maintain and improve this estimate.

Population and Occupancy

Guidance on population and occupancy should be derived using the guidance in the Water Resources Management Plan Guidelines¹¹.

Unmeasured Per-capita Consumption (PCC)

Unmeasured household per capita consumption shall be estimated from a company's own consumption monitor following good practice as defined in the UKWIR Report 'Best Practice for unmeasured per-capita consumption monitors 1999'. Good practice has improved since this report with innovation and new technologies now available although the basic principles of the monitors is unchanged. Companies can use individual household monitors (IHMs) or Small Area Monitors (SAMs) established by companies.

Recent good practice is that IHMs shall be based on a representative sample of at least 1000 unmeasured properties across a company's area of supply. Representation may be by demographic group, property type or other recognised statistical group. Individual monitors have a high resolution meter and associated logger to transmit data to a control centre. Data is expected to be collected at least at hourly intervals and regularly downloaded on a weekly basis. Data on household occupancy is updated at least once per year. The IHM needs continual monitoring to limit the level of any supply pipe losses or other continuous flows. Any other

¹¹ Final Water Resources Management Plan Guidelines, EA/ Natural Resources Wales, May 2016

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continuous flows are attributable to customer use or plumbing losses and should be included in estimates for PCC or PHC.

While an allowance is made for meter under-registration it is expected that meters will have an enhanced specification compared with normal domestic meters and are continually monitored. Meters are expected to be selected and maintained to minimise meter under-registration. A phased meter replacement programme should be in place.

SAMs are also be based on a representative sample of areas of DMAs or smaller whole DMAs which are specifically designed with one meter and permanent data loggers. They should exclude non-households; the total sample size is dependent on the acceptable uncertainty applied to PCC estimates and assumptions on SAM outage. The number of properties in SAMs for night use are greater than required for IHM because of the variability in intermittent night use. There are limitations to the SAMs where the proportion of metered properties increases above 50%. The best practice guide¹¹ provides further guidance. The IHM monitoring requirements for household occupancy, continual monitoring and meter under-registration shall be equally applied.

Estimates of plumbing losses not fully represented in the sample shall be based on a company's own data either through a separate assessment or with the IHM or SAMs surveys.

New guidance on the estimation of unmeasured household consumption¹² has been published. This provides further guidance on monitoring processes in particular the impact of adopting models to increasing meter penetration. The report sets out several potential options for estimating unmeasured households and a framework for selection of an alternative method.

A company is expected to report per capita consumption for unmeasured households using the following criteria.

- The PCC surveys shall follow the principles set out in the UKWIR Report 'Best Practice for unmeasured per-capita consumption monitors 1999'¹⁰ and the more recent report Future Estimation of Unmeasured Household Consumption, UKWIR 2017¹¹.
- An estimate of PCC shall be derived from a company's own individual household monitor or small area surveys.

¹² Future Estimation of Unmeasured Household Consumption, 17/WR/01/16, UKWIR 2017

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- It shall demonstrate that its survey is representative of the company as a whole; disaggregation of the sample by demographic factors, property type or similar factors represents good practice. Valid data from the survey shall be from at least 80% of monitors as an annual average measure. A company may develop and use an alternative survey as defined in the 2017 UKWIR Report.
- A SAM shall also comprise a representative sample of customer' characteristics. The sample size shall be sufficient to provide a statistically representative sample after allowing for outages. Where the proportion of metered properties in an area exceeds 50% of total properties then further data validity tests shall be applied.
- Quantify the uncertainty allocated to unmeasured household consumption and provide evidence to justify the uncertainty value used.
- Continual monitoring and maintenance of IHMs and SAM monitors.
- Meters shall be selected to provide sufficient granularity to detect low continuous flows indicative of plumbing losses or leakage short duration flow variations. The value of meter under registration should be less than the company's average meter stock.
- Estimate of plumbing losses shall be based on the company's own data.

Unmeasured non-households

This component is normally a small proportion of total non-household demand. The extent of water delivered to unmeasured non-households is derived from a study of the consumption of measured non-households of similar categories applying a recognised statistical approach.

A company is expected to report water delivered to unmeasured non-households using the following criteria.

- Where this reported volume is less than 2% of total non-household demand, data from a per property consumption study shall be refreshed every five years.
- Where reported volumes are greater than 2% of non-household demand, data from a property study shall be refreshed every two years.

6.4 Company Own Water Use

Many water and sewerage companies have significant water use at their sewage treatment works and other major assets. The driver for metering is not only accounting for water in the balance but to allow use as part of leakage monitoring

and reporting. Many companies have water efficiency targets to meet and metering is an enabler to achieve these.

Distribution system operational use comprises water knowingly used by a company to meet its statutory obligations particularly those related to drinking water quality. This includes, amongst other things, mains flushing, air scouring, swabbing, service reservoir cleaning, discharge to control pH and other chemical parameters in distribution. Water taken for commissioning of assets or as part of other legitimate network use shall be included. A proportionate approach is appropriate. An industry average can be applied. Where use is greater than 0.6% (20% above current industry average) of distribution input this is to be clearly evidenced and justified.

A company is expected to report using the following criteria.

- All sewage treatment sites and other key assets using greater than 10 m³/d (0.01 MI/d) shall be metered.
- An estimate of total company own use shall be included in the water balance, based on a clear methodology and actual data.
- Where an estimate of distribution operational use is greater than 0.6% of distribution input then this value needs to be clearly stated and justified. There should be no change to current assumptions unless clearly evidenced.

6.5 Other Water Use

This component comprises water delivered both legally and illegally.

Water taken **legally** unbilled shall include all water supplied to customers that is unbilled and not reported as water delivered to billed customers. It can include public supplies for which no charge is made such as some sewer flushing, uncharged church and other supplies, fire-fighting and training where not charged. The measure excludes leakage allowance rebates for measured customers. A proportionate approach is appropriate. An industry average can be applied. Where use is greater than 1.2% of distribution input (based on 20% above current industry average) this is to be clearly evidenced and justified.

Water taken **illegally** unbilled should only be reported here if it is based on actual occurrences using sound and auditable identification and recording procedures. This includes water use in void properties. A proportionate approach is appropriate. An industry average can be applied. Where use is greater than 0.6% of distribution input (based on 20% above current industry average) this is to be clearly evidenced and justified.

A company is expected to report Other Water Use using the following criteria.

- Other use components should be based on a company's own data.
- Where an estimate of water delivered unbilled (legally and illegally) is greater than 1.8% of distribution input then this value needs to be clearly stated and justified.
- Estimates should be updated when there is a material increase or decrease to volumes.

7. MLE Adjustment

Concept

The basic assumption is that:

Distribution Input shall equal the sum of water delivered to customers or used for other purposes and leakage from a company's network.

As this is averaged over a year, any change in service reservoir storage is not material.

The methodology for estimating water balances set out in the Demand Forecasting Methodology report¹³ shall be applied. An initial balance of all components shall be applied to identify the extent of any water balance gap. The distribution is carried out by reference to the size and uncertainty surrounding each component of the water balance.

The water balance gap is defined as:

'The difference between distribution input and the sum of water delivered to customers, a company's own water use, water delivered unbilled, distribution system use and leakage. The water balance gap is positive where distribution input is >the sum of components and negative where distribution input is < the sum of components.'

A gap of $\pm 2\%$ is considered good practice. A water balance gap $>5\%$ or $< -5\%$ indicates a significant inconsistency in one or more of the major components. A company is required to explain the reasons for any water balance gap of greater than a lower threshold of $\pm 3\%$. A water balance gap $>5\%$ or $< -5\%$ is too wide for a valid MLE adjustment to be carried out. In this instance, any water balance gap in

¹³ Demand Forecasting Methodology, NERA for UKWIR 1995: 95/WR/01/1

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excess of the +5% gap, expressed as MI/d, shall be added to the leakage component. In addition, for any water balance gap >5% or < -5% a review of all material components of the water balance is required.

A company is expected to:

- apply the MLE methodology and identify any water balance gap;
- disclose and explain the reasons for any water balance gap exceeding 3% of distribution input;
- any water balance gap in excess of the +5% gap, expressed as MI/d, shall be added to the leakage component; and
- Revisit all material components of the water balance where the water balance gap is >5% or < -5%.

Confidence Intervals

The MLE methodology applies a confidence interval to each component of the water balance. This is to reflect the accuracy of each of the components. Best practice is to derive a statistical measure of accuracy for each component although this is difficult in practice. Applying a relative accuracy is an alternative approach.

Applying differing confidence intervals very often has a significant impact on the water balance, particularly for leakage and per capita consumption. There is therefore a need to be more prescriptive in the approach to defining the range of confidence intervals. A range of confidence intervals can be applied to each group of components.

A company is expected to apply confidence intervals within the following ranges unless it has a valid statistical basis for specific components.

- Fully measured components such as distribution input should have a range from 2% to 4%.
- Mainly measured with some estimated adjustments such as measured volumes with supply pipe losses and meter under-registration: from 2.5% to 5%.
- Estimated using detailed and reliable methods such as distribution leakage and unmeasured household (including PCC): from 8% to 12%.
- Broad estimates not fully detailed or reliable such as trunk main leakage and water delivered unbilled components: from 20% to 50%.

Total Leakage

Total leakage is taken as the sum of the post MLE values for distribution leakage, including supply pipe leakage, and trunk main / service reservoir leakage. It is expressed as an annual average MI/d value to one decimal place, consistent with the performance commitment measure.

8. Glossary

ABV	Annual billed volume
AZNP	Average zone night pressure
BABE	Burst and background estimating methodology
DI	Distribution input
DMA	District Meter Area
EA	Environment Agency
HDF	Hour to day factor
HHNU	Household night use
IHM	Individual household monitor
MLE	Maximum likelihood estimation
NHHNU	Non household night use
MI/d	Mega-litres per day
PCC	Per capita consumption
SAMs	Small area monitors
UKWIR	United Kingdom water industry research

1.6 Per capita consumption (PCC)

Per capita consumption is defined as the average amount of water used by each customer that lives in a household property. We are using the same definition as that used for water resources management plans (WRMPs).

This is calculated as total consumption (both metered and unmetered households) divided by the total population. All estimates of per capita consumption (PCC) should

be expressed in units of litres per head per day (l/h/d) and exclude underground supply pipe losses.

Companies should report the same forecast data as used in WRMP tables for the “Average Household – PCC” reported in the final plan table (Row 31FP) and the outturn should be consistent with the WRMP annual review returns.

The WRMP tables auto-calculate the PCC from consumption divided by population (i.e. top down), not directly from the sum of demand micro-components. This is because company calculations of PCC may include Maximum Likelihood Estimation (MLE) adjustments.

The reporting for the PCC outcome should be consistent with this approach.

In detail the Average Household – PCC is calculated for WRMP19 as follows:

$$\frac{\textit{Measured household consumption} + \textit{Unmeasured household consumption}}{\textit{Measured household population} + \textit{Unmeasured household population}}$$

Each consumption component is made up of:

- water delivered minus underground supply pipe leakage; and
- where water delivered is the average volume of water entering the distribution network at point of production and then delivered to households. This measure of water delivered excludes water lost on the distribution network (distribution losses) and any water taken unbilled, but this does include supply pipe leakage.

1.7 Internal sewer flooding

The definition of internal sewer flooding which follows is identical to the one [published on UKWIR's website](#). The UKWIR definition includes external sewer flooding, but it is only internal sewer flooding that we are proposing to be a common performance commitment for PR19. However, external sewer flooding is part of our long list of asset health metrics and uses the definition that follows (see section 2.2.4).

Reporting Guidance – Sewer Flooding

1. Objective

This guidance seeks to enable all companies to report on sewer flooding for the defined year with confidence and at a reasonable level of accuracy and with a common approach. Companies shall apply consistent and robust methods and common assumptions. This will facilitate the comparison of performance across companies by customers, regulators and other companies with reasonable confidence.

2. Key principles

There are several key assumptions made in the compilation of the guidance.

- Reporting of flooding incidents shall be subject to each company's assurance process which is applied to all measures reported annually.
- Companies have a methodology or procedure in place for reporting on flooding incidents. This procedure is reviewed as part of their assurance process.

There is an assumption that there will be continued improvement by all companies in the short and medium term through innovation, new technology, data quality improvements and staff training.

- The measure assumes a clear and simple approach that can be understood by customers and regulators.
- The essential reporting requirements for reporting on sewer flooding are set out.
- The focus of the guidance is on annual reporting of sewer flooding incidents. It is not intended as a definitive guide to managing the risk of flooding from sewers.
- Exclusions are to be kept to a minimum and shall be consistent with the reasonable expectations of an affected customer.

This is likely to mean that comparisons of historical performance between companies, and of individual companies, may not necessarily be valid. However, it is anticipated that analysis of future individual company year on year trends in performance will be possible.

3. Measure Definition

There shall be two measures of flooding incidents, both of which shall include flooding due to overloaded sewers (hydraulic flooding) and due to other causes (FOC). The two measures are:

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1. the number of internal flooding incidents per year; and
2. the number of external flooding incidents per year.

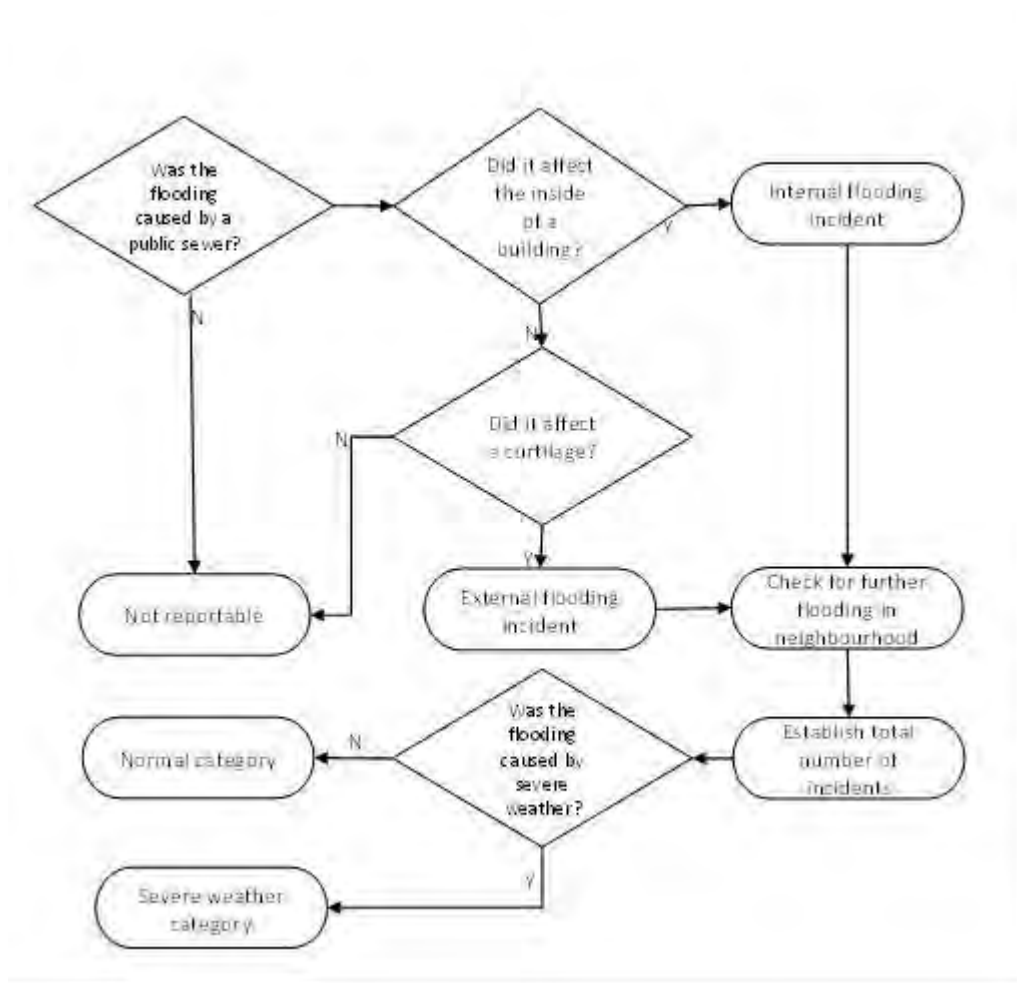
For both measures, companies will report the number of incidents a) including and b) excluding the impact of severe weather, as defined in section 6.

For the purpose of the return, a flooding incident is defined as the number of properties (or curtilages) flooded during each flooding event from a public sewer. For example, five properties which suffered two flooding events during a year, would count as ten incidents. Where a property floods both internally and externally during the same event it shall only be recorded as an internal flooding incident.

A flooding event is the escape of water from a sewerage system, irrespective of size as evidenced by standing water, running water or visible deposits of silt or sewage solids.

4. Process diagram

The diagram below shows a simplified version of the process.



1. Assets causing flooding

Incidents caused by an escape from public sewers (whether foul, combined or surface water); including pumping stations, sewage treatment works and other assets under the control of the sewerage undertaker shall be reported. Incidents caused by sewers transferred under the Transfer of Private Sewers Regulations 2011 and pumping stations transferred in 2016 shall be included.

For the purposes of consistent reporting, flooding caused by the blockage or failure of a gully, shared by two or more properties and connected to a public sewer, or blockage of the gully grating, or the failure of any pipework above ground, shall be excluded. It should be noted that this is not to be taken as an opinion on the legal status of these aspects of drainage apparatus.

Flooding caused by assets which are beyond the undertaker's control is excluded, for example:

- flooding due to surface water run off which has not originated from public sewers,
- fluvial flooding,
- coastal flooding,
- ground water which has not originated from a public sewer,
- flooding from water mains etc.; or
- incidents caused by highway drains and private assets. The Water UK "Guide to Transfer of Private Sewers Regulations 2011", published on 30th September 2011 shall be applied to assess if the flooding incident should be attributed to the undertaker or a private asset.

2. Severe weather

Individual rainfall events with a storm return period greater than 1 in 20 years shall be classed as severe weather. The Flood Estimation Handbook, FEH13 model shall be used to estimate the return periods of individual events, using radar or rain gauge data.

Flooding incidents caused by severe weather shall be identified and recorded separately to other reported incidents.

Flooding caused as a result of outfalls being locked out by receiving watercourses being at or above their 1 in 100 year flood levels, shall also be included in this category.

On an exceptional basis, consideration may be given to include incidents in this category where flooding is caused by the impact of multiple rainfall events with individual return periods of less than 1 in 20 years but with a cumulative rarity of greater than 1 in 20 years. Any proposal for such categorisation must be supported by robust evidence, tested by the company's assurance process, and be fully transparent to customers and regulators.

It is the responsibility of the company to evidence why any individual incidents are to be included in this category.

3. Determining whether flooding is internal or external

Internal flooding

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Internal Flooding is defined as flooding which enters a building or passes below a suspended floor. In this context, buildings are defined as those normally used for residential, public, community, commercial, business or industrial purposes. The list below gives examples of what parts of buildings shall be included in the internal flooding category. It is not designed to be an exhaustive list.

- The main parts of the building.
- Conservatories.
- Basements and cellars (even if unoccupied).
- Areas below suspended floors.
- Lift shafts.
- Stairwell/lobby area of flats (to be counted as 1 flooded property).
- Any shared car parking areas beneath the main building where access to the parking area is from within the building (to be counted as 1 flooded property).
- Studios and workshops, which are an integral part of the main building.
- Porches.
- Garages which are an integral part of the house with an adjoining door to the occupied building.

External Flooding

External flooding is defined as flooding within the curtilage of a building normally used for residential, public, community and business purposes. It includes buildings in those curtilages which do not comply with the definition for internal flooding. For example:

- buildings where the prime purpose is for storage or installation of domestic appliances and is not accessed from the house by means of an adjoining door to the habitable building;
- detached garages (whether situated inside the boundary of the property and separated from the main building or outside the boundary but with common access as in a garage block);
- linked detached garages (i.e. garages which are attached to a property but separated from it by an external passageway);
- sheds and outbuildings (e.g. stables, kennels, coal houses, outside toilets);
and
- summer houses.

In the case of farms, golf clubs etc.; flooding of the immediate curtilage of the main buildings (gardens, patios etc.) shall be included.

In the case of a flooding event affecting an area in the same ownership, such as an industrial park, retail park, hospital site, university site etc., it shall be counted as one incident.

The following areas shall be excluded from the reported numbers:

- 'highways' – including footpaths; and
- 'public' open space; agricultural land; car parks.

Where a property floods both internally and externally during the same event it shall only be recorded as an internal flooding incident.

4. Repeat incidents

Where a flooding has occurred, and flooding subsides and/or any clean-up has started, any subsequent flooding shall be counted as a separate incident. This shall be regardless of the time between events and if any investigation or follow on work is complete.

5. Further clarification

Flooding due to third party action shall be included in all cases.

Any flooding due to jetting shall be included, unless the water is fully contained within a toilet bowl.

Damp patches caused by seepage through walls or floors shall be excluded, but any area which has visible standing or running water or which has visible deposits of silt or sewage solids shall be included.

If there is a strong suspicion of potentially fraudulent reports of flooding made with the intention to gain GSS payments or receive increased service, and there is no evidence of flooding, companies should exclude the incidents unless the customer provides substantiation that the flooding occurred.

6. Neighbouring properties

Companies shall make all reasonable efforts to determine the number of properties affected by flooding. This should include site visits to the affected property and all neighbouring properties that may have been affected. The company shall actively

seek evidence of flooding. It should include the use of modelling where this is appropriate. Calling cards shall be left, if necessary.

If there is clear site evidence that a property has flooded then the incident shall be included despite the absence of a customer report, or a denial by a customer that flooding occurred.

7. Records

Companies shall maintain verifiable records for all reported flooding incidents irrespective of whether they are included. The aim of the records is to provide an auditable method for identifying the specific incidents that are included and excluded from the return.

8. Risk

Companies shall develop their own approach to managing the risk of flooding from sewers.

9. Methodology statement

Companies shall maintain a methodology statement. It shall be used as a decision support tool to expand on this document as necessary. It should record any changes in approach compared to previous years.

10. Compliance Check List

The Compliance checklist in Annex A shall be completed and presented with the reported figure.

11. References

1. The Water UK "Guide to Transfer of Private Sewers Regulations 2011", published on 30th September 2011
2. The Flood Estimation Handbook (FEH), published by the Centre for Ecology and Hydrology.

1.8 Pollution incidents (Category 3)

We are proposing to use Category 3 pollution incidents for the PR19 common performance commitment. We are using the Environment Agency's (EA's) definition, including [its classification](#) of pollution incidents according to their impact on the environment and people and the level of response needed.

1.8.1 Definition of a pollution incident

An incident is:

- a specific event or occurrence;
- brought to the EA's attention;
- within its areas of responsibility; and
- which may have an environmental and/or operational impact¹⁴.

An incident can either happen in a single location or in multiple locations at the same time or sequentially (such as flooding).

Events are brought to the EA's attention through reports from members of the public, emergency services, local authorities, other regulators, industry, EA staff and other parties.

Incidents within the EA's area of responsibility, that have a potential or actual environmental impact, include reports of:

- environmental harm/pollution of surface waters or groundwater;
- environmental harm to land, air and water from a site, substance or process we regulate;
- impacts on human health or nuisance to the local community from a site, substance or process we regulate;
- major air pollution incidents where we co-ordinate the monitoring and modelling;
- fish kills and illegal fishing;
- damage to nature conservation sites and species from activities we regulate;
- illegal abstraction and low river flows;
- speeding vessels and closure of a navigation fairway;
- flooding or potential causes of flooding; and
- environmental harm from land drainage works.

¹⁴ This is outlined in the EA document, available from the EA on request, "Incidents and their classification: The Common Incident Classification Scheme"

Environmental harm includes damage to nature conservation sites and species, physical habitats, and fish and the fisheries they support.

The incident does not actually need to result in an environmental impact, as the EA's actions may prevent damage occurring.

Alarms from EA telemetry / automated equipment

An event leading to the generation of an alarm, from EA telemetry or other automatic equipment, is as an incident if the EA needs to deploy non-routine resources to investigate or respond.

This includes automated recordings of high flows and low dissolved oxygen, and operational telemetry alarms indicating flooding or an imminent potential for flooding.

Analytical failures

A retrospective analytical failure is an incident where the investigation reveals an ongoing polluting problem, or there is evidence of an environmental impact. This includes both results from EA sampling and self-reporting from the industry.

For example, bathing water sample exceedances are incidents if the subsequent investigation reveals evidence of an event at an identified source, such as a combined sewer overflow (CSO).

Failing a mandatory directive doesn't automatically mean a Category 1 or 2 incident, but is likely to. The EA will also consider the actual impact on water quality, the status of the water body, and other impact criteria.

Operator ('self') recorded / reported events

A permit, consent, or local agreement, may require an operator to notify the EA of alarms and emissions. Operators may also be required to keep records of any emissions and actions taken to comply with the permit, and submit them to us or make them available for inspection.

These are classified as incidents where the investigation reveals an ongoing polluting problem, or there is evidence of an environmental impact.

Works undertaken to address minor nuisance issues which have not resulted in environmental impact will not normally be incidents. For example, a record of litter

outside a site which has been collected or mud on the road which has been cleaned up.

The majority of notifications of emission limit values being exceeded from installations do not have any environmental impact as the permit is based on best available techniques (BAT) or appropriate measures / cost-benefit. Historically, self-notification of breaches of emission limit values by operators results in few incidents.

Breaches of legislation, permit limits, and illegal activity

A permit breach and illegal activity is an incident if it is a specific event that is having, or about to have an environmental impact if some form of immediate preventative action is not taken. For example:

- an unbunded oil tank on a permitted site would not be an incident unless it was leaking and causing or likely to cause pollution; and
- a breach of a flood defence consent would not be an incident unless an environmental impact was actually taking place, or action was required to prevent an imminent impact (see [consent infringements](#)).

This applies however observed, whether by EA staff during routine visits, or reports from the public or operator.

Inspections

For non-flood related work, an event observed during a routine visit or inspection is an incident if it is a specific event that is having, or about to have an environmental impact if some form of immediate preventative action is not taken.

Soil damage observed during a farm cross compliance visit is not an incident unless it is having, or immediately about to have, an environmental impact which is within the EA's area of business (such as actual or potential pollution of surface waters or groundwater).

For flood-related work, an event observed during a routine visit or inspection is an incident if it is causing flooding, or non-routine maintenance is required to prevent imminent flooding.

Amenity issues

All complaints about permitted sites are incidents, with each type of amenity issue (such as noise, odour, flies or dust) being a separate incident.

For ongoing incidents of the same type, the first incident will be recorded as normal, and all subsequent incidents will be recorded as duplicates.

Issues with fundamentally different causes will be classified as separate incidents.

Ongoing events

Flooding from severe weather, causing multiple events throughout the duration of the high water, are separate incidents by river catchment. Record by field team area where this involves several small catchments.

Intermittent discharges

Ongoing complaints about intermittent discharges are separate incidents if each one relates to a discrete event. Even if the source is exactly the same, each discrete event will usually constitute a separate incident unless the operator is taking agreed action to resolve a known problem. For example: intermittent discharges from a broken pumping station or sewer when it rains and where the water company has a timely program in place to address are considered as the same incident.

Complaints about an ongoing event of which the EA is already aware (and where the operator is taking action) are separate incidents if the report suggests that the impact may have increased and an inspection is needed.

Bathing Waters Directive: short-term pollution events

The EA's forecasts of 'short term pollution' (STP) for some bathing waters, in line with the revised bathing waters directive, are not pollution incidents. However, it is possible that a pollution incident could occur and coincide with a forecast of STP. If this happens, the incident will be recorded in the normal manner.

Complaints regarding permitted sites, discharges or emissions

Where an event constitutes an incident (based on the conditions set out in the paragraphs above), the EA will presume any emission or discharge to have an environmental impact. It is responsibility of the operator to prove otherwise.

Reports regarding the EA's role as competent or responsible authority

All reports about a site or asset where the EA is the competent or responsible authority are incidents if they have the potential to, or are, impacting on people, property or the environment.

1.8.2 Specific information about this metric

Reporting for this metric will be the total number of category 3 (minor or minimal impact) pollution incidents in a calendar year emanating from a discharge or escape of a containment from a sewerage company asset.

Performance will be reported as the number of incidents per 10,000km of sewer.

Category 3 - minimal impact

Pollutants that have entered the water course so have caused an impact but that impact is limited.

Other factors to consider will be downstream receptors, such as sites of special scientific interest (SSSIs), abstractors, how far they are away from the discharge, and the number of reports about the same incident. For spills to land, factors to consider are the presence of a source protection zone (SPZ) or if the water course is being used for amenity (i.e., people in the water, swimming, boating, etc.). The presence of one of these factors may increase the potential impact score. For example:

- discharge of grey water (probably sewage) from a pipe in to a water course. The pollution can be seen a few metres downstream but there is no other impact observed;
- road traffic collision that has released a few 10s of litres of vehicle fluids (fuel, oil, coolant water, etc.) on to the road and into a surface water drain;
- spill of a few litres of oil that has gone in to a surface water drain;
- a thin sheen of oil on a water course. The thin sheen (rainbow effect) may extend a few hundred metres: a small amount of oil will spread out a long way but is still only a small amount; and
- discoloured, soapy, foaming or 'dirty' discharge from a pipe. The pollution can only be seen for a few 10s of metres downstream and no other impacts are observed.

1.9 Risk of severe restrictions in a drought

The overall measure will be presented as the percentage of the population the company serves that would experience severe supply restrictions (e.g., standpipes or rota cuts) in a 1 in 200 year drought.

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This would be, on a company basis, the number and percentage of population at risk of experiencing severe restrictions (such as standpipes or rota cuts) in a 1 in 200 year drought. The population is considered to be 'at risk' if the supply-demand balance for the 1 in 200 year drought event results in a deficit. This will occur when the theoretical deployable output minus outage allowance (available supply) is less than the dry year demand plus base year target headroom (uncertainty).

The data used for this metric should be consistent with that forecast and reported for the water resources management plans (WRMPs) which have their own technical guidance issued by the Environment Agency, Natural Resources Wales and others. The 1 in 200 year drought used as part of this metric should be the same design event as used to provide cost information for the reference level of service (0.5% or 1 in 200) as required by the water resources planning guidelines (in section 3.6 - Reference level of service).

Companies' forecasts should include the impacts of less severe restrictions (temporary use bans, non-essential use bans) on the supply-demand balance components at a frequency as stated in their WRMP, when calculating this measure.

Companies should report the forecast population at risk (numbers and proportion) for the next 25 years (minimum planning period used in water resources planning) based on the supply demand balance for the 1 in 200 year drought event. If a water resource zone is in a deficit in any year the number of customers in that zone are reported as at risk. All the companies' zones are then summed together to give a total number of customers at risk in any given interval. The annual proportion of customers at risk is calculated by dividing this by the total number of customers served by the company. The overall measure will use the annual average (over 25 year forecast) proportion of customers at risk.

This will be the total number of customers at risk over the 25 years, divided by the 25 years as a proportion of total customers served.

$$\frac{\sum \text{total customers at risk over 25 years} / 25}{\sum \text{total customers over 25 years} / 25} \times 100$$

It is expected that this initial forecast will show a stable or improving trend over the 25-year period.

Companies will update the 25-year forecast at the end of the 2020-21 to 2024-25 period, to cover the new 25-year period (2025-26 to 2049-50) and report the revised annual average proportion of customers at risk. The difference between the two 25-year forecasts' performances indicates how well the company has performed. The

reward and penalty can then be based on the change in the forecasts of customers at risk.

The revised forecasts should be consistent with data submitted as part of WRMP annual reviews and those being incorporated into WRMP24. The revised forecasts should utilise updated outturn data for deployable output (delivered schemes), outage allowance, demand data components, and target headroom. The assumptions and tools to calculate the supply-demand balance forecasts should remain consistent with the start of AMP forecasts.

A company should be able to improve performance on this metric by reducing its actual outage, reducing its actual demand (e.g., leakage, water efficiency) and increasing its available supplies in a drought (deployable output) that will be of benefit in the 1 in 200 year event, which covers three of the four resilience aspects (redundancy, reliability and resistance). These changes in outturn will feed into the revised forecasts at the end of period allowing the metric performance to be reported.

For target headroom companies should use 95% uncertainty (or equivalent for complex methods) for the first five years of the planning period forecasts and for performance reporting.

Example calculation of risk of severe restrictions in a drought metric

A water resource zone has 100,000 customers

For each year interval in the 25 year planning period the supply-demand balance for the 1 in 200 year drought is as follows:

Deployable output – Outage allowance – Demand – Target headroom

For the example water resources zone this equates to

$100 - 10 - 85 - 10 = -5$ (5MI/d deficit in supply-demand balance calculation)

Therefore, for this year, all customers (100,000) in this zone are at risk of severe restrictions in a 1 in 200 year drought.

If the company has two water resource zones and the second WRZ (also with a population of 100,000) has a forecast surplus for this interval year in the planning period, then the number of customers at risk would be 100,000 and the proportion of customers at risk would be 50%.

	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	...	2044-45	Forecast annual average
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PR19 forecast customers at risk (nr 000s)	100	100	100	100	100	100	...	100	100
PR19 forecast proportion customers at risk (%)	50	50	50	50	50	50	...	50	50
PR24 forecast customers at risk (nr 000s)	-	-	-	-	-	0	...	0	0
PR24 proportion of customers at risk (%)	-	-	-	-	-	0	...	0	0

In this example the company initially forecasts stable risk for the 25 year period. However, they deliver outperformance in this measure by improving their supply demand balance for a 1 in 200 year drought meaning that less customers are at risk (none) for the next 25 year forecast period.

The data feeding this metric is expected to be consistent with the company's WRMP, which has associated guidance and is reviewed by the EA. We expect the company to provide their own data assurance on the components that contribute to this metric on the basis that it is the company's responsibility to own and assure their own data.

1.10 Wastewater flooding risk

This metric aims to capture the risk of a wastewater company's population experiencing wastewater system flooding. As outlined in the outcomes appendix 2 there are four options (1a, 1b, 2 and 3) for this metric:

1.10.1 Risk of flooding of wastewater systems

There are two options within option 1, both of which have the same first step. However, for ease of presentation we will show the two options separately.

Option 1a

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Flooding Metric for wastewater drainage systems		Step 1 Initial Catchment assessment (whole catchment populations)		Step 2 Find residual risk in catchment by assessing resilience activities that have been applied beyond the design / standard operation of the asset, to reduce the impact of flooding	
Impact	Surface water and sewer flooding				
Hazard	Extreme rainfall in excess of 1 30				
Risk Grade	Catchment characteristics	Population	% Region	Population	% Region
5	The sewer network is the only drainage network in the catchment and the catchment is low lying discharging to a terminal pumping station. The capacity and capability of the pumping station is critical in extreme weather and can be overrun as all flows have to be pumped AND/OR there is a lack of capacity in the trunk sewer network and the pumping station within extreme weather events.	623839	12.83%	50000	1.03%
4	This catchment has a rapid response resulting in high flow routing through the sewer and drainage network AND/OR through one point in the network (such as a terminal pumping station) AND/OR there is a lack of capacity within the sewer network to handle these high peak flows resulting in sewer and surface water flooding and overland flow - there are other drainage pathways through the catchment.	1959000	40.29%	130000	2.67%
3	The catchment is at risk of fluvial or sea inundation with the sewerage assets being overrun by flood waters. The sewer network can no longer operate effectively due to the presence of flood waters. AND/OR Consequence of asset failure as a result of other critical infrastructure AND/OR Risk of asset failure due to transport dependency (access roads). AND/OR catchments that are dependant on HIGH RISK assets such as sewers and rising mains under/over rivers, railways and motorways or catchments with complicated drainage arrangements such as multiple flow	1859409	38.24%	180000	3.70%
2	Large complex networks with many dependencies and high urban density. HIGH RISK for urban creep and legacy misconnections of surface water resulting in a storm response. High urban growth. Assets may be in vulnerable areas (under railways) and HIGH risk of vandalism/theft. Catchment may also be subject of HIGH RISK of ground water ingress through proximity to water table. HIGH RISK of illegal (or out of consent) trade discharge of a substance/material that could affect sewage system/treatment operation.	144887	2.98%	40000	0.82%
1	Small simple networks with low urban density. Low potential for urban creep and legacy misconnections of surface water. Low growth levels. AND/OR Catchment has slow response and may be flat (risks of septicity).	275706	5.67%	20000	0.41%
Total population		4862841		420000	

Step 1: Assign a level of risk (1 to 5) to the catchment in question using the table. In some ways this is a measure of vulnerability of the catchment as well as likelihood of the flood since it takes into account capacity in peak flows and geographical location. The population size gives a measure of the consequence of failure.

Step 2: Calculate the residual population at risk in each catchment to rainfall with a return period of 1 in 50 years.

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Factors such as new development, impermeable paving of land and population growth would act to increase risk. Companies' actions to remove surface water/ground water ingress from sewers or to increase sewer capacity would act to reduce risk. We would expect companies to show a stable or improving trend over the five year period.

Please note that Option 1a is not a fully completed metric. Guidelines are needed to ensure companies complete the spreadsheet and steps consistently. In particular some more work is needed to:

- characterise catchments - this should include clarity on definitions and risk assessment methodologies; and
- standardise the approach to calculating residual population at risk.

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Option 1b

Example flooding metric catchment consequence table

Flooding Metric for wastewater drainage systems		Step 1: Initial Catchment assessment - what rainfall return period to apply to drainage capacity model
Impact	Surface water and sewer flooding	
Hazard	Extreme rainfall	Design storm to use
Risk Grade	Catchment characteristics	
5	The sewer network is the only drainage network in the catchment and the catchment is low lying discharging to a terminal pumping station. The capacity and capability of the pumping station is critical in extreme weather and can be overrun as all flows have to be pumped AND/OR there is a lack of capacity in the trunk sewer network and the pumping station within extreme weather events.	1 in 50
4	This catchment has a rapid response resulting in high flow routing through the sewer and drainage network AND/OR through one point in the network (such as a terminal pumping station) AND/OR there is a lack of capacity within the sewer network to handle these high peak flows resulting in sewer and surface water flooding and overland flow - there are other drainage pathways through the catchment.	1 in 30
3	The catchment is at risk of fluvial or sea inundation with the sewerage assets being overrun by flood waters. The sewer network can no longer operate effectively due to the presence of flood waters. AND/OR Consequence of asset failure as a result of other critical infrastructure AND/OR Risk of asset failure due to transport dependency (access roads). AND/OR catchments that are dependant on HIGH RISK assets such as sewers and rising mains under/over rivers, railways and motorways or catchments with complicated drainage arrangements such as multiple flow	1 in 20
2	Large complex networks with many dependencies and high urban density. HIGH RISK for urban creep and legacy misconnections of surface water resulting in a storm response. High urban growth. Assets may be in vulnerable areas (under railways) and HIGH risk of vandalism/theft. Catchment may also be subject of HIGH RISK of ground water ingress through proximity to water table. HIGH RISK of illegal (or out of consent) trade discharge of a substance/material that could affect sewage system/treatment operation.	1 in 20
1	Small simple networks with low urban density. Low potential for urban creep and legacy misconnections of surface water. Low growth levels. AND/OR Catchment has slow response and may be flat (risks of septicity).	1 in 10 if applicable

Step 1: Assign a risk grade (1 to 5) to the catchment in question using the table (the same table as for Option 1a).

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Step 2: Use the risk grade from the table to dictate the rainfall return period that should be used as an input into the drainage capacity model for the assets in the catchment. Companies can include catchments in the lowest risk category, but this is not mandatory for practical reasons due to lower need to prioritise getting data for low risk catchments. It should either include all level 1 catchments or exclude all level 1 catchments for all years.

The risk categorisation is a high level way to consider the potential consequences of flooding in a catchment. The methodology proposed does not consider flooding at a property level, but that sewers may discharge in heavy rainfall. In a high risk catchment, such as that in which the city of Hull resides, the consequences of flooding are severe. It is proportionate that the system has a high level of flood protection. For rural catchments, while flooding is undesirable, if flooding does not impact properties either internally or externally, it is proportionate for these catchments to have a lower level of flood protection.

Step 3: This step is an adaptation of the drainage capacity model^{15 16} enhanced method outlined in workstream 2 (WS2) of the 21st Century Drainage programme (21st CDP).

For each catchment follow the methodology described, but only use the design storm for the catchment determined in step 1. A variety of durations must be used to determine the critical storm. For each catchment determine the pipes that surcharge in the critical storm. For all pipes in a catchment that surcharge weight results using population equivalent.

$$\frac{\text{Population equivalent upstream of all pipes that surcharge} \times 100}{\text{Population equivalent upstream of all pipes}}$$

Where there is no data, and the risk grade of the catchment is 2 to 5, the pipes in that catchment should be assumed to surcharge. This will highlight where companies do not have good models or data.

We would expect assurance to be provided by the companies, including of forecasts, if we use the future performance model.

¹⁵ <http://www.water.org.uk/policy/improving-resilience/21st-century-drainage> in particular guidance document in <https://dl.dropboxusercontent.com/u/299993612/Policy/21CD/WS2/WS2-RT006-Guidance-R2.0.pdf>

¹⁶ Chartered institute of water and environment management (CIWEM) urban drainage group has a code of practice for sewer hydraulic modelling [Code of Practice for the Hydraulic Modelling of Sewer Systems](#). We would expect all companies to follow this code of practice. This is currently being updated.

There are further options. We could dispense with step 1 and only complete step 2 using the rainfall return period of 1 in 50 years, a storm only likely to occur once in 50 years. However, this would not differentiate the consequences that lack of capacity in the sewerage system can have on different catchments and the implications for operational resilience.

We could also use the methodology proposed by work stream 2 of the 21st Century Drainage Programme and consider the proportion of pipes that this methodology highlights as “red” using enhanced models, weighted by the population equivalent upstream of each pipe. Again this methodology does not take into account the potential consequences of flooding in different catchments and uses a relatively low standard to determine the red rating – a surcharge return period of 2 years or less.

1.10.2 Option 2: vulnerability of combined sewer overflows (CSOs) to rainfall

This metric would measure the frequency of combined sewer overflows.

There will be event duration monitors on the vast majority of CSOs by 2020. Depending on the sensitivity of the water course it spills into, the CSO will be monitored either every 2 or 15 minutes. Currently the expectation is for companies to report annually on spill frequency and duration to the Environment Agency.

Spill frequency and duration can give an indication of the performance of assets, for example, increases in spill frequency could indicate the catchment needs to be managed better by using more sustainable drainage, or building additional capacity in the system.

This metric would require companies to monitor their overflow frequency¹⁷ in separate categories for the 2 / 15 minute measurements. This would be for all CSOs in place and returning data by April 2020.

The CSOs would then be categorised into High, Medium or Low spill frequency:

Vulnerability of CSO / Frequency spill / year	Number of CSOs
High (>40)	X
Medium (>20 but <40)	Y
Low (<20)	Z

¹⁷ At this early stage the measure would not use duration as well as frequency to calculate a volume.

$$\frac{\text{Number of high frequency spilling CSOs} \times 100}{\text{Number of all measured CSOs}}$$

The proposal here is for a metric of high frequency spills. The metric could use catchment area or the upstream population equivalent.

CSO event duration monitoring is in early stages of development. Performance on the metric would be assessed as performance in 2025 relative to that on the same CSOs in 2020.

There would be no exceptions to excluding data from this metric. However, companies could set their performance commitment levels taking into account the storm overflow assessment which all companies must do for each CSO that has over 40 spills. The storm overflow assessment looks at the costs and benefits¹⁸ of interventions to reduce spills. If an overflow passes through this process and is found to be non-cost beneficial to reduce spill frequency then it is removed from that, and the next, reporting round.

This metric is a lagging indicator but can assess vulnerability of the wastewater system as high frequency of overflows would likely indicate reduced resilience of systems to rainfall. As the 21st CDP Workstream 2 process further develops modelling for CSOs, a leading indicator similar to how the model for pipes in Option 1b works could be developed looking at future spilling risk and flood / surcharge return periods.

1.10.3 Option 3: reduction in surface water in combined sewers, by looking at the size of the area disconnected from combined sewers by retrofitting sustainable drainage

This metric looks at the size of the area disconnected from combined sewers by retrofitting sustainable drainage systems. The size (measured in hectares, for example) of a local impermeable area that would normally contribute to surface water run-off into a combined sewer that is disconnected from the combined sewers by fitting sustainable drainage measures. These measures are, for example, water butts, permeable paving, rain gardens and green roofs. Thames Water's performance commitment SB5 from PR14 is an example of a metric of this type.

¹⁸ best technical knowledge not entailing excessive costs (BTKNEEC)

1.11 Common asset health measure 1: mains bursts per 1,000 km

Our definition for mains bursts per 1,000km comes from [JR11 Reporting requirements](#) Issue 1.1 - March 2011, June Returns 2011, chapter 11 line 12.

Number of mains bursts per thousand kilometres of total length of mains. Mains bursts include all physical repair work to mains from which water is lost. This is attributable to pipes, joints or joint material failures or movement, or caused or deemed to be caused by conditions or original pipe laying or subsequent changes in ground conditions (such as changes to a road formation, loading, etc. where the costs of repair cannot be recovered from a third party). Include ferrule failures that are attributable to mains material condition or local ground movements, but not incidents of ferrule failure due to ferrule materials or poor workmanship, or associated with the communication pipe connection.

Exclude maintenance work on valve packings, hydrant seals, air valves etc. For the avoidance of doubt, all leakage occurring at locations or through joint or material failures which would have been designed for the life of the main (irrespective of whether earlier failure occurs) should be regarded as mains bursts. Failure of consumable or maintainable items (valve packings, etc.) should be excluded. Exclude valve, hydrant, washout and air valve replacements.

Include incidents of over-pressure or pressure cycling, and surge failures, etc., which reflect the system operating conditions, even where these failures are accidental rather than associated with weaknesses in pipe condition.

All third party damage should be excluded where costs are potentially (rather than actually) recovered from a third party.

1.12 Common asset health measure 2: unplanned outage

This is a measure of asset outage (primarily non-infrastructure – above ground assets), for water abstraction and water treatment activities, in terms of the average unavailable flow (based on maximum production capacity) for each company. This measure is proportionate to both the frequency of asset failure as well as the criticality / scale of the assets that are causing an outage.

Unplanned outage for this measure is a temporary loss of maximum production capacity. It is a requirement of the WRMP annual review regulatory submissions to report on actual outage in terms of deployable output. This definition closely matches

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those used for water resources planning where a statistical outage allowance is calculated for WRMP forecasts and actual outage is reported for WRMP annual review data returns. However, where deployable output reductions are used for these (WRMP) purposes, this measure uses maximum production capacity. We prefer the use of maximum production capacity rather than deployable output due to it being a fixed value that should be more readily known within company operations (rather than the variable and specialist use of deployable output). It also captures more asset health type events without any further threshold trigger requirements (e.g. impact on zonal deployable output) and will be easier to explain to customers. This definition of unplanned outage makes use of [UKWIR outage allowance for water resource planning, 1995](#).

An unplanned outage is an unforeseen or unavoidable event which can affect either part or all of the source works which contributes to maximum production capacity. This is different to planned outages where a planned event such as planned maintenance reduces a source works output. A source works is considered to be all assets used between and including the point of first abstraction and the point at which water is first fit for purpose (enters distribution network). This can include:

- source abstraction assets (e.g. abstraction pumps, screens, boreholes);
- raw water transport assets (e.g. pumping plant and mains);
- raw water storage assets (e.g. balancing reservoirs);
- water treatment assets;
- treated water storage assets (e.g. contact tanks, pre-distribution storage); and
- treated water distribution assets (e.g. treated water pumping).

Unplanned outage events can be caused by an unplanned action or event to the above components, including:

- poor source water quality / pollution;
- turbidity;
- power failure (e.g. company assets or grid); and
- system failure (e.g. unplanned asset maintenance, asset failure).

Water resource availability based on quantity is not included in unplanned outage reporting. Supply availability due to overall quantity (dry weather) is related to baseline deployable output which is considered elsewhere as part of water resource planning. The assumption here for outage reporting is that there is enough water available (in terms of quantity) when it is required (which is likely the case under normal weather conditions). However, this does not apply to production capacity (quantity) being unavailable due to unplanned reservoir works such as unplanned drawdowns for maintenance. As shown in the above list this also does not apply to

water quality – where poor raw water quality limits the maximum production capacity this should be reported in the outage calculation.

An unplanned outage may or may not have an actual impact on the resource zone or its customers. If an outage occurs during a period of low demand and resources are relatively plentiful it is unlikely that the individual outage will cause a supply-shortfall. It does increase the risk of a customer interruption (by reducing redundancy) and highlights asset health concerns. This would still be recorded as an unplanned outage.

An unplanned outage is considered to be temporary as it is the loss in maximum production capacity that can be recovered (e.g., repairing a failed asset). This temporary loss in production capacity may be for a few hours or up to three months. In general any longer than three months then the loss should be reflected in baseline maximum production capacity (thus contributing to the deployable output assessment for water resources planning). If there is a temporary loss which has taken over three months then its inclusion should be justified appropriately and included in the unplanned outage measure and WRMP (deployable output) outage reporting for consistency. For this measure the minimum length of an outage that should be reported is one day. Some companies report outages at a more granular sub-daily level and can continue to do so. Where sub-daily outages are reported in WRMP data this should be consistent with this measure.

The maximum production capacity is a fixed value and therefore does not vary based on planning assumptions (such as weather). The maximum production capacity may not be what the works output is on the day of the outage or what it is required to produce that day. Whether or not the capacity is needed, the reduction from maximum capacity should be recorded and reported as unplanned outage. The actual unplanned outage should be reported as the temporary loss of production capacity in the reporting year weighted by the duration of the loss (in days).

Unplanned outage – calculation example

For a single source works:

- A source works has a maximum production capacity of 30 MI/d
- For 15 days the maximum output is reduced to 15MI/d due to a temporary outage (pump failure)
- This is a loss of maximum capacity of 15 MI/d for 15 days
- The weighted outage for this source = $15 \times (15 / 365) = 0.62$ MI/d

Each weighted outage is then summed over the reporting year to give a total actual outage for the water resource zone.

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For a water resource zone:

- First source works in zone – weighted outage = 0.62 MI/d
- Second source works in zone – weighted outage = 2.58 MI/d
- Third source works in zone – weighted outage = 3.67 MI/d
- Zonal weighted outage = 6.87 MI/d

The company water resource zone weighted outage can then be summed and then be normalised based on overall company maximum production capacity.

Company normalising:

- Zone 1 weighted outage = 6.87 MI/d
- Zone 2 weighted outage = 7.95 MI/d
- Company weighted outage = 14.82 MI/d
- Company maximum production capacity = 120 MI/d
- Unplanned outage proportion = 12.4%

Although this unplanned outage definition is different to that reported for the annual WRMP review, in many cases the outage as measured in terms of lost deployable output will be the same or very close to that of production capacity. It will be expected that actual outage trends reported for the WRMP review should closely match those for this measure using maximum production capacity.

1.13 Common asset health measure 3: sewer collapses per 1,000 km

Our definition for sewer collapses comes from [JR11 Reporting requirements](#) Issue 1.1 - March 2011, June Returns 2011, chapter 16, line 12.

Number of sewer collapses per thousand kilometres of all sewers. Include bursts to rising mains, even where failures are accidental rather than due to weakness in pipe condition. All third party damage should be excluded where costs are potentially (rather than actually) recovered from a third party.

1.14 Common asset health measure 4: pollution incidents caused by non-infrastructure (above ground) assets

The number of pollution incidents (categories 3 and 4 as classified by the Environment Agency) should be filtered by their cause following any root-cause analysis undertaken for lessons learned and reporting purposes. Those incidents (3 and 4) that were caused by non-infrastructure assets, namely those associated with sewage treatment works, storm tanks and sewage pumping stations (including rising mains) should be included in this asset health measure.

The asset cause of pollution incidents could include, asset failure, functional deterioration, being inoperable at the time they are required, and telemetry/meter failure. It is the responsibility of companies to categorise these events clearly and consistently. The data assurance should be consistent with that for reporting other measures with company ownership of data and processes but should also show data consistency with any EA data reporting.

This will be reported as a number of pollution incidents per volume of wastewater discharge permits (number/m³/day).

2. Definitions for asset health long list

2.1 Water indicators

The following indicators are historic serviceability indicators proposed for the asset health long list from which companies can select and report on.

2.1.1 Properties at risk of receiving low pressure

This measure is the same as the former [DG2 serviceability indicator](#). Any reference to DG2 in this definition is to aid familiarity and to reinforce that the indicator has not changed from that used in the former June Returns for DG2.

The aim of this indicator is to identify the number of properties that have received, and are likely to continue to receive, pressure below the reference level when demand is not abnormal.

The total number of properties in the undertaker's area of water supply which, at the end of the year, have received, and are likely to continue to receive, a pressure or flow below the reference level.

To ensure consistency of information reported by companies the following regularly used terms are defined below:

Reference level: The reference level of service is a flow of 9l/min at a pressure of 10m head on the customer's side of the main stop tap (mst). The reference level applies to a single property.

The reference level of service must be applied on the customer's side of a meter or any other company fittings that are on the customer's side of the main stop tap.

Where a common service pipe serves more than one property, the flow assumed in the reference level must be appropriately increased to take account of the total number of properties served.

For two properties, a flow of 18l/min at a pressure of 10m head on the customers' side of the mst is appropriate. For three or more properties the appropriate flow should be calculated from the standard loadings provided in BS6700 or Institute of Plumbing handbook. See below for a tabulation of minimum mains pressures for the reporting of low pressures on common services.

Surrogate for the reference level: Because of the difficulty in measuring pressure and flow at the mst, companies may measure against a surrogate reference level. Companies should use a surrogate of 15m head in the adjacent distribution main unless a different level can be shown to be suitable. In some circumstances companies may need to use a surrogate pressure greater than 15m to ensure that the reference level is supplied at the customer's side of the mst (for example in areas with small diameter or shared communication pipes).

Common supplies: Common supplies are where a communication pipe supplies more than one property. The required pressure in the adjacent water main used to estimate properties affected should exceed those given in the table in the guidance section. This table is intended to be a guide to the absolute minimum service acceptable over an hour (i.e. it is not based on an instantaneous peak flow). The calculations assume delivery of 9 l/minute upstairs to a combination tank (not in the loft) in the end property on a common service of half-inch bore. The calculations use the BS 6700 loading units (LU) basis, but at 3 LUs per property (9 l/minute). The LU calculations on larger groups of properties (i.e. more than 100) give instantaneous flows of between 4 and 8 times the peak hour flow rates actually observed on local distribution systems, subject to leakage and hose pipe assumptions. Accordingly, the use of 3 LUs per property is taken as an acceptable minimum.

Allowable exclusions: There are a number of circumstances under which properties identified as receiving low pressure should be excluded from the reported figure. The aim of these exclusions is to exclude properties which receive a low pressure as a result of a one-off event and which, under normal circumstances (including normal peaks in demand), will not receive pressure or flow below the reference level. For exclusions see the guidance section.

Guidance

Surrogate for the reference level: Where companies choose to report against a surrogate pressure of less than 15m, evidence must be provided that this is sufficient to provide the reference level of service for all properties taking into account the length and condition of communication pipes and head loss through any meters or other company fittings. We expect all assumptions to be in the methodology. A surrogate pressure which will only provide the reference level for average properties (i.e. for average length communication pipes in good condition with no meter fitted) is not appropriate because some properties will have communication pipes longer than average; others will be in a poor condition or have meters fitted. Allowance must be made in such instances.

If a higher surrogate is used, the assumptions should be clearly stated in the methodology.

Headline figure: This is an estimate of the total number of properties in the company's area that are below the reference level. Therefore, if the reported figure is likely to represent an underestimate (or overestimate), this must be reflected in the assessment of the reliability and accuracy of the reported information.

In practice, companies will report the number of properties served by a main in which the measured pressure falls below the surrogate for the reference level (usually 15m head in the adjacent distribution main) subject to the allowable exclusions.

Estimated figures: Companies may include in their reported figures estimates for the number of properties which are below the reference level but which have not yet been specifically identified. The basis for the estimate must be explained in the methodology.

Allowable exclusions: Companies must maintain verifiable, auditable records of all the exclusions that they apply in order to confirm the accuracy and validity of their information.

All properties identified as having received pressure or flow below the reference level must be reported, unless it can be confirmed that they are covered by one of the following exclusions.

Abnormal demand

This exclusion is intended to cover abnormal peaks in demand and not the daily, weekly or monthly peaks in demand which are normally expected.

Some companies are more affected by low pressures caused by occasional prolonged peaks in demand than by a few abnormal peak days each year. In such cases, instead of excluding up to five days each year, companies may choose to apply the abnormal demand exclusion over a five-year period. This will allow companies to exclude from their figures properties affected by low pressures that occur on any 25 days in a rolling five-year period.

The 'excluded day' may be applied to the company as a whole or at the level of individual zones. However, in either case, once a property has suffered low pressures on either more than five days in one year or 25 days in five years, it must be added to the reported figures.

Option 1 - During the report year, companies may exclude for each property a maximum of 25 days of low pressure caused by abnormal demand in a rolling five-year period. Companies should exclude from the reported figures properties that are affected by low pressure only on the days identified as "high demand" in the report year. In years where demand is normal (i.e. the exclusion is not being used), properties affected by relevant low pressure incidents should be reported as receiving low pressure (unless covered by one of the other exclusions).

Option 2 - Where extensive pressure logging covering the majority of properties in the supply area is used, the company may exclude properties where logger records verify that up to five incidents of low pressure lasting more than one hour have occurred. Under this option, it is not necessary to match the low pressure incidents with high demands. Companies that choose this method must include the number of properties that suffer more than five incidents of low pressure lasting more than one hour in the reported figure without necessarily identifying the specific occasions and reasons for abnormal demand. If this method is used, no other allowance may be made for abnormal demand but the other exclusions still apply.

Companies must clearly state in their methodologies which approach they have adopted in applying this exclusion, list the distribution or supply zones they have chosen and the number of days excluded. If the exclusion is applied at the level of

individual zones, rather than to the company as a whole, the company must maintain verifiable records which list the number of 'excluded days' used for each distribution zone each year.

Planned maintenance

Companies should not report low pressures caused by planned maintenance. It is not intended that companies identify the number of properties affected in each instance. However, companies must maintain sufficiently accurate records to verify that low pressure incidents that are excluded because of planned maintenance are actually caused by maintenance.

One-off incidents

This exclusion covers a number of causes of low pressure:

- mains bursts;
- failures of company equipment (such as Pressure Reducing Valves or booster pumps);
- firefighting; and
- action by a third party.

If problems of this type affect a property frequently, they cannot be classed as one-off events and further investigation will be required before they can be excluded.

Low pressure incidents of short duration

Properties affected by low pressures which only occur for a short period, and for which there is evidence that incidents of a longer duration would not occur during the course of the year, may be excluded from the reported figures.

- In locations where companies carry out continuous pressure logging year round, low pressure incidents of less than one hour may be excluded.
- Where short term or intermittent logging is used, if all low pressure incidents lasting less than one hour are excluded then there is a danger that properties which are actually below the reference level will be missed from the figures. In this case a suitable minimum duration depends on the exact methodology used but may be 30 or even 15 minutes. If logging is carried out at times when low pressures are unlikely to be detected because demand is low, the results cannot be used to confirm zero returns.

Common services

Companies should establish the numbers of properties supplied via common services from sample investigation of the distribution system. Many instances of low pressure in these situations are presently unreported. Not all of these properties have either loft tank storage or any water supply upstairs.

Companies are required to record the numbers of properties on common services that have received and continue to receive pressures below the reference level, and include these in the reported numbers.

Companies may use their own calculations, but the required pressure in the adjacent water main used to estimate properties affected should exceed those given in the table below. This table is intended to be a guide to the absolute minimum service acceptable over an hour (i.e. it is not based on an instantaneous peak flow). The calculations assume delivery of 9 l/minute upstairs to a combination tank (not in the loft) in the end property on a common service of half-inch bore. The calculations use the BS 6700 loading units (LU) basis, but at 3LUs per property (9 l/minute). The LU calculations on larger groups of properties (i.e. more than 100) give instantaneous flows of between 4 and 8 times the peak hour flow rates actually observed on local distribution systems, subject to leakage and hose pipe assumptions. Accordingly, the use of 3LUs per property is taken as an acceptable minimum.

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Number of properties fed from one direction on common service	Pressure (in head) required in adjacent main			
	Half-inch communication pipe		Three quarter-inch communication pipe	
	Short side ¹⁹	Long side	Short side	Long side
2*	10	11	10	11
3	12	14	11	13
4	15	18	13	16
5	19	23	16	20
6	25	29	21	24
7	30	35	25	28
8	37	42	31	33
9	45	51	38	40
10	54	61	46	48

Note: if delivery to a loft tank is taken to be the minimum acceptable service, not less than 3 m pressure should be added to the above tabulated values.

The values calculated for two properties are theoretical: for delivery to a loft, the usual surrogate of 15 m head to a single property should be taken as a minimum reference level.

The section on the reference level refers to the need for companies to use a higher flow rate in the reference level for common services and sets out the criteria for determining appropriate flows in these circumstances.

These criteria are not intended to extend the company's responsibility to solving problems caused by deficiencies in customers' pipes. Its aim is to ensure that there is a proper recognition of pressure and flow problems which affect properties sharing common services, where there is a deficiency in the part of the apparatus which is the company's responsibility (e.g. an undersized communication pipe which is unable to provide sufficient flow).

Properties with the common service pipes can be split into four categories:

- company's and customer's apparatus are adequate:
 - no problems with pressure or flow, nothing to report;
- company's apparatus adequate, but customer's pipework is deficient:

¹⁹ Short side and long side refer to the length of supply pipes from properties to water mains which are usually not laid down the middle of a road.

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- pressure and/or flow problems are not reportable because company pipes are able to provide sufficient pressure and flow to the limit of company responsibility;
- company's apparatus is inadequate but customer's pipework is adequate:
 - pressure and/or flow problems which are reportable because there is a deficiency in the company's apparatus;
- both the company's and the customer's apparatus are inadequate:
 - pressure and/or flow problems are reportable.

Of these four categories, only the last two fall within the definition of properties at risk of receiving low pressure.

Ofwat recognises that in cases covered by the final category it may not always be sensible for the company to take unilateral action to solve the problem unless the customer takes some action to improve their own pipework. Nevertheless, these problems must be included in the reported figure. If significant, companies should note the number of properties which are below the reference level but the company cannot solve because there are also defects in the customer's part of the system.

Company methodologies should discuss how common service problems are identified and assessed and include reference to standard loadings.

2.1.2 Customer contacts per 1,000 population supplied – discolouration (orange/brown/black)

Customer contact rate per 1,000 population supplied for discolouration (orange/brown/black) as reported in the [Chief Inspector's Report on Drinking Water](#) on a calendar year basis. This is the same measure as reported for the former serviceability matrix, however, the continuity of this indicator depends on the DWI's policy on keeping this indicator for future reporting.

2.1.3 Distribution index TIM

The arithmetic mean of the mean zonal compliance values for the three parameters turbidity, iron and manganese. Item 9, 3 and 4 of Part II in Table B of Schedule 1 of the Water Supply (Water Quality) Regulations 2016. This is the same measure as reported in the [Chief Inspector's Report on Drinking Water](#) on a calendar year basis.

This is also the same measure as reported for the former serviceability matrix, however, the continuity of this indicator depends on the DWI's policy on keeping this indicator for future reporting.

2.1.4 Water treatment works coliform non-compliance (% samples failing for coliforms leaving WTW)

The number of water treatment works with determinations containing coliforms as a percentage of the number of determinations of water leaving treatment works taken at frequencies required by regulation 13 (Schedule 3, table 3, item 2), as specified in regulation 4 (schedule 1, table A, part II, item 1) of the 'Water Supply (Water Quality) Regulations 2016' (and its equivalent in Wales). This is the same measure reported in the [Chief Inspector's Report on Drinking Water](#) on a calendar year basis.

2.1.5 Service reservoir coliform non-compliance (% service reservoirs having more than 5% of coliform samples failing)

The number of service reservoirs where more than 5% of the samples taken exceeded the maximum concentration required for coliform bacteria as a percentage of the number of service reservoirs tested for microbiological parameters. As stated for Item 1 of Part II in Table A of Schedule 1 of the Water Supply (Water Quality) Regulations 2016. This is the same measure reported in the [Chief Inspector's Report on Drinking Water](#) on a calendar year basis.

2.1.6 Number of water treatment works where turbidity 95th percentile is greater than or equal to 0.5 NTU

The number of operational potable water treatment works and sources (where measured) whose turbidity 95th percentile equals or exceeds a 0.5 NTU (Nephelometric Turbidity Units) threshold. Calculate 95th percentile value using all data from regular routine sampling of final water from sources for the calendar year.

2.1.7 Enforcement actions considered for microbiological standards

The number of enforcement actions considered by the DWI for a breach of microbiological standards during the calendar year.

2.1.8 Unplanned non-infrastructure maintenance (water)

Unplanned maintenance required as a result of equipment failure or reduced asset performance.

Unplanned maintenance is a company specific indicator and should closely align with the metrics used by the company to measure the ongoing state of its mechanical, electrical and instrumentation and control equipment.

The counting procedures should focus on capturing relevant data from the company's maintenance systems at a level of granularity and materiality for this purpose. A rising trend in the indicator will indicate deterioration, a reducing trend will indicate improvement, and a stable trend will indicate stability, for an unchanging size of asset base. The data should be held at one or more levels of aggregation, to inform the distribution of numbers among different asset types, e.g., pumping and treatment.

The data collected should be a count of all the unplanned jobs completed (with a completed work order). It should not be a count of investigations where nothing was done, or minor jobs carried out as a result of an inspection which are not recorded as a work order.

The data should include all water non-infrastructure assets, including: water treatment works, pumping stations (on the network), and any other non-infrastructure asset. The data must also include all planned-reactive jobs, that is, anything strategically planned for reactive maintenance, i.e., 'run to fail' assets, etc.

Unplanned maintenance on all assets should be included in the data regardless of asset criticality, this ensures the entire asset base is captured. Reported as total unplanned non-infrastructure maintenance jobs as a proportion of all non-infrastructure assets

2.2 Wastewater indicators

2.2.1 Pollution incidents categories 1 and 2

This is the Environment Agency's measure of Category 1 and 2 pollution incidents. We have set out the definition of a pollution incident under section 1.8 above. This section look at the definition of Category 1 and 2.

The Environment Agency's categorisation of pollution incidents describes incidents of major, persistent, extensive or serious impact or damage to air, land, water, people, property, ecosystems, habitats and / or amenity as category 1, and pollution incidents of significant impact or effect on environment, people or property as category 2. It should be noted that this includes pollution incidents from all asset types.

Category 1 - major effect on water quality

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Pollutants that have a visible or measureable effect for a longer distance downstream (several kilometres) and that will have an impact on the quality or use of that water.

Other factors to consider will be downstream receptors and how far they are away from the discharge, the number of reports about the same incident, the presence of an abstraction point or conservation designation (e.g., sites of special scientific interest, SSSIs), for spills to land the presence of a source protection zone (SPZ), or if the water course is being used for amenity (i.e., people in the water, swimming, boating, etc.). The presence of one of these factors may increase the potential impact score.

Category 1 incidents will very likely cause impacts on wildlife, and may be associated with dead or dying fish. For example:

- a thick film of oil extending several kilometres downstream and possibly covering the whole water course width;
- a discharge of discoloured, soapy, foaming or 'dirty' water from a pipe. The pollution can be seen for 600 plus metres downstream and will be visible across the whole width of the watercourse;
- a failure of a large rising main sewer that is discharging directly into a watercourse or surface water drain and cannot be shut down;
- a road traffic collision that has released thousands of litres of vehicle fluids (fuel, oil, coolant water, etc.) on to the road and into a surface water drain;
- a road traffic collision involving a HGV that has lost containment of its load (liquid) resulting in a few hundreds of litres entering the surface water drainage;
- a highly discoloured watercourse, where the effect is observable over the full width of the watercourse and for over 800 metres;
- firefighting activities resulting in large amounts of runoff entering a watercourse or surface water drainage. This will normally be a fire with more than 10 fire engines (pumps, tenders or appliances) in use. This includes waste fires;
- any report of a Control of Major Accident Hazards (COMAH) incident should be a potential category 1 incident; and
- large volume spills (more than 1,000 litres) of food stuffs, such as milk, fruit juices, beer, sugar/syrup, etc.

Category 2 - significant effect on water quality

Pollutants that have a visible effect or a measureable effect (this would be identified by field measurements for substances like ammonia, dissolved oxygen, pH, etc.) for a longer distance downstream (several hundred metres or a few kilometres) and that will have an impact on the quality or use of that water.

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Other factors to consider will be downstream receptors and how far they are away from the discharge, the number of reports about the same incident, for spills to land the presence of an SPZ, or if the water course is being used for amenity (i.e., people in the water, swimming, boating, etc.). The presence of one of these factors may increase the potential impact score.

Category 2 incidents will often cause impacts on wildlife, and may be associated with dead or dying fish. For example:

- a thick film of oil extending several hundred metres downstream and possibly covering the whole water course width;
- a discharge of discoloured, soapy, foaming or 'dirty' water from a pipe. The pollution can be seen for at least 100 to 600 metres downstream and may be visible across the whole width of the watercourse;
- a failure of a rising main sewer that is discharging directly into a watercourse or surface water drain;
- a road traffic collision that has released a few 100s of litres of vehicle fluids (fuel, oil, coolant water, etc.) on to the road and into a surface water drain;
- a road traffic collision involving an LGV that has lost containment of its load (liquid) resulting in 200 to 600 litres entering the surface water drainage system;
- a highly discoloured watercourse, where the effect is observable over the full width of the watercourse and for 400 to 800 metres;
- firefighting activities resulting in large amounts of runoff entering a watercourse or surface water drainage. This will normally be a fire with more than five fire engines (pumps, tenders or appliances) or a high volume pump; this includes waste fires; and
- large volume spills (more than 205 litre standard barrel size) of food stuffs, such as milk, fruit juices, beer, sugar/syrup, etc.

2.2.2 Pollution incidents category 4

This measure is to highlight the number of pollution incidents with little or no impact on the environment and people (category 4) caused by the company-owned assets or operations during the calendar year. It should be noted that this includes pollution incidents from all asset types.

Category 4 - no impact

Incidents that fall within the definition of an incident but do not have an impact on the environment. For example:

- a spill on a site that is contained within the boundary of the site by designed infrastructure like bunding or sealable site drainage, or it may be simply that the land around the site contains the spill or it is contained by spill kits;
- a farmer who has spilt some slurry but digs a containment ditch or bank to contain the spill; and
- a fire where the runoff water is going into only the foul water drain (the local water company should be notified).

2.2.3 Sewer blockages

Number of sewer blockage events that required clearing. A blockage is an obstruction in a sewer which causes a reportable problem (not caused by hydraulic overload), such as flooding or discharge to a watercourse, unusable sanitation, surcharged sewers or odour.

2.2.4 External sewer flooding

The definition of external sewer flooding we are proposing is identical to the one [published on UKWIR's website](#). The UKWIR definition is set out in section 1.7 as it combines internal and external sewer flooding.

2.2.5 Percentage of sewage treatment works discharges failing numeric consents

The percentage of sewage treatment works discharges with numerical discharge consents found to be non-compliant with sanitary or non-sanitary consent conditions in the calendar year. Include both those failing Water Resources Act 1991 (WRA91) consents and Urban Waste Water Treatment Directive (UWWTD) self-monitored consents. This compliance assessment is undertaken by the Environment Agency on a calendar year basis.

2.2.6 Percentage of total population equivalent served by sewage treatment works in breach of WRA or UWWTD consent (LUT)

The percentage of population equivalent served by sewage treatment works discharges which were sampled during the calendar year and found to be non-compliant with look-up table consents conditions in the Water Resource Act look-up table consent conditions, or non-compliant with Urban Wastewater Treatment Directive look-up table consents for biochemical oxygen demand (BOD) and / or

phosphorus (P). This compliance assessment is undertaken by the Environment Agency on a calendar year basis.

2.2.7 Unplanned non-infrastructure maintenance (wastewater)

Unplanned maintenance required as a result of equipment failure or reduced asset performance.

Unplanned maintenance is a company-specific indicator and should closely align with the metrics used by the company to measure the ongoing state of its mechanical, electrical, and instrumentation and control equipment.

The counting procedures should focus on capturing relevant data from the company's maintenance systems at a level of granularity and materiality for this purpose. A rising trend in the indicator will indicate deterioration, a reducing trend will indicate improvement, and a stable trend will indicate stability, for a constant size of asset base. The data should be held at one or more levels of aggregation, to inform the distribution of numbers among different asset types, e.g., pumping and treatment.

The data collected should be a count of all the unplanned jobs completed (a completed work order). It should not be a count of investigations where nothing was done, or minor jobs carried out as a result of an inspection which are not recorded as a work order.

The data should include all wastewater non-infrastructure assets, including sewage treatment works, pumping stations (on the network), and any other non-infrastructure asset. The data must also include all planned-reactive jobs, that is, anything strategically planned for reactive maintenance, i.e., 'run to fail' assets, etc.

Unplanned maintenance on all assets should be included in the data regardless of asset criticality as this ensures the entire asset base is captured.

Appendix OC.A3.1

Action ref AFW.OC.A3; A33; A35

Supplementary report to Ofwat from the Affinity Water Customer Challenge Group (29 March 2019)



PR19 – IAP stage - CCG Report

**Supplementary report to Ofwat from the
Affinity Water Customer Challenge Group**

29 March 2019

About this report

This is a report prepared for Ofwat by the Affinity Water Customer Challenge Group (CCG) about Affinity Water Limited's (AWL) response to Ofwat's Initial Assessment of Plans (IAP). The members of the CCG at 1 April 2019 are listed at Annex A. Our Terms of Reference can be found on AWL's website.²⁰

The IAP is part of Ofwat's process for considering AWL's PR19 Business Plan submission for the period 2020/25. In relation to PR19 Ofwat has asked the CCG to provide:

'independent challenge to the company and independent assurance to Ofwat on the quality of the company's customer engagement for PR19, and the degree to which this is reflected in its business plan'.

The CCG submitted its primary PR19 report to Ofwat on 3 September 2018²¹. That report explains in more detail the CCG's role in the PR19 process and the approach taken to challenging and assuring AWL's customer engagement for PR19.

In relation to the IAP stage in the PR19 process the CCG has been asked to undertake assurance of additional customer engagement AWL is carrying out between 31 January and 1 April 2019 and to provide a report to Ofwat, also by 1 April. In an email to all CCG Chairs²² Ofwat advised that they were asking:

'CCGs to submit by 1 April a short and focussed report covering any aspects of the re-submission [of the business plan] that require comment on the quality and influence of related customer engagement.'

Ofwat added that

'Documents released to companies today make clear which parts of the resubmitted business plans will require assurance from the CCG.'

The CCG's has reviewed and commented on AWL's responses to **16** action points Sections 2 and 3 of this report. Section 2 deals with the 2 action points where Ofwat asked the company to obtain assurance from the CCG. Section 3 covers the 14 action points which we have selected to review because they either a) relate to matters the CCG considered in some depth in its September 2018 report; or b) Ofwat has mentioned the CCG, but without asking that we provide assurance; or c) we are currently involved in advising and challenging AWL, e.g. the revisions to the draft Water Resources Management Plan (rdWRMP) which is completed in May 2019.

²⁰ <https://stakeholder.affinitywater.co.uk/docs/CCG-terms-of-reference.pdf>

²¹ <https://stakeholder.affinitywater.co.uk/docs/CCG/CCG-Business-Plan-Report-Complete-final%20%20September-11am-Linked-Version.pdf>

²² Ofwat email to CCG Chairs 31 January 2018

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Annex A – List of CCG Members at end March 2019

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Annex C – CCG PR19 test areas

Acronyms and abbreviations

AWL	Affinity Water Limited
BP	Business Plan
dBP-	draft Business Plan
CCG	Customer Challenge Group
CCW	Consumer Council for Water
IAP	Initial Assessment of Plans
KPI	Key Performance Indicator
Ofwat	Office of Water Services
ODI	Output Delivery Incentive
PC	performance commitment
PR19	Price review 2019
PSR	Priority Services Register
WRMP	Water Resources Management Plan
dWRMP	draft Water Resources Management Plan
rdWRMP	revised draft Water Resources Management Plan

1. Summary

- Σ We have reviewed AWLs responses to **16** Ofwat IAP action points.
- Σ We **provide positive confirmatory assurance on the action AWL has taken** on the two action points where Ofwat specifically asked AWL to obtain assurance from the CCG (**AV.A1** and **AV.A2**).
- Σ We **note** that the company now proposes a lower level of charges for clean water (without inflation and sewerage charges). The average water bill is now projected to reduce by 1.6% between 2020 and 2025 (instead of increasing by 2.1%) and will further reduce by 2.0% between 2025 and 2030 (instead of increasing by 3.1%). The details of the proposal are set out in AWLs response to **RRA10**, which we have reviewed. The revised average bill level now proposed by AWL was effectively tested with customers in Spring 2018 as part of 'Phase 2' of AWL's customer engagement programme. We remind Ofwat of the assurance we have previously provided on that research in our September 2018 report.²³
- Σ We note and **welcome** that AWL has decided to improve and extend its performance commitments (PCs) to customers in several areas:
 - Increasing the level of its performance commitment on leakage reduction so that leakage is reduced by 18.5% by 2025, instead of 15% proposed in its Business Plan;
 - Adopting a new performance commitment to maintain the BSI certification 18477 for Inclusive Services between 2020-25;
 - Increasing its target performance levels for bespoke PCs concerned with satisfaction with services and experience of dealing with AWL amongst customers in vulnerable circumstances to 90%, instead of 82% proposed in September 2018;
 - Accepting the new 'Common Performance Commitment' proposed by Ofwat in relation to its Priority Services Register (PSR), and setting a target to increase the number of customers on the PSR from 2.5% in

²³<https://stakeholder.affinitywater.co.uk/docs/CCG/CCG-Business-Plan-Report-Complete-final%2020September-11am-Linked-Version.pdf>

2018 to 7.22% of customers by 2025, instead of both the increase to 6.3% of customers proposed by AWL in September 2018, and 7% proposed by Ofwat on 31 January 2018.

- Retaining its present PC to undertake an annual survey of customer perceptions of 'value for money', with appropriate changes made to the methodology for this survey, seeking advice from the CCG on this;
- Introducing a new bespoke PC on resilience relating to disruption to customers as a result of unplanned interruptions to IT systems and online services, an area where customers have experienced problems with performance in the past few years.

Σ We note that as part of the research AWL has conducted to respond to Ofwat's AV.A1 and AV.A2 action points it asked customers for their views on the acceptability of several new performance commitments that are now included in the Business Plan in response to Ofwat's IAP. These include four aspects relating to AWL's services and support for customers in vulnerable circumstances, IT system and service downtime and strategic water resource development.

1. Method and approach

1.1 Background

On 31 January Ofwat published its Initial Assessment of Plans (IAP) submitted by all water (and sewerage) companies in September 2018. These plans were required as part of Ofwat's periodic review of companies' price limits, a process which ends in December 2019 when Ofwat will have decided the prices water (and sewerage) companies can charge their customers between 2020 and 2025. This periodic review process is called 'PR19'.

Ofwat has given companies detailed assessments and 'action points', most of which require responses by 1 April 2019. Although this process is being called a 'resubmission' of the business plan companies are responding to discrete questions about their proposed plan. This includes requests for more evidence or research to be done, or for changes to be made to elements of their plan such as performance commitments or targets.

AWL has been asked to obtain assurance from the CCG of evidence of engagement with customers about the bills that were proposed by AWL in September 2018. We are asked to provide a report to Ofwat by 1 April.

Ofwat has not set out any specific requirements as to the format of responses or scope and approach that CCG reports should take. Only a few of the 'action points' they have published for companies refer specifically to CCG assurance being required, but most do not make any reference to CCGs. In an email to CCG Chairs on 31 January 2019 Ofwat said:

'We recognise that time is very limited, so expect companies and CCGs to work together constructively, effectively and pragmatically as you and they develop responses to our initial assessment of business plans.'

Below we explain the decisions we have made about the scope of our work on this task, and our approach to providing any 'assurance' requested by the company and Ofwat.

1.2 Agreeing the scope of our report

In February 2019 members of the CCG reviewed and noted Ofwat's assessment of AWL's business plan²⁴ and that AWL had been given many Action Points to respond to. Only two of those action points (AV.A1 and AV.A2) require the company to obtain assurance from the CCG.

²⁴ <https://www.ofwat.gov.uk/regulated-companies/price-review/2019-price-review/initial-assessment-of-plans/>

Mindful that Ofwat has used the word '*pragmatic*' in their request to us, and the limited time for this exercise we considered that beyond addressing the two action points where Ofwat has specifically asked the company to obtain assurance from us it is a matter for us to decide what other matters we wished to, and could, review in the time available between 31 January and 1 April 2019.

We initially agreed²⁵ to review AWLs responses to **10** of the Ofwat action points, including the two action points (AV.A1 and AV.A2) where Ofwat had required the company to obtain assurance from us. The other action point responses were selected by us because they related to matters the CCG considered in some depth in its September 2018 report, or Ofwat has mentioned the CCG but without asking that we provide assurance, or, as in the case of the revisions to the draft Water Resources Management Plan (rdWRMP) we are currently involved.

During March the Chair requested that the CCG could review a further **6** responses, bringing the total number of company action responses we have reviewed to **16**. These are set out below:

Ofwat Assurance requested Action points – (2)

AV.A1	Affordability and acceptability of bill profile 2020/25
AV.A2	Affordability and acceptability of bill profile 2025/30

Action points the CCG has asked to review – (14)

AV.A3	Social tariff cross-subsidy research
AV.A4	Performance Commitment (PC) on achieving the BSI standard
AV.A5	PC on increasing registrants on the Priority Services Register (PSR)
OC:A3	Value for Money survey performance commitment
OC.A11	Leakage reduction target
OC.A27	Water pressure performance commitment level
OC:A32	PC on customer satisfaction with services for customers in vulnerable circumstances
OC:A34	PC on customers in vulnerable circumstances experience of dealing with AWL
OC:A33	Performance level for PC on customers in vulnerable circumstances satisfaction with AWLs service
OC:A35	Performance level for PC on customers in vulnerable circumstances experience of dealing with AWL
OC.A36	Customer evidence for the PC on 'environmental projects'
OC.A46	Mean Zonal Compliance – proposed retention of PC

²⁵The CCG Chair circulated a proposed course of action and scope to CCG members and AWL on 31 January 2019. At its meeting on 13 March 2019 the CCG confirmed its agreement to the approach to the task and reviewed written responses from AWL to various Ofwat IAP action points.

CMI.A1	Potential strategic supply options and engagement
RR.A10	Steps taken to address CCG concerns

The CCG's comments on **16** action points are addressed in Sections 2 and 3. Section 2 deals with the 2 action points where Ofwat asked the company to obtain assurance from the CCG. Section 3 covers the other action points which we have selected to review.

1.3 Our approach to assessment and 'assurance'

Our approach to providing any judgement, assurance or comment on the company's responses to Ofwat's action points has been to:

- Σ confirm we have reviewed the company's response in as final form as has been possible in a parallel reporting exercise;
- Σ confirm, if we are able, that AWL has undertaken the action requested by Ofwat in an appropriate way, having regard to their PR19 methodology;
- Σ provide Ofwat with any relevant information or observations we have on the matter, including reference to issues we have raised with the company and relevant issues referred to in our September 2018 report.

We also agreed that if we were expected to provide a judgement about the *quality* of any new customer engagement in the company's responses we would apply and refer to the 'test areas' which we used in our report for Ofwat in September 2018.²⁶ These test areas were designed to address the requirements Ofwat had set out for effective customer engagement in its policy statement on customer engagement (May 2016). The role of CCG's is primarily to comment on the effectiveness of customer engagement at this price review not to endorse company plans.

Bearing in mind the scope of the action points we agreed to review the most relevant of our PR19 test areas for this task are 5, 7, 11 and 12, set out below. The full list of all our agreed test areas for PR19 is included in Annex C for reference:

Test Area 5	Has the company presented its customers with realistic options?
Test Area 7	Has the engagement with customers been sufficiently diverse, involving the using of methods appropriate and effective for engaging with a diverse range of customers. Does this include customers in circumstances that

²⁶ See Annex C

	make them vulnerable? Has the company considered the most effective methods for engaging different customers, including those that are hard to reach?
Test Area 11	Is the proposed plan affordable for current customers, future customers and those struggling or at risk of struggling to pay? How well does the company understand what affordability looks like for its customers, and do customers support the approach they have taken?
Test Area 12	Vulnerability - Is the company's approach to vulnerability targeted, efficient and effective? CCG view on the quality of planned support for customers in vulnerable circumstances, taking into account Ofwat's February 2016 Vulnerability Focus report.

In view of the discrete and informational nature of AWLs responses to Ofwat's action points we have not sought to provide 'Red', 'Amber' or 'Green' ratings as we did in our September 2018 report. Rather we have used our 'test areas' as guides to judge whether to comment on the company's responses.

1.4 Working process adopted

Our approach to this task has involved the following key stages:

31 January	Initial briefing for members after the publication of Ofwat's IAP
12 February	Outline approach to the task circulated by the Chair following meetings with AWL following up company communication of 9 February
20-22 February	4 members reviewed and commented on/challenged draft survey designs used by AWL to respond to AV1 and AV2
26 February	AWL Board agreement to the scope of the CCG review (i.e. the initial proposal from the Chair for the CCG to review 10 action points)
8 March	Drafts of some AWL responses circulated to CCG members for comment/queries
13 March	CCG meeting to review company responses to 10 action points in our initial agreed scope, queries raised and discussed with the company. AWL tabled updates on its proposed bill profile and other matters it intended to change in its business plan submission. CCG requested sight of 2 further action point responses relating to the performance levels for PCs measuring vulnerable customers' satisfaction with AWL services.
18 March	Draft CCG report circulated to members and AWL for comment by 22 March

20 March	CCG Chair requested sight of 4 additional action point responses likely to relate to matters in the CCG's September 2018 report, or relating to issues raised at the meeting on 13 March (leakage, low pressure, environmental projects and MZC)
21 March	CCG Chair attended AWL board meeting and discussed and received queries and comments on the draft report
28 March	Final versions of some action point responses received by the Chair. Revisions and redrafting

In parallel with the above some members of the CCG have been involved in a sub-group concerned with the revised draft Water Resources Management Plan (rdWRMP) and thus those members have been able to comment on AWL's response to action point CMI.A1 which relates to that task.

1.5 Sources of information

To develop this report, we have referred to the documents and sources which are also listed in Annex B. These include:

- Σ Ofwat's published IAP for AWL
- Σ Ofwat's briefing for CCG Chairs on the IAP process
- Σ Drafts of company responses circulated to CCG members on 8 March and 15 March and 'final' versions circulated to the Chair on 28 March 2019. For some responses we have seen 2 or 3 drafts as well as the final version and comments and queries have been raised at a meeting with AWL and by email.
- Σ CCG report to Ofwat September 2018 and related evidence base, including AWLs September 2018 business plan.
- Σ Drafts of survey designs (for the survey being used to inform AWL's responses to AV.A1 and AV.A2)
- Σ Topline and full report from Verve²⁷ presented at CCG meeting on 13 March and circulated on 15 March
- Σ Information presented to the CCG's rdWRMP sub-group meetings.

²⁷ Market research contractor for AV.A1 and AV.A2

2. Review of AWL Action Point responses where CCG assurance was required by Ofwat

AV.A1 – Affordability and acceptability to customers of AWL’s proposed bill profile 2020-25

Topic	Reference	Ofwat ‘action point’
Addressing Affordability and Vulnerability	AFW AV.A1	<i>Affinity Water proposed a higher bill than what it tested [sic] with customers and it also proposed a different bill profile for the 2020 to 2025 period. The company should provide sufficient and convincing evidence that it has engaged with its customers on affordability and acceptability of its proposed bill profile for the 2020 to 2025 period. Affinity Water should demonstrate that its customers find its proposed bill profile acceptable and affordable. This should include testing of the combined water and wastewater bill. Affinity Water should confirm that testing will be assured by its CCG and conducted in line with social research best practice.</i>

CCG response to AV.A1

The CCG have reviewed AWL’s response to AV.A1.

We can provide assurance to Ofwat that AWL has undertaken the research with customers described in its response to AV.A1. The research tested customer views on the acceptability and affordability of proposed bills and proposed profile of bill increases between 2020 and 2025. The survey included a ‘base’ proposal for the future average water bill (clean water only) without inflation that is in line with the amounts presented in the Business Plan in September 2018, being £170.90 in 2019/20 and £174.40 in 2024/25.

We also note that the survey tested a variety of proposed bills, and profiles, including with inflation and the expected level of bills for three different wastewater service providers who serve AWLs customers.

We appreciate Ofwat’s conclusion that the bill AWL proposed in its business plan had not been specifically tested with customers for its perceived affordability and acceptability. In our initial PR19 report to Ofwat²⁸ we noted the range of different proposed bills that AWL had shared with us and tested with customers in 2018 and noted that the final proposed bill had not actually been tested with customers. In Annex D is an updated table for reference showing the value of bills proposed and tested with customers at different stages since Spring 2018.

²⁸ <https://stakeholder.affinitywater.co.uk/docs/CCG/CCG-Business-Plan-Report-Complete-final%20%20September-11am-Linked-Version.pdf>

Ofwat has now asked the company to show that '**its proposed bill profile**' presented in the Business Plan is considered acceptable and affordable by its customers. Our understanding is that AWLs '**proposed bill profile**' is that presented as 'Profile 1' in the latest survey (by Verve), the key findings from which are summarised in AWL's response to AV.A1. The final report of that research with customers indicates²⁹ **bill Profile 1 was considered acceptable by 81% of customers and affordable by 76% of customers taking part in this survey** (when the responses to the proposed bills for clean water only and without inflation are considered). We note that levels of acceptability and affordability decline when inflation and the expected level of sewerage charges are added.

We note that AWL also commissioned research to test customer views on an alternative bill profile which did not feature in its Business Plan. This is referred to as 'Profile 2' in the research and would see the clean water only, without inflation, bill rise from £170.90 to £179.60 between 2020 and 2025. There does not appear to us to be any material difference in customer views on the acceptability of bill Profile 2, although it seems to be considered marginally less affordable by customers.

The sample size used by AWL for this additional research appears sufficient and appropriate for the size of their customer base and we note that their chosen research supplier (Verve) has provided professional comment in their final report to the effect that the sample size is sufficient. Verve have also highlighted where different responses to questions between sub-groups are and are not statistically significant. We note that the research design did not ask customers to indicate preferences *between* Bill Profile 1 and Profile 2. Instead each was tested independently with half of the sample of customers, and the results were compared.

We have considered carefully whether the research methods used by AWL in their response to AV.A1 (and AV.A2) meets Test area 7 in our PR19 test areas. Test area 7 requires us to consider whether the research methods used are appropriate to include customers in circumstances that make them vulnerable. In this case the research was conducted entirely using online methods.

Overall, taking all the considerations set out below into account we consider the use of an online only research method was sufficient on this occasion for this purpose. Below we explain the factors we have considered to arrive at this view.

First, we note the discussion of this issue in the final research report (see Verve final report, page 3). This highlights that online methods can be more inclusive for some vulnerable customers, and the present relatively high extent of digital inclusion such that an online research method might not prevent the sample from being representative.

²⁹ Final report, Verve, listed as document 14 in Annex B

Second, we note the analysis in the Verve final report of demographic and other social/economic characteristics, which shows that whilst the affordability of bill Profile 1 is consistent across most demographics the results suggest that the bill is

‘considered significantly less affordable for customers who receive benefits; 63% agreed it was a fairly or very affordable proposal, compared with 76% overall’ (see Verve Final report page 8)’

This would indicate there are enough numbers of customers who rely on income from welfare benefits to form a sub-set for comparative purposes, and that the sample has captured customers in receipt of benefits which the CMA has recently highlighted is a strong indicator of low income, and vulnerability.³⁰

Third, the timescale within which AWL was asked to respond to Ofwat’s action point was a very short one in which to test the acceptability and affordability of its proposed PR19 business plan bill profile with a representative sample of customers. We do not see how AWL could have realistically used a face to face in home method of research.

Fourth, we note from their response to AV.A1 that AWL is intending to undertake further research with customers in April and May to prove the acceptability and affordability of the bill profiles it has submitted in its revised BP (see below) once it has the final waste-water bills from sewerage service providers, and that this will include the use of face to face methods.

Finally, and most significantly, AWL has decided to change its proposal for the level of customer bills. Their proposal is now for their average bill (in real terms) to be £170.50 in 2019/20 reducing to £167.80 in 2024/25. This is less than most of the proposals the company has consulted its customers about since Spring 2018 (see Annex D). The company is now proposing a level and profile of bills that is in line with a proposal tested with customers as ‘Plan L’ in Phase 2 of the customer engagement programme in Spring 2018. We comment further on this in relation to RR:A10 below. As the bill level associated with ‘Plan L’ is lower than that submitted by AWL in its BP in September 2018 it might be reasonable to expect the objective levels of customer acceptability and perceived affordability to improve.

AV.A2 – Affordability and acceptability to customers of AWLs proposed bill profile 2025-30

Topic	Reference	Ofwat ‘action point’
Addressing	AFW	<i>Affinity Water has provided insufficient evidence that it has</i>

³⁰ **Consumer Vulnerability : challenges and potential solutions, CMA, 28 February 2019** . . The Competition and Markets Authority found a strong correlation between customer vulnerability and characteristics of low income, disability or aged over 65, (all of which are factors associated with receipt of income from welfare benefits).

Affordability and Vulnerability	AV.A2	<i>engaged with customers on bills beyond 2025. For example, although it has provided a long-term view of its forecast bills for the next three asset management plan (AMP) periods to 2040, there is insufficient evidence of engagement with its customers on these long-term bill profiles after the 2020 to 2025 period. Furthermore, there is insufficient evidence of how acceptable customers find the long-term bill profile. The company should undertake customer engagement on long-term bill profiles for the 2025-30 period and provide sufficient evidence to outline customer support for each of the profiles tested. Affinity Water should confirm that testing will be assured by its CCG and conducted in line with social research best practice.</i>
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CCG response to AV.A2

The CCG have reviewed AWL's response to AV.A2.

We can provide assurance to Ofwat that AWL has undertaken the research with customers described in its response relating to AV.A2.

We have engaged with this action in common with our engagement on AV.A1 and these comments should be read in conjunction with our response to AV.A1 above.

We note Ofwat has simply asked the company to '*provide sufficient evidence to outline customer support for each of the profiles tested*'. This is a slightly different requirement to that Ofwat posed for AV.A1.

The company is submitting a full copy of the research report with its response which should provide sufficient evidence. The research tested customer views on the acceptability and affordability of proposed bills and the proposed profile of bill increases between 2025 and 2030. The company's response summarises the levels of customer 'support' in terms of acceptability for each of two bill profiles tested for clean water bills with and without inflation.

Our understanding is that AWLs **proposed** bill profile from its September 2018 business plan is that used as 'Profile 1' in the survey. Profile 1 was considered acceptable by 74% of customers surveyed and affordable by 73% of those surveyed. We note that Profile 2 was considered acceptable by 81% and affordable by 78% of customers surveyed. Levels of acceptability and affordability declined for both Profile 1 and Profile 2 when inflation was added.

We refer Ofwat to our response on AV.A1 for further comment relating to the use of an online survey method and the extent to which the evidence base for this research is likely to include customers who are vulnerable as a result of using the online method.

Also, as noted in our response on AV.A1 the company is now proposing a lower level of bills in the period to 2025 and beyond. This is also considered under RRA.10 below.

The various documents provided to us are listed in Annex B and the Final Report from Verve forms part of the company's response to the IAP action points.

3. Review of AWL Action Point responses which the CCG decided to review

This section comments on 14 AWL action points which the CCG decided to review. These action points were selected either because the matters concerned issues the September 2018 CCG report had examined in some depth and/or Ofwat's action referred to the CCG report in some way, without asking us to undertake assurance. Some action points were selected when it became clear that AWL was proposing some new performance commitments which had not featured in their September 2018 BP.

AV.A3 – Social tariff cross-subsidy research

Topic	Reference	Ofwat 'action point'
Addressing Affordability and Vulnerability	AFW AV.A3	<i>Affinity Water has provided insufficient evidence on social tariff cross-subsidy research – little evidence has been provided on what customers were asked, the different levels of cross-subsidy they were presented with, and the levels of support these gathered. The company should undertake customer engagement on different levels of social tariff cross-subsidies and provide sufficient evidence to outline customer support for the same.</i>

CCG response to AV.A3

The CCG have reviewed AWL's response to AV.A3.

We support the company's statement that the evidence required by Ofwat was submitted within its September 2018 Business Plan. We do not consider the company needs to undertake further customer engagement. It has already provided sufficient evidence, in our view, to outline customer support for its proposals, which is repeated in its response to AV.A3.

We also direct Ofwat to our report submitted to them on 3 September 2018 which set out clearly the work the CCG had done to advise and challenge the company on its proposed policies for supporting customers having trouble paying their bills, including through provision of a social tariff funded by higher bills for other customers (cross-subsidy). On page 42 and 43 of our September 2018 report we said:

Σ *'AWL has undertaken three waves of quantitative research with representative samples of customers to establish customer support for the maintenance and*

potential expansion of the current social tariff as proposed in the BP³¹. The first survey in January 2018 established that 75% of customers supported the company providing support and assistance to customers in financial difficulty, with 65% in favour of paying more, through their water bills, to enable the company to continue to offer a social tariff. The second survey asked a range of questions about support for customers in debt and specifically asked a question of extending the coverage of the social tariff scheme. AWL’s customers were asked if they supported adding £1.50 or £3 a year to bills to enable either 25,000 or 48,000 more customers to be assisted by the scheme. These options each only secured a minority of support, which together suggested that support for an additional £1.50 added to bills might only be 47%. Notably 39% of customers in this survey did not support an increase in bills to increase the coverage of the social tariff. The third survey, in August 2018 made it clear that bills already include £3 to cover the cost of the social tariff scheme under which 51,000 customers have capped water bills if they are on a low income. Customers were asked specifically if they supported an increase to their bill of an additional £1.50 so that AWL could assist an additional 25,000 customers by 2025, 60% of customers surveyed supported this and 6% said they did not mind.’

More generally in the introduction to our September 2018 report to Ofwat we stated:

*‘In relation to AWL’s support for customers who are vulnerable or have difficulty paying their bills the company has undertaken good analysis of need and planning for the proposed services and activities in its BP. **The company has established that customers and stakeholders support the approach they propose to take and have demonstrated effective engagement with relevant expert stakeholders and customers to design their services.** AWL’s Inclusive Services Strategy, which underpins the proposed bespoke performance commitments in the BP, will be a significant business change for AWL’*

Our report in September 2018 also outlined in full the process we had undertaken to arrive at those opinions and referred to all the documents we had reviewed, including the full results of all the research on social tariff issues the company undertook in 2018.³²

AV.A4 – Performance Commitment on achieving the BSI standard

Topic	Reference	Ofwat ‘action point’
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³¹ Ipsos MORI, January 2018, 500 Customers; Ipsos MORI May 2018 825 customers and Ipsos MORI July 2018

³²<https://stakeholder.affinitywater.co.uk/docs/CCG/CCG-Business-Plan-Report-Complete-final%20September-11am-Linked-Version.pdf>

Addressing Affordability and Vulnerability	AFW AV.A4	<p><i>Affinity Water has stated that it will achieve the British Standards Institution (BSI) standard for inclusive services by 2020 but has not provided a Performance Commitment or plan on how it will do so.</i></p> <p><i>The company should propose a Performance Commitment on achieving the BSI standard for fair, flexible and inclusive services for all and maintaining it throughout the 2020 to 2025 period</i></p>
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CCG response to AV.A4

The CCG have reviewed AWL's response to AV.A4.

We note that the company has agreed to introduce a performance commitment that it will maintain the BSI accreditation 18477 for inclusive services, which it says in its response to AV.A4 was substantially achieved in February 2019.

We note Ofwat comments that the company has not provided a plan on how it would achieve the BSI standard. We direct Ofwat to our September 2018 report, which set out the work the CCG had done to advise and challenge the company on its proposed policies for supporting customers in vulnerable circumstances. That included reviewing the plan the company had developed for achieving the BSI standard. We specifically considered whether the company's approach to vulnerability was targeted, efficient and effective and what the CCG's view of the quality of planned support for customers in vulnerable circumstances was, taking into account Ofwat's February 2016 Vulnerability Focus report. We assessed the company's business plan as meeting those expectations.

Our review of the company's plan for improving its service to vulnerable customers enabled us to take the view that its proposed performance commitments to improve customer satisfaction amongst vulnerable customers involved significant business change and therefore were stretching. Ofwat's methodology indicated that a significant business change might amount to a stretching commitment and we set out our reasoning on this in our report.

Relevant extracts from our September 2018 report for Ofwat are below:

*'In relation to AWL's support for customers **who are vulnerable** or have difficulty paying their bills the company has undertaken good analysis of need and **planning** for the proposed services and activities in its BP. The company has established that customers and stakeholders support the approach they propose to take and have demonstrated effective engagement with relevant expert stakeholders and customers to design their services. **AWL's Inclusive Services Strategy, which underpins the proposed bespoke performance commitments in the BP, will be a significant business change for AWL.**'³³*

³³ <https://stakeholder.affinitywater.co.uk/docs/CCG/CCG-Business-Plan-Report-Complete-final%2020September-11am-Linked-Version.pdf>

and

*'The company has developed and provided the CCG with adequate opportunities to challenge proposals for an **'Inclusive services strategy'** described in Chapter 7 of the BP submission. This covers support services the company will deliver for customers in vulnerable circumstances. The strategy also covers proposed support for customers who have difficulty affording their water bills, including the provision of a 'social tariff' scheme which provides a significant reduction in bills for customers who have difficulty paying their bills and meet certain criteria. (see also Test area 11 above)*

The Business Plan includes a proposed bespoke performance commitment based on customer satisfaction with the services provided by the Priority Services Register (PSR).

The company has made a commitment to significant business change, before 2020, by seeking and achieving independent accreditation from BSI (18477) that it meets the requirements of that standard for Inclusive Service provision.'

AV.A5 – Performance commitment on increasing registrants on the Priority Services Register (PSR)

Topic	Reference	Ofwat 'action point'
Addressing Affordability and Vulnerability	AFW AV.A5	<p><i>Affinity Water has not proposed a performance commitment on Priority Services Register (PSR) growth. It is proposing to increase its PSR reach from 2.5% in 2019/20 to 6.3% of households in 2024/25. We consider this to be an insufficiently ambitious target. In addition, the company has checked no PSR data over the past two years.</i></p> <p><i>We propose to introduce a Common Performance Commitment on the Priority Services Register (PSR): The company should include a Performance Commitment which involves increasing its PSR reach to at least 7% of its customer base (measured by households) by 2024/25 and committing to check at least 90% of its PSR data every two years.</i></p> <p><i>For further information on the performance commitment definition, and reporting guidelines, please refer to 'Common performance commitment outline for the Priority Service Register ("PSR")', published on the initial assessment of plans webpage.</i></p>

CCG response to AV.A5

The CCG have reviewed AWL's response to AV.A5.

We note that Ofwat has decided to introduce a common performance commitment and level of expectation in terms of proportion of customers registered across all water companies in England and Wales.

We note the company has agreed to make a specific performance commitment in this area and is proposing to achieve 7.22% of its customers registering on its PSR by 2024/25.

We commented in our September 2018 report that the company was planning to significantly increase the number of customers registered on its PSR as part of a range of initiatives aimed at improving its services for vulnerable customers. At that time Ofwat had not indicated that it expected all water companies in England and Wales to make a performance commitment to increase the number of customers registering on PSRs, or that companies should achieve at least 7% of their customers registered by 2024/25.

We specifically noted in our September 2018 report several aspects of how AWL had arrived at its business plan proposals in this area, our intention being to provide assurance that the proposal was based on analysis and consultation with customers and stakeholders:

*‘AWL undertook comprehensive analysis of a range of external data (from Acorn, RNIB, Experian and government data on indices of deprivation and health inequalities) to identify the gap between the number of customers in its supply areas that might potentially benefit from its priority services, and the priority services register. They have used this analysis to set a target to significantly increase to ‘circa 92,000’ the number of customers on their PSR by 2025, from 25,000 in 2018³⁴ and set out a plan of action designed to achieve that. **Achieving that level of take up represents a stretching goal**, though take up is not a business plan Performance Commitment the plan commits to this goal and supporting actions.’*

We also noted that:

‘AWL have been working collaboratively with other utilities, including UK Power Networks locally and the water and energy industry trade body led projects to identify how to bring about improved data sharing between utilities to maximise take up and use of individual company’s PSRs

AWL consulted widely with a comprehensive range of charity and other stakeholder organisations in its area during this review. It approached discussion with those stakeholders in a very open way (we remotely observed a meeting with stakeholders at first hand as if it was a market research focus group, and it was independently facilitated).’

³⁴ P120 V4 BP – the company had advised us in June 2018 their goal was an increase to 100,000 as shown in document 70 – Appendix 5. The figure could therefore change again in the final BP.

OC.A3 – Value for Money survey performance commitment

Topic	Reference	Ofwat 'action point'
Delivering Outcomes for Customers	AFW OC.A3	<i>The company should provide justification for discontinuing its PR14 Value for Money PC (R-A2: Value for money survey). If sufficient justification for discontinuing the PC cannot be provided, the company should continue its PR14 Value for Money PC.</i>

CCG response to OC.A3

The CCG have reviewed AWL's response to OC.A3.

We note that the company has decided to maintain its performance commitment to measure customer perception of the value for money of the service they receive from Affinity Water, in addition to the customer surveys required for the new CMEX measure. The company has undertaken in its response to work with the CCG in developing a new survey design to measure customer views of value for money in future which is fit for purpose.

Our understanding is that the company had proposed ending this performance commitment on the basis that if it maintained the **current** rolling survey of customer views, which it commissioned initially in 2015 to fulfil the performance commitment it gave in its current (AMP6) business plan, this would duplicate with elements of the new survey data being commissioned in relation to the new CMEX performance commitment monitoring arrangements Ofwat is developing for use from 2020. The CCG would only wish the company to continue with its original 'value for money' survey alongside the monitoring for CMEX **if** the data gathered is used and useable by the company. We would also be unhappy about expenditure on research which duplicated as this would not be good value for customers' money. We have previously commented to the company in our Annual Reportsⁱ that we had concerns about and had challenged the company on the usability of the chosen methodology for the value for money survey, in its present form. The value for money index is built up using customer views on a range of matters outside AWL's responsibilities which the company is not capable of influencing, e.g. energy bills. We have also queried whether the value for money index has been used by and is capable of being used to drive the business due to the chosen methodology. For example, in our Annual report for 2017/18 (page 3) we said:

'We can provide assurance that the value for money survey is undertaken by the company. However, we have not seen evidence to show that the survey is used by the company as originally intended to help it make decisions about improving delivery and service to customers.'

We have challenged the company to show how it was using the insight from this survey to develop its PR19 business plan. We are satisfied that the company has referred to the evidence from this survey, although at a relatively late stage in the development of their evidence base.'

As the company is now maintaining this performance commitment, we will challenge the company to ensure that the design of the research in future will result in a tool which is useable and used by AWL and does not duplicate with CMEX.

OC.A11 – Leakage reduction target .

Topic	Reference	Ofwat 'action point'
<i>Delivering Outcomes for Customers</i>	<i>AFW O.:A11</i>	<i>Leakage: The company should reconsider its proposed service levels and ensure that they are stretching and meet the upper quartile values or provide compelling evidence to demonstrate why this level cannot be achieved. Based on the forecast data provided by companies in the September 2018 business plan submission the upper quartile values are 75 litres/property/day and 5.42 m3/km of mains/day. The company should clearly set out the evidence and rationale for the revised targets.</i>

CCG response to OC.A11

We note that AWL has reconsidered its proposed service levels on leakage reduction and is now targeting an 18.5% reduction (in absolute terms) over AMP7 from 162.2 Ml/d in 2019-20 to 132.2 Ml/d in 2024-45, instead of its initial BP proposal of a 15% reduction target.

Throughout the customer engagement programme AWL carried out in 2017/18 on both its business plan and its dWRMP it received strong feedback from customers and stakeholders that they wished to see more action on the part of the company to reduce leakage.

We noted in our September 2018 report that notwithstanding its 14% reduction target in AMP6 Affinity Water had a fairly high level of leakage in 2017/18 in terms of litres of water per property per day (that leaks). Whilst leakage in AWL's supply area of 115 litres per property per day was below the overall industry average, it was the 5th highest, amongst 18 companies in England and Wales, and many other companies have lower levels of leakage. AWL's September BP commitment to reduce leakage by 15% over 5 years was in-line with a challenge posed by Ofwat (that companies should propose to reduce leakage by *at least* 15%). However, we observed that if all other companies made similar or greater reductions in future AWL could remain the 5th highest company for leakage even with a 15% reduction. Achieving an 18.5% reduction in leakage by 2025 could therefore improve AWL's comparative performance, depending of course on the reduction targets of other companies.

OC.A27 – Low Pressure

Topic	Reference	Ofwat 'action point'
Delivering Outcomes for Customers	AFW O.A27	<i>Properties experiencing longer or repeated instances of low pressure: The company should either use the original DG2 and long list definition or provide further evidence to support its view that the updated definition is a better and more appropriate measure for the company, for wider stakeholders and for customers. In particular the company should refer to trend analysis which may be potentially more difficult and the poor current levels of performance in this</i>

CCG response to OC.A27

The CCG have reviewed AWLs response to OC.A27. We understand that the company has now decided to propose an additional bespoke performance commitment for low pressure using the existing definition/measure called 'DG2' (and that proposed PC has a financial ODI). The bespoke performance commitment for low pressure (non DG2) which was included in the Company's Business Plan from September 2018 is retained but now has a non-financial ODI. The company's account of this decision appears in their response to OC.A3, but we have not reviewed that response.

Our September 2018 report for Ofwat commented on the original proposal for performance commitment on low pressure. AWLs proposal was to reduce the average hours of low pressure per property per annum from 12 hours to 8.7 hours. This was prima facie a service level improvement. We had also seen evidence from analysis of operational data that the problem of low pressure was a significant feature of customer complaints, it was therefore right for AWL to make a commitment to improve its performance.

However, it was not easy for us to see how stretching or difficult the proposed performance improvement would be to achieve, in the absence any comparative information on this measure. The company showed us data that in terms of the number of properties per 10,000 properties which are below a reference level of water pressure (DG2) AWL has 'the worst' performance amongst the water companies in England and Wales and is an outlier. **Together with the customer complaint data this supported the case for a performance commitment to improve service to customers.** As part of the Business Planning process AWL also agreed to consider a KPI for this area which would enable it, and us, to see how many customers are affected by low pressure problems because an overall average 'hours per annum' can disguise extreme problems experienced by a few customers.

We have noted Ofwat's concerns that the proposed new bespoke measure relating to properties experiencing low water pressure (instead of using the established measure called 'DG2') makes the PC less transparent to stakeholders and customers, as well as making trend analysis difficult for the company and wider stakeholders. The company seems to have responded to this concern by adopting the DG2 method of definition for one of its PCs, which may also address the request the CCG had made for a KPI for the number of properties experiencing low pressure.

OC.A32 Performance Commitment on customer satisfaction with services for customers in vulnerable circumstances

Topic	Reference	Ofwat 'action point'
<i>Delivering Outcomes for Customers</i>	<i>AFW OC.A32</i>	<i>Customers in vulnerable circumstances satisfied with our service PC: The company should split this PC into 2 PCs, one for financial and one for non-financial support scheme support. This would support more transparent measurement and reporting than the current PC proposes. In addition, the company should provide additional evidence on the sample size used in the monthly survey to determine the PC target and provide external assurance that the survey will be conducted in line with social research best practice.</i>

CCG response to OC.A32

The CCG have reviewed AWL's response to OC.A32. We have raised several queries with the company with the aim of clarifying their response.

We note that the company has agreed to split this PC into two PCs as requested by Ofwat.

We note too that the company has made an additional commitment to go beyond simply surveying PSR customers who are in contact with them by introducing a periodic proactive satisfaction survey for both groups of customers in vulnerable circumstances who have not contacted AWL within 12 months. We welcome this initiative as it will increase the quantity of feedback from customers, improve the representativeness of the survey and enable the company to identify any customers who may need assistance who have not been in contact with them recently.

OC.A34 Performance Commitment on customers in vulnerable circumstances' experience of dealing with AWL

Topic	Reference	Ofwat 'action point'
Delivering Outcomes for Customers	AFW OC.A34	<i>Customers in vulnerable circumstances who found us easy to deal with PC: The company should split this PC into 2 PCs, one for financial and one for non-financial support scheme support. This would support more transparent measurement and reporting than the current PC proposes. In addition, the company should provide additional evidence on the sample size used in the monthly survey to determine the PC target for and provide external assurance that the survey will be conducted in line with social research best practice.</i>

CCG Response to OC.A34

The CCG have reviewed AWL's response to OC.A34. We have raised several queries with the company with the aim of clarifying their response.

We note that the company has agreed to split this PC into two PCs as requested by Ofwat.

We note too that as with OC.A32 the company has made an additional commitment to go beyond simply surveying customers in vulnerable circumstances who are in contact with them by introducing a periodic proactive satisfaction survey for both groups of customers in vulnerable circumstances who have not contacted AWL within 12 months. We welcome this initiative as it will not only improve the representativeness of the survey but enable the company to identify any customers who may need assistance who have not contacted them recently.

OC.A33 Performance level for PC on customers in vulnerable circumstances satisfied with our service

Topic	Reference	Ofwat 'action point'
Outcomes for Customers	AFW OC.A33	<i>Customers in vulnerable circumstances satisfied with our service PC. The company should revise its performance level for this PC to at least meet current satisfaction levels.</i>

CCG Response to OC.A33

The CCG have reviewed AWL's response to OC.A33 and our comments are included with our comments on OC.A35 below.

OC.A35 Performance level for PC on customers in vulnerable circumstances experience of dealing with AWL

Topic	Reference	Ofwat 'action point'
Outcomes for Customers	AFW OC.A35	Customers in vulnerable circumstances who found us easy to deal with PC . The company should revise its performance level for this PC so that it is more stretching and provide justification for the level of stretch as well.

The CCG have reviewed AWL's responses to OC.A33 and OC.A35. Although Ofwat's action points are slightly different, and the proposed performance commitments and performance levels are concerned with slightly different questions, the substance of the AWL's responses is common to both matters.

We note that AWL is now proposing to set a higher target performance level for both these new bespoke performance commitments of 90% customer satisfaction/found us easy to deal with. **The CCG welcomes the company's proposal to improve the performance commitment level.** Below we discuss our consideration of whether the revised proposal(s) address Ofwat's expectations that the performance level at least meets current satisfaction levels/is more stretching.

AWL originally proposed target levels of 82% satisfaction/found us easy to deal with.

In its responses to OC.A33 and OC.A35 AWL has set out how it considers its revised proposal, for a performance level of 90%, is at least meeting current satisfaction levels (for OC.A33) and is more stretching (for O.A35).

We commented on the performance commitment relating to satisfaction with PSR services (OC.A33) in our September 2018 report . We observed we had seen .data which suggested the proposed performance commitment level of 82% might not have been in line with, and could even have been lower than, performance being achieved in 2018.³⁵ This had tended to suggest to us that the proposed forward target of 82% customer satisfaction was not stretching.

However, we also noted that:

*'This is a new bespoke performance commitment measure **so there is no baseline of data available to judge if the proposed performance commitment level of 82% is stretching.***

We commented that the data we had seen was arguably not comparable and the company was also planning to significantly increase the population of customers who are on its PSR, who would form a significant proportion of the customers represented in this survey.

³⁵ An AWL paper circulated to the CCG on 5 June 2018 suggested 82% was the performance the company was achieving on its 'Rant and Rave' customer feedback/survey for 2017/18

We note from the company's responses to OC.A33 and OC.A35 that after undertaking further analysis it now considers that its current performance on this measure/these measures would be higher than 82%, as proposed in September.

The company's comments explain how the current data it has points to a range in satisfaction ratings from customers, according to the channel used to collect feedback, ranging from 68% to 91% and 92%. We recognise that the current results may not be comparable with what AWL might expect to see when the proposed performance commitments are in place due to expected changes in the size of the group of customers surveyed, the expansion of methods used to capture customer feedback (beyond simply SMS surveys) to include letters and emails. Those changes will improve inclusivity of the company's approach to gathering customer feedback and they now commit to including pro-active contact with vulnerable customers who have infrequent contact with the company.

In selecting to adopt 90% as the performance level for both OC.A33 and OC.A35 the company has adopted a figure at the upper end of the range of its current performance measured with all customers via the one channel which is currently generating the most positive feedback. This appears to us to be a realistic approach which the company has explained in its response.

We note that AWL has also decided to change its approach to gathering customer feedback so that in future it uses a 0-10 band rating system (where 10 is good) instead of a 1-5 band system. This appears to be a simpler approach than presented in September 2018.

OC.A36 – Performance commitment on environmental projects - evidence

Topic	Reference	Ofwat 'action point'
<i>Delivering Outcomes for Customers</i>	<i>AFW OC.A36</i>	<i>Environmental innovation - delivery of community projects PC: The company should provide further evidence of customer support for this PC. In particular, the company should provide evidence that customers were presented with choice and context related to the design of the currently proposed PC.</i>

CCG response to OC.A36

The CCG have reviewed AWL's response to OC.A36.

We recognise the company's account that the proposal for a bespoke PC to deliver a number of local environmental projects was developed following advice and challenge from members of the CCG, several whom have significant experience as practitioners in community engagement with environmental issues in AWL's supply area, including representatives from the Environment Agency.

In September 2017 the CCG agreed to AWLs request that we form a sub working group on “Resilience and Environment”, with a purpose to challenge and advise on the development of relevant PCs to help the company with developing its business plan proposals. The group considered proposals for several PCs, one of which was for AWL to undertake a number of environmental pilot projects which could be aimed at finding innovative ways to promote a reduction in water use, promote customer education on the link between water and the environment and improve the environment. The CCG suggested that pilot projects undertaken in each of AWLs 8 community areas, which relate to water resource zones, could involve partnering with other organisations such as councils or local river groups, who could help to co-create and deliver as well as support and promote the initiatives. That approach would also fit with the company’s commitment to be the leading community focussed water company³⁶

In its response the company has set out the evidence it has of customer support for the proposed PC on environmental innovation, including how the proposal was presented to customers. The CCG have already commented on this in our September 2018 report. We:

- Σ confirmed that this proposed performance commitment was one of 7 specifically set out to customers – in the ‘Phase 2’ Acceptability survey.
- Σ explained that customers were asked for their views on three alternative plans with different levels of service for 7 performance commitments and price.³⁷ Customers were asked about acceptability, affordability and to indicate preferences between the three plans.³⁸
- Σ noted a ‘second’ acceptability survey conducted with customers in July/August 2018 which presented a proposal for ‘investing in eight new environmental pilots to test new innovations’.
- Σ said we considered the company had obtained appropriate quantitative evidence from two representative acceptability surveys which shows customer support for some of its proposed performance commitments (including that for environmental projects/innovation).

³⁶ At page 34 of our September 2018 report to Ofwat we said ‘*The business plan also proposes that the company invests in 8 local environmental projects which are also ‘innovative’ working with local partners and organisations as part of the implementation. The CCG has not been involved in the identification of these projects – only the development of the proposal to have a performance commitment framed in this way, which a subgroup of the CCG met with the company to discuss in 2017/18.*’

³⁷ See p50 CCG September 2018 report to Ofwat

³⁸ In the ‘Phase 2’ research for the customer engagement programme customers were asked for their views on different levels of expenditure on local environmental projects being ‘£2 million’ or ‘£6 million’ depending on the plan option presented.

OC.A46 – Mean Zonal Compliance (MZC)

Topic	Reference	Ofwat 'action point'
<i>Delivering Outcomes for Customers</i>	<i>AFW OC:A46</i>	<i>Mean Zonal Compliance (MZC): The company should remove MZC. If the company doesn't do this it should provide further evidence that customers support the provision of two very similar measures. Also see action AFW.OC.A1 as we expect the company to select the two PCs from the asset health long list that measure water quality contacts as also are reported on the Discover Water website</i>

CCG response to OC.A46

The CCG have reviewed AWLs response to OC.A46. We note the company has withdrawn the proposal for a **performance commitment** based on MZC but intends to retain the use of MZC as a 'KPI'.

We support the decision by AWL to retain MZC as a KPI. We have seen no evidence that the new DWI measure of water quality, 'CRI', has been tested with customers to demonstrate that it is understood and is capable of being understood easily by significant numbers of customers. We raised this issue with the DWI when they met with the CCG in 2018 and understood they had done no testing with customers to find out whether and how it is understood, or which measure customers would prefer (between CRI and MZC). Given the importance of water quality to AWLs customers as the most important outcome they expect the company to deliver it is important that performance can be reported in a way that makes sense to customers and is readily understandable. MZC is in our view far simpler and more accessible than CRI for use in general communications with customers.

CMI.A1 – Potential strategic supply options and engagement

Topic	Reference	Ofwat 'action point'
<i>Targeted controls markets and innovation</i>	<i>AFW CMI.A1</i>	<i>The company should ensure that the business plan sets out the potential strategic supply options that it has assessed and explain how it will engage with interested parties and other stakeholders to progress these options. We also expect the business plan to align with the revised water resources management plan.</i>

CCG response to CMI.A1

The CCG have reviewed AWL's response to CMI.A1.

We can provide assurance that we recognise the account the company has given of its engagement with stakeholders and customers concerning its revised draft Water Resources Management Plan (rdWRMP).

The company launched a consultation with customers and stakeholders about the rdWRMP on 1 March 2019 and closes the consultation on 26 April. The revised plan is due to be submitted to the Secretary of State for the Environment, Food and Rural Affairs on 31 May 2019.

As the company response to CMI.A1 indicates the CCG has formed a sub-group of members to advise and challenge the company on the consultation about the rdWRMP. The sub-group has provided advice and comment on the consultation and engagement programme, including reviewing text of collateral and engagement material and survey questions. The sub-group has also been asked to '*evaluate how customer insight is incorporated into the Plan*' and to provide a report giving its opinion to the company, so that the Board has this when it signs off the revised dWRMP in 'late May'.

Meetings of the CCG sub-group were held on 6th December and 11th February and an additional session was held prior to the CCG meeting on 19 December. In addition, a significant quantity of draft survey questions, collateral/communication material and topic guides for focus groups have been circulated to CCG members of the sub-group between meetings and members have also observed most of the customer focus group sessions held Autumn/Spring 2019, which were independently facilitated by Ipsos Mori.

AWL has taken on board advice and challenge provided by the CCG concerning the design of its customer and stakeholder engagement process by:

- ∑ Commissioning a quantitative survey with a representative sample of customers in addition to focus group sessions with customers in Autumn and Spring 2019;
- ∑ approaching the consultation and engagement materials in a way that is designed to attract attention to the key issue of water resource challenges and stimulate responses – i.e. by setting out very clearly a 'call to action' or burning platform around water resources and adopting a consistent approach to presentation of the engagement materials across different channels;
- ∑ setting targets/performance indicators for the consultation and engagement exercise designed to achieve a greater number of responses than for the first dWRMP in 2017/18;

- Σ using email to approach customers directly to tell them about the plans and the opportunity to get involved

A further meeting of the CCG sub-group will be held in May 2019 to review the findings and feedback of AWL's consultation and engagement with customers and consider formulation of the CCG's report for the AWL board

AFW. RR.A10 – Steps taken to address CCG concerns

Topic	Reference	Ofwat 'action point'
<i>Aligning Risk and Return</i>	<i>AFW RR.A10</i>	<i>The company should set out the steps taken to address the concerns raised by the Customer Challenge Group in relation to the late addition of the final bill profile to the business plan, providing evidence that the annual bill profile set out in the business plan is consistent with customer preferences</i>

CCG response to RR.A10

The CCG have reviewed AWL's response to RR.A10.

The company has acknowledged that late changes to its AMP7 bill profile did not allow the CCG to have early sight of the final bill profile included in its September Plan. AWL has described how it has sought to improve arrangements for its revised business plan, albeit the timescale for this work has been very limited.

AWL has carried out the actions required from Ofwat (AV.A1 and AV.A2) to test the bill profile it proposed in its Business Plan with customers and the results are provided in the company responses to AV.A1 and AV.A2. The company's responses to AV.A1 and AV.A2, and our comments on those responses above, relate to the bill level, and profile, proposed in September 2018.

We understand that the company now proposes a lower level of bill for clean water (without inflation and sewerage charges) such that it will reduce by 1.6% between 2020 and 2025 and will further reduce by 2.0% between 2025 and 2030. The details of that proposal are set out in the response to RRA10.

The revised bill level now proposed by AWL is very close to a proposal which was tested with customers in Spring 2018 as part of 'Phase 2' of AWL's customer engagement programme. Details of a draft Business Plan were published for public consultation, focus group discussions were held moderated by independent market research firm Ipsos Mori and quantitative research was conducted by them with 825 customers interviewed face to face. As we noted in our September 2018 report to Ofwat:

'The Phase 2 customer acceptability survey³⁹ in particular asked customers for their views on the proposed business plan outcomes and proposals for three alternative business plans⁴⁰ and average bill levels and was supported by a series of independently facilitated focus group discussions involving 70 customers in different socio-economic profile groups. The in-home face to face research methods used for the quantitative survey meant that it was able to include those of AWL's customers who are digitally excluded and would not be represented in on-line market research panels.'

In that research a proposal called 'Plan L' was presented to customers with information about key business plan components. Plan L was the only plan, of 3 presented, which included a 15% reduction in leakage together with a reduction in abstractions of 39 million litres per day and a target for personal consumption, per head, of 124 litres per day. As such it is also closest to the performance commitments given in the Business plan AWL submitted in September 2018. Customers were told that under Plan L their yearly bill would be £168 in 2019/20 and reduce to £167 in 2024/25.⁴¹ Plan L was considered acceptable by 74% of those customers surveyed.

³⁹ dBP phase 2 customer acceptability survey (825 customers, face to face, Ipsos MORI/Arup)

⁴⁰ In the public consultation document the plans were called A, B and C. In the market research and focus groups the plans were called J, K and L. The average bills presented to customers in focus groups were personalised for the relevant AWL charging zone that the customers lived in.

⁴¹ The proposals in the Phase 2 research were expressed as an average bill across all AWL's charging areas – of which there are three, were in real terms, without inflation and without including future sewerage charges.

Annex A

CCG Members at 31 March 2019

Independent members

Tina Barnard, Watford Community Housing Trust

David Cheek, Friends of the Mimram

Essex Richard Haynes, Up on the Downs

James Jenkins, University of Hertfordshire

John Ludlow, Public affairs and government relations professional

Teresa Perchard, Chair

John Rumble, Hertfordshire County Council

Gill Taylor, Groundwork East

The following members represent statutory organisations:

Karen Gibbs, Consumer Council for Water (CC Water)

Caroline Warner, CC Water – Local Consumer Advocate

Rachel Nelson, Environment Agency

Jonathan Sellars, Environment Agency (continues to be involved with the rdWRMP working group until May 2019)

Annex B**AWL CCG – Supplementary Report to Ofwat – Annex B****Documentation received by the CCG to help it prepare its Supplementary report**

	Items	Author	Status	Date circulated	Discussion forum	Record
1	Proposed CCG assured action items	AWL	final	18/02/2019	e-mail AWL approach to customer engagement	comments via e-mail
2	PR19 research brief	AWL	final	18/02/2019	e-mail - bills - additional customer engagement	comments via e-mail
3	BP survey bills presented	AWL	final			
4	Proposed CCG assured action items	AWL	final			
5	AWL draft quantitative survey	Verve	draft	20/02/2019	e-mail for review	comments via e-mail
6	Draft Test Evidence Response CMI.A1	AWL	draft	08/03/2019	Quarterly meeting 13 March 19	Minutes of meeting
7	Draft Test Evidence Response AV3-5	AWL	draft			
8	Draft Test Evidence Response OC 3	AWL	draft			
9	Draft Test Evidence Response OC 32-35	AWL	draft			
10	Test Area Evidence Addressing Affordability and Vulnerability Template v0.1 - CCG AV1-2	AWL	draft	08/03/2019	Quarterly meeting 13 March 19	Minutes of meeting
11	Quantitative survey for AV.A1 and AV.A2 draft findings	Verve	draft			
12	CMI.A1 evidence report	AWL	draft	12/03/2019	tabled at quarterly meeting 13 March 19	Minutes of meeting

13	Affinity Water_PR19 Bill profile testing report_110319_C final	Verve	final	13/03/2019	e-mail for noting & comment	comments via e-mail
14	Bill Survey Results Summary	AWL	draft	14/03/2019	e-mail following quarterly meeting	comments via e-mail
15	AWL Final Bill Profile 15 March 2019 RRA10	AWL	draft	15/03/2019	e-mail to TP for review and CCG report	comments through e-mail and CCG report
16	Test area evidence addressing affordability and vulnerability AV A1-5	AWL	draft			
17	Test Area evidence delivering outcomes for customers template OC3 32-35	AWL	draft			
18	Test area evidence targeted controls and innovation CMI.A1	AWL	draft			
19	RR.A10 draft response	AWL	draft	17/03/2019	e-mail to TP for review and CCG report	comments through e-mail and CCG report
20	RR.A10 draft response	AWL	draft	18/03/2019		
21	AWL Delivering outcomes for customers - response OC32,35	AWL	draft	18/03/2019		
22	AWL Delivering Outcomes for customers OC32-35 18th March	AWL	draft	19/03/2019	e-mail to members for review against CCG report	comments through e-mail and CCG report
23	RR.A10 final bill profile draft response 18th March	AWL	draft			
24	Test area evidence addressing	AWL	draft			

	affordability and vulnerability AV A1-5					
25	Test area evidence targeted controls and innovation CMI.A1	AWL	draft			
26	OC.A46 25.03.19 - response on MZC	AWL	draft	25/03/2019	e-mail to TP for review and CCG report	comments through e-mail and CCG report
27	AWL final response on Addressing Affordability and Vulnerability v 3.1 AV A1-5	AWL	final	27/03/2019	e-mail to TP for review and CCG report	comments through e-mail and CCG report
28	AWL final response to CMI .A1 v3					
29	AWL final response to OC.A32-36					
30	AWL final response to OC.A2 and OC.A3					
31	AWL final response to OC.A11					
32	AWL final response to OC.A46 - MZC					
33	AWL final response to RR.A10					

Documentation Shared with CCG relating to the revised dWRMP

Ref	Items	Author	Status	Date circulated	Discussion forum	Record
1	Draft Water Resources Management Plan 2019 - Statement of Response	AWL	final	15/10/2018	Quarterly meeting Oct 18	minutes of meeting
2	Revised dWRMP – approach to further consultation	AWL	final			
3	rdWRMP 2018_Pre Consultation Method Statement_V4	Ipsos Mori	draft	14/11/2018	sub group meeting 20th Nov 18	minutes of meeting and

4	rdWRMP consultation paper v final	AWL	final			rdWRMP table of collated comments and responses
5	rdWRMP sub group meeting schedule	AWL	draft			
6	revised rdWRMP Awareness campaign plan 4 Dec 18 v2	AWL	draft	05/12/2018	sub group meeting 6th Dec 18	minutes of meeting
7	rdWRMP non tech summary v30.11.18	AWL	draft	05/12/2018		
8	rdWRMP timeline Dec 18	AWL	draft	05/12/2018		
9	Revised draft ToR CCG WRMP working group	AWL	draft	15/01/2019	e-mail for review	comments via e-mail
10	rdWRMP Consultation and Timeline Summary Jan 19	AWL	draft	15/01/2019	e-mail for review - updates following Board meeting	comments via e-mail
11	rdWRMP technical plan(board item 2.1)	AWL	final			
12	rdWRMP consultation video storyboard 01	AWL/Campaign Works	draft	25/01/2019	sub group e-mail for review	rdWRMP table of collated comments and responses
13	rdWRMP - Method statement for the on-line customer survey	Ipsos Mori	final	29/01/2019	sub group e-mail for review	rdWRMP table of collated comments and responses
14	1. rdWRMP WG minutes 6-12-18 v final	AWL	final	06/02/2019	sub group meeting 11th Feb 19	minutes of sub group meeting & rdWRMP table of collated comments and responses
15	2. CCG WG ToR Jan 19 tracked changes 2	AWL	draft			
16	4. WRMP Timeline_Jan 2019	AWL	final			
17	5i. Stakeholder engagement	AWL	draft			
18	5ii. rdWRMP pre consultation customer focus Groups 2 - Report	Ipsos Mori	final			
19	5iii. 2019-02-05 rdWRMP Triangulation report	Arup	final			

20	6i. rdWRMP Further consultation campaign 6 Feb 2019	AWL	draft			
21	6ii. Video Storyboard	AWL/Campaign Works	draft			
22	6iii. drWRMP consultation leaflet A5	AWL	draft			
23	6iv. Non Tech summary content version draft 3	AWL	draft			
24	6vi. Further consultation questions v8	AWL	draft			
25	6v. draft customer survey	Ipsos Mori	draft	08/02/2019	sub group meeting 11th Feb 19	minutes of sub group meeting & rdWRMP table of collated comments and responses
26	Further consultation questions v13	AWL	draft	15/02/2019	e-mail to sub group for review	rdWRMP table of collated comments and responses
27	rdWRMP customer on line survey_V13	Ipsos Mori	draft	25/02/2019	e-mail to sub group for review	rdWRMP table of collated comments and responses
28	rdWRMP further consultation Stakeholder Engagement timetable	AWL	final	06/03/2019	e-mail to sub group to note	comments via e-mail
29	WRMP update (for all members)	AWL		08/03/2019	Quarterly meeting 13 March 19	minutes of meeting

Annex C

Overview of AWL CCG PR19 Test areas

1.	Has AWL developed a genuine understanding of customers priorities, needs and requirements, drawing on a robust, balanced and proportionate evidence base
2.	Has AWL engaged with customers on the issues that matter to them?
3.	Has evidence from customers genuinely driven and informed the development of the business plan?
4.	Has the company used multiple data sources and triangulated those effectively to develop its proposals, and carry out customer engagement?
5.	Has the company presented its customers with realistic options?
	Has the customer engagement process been ongoing two way and transparent with the company informing customers as well as soliciting feedback from them?
7.	Has the engagement with customers been sufficiently diverse, involving the using of methods appropriate and effective for engaging with a diverse range of customers. Does this include customers in circumstances that make them vulnerable? Has the company considered the most effective methods for engaging different customers, including those that are hard to reach?
8.	Has the company engaged effectively with customers on future and long-term issues, including trade-offs and risks, in a way customers could be expected to understand?
9.	Where appropriate, has the company considered how customers could help co-create and co-deliver solutions to underlying challenges?
10.	Has the company effectively informed and engaged customers about its current performance and how this compares with other companies in a way customers could be expected to understand?
11.	Is the proposed plan affordable for current customers, future customers and those struggling or at risk of struggling to pay? How well does the company understand what affordability looks like for its customers, and do customers support the approach they have taken?
12.	Vulnerability - Is the company's approach to vulnerability targeted, efficient and effective? CCG view on the quality of planned support for customers in vulnerable circumstances, taking into account Ofwat's February 2016 Vulnerability Focus report.
13.	Performance commitment framework – including Outcomes and ODIs – how have we reviewed and challenged
14.	Opinion on proposed outcomes, performance commitments – both common and bespoke - and outcome delivery incentive in terms of level of stretch, customer engagement and support
15.	AIM – has Affinity engaged with local stakeholders to propose its AIM incentives? Has it identified suitable sites in liaison with the Environment Agency? (Aim is also a PC see Q14 above)
16.	Leakage – has Affinity taken customer views into account in its proposed five year PC levels? (see also response to Q14 above Green
17.	Transparency – are company plans for reporting on performance 2020 – 25 suitable
18.	Resilience – has the company's assessment of resilience been informed by engagement with customers so as to understand their expectations on levels of service, their appetite for risk and how customer behaviour might influence resilience
19.	Cost efficiency – if there are cost adjustment claims is there evidence that customers support the project? Does the proposal deliver outcomes that reflect customers' priorities identified from customer engagement? Has the company taken account of customers' views and is there evidence that the proposed solution represents best value for customers in the long term, including evidence from customer engagement

Annex D

Reference table showing the values of bills AWL has proposed and those tested with customers Spring 2018 to September 2018

Document	2019/20 average bill	2024/25 average bill
Our Future Plans April 2018 (and Phase 2 Acceptability Survey - Mori)	£165 (on page 5) £170 (on pp 17/18/19) £168 (p11 Mori final rpt)	Plan A/J - £158 Plan B/K - £161 Plan C/L - £168
18 July 2018 briefing for the CCG (slides tabled at meeting).	£170	Various numbers quoted according to what changes to the plan were proposed. Main proposals were: £172.40 inc CRI at 2.8 and abstractions at 33 M/ld And £175.90 inc 'additional resilience' various costs
Phase 3 Acceptability Survey – Ipsos MORI/Arup	£168.77 (fig 3.1 report)	£172.40 (fig 3.1 report)
Phase 3 Additional Resilience Investment – Blue Marble	£175 (draft of Q9 circulated to CCG – no year for this bill level stated)	Seems to have been expressed as £1-£2 extra per annum Or £3-£5 extra per annum Presumably on the '£175' in Q9.
V4 BP	£172.40	£175.90
Email 1/9/2018	£170.90	£174.41
BP submission 3/9/2018	£170.90	£174.44
IAP response – RRA10	£170.50	£167.80

Appendix OC.A4.1

Action ref **AFW.OC.A4; A10; A13; A14; A15; A20; A23; A25**

Ofwat, “Technical appendix 1: Delivering outcomes for customers”
January 2019, page 28.

January 2019

Trust in water

Technical appendix 1: Delivering outcomes for customers

Technical appendix 1: Delivering outcomes for customers

Technical Appendix 1

Delivering outcomes for customers

Technical appendix 1: Delivering outcomes for customers

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Technical appendix 1: Delivering outcomes for customers

Introduction

The aim of this Technical Appendix is to assist companies in better understanding the context for their individual assessments against elements of the Delivering Outcomes for Customers test area and the actions and potential interventions that flow from that. The focus of the Appendix is on a number of cross-cutting themes within the Outcomes framework that are relevant for all companies, rather than on the application of the methodology to specific companies or individual performance commitments (PCs) and outcome delivery incentives (ODIs).

We provide details of our approaches to applying elements of the PR19 final methodology in our initial assessments of the companies' proposed PCs and ODIs in the following areas:

- The levels of stretch in companies' proposed PCs (Section 2);
- Companies' proposed ODI rates (Section 3);
- Companies' proposals for enhanced ODIs (Section 4);
- Companies' asset health packages (Section 5); and
- Customer protections in the event of unexpected levels of outperformance payments (Section 6).

We note that there are significant variations in the commitments and other proposals that companies put forward on PCs and ODIs in their business plans. In response, we have developed and implemented a consistent set of approaches to applying the final methodology to our initial assessments across all companies. We summarise some of the conclusions arising from our initial assessment of business plans in these areas, and the nature of the associated actions and expectations on companies.

In general, we do not set out company-by-company results or company-specific data, with the exceptions of our current assessments of stretching performance levels for five common PCs (Annex 1) and our current assessments of reasonable ranges for ODI rates on a number of common and comparable PCs (Annex 2).

Technical appendix 1: Delivering outcomes for customers

Performance Commitment Levels

- [What we said in the Final Methodology](#)

As we set out in the final PR19 methodology, we want companies to commit to set stretching and good value service levels for all of their PCs, both bespoke and common, for the benefit of their current customers, future customers and the environment. We said we would assess the level of stretch in all companies' proposed service levels in the initial assessment of plans and we retain the ability to intervene to set service levels if companies' proposals are insufficiently stretching, or if their justification is not well evidenced.

Our specific decisions in the methodology are as follows:

- Setting the initial service level (2019-20) – we expect companies to forecast appropriate initial service levels for 2019-20, and for these to influence the level of their PCs for 2020-21 onwards.
- Stretching levels for bespoke PCs – we expect companies to challenge their proposed PC levels against six approaches that were set out in the final methodology or explain why they have not done so. These approaches are:
 - cost benefit analysis;
 - comparative information;
 - historical information;
 - minimum improvement; □ maximum level attainable; and □ expert knowledge.
- Stretching levels for the common PCs – we expect companies to use the same approaches for setting bespoke PC levels to inform their setting of stretching PC levels for the common PCs. We particularly expect companies to challenge their PC levels for the common PCs against forecast upper quartile performance levels.
- We expect companies to use annual data for their PCs, particularly with in-period ODIs, with the exception of leakage and per capita consumption (PCC) PCs for which we require companies to use three-year averages.

We expect all companies to be ready to report in line with standard definitions for

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2019-20. We expect companies to provide a clear commitment that they are putting in place all necessary plans to be able to do this for all common PCs. This includes the Unplanned outage PC, where companies are working to develop reporting of the metric.

- [Our Response](#)

We assess the proposed commitment levels using the calculated forecast upper quartile values for each year of the 2020-25 period based on companies' business plans for the following three common PCs:

- Water supply interruptions; □
Internal sewer flooding; and □
Pollution incidents.

We expect all companies to revise their performance commitment levels for these PCs to reflect the values we have calculated for each year of the 2020 to 2025 period.

For leakage, we expect companies to propose stretching PC levels to achieve forecast upper quartile performance (in relation to leakage per property, per day and leakage per kilometre of main per day), achieve at least a 15% reduction in leakage, and achieve the largest actual percentage reduction achieved by the company since PR14, or justify why this is not appropriate.

We expect full compliance to be proposed for the following PCs:

- Water quality compliance (CRI);
and □ Treatment works
compliance.

Where companies do not propose full compliance we expect the companies to revise their commitment levels to set them at 100% compliance.

To assess the remaining common PCs we use a variety of approaches, aligned to how we expect companies to challenge themselves in setting their PC levels in their business plans. For the majority we derive forecast upper quartile values and, in some cases, forecast median values using the companies' business plans to assist our reviews, but we do not use these values to assess PC levels in isolation. We also use other approaches as laid out in the final methodology (for example, comparative and historic information), and consider the evidence submitted by individual companies.

For some PCs, e.g. Per capita consumption (PCC), we are not specifying common levels for the industry as a whole, because we do not consider it appropriate. In addition to a

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direct comparison of the companies' proposed levels, we also consider the relative percentage reduction, each company's individual circumstances and the nature of its supply systems, to assess its proposed levels.

Where this assessment results in a different commitment level to the one included in business plans, we retain the ability to intervene in our determinations, unless the company can provide compelling evidence otherwise.

A summary of our assessment approaches for the common and bespoke comparable PCs¹ is provided in the table below.

PC assessment approach

	PC	Summary of assessment approach
1	Water quality compliance The DWI's Compliance Risk Index (CRI)	We review each company's evidence to assess whether the DWI's guidance ² is followed consistently. We expect full compliance should be achieved.
2	Water supply interruptions	We review each company's evidence to assess whether our methodology ³ is followed consistently. We calculate forecast upper quartile values for each year of the 2020-25 period based on all companies' business plans and expect the proposed commitment levels to reflect the values we have calculated for each year of the 2020 to 2025 period.
3	Leakage	We review each company's evidence to assess whether our methodology is followed consistently. We calculate the percentage difference between the annual average level expected in 2019-20 and the annual average leakage proposed in 2024-25. We expect the percentage difference to be greater than both the largest actual percentage reduction achieved by the company since PR14 and also at least a 15% reduction in leakage or the company to provide compelling justification why this is not appropriate. We also calculate forecast upper quartile performance in relation to leakage per property per day and leakage per kilometre of main per day in 2024-25 using three-year average leakage values provided in companies' business plans and divided by the corresponding property and mains length values. We benchmark each company against all other companies and consider each company's own circumstances, such as past

¹ Bespoke comparable PCs are those bespoke to each company but which in practice concern a service commitment that is similar across a large number of companies.

² <https://www.ofwat.gov.uk/outcomes-definitions-pr19/>

³ <https://www.ofwat.gov.uk/publication/delivering-water-2020-final-methodology-2019-price-reviewappendix-2-delivering-outcomes-customers/>

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	PC	Summary of assessment approach
		performance. We expect the proposed commitment levels to be at or exceed these values, or the company to provide compelling justification why this is not appropriate.
4	Per capita consumption (PCC)	We review each company's evidence to assess whether our methodology is followed consistently. We benchmark all companies against each other, combined with evidence and justification provided for the forecast performance levels. We use each company's water resources position, their supply/demand balance, relative percentage reduction, proposed supply-side investment and the company's own circumstances, geographical location and benchmarking against neighbouring companies or companies with similar characteristics in the same region.
5	Internal sewer flooding	We review each company's evidence to assess whether our methodology is followed consistently. We calculate forecast upper quartile values for each year of the 2020-25 period based on all companies' business plans and expect the proposed commitment levels to reflect the values we have calculated for each year of the 2020 to 2025 period.
6	Pollution incidents	We review each company's evidence to assess whether our methodology is followed consistently. We calculate forecast upper quartile values for each year of the 2020-25 period based on all companies' business plans and expect the proposed commitment levels to reflect the values we have calculated for each year of the 2020 to 2025 period.
7	Risk of severe restrictions in a drought	We review each company's evidence to assess whether our methodology is followed consistently, and whether the proposed service levels are reflective of its draft Water Resources Management Plan (dWRMP) and any feedback we have given.
8	Risk of sewer flooding in a storm	We review each company's evidence to assess whether our methodology is followed consistently. We benchmark all companies against each other using their achieved level for 2017-18, forecast performance for 2019-20 and proposed service level for 2024-25, to assist our review and consider what assumptions are made in relation to measurement and reporting of the metric.
9	Mains repairs	We review each company's evidence to assess whether our methodology is followed consistently. We calculate forecast upper quartile and median performance expressed as the number of mains repairs per 1000 km of mains in 2024-25 using all companies' business plans to assist our review. We also consider each company's historical performance. We expect there to be no deterioration for asset health as measured by the level of mains repairs.
10	Unplanned outage	We review each company's evidence to assess whether our methodology is followed consistently. We calculate forecast upper quartile performance expressed as the total unplanned outage as a proportion of total production capacity (%) in 2024-25 using all companies' business plans to assist our review. We benchmark the companies against each other and their own 2017-18 performance and 2019-20 forecast to assess the proposed level of stretch.

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11	Sewer collapses	We review each company's evidence to assess whether our methodology is followed consistently. We calculate forecast upper quartile and median performance expressed as sewer collapses per
	PC	Summary of assessment approach
		1000 km of sewers in 2024-25 using all companies' business plans to assist our review. We expect improvements in comparison with 2017/18 performance and 2019-20 forecast performance levels.
12	Treatment works compliance	We review each company's evidence to assess whether our methodology is followed consistently. We expect full compliance should be achieved.
13	External sewer flooding	We review each company's evidence to assess whether our methodology is followed consistently for the companies which propose this PC. We calculate forecast upper quartile performance expressed as the number of incidents per 10,000 connections in 2024-25 using companies' business plans to assist our review. We expect each company to meet forecast upper quartile levels or provide convincing evidence why this is not appropriate.

We set out in the PR19 final methodology that more stretching performance commitment levels do not cost customers more money in themselves. We have a separate test for cost efficiency, which challenges companies to have efficient levels of cost, and we do not allow companies a higher cost allowance just for a more stretching commitment level or to catch-up from poor historic performance levels. If a company incurs expenditure to improve its service performance customers will bear a share of that expenditure through Totex efficiency sharing. Therefore, in our initial assessment of stretching performance levels for PCs, we do not consider companies' Base Totex levels and whether or not they propose additional enhancement expenditure or submit cost adjustment claims to enable them to reach the committed performance levels.

We also set out in the PR19 final methodology that if companies consider that their customers should provide additional funding for their PCs they need to make their case separately for additional costs and provide robust evidence to support any special cost claim. Such enhancement expenditure and cost adjustment claims (including for scheme delivery) are assessed within the cost efficiency test in our Initial Assessment of Business Plans (IAP).

To have an additional allowance made in costs or reduced service levels the company needs to show sufficient and convincing evidence that company-specific factors justify it being treated differently to other companies. Also, that these factors are unlikely to be offset by other factors where the company may have advantages compared to other companies.

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Further detail on the companies' proposals and potential stretch targets for leakage, PCC and the three "forecast Upper Quartile" (UQ) PCs are presented in Annex 1 to this paper.

Outcome Delivery Incentive Rates

- **What we said in the Final Methodology**

In the final methodology we set out an approach to ODIs designed to better align the interests of company management and investors with those of customers, providing incentives for companies to fulfil their service commitments to customers and penalties for those that do not.

We set out an expectation that ODIs should be financial rather than reputational as a default. Financial ODIs should include an underperformance rate in order to protect customers against failure to meet the committed service delivery level. For ODI outperformance payments to be appropriate, the company must at least:

- be proposing a stretching performance commitment level so that outperformance payments are for strong outperformance and not for carrying out the "day job";
- demonstrate there are benefits from improved performance; and
- provide evidence of customer support for its proposed outperformance payment.

Our approach allows for a company to propose a reputational-only ODI, but only if the company provides convincing evidence that this is appropriate, including evidence from its customer engagement.

We also set out the following specific decisions with regards to the setting of ODI outperformance and underperformance payment rates:

- Companies can base their ODI rates on the existing formulas developed at PR14⁴², but amended such that companies can use alternative customer valuation methodologies.
- Companies can use other customer evidence to propose changes to the ODI outperformance and underperformance payment rates calculated according to the existing formulas, provided the changes are well justified.

⁴² <https://www.ofwat.gov.uk/wp-content/uploads/2017/12/Appendix-2-Outcomes-FM-final.pdf#page=92>

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- Companies should use forecast efficient marginal cost levels in their estimates of incremental cost in the underperformance payment formula.
- Companies should not propose top-down, calculated outperformance and underperformance payment rates derived from a pre-set Return on Regulated Equity (RoRE) range or amount of revenue. Companies should use a bottom-up approach, which is based on customer evidence.
- Companies should calibrate their financial ODIs with total expenditure (Totex) efficiency sharing and any other incentives that might apply to their performance. Companies can calibrate their ODI rates for overlap between PCs if they can provide evidence this is appropriate.
- Companies should provide information on the approach and evidence they have used to set ODI outperformance and underperformance payments, through the relevant business plan tables, the associated table commentaries and the sections of their business plans on ODIs. Any adjustments should be clearly explained, grounded in customer evidence and quantified transparently.

We set out that our approach to assessing ODIs would compare companies' marginal valuation amounts, marginal cost information, and outperformance and underperformance payment rates. We would seek to challenge companies on their proposed outperformance and underperformance payment rates, where appropriate. Our assessment of ODIs focuses upon the evidence and justification for a company's ODI rates provided by the company.

- **The Issues we found**

Within this framework, we have had particular regard to the setting of ODI outperformance and underperformance payment rates when assessing business plans.

In reviewing companies' proposed ODI rates for common and bespoke comparable PCs (e.g. external sewer flooding) we find substantial variation across companies both on an absolute and per household basis. In a number of cases we observe that companies' proposed ODI underperformance payments do not provide a sufficient incentive against service under-delivery, because they have a low ODI rate or absolute magnitude relative to the level of stretch proposed by the company.

The degree of variation observed in proposed ODI rates implies large differences in marginal costs and/or underlying customer preferences for incremental changes in the same unit of performance. Moreover, the extent of this variation is difficult to plausibly explain by factors such as company scale, comparative and historical performance or

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regional differences in household income or water stress. Although in some cases we observe that standard rates of large magnitude could be explained by scaling factors that companies have applied across their package of ODIs or alternative calculation methodologies that companies have developed, large variability remains even accounting for these differences in approach. This unexplained variation is a concern.

In our assessment of ODI rate methodologies, we find that companies have submitted evidence of variable quality on marginal costs and benefits, including evidence of varying customer valuations underlying these. They also adopt a range of approaches to calculate their standard ODI rates, particularly for bespoke PCs. In many cases, companies do not provide sufficient evidence to demonstrate the calculations that they have used to form their standard payment rates or, for example, to demonstrate their approach to the triangulation of customer valuations into a single marginal benefit estimate. Where companies deviate from the Ofwat formula, this is not always sufficiently evidenced. For example, we find that some companies employ top-down methodologies to allocate a pre-set amount of revenue to particular ODIs, or apply scaling factors across their ODI packages without sufficient justification.

Some companies propose PCs with outperformance payments for going beyond statutory obligations or delivering statutory schemes earlier than required. In these cases, our assessment has had regard to whether there is a clear line of sight to improved outcomes for customers or the environment, and the evidence of customer support for the outperformance payment.

- **Our Response**

Given the variation found across common and comparable PCs, we are asking companies in their business plan re-submissions to explain why their proposed ODI rates differ from a range around the industry average and to demonstrate that this variation is consistent with customers' underlying preferences and priorities for service improvements. In the case of some bespoke PCs we are asking companies to provide further evidence to support the type of ODI proposed (i.e., financial or reputational), and the proposed ODI rates.

We are also asking companies to provide the following information to allow us to better understand the causes of variation in ODI rates and assess the appropriateness of the customer valuation evidence supporting companies' ODIs: □ The performance increments/decrements tested with customers and the extent to which these are consistent with the plausible range of performance associated with the relevant PCs in the company's business plan.

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- The basis on which unit willingness to pay (WTP) values are calculated from the result of the company's customer valuation research (including whether these were calculated across performance increments and decrements or performance increments only).
- Whether any scaling is applied to valuations for individual service attributes (for example to account for package effects) and if so to provide information on the associated packages.

If companies cannot provide sufficiently compelling evidence for proposed ODIs, we may intervene in our determinations to set ODI types and rates. This may include removing outperformance payments, changing a financial PC to a reputational PC, introducing an ODI rate in instances where companies propose a non-financial incentive, or changing the levels of ODI rates. For common or comparable PCs, these interventions could include:

- Reductions to proposed outperformance payments that are above the upper bound of our view of a reasonable range of outperformance payment rates; and
- Increases (in absolute terms) of proposed underperformance payments that are smaller than the lower bound of our view of a reasonable range of underperformance payment rates.
- [Our approach to evaluating reasonable ODI rates for common and comparable PCs](#)

In undertaking our assessment of ODI rates for common and comparable PCs we have compared rates between companies on a per household (HH) basis to take account of aggregation effects⁴³.

For comparison purposes, ODI rates for Leakage have additionally been converted to units of £/HH/% distribution input because the PC is expressed in megalitres per day (Mld) (and 1 Mld is likely to be perceived as a greater increment in performance by

⁴³ For example, the internal sewer flooding PC is expressed as the number of incidents per 10,000 connections and the ODI rate accordingly in units of £m/incident per 10,000 connections. To make the ODI rate comparable between companies we have normalised by the number of HHs to obtain a rate expressed in £/HH/ incident per 10,000 connections.

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households or smaller companies compared to larger companies, being a bigger percentage of their total usage). For External sewer flooding (a bespoke but comparable PC), we convert the ODI rates into units of incidents per 10,000 connections. The PC units for all other common PCs are already expressed in comparable units (e.g. incidents per 10,000 km sewer, average minutes per property, etc.), such that no additional normalisation is necessary to compare proposed ODI rates.

The tables in Annex 2 set out the normalised comparisons of ODI rates between companies for selected PCs.

In the absence of compelling evidence to explain the observed variation in ODI rates, we assess possible reasonable ranges on a top-down, statistical basis.

For the purposes of our IAP, we used the following approach to develop a reasonable range for the following PCs; at ± 0.5 standard deviations from the mean: Leakage, Per capita consumption, Supply interruptions, CRI, Internal sewer flooding, Pollution incidents and External sewer flooding.

For common asset health PCs (Mains repairs, Unplanned outages, Treatment Works Compliance, Sewer collapses) we take a different approach to defining a possible reasonable range. In general, companies have not provided strong evidence to justify their approach to setting ODI rates for asset health PCs. We recognise the challenges involved in obtaining accurate customer valuations for asset health related PCs compared to service measures with more direct customer facing impacts. In particular, there is a risk that customer valuations are elicited in a way which does not capture the long-term impact on customers of companies failing to properly maintain their assets.

For the IAP, we therefore base our current view of reasonable underperformance payment rates for asset health PCs on the upper quartile of companies' proposed rates (measured in absolute terms and on a per HH basis) to ensure that companies have sufficient incentive to maintain their assets and deliver performance to customers over both the long and short term.

For outperformance payment rates, where we have fewer comparators on which to base our assessment, we assess our current view of an upper bound on reasonable rates at the median. We consider that this approach is likely to strike the best balance between providing companies with meaningful financial incentives to properly maintain their assets, and protecting customers in the absence of compelling evidence to explain variation in ODI rates.

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Enhanced ODIs

Enhanced ODIs encourage companies to innovate to improve performance to levels beyond what the current leading company achieves. In the long-term, all customers (not just those of the innovating company) should benefit from such frontier-shifting performance as other companies should be able to apply lessons learned from the innovating firm's performance, and we could use these new performance levels as benchmarks for future price controls.

- [What we said in the Final Methodology](#)

To incentivise this step change in performance, in the final methodology we allowed companies to propose higher outperformance payments for very high levels of performance. We said that companies could take account of wider benefits of this increased service level when proposing enhanced ODI rates. A corresponding enhanced underperformance payment is required to protect customers from excessive risk taking by companies.

Companies are not required to propose enhanced ODIs. Instead, companies are free to propose as many or as few as they want. We do not penalise companies for not proposing enhanced ODIs.

- [The Issues we found](#)

A total of 35 enhanced ODIs are proposed by ten companies. All of these relate to common PCs, as required in the methodology. Leakage is the most frequent PC to attract an enhanced ODI, with seven companies proposing enhanced ODIs relating to this PC. Other PCs for which more than one company proposes an enhanced ODI are: Per capita consumption, Sewer flooding and Mains repairs.

There is considerable variation in the approach companies take when proposing the appropriate level for enhanced outperformance payments. Some companies note that there is a tension between (a) providing the company with incentives that align with the benefits that customers throughout England and Wales might realise from frontier shifting performance, and (b) protecting their own customers from having to pay outperformance payments that exceed their own willingness to pay for the improvements.

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- [Our Response](#)

When assessing the proposed enhanced ODIs, we look for evidence that the company's own customers will be protected and will not be in a situation where the company is collecting outperformance payments from its own customers that exceed those customers' willingness to pay for the outcome. Consequently, we are asking for additional supporting evidence where a company has put forward a maximum enhanced ODI rate of greater than 2x the associated standard outperformance payment rate.

We also consider that caps on enhanced ODIs are appropriate to protect customers from higher than expected enhanced outperformance payments, except to the extent that there is a maximum practical performance level (a "natural cap") which will achieve this objective.

We expect all enhanced ODIs to contain performance thresholds in 2020-21 at which enhanced outperformance payments commence, that are at least as good as performance levels currently being achieved, or forecast, by the best performing company. For companies that are already leading performers, we expect the threshold to represent a step change on current performance levels. Our assessment of proposed enhanced performance thresholds considers whether companies have allowed for the likelihood that performance might be expected to improve over time anyway. When assessing how much more demanding the threshold should be in 2024-25, we have regard to the forecast improvement over the five years in the upper quartile and performance commitment levels proposed by other companies.

Asset Health

Asset health is a key area of network and service resilience. It focuses on the ability of assets to provide services now and into the future, which is what matters to customers.

- [What we said in the Final Methodology](#)

We state in the final methodology that companies should clearly present, in their business plans, their approach to asset health and which of their PCs and ODIs relate to it. We expect companies to include four common asset health PCs as part of their asset health commitments, as well as additional PCs reflecting their own asset health challenges.

We assess the asset health PCs proposed by each company as a package - this includes the four common PCs, PCs selected from the asset health long-list and additional bespoke PCs proposed by the company. We assess the asset health PC

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packages for customer acceptability and extent of coverage, including alignment to past performance issues. To understand past performance, we identify issues from the current and previous periods to highlight areas which may still need monitoring and may not have been selected as PCs. We also compare companies' asset health PC packages to help identify any gaps or shortcomings.

We assess the ODI elements of the proposed asset health PCs together as a package. The asset health ODI package should protect customers both now and in the long-term; this should be achieved through appropriately sized incentives. We test if the company has expressed this in its own business plan by presenting its asset health package in terms of RoRE exposure, and the appropriateness of the range. We also compare companies' overall ODI packages to identify outliers and make appropriate adjustments. The incentives should also be in the right areas, for example where there are past performance issues, and areas that are strongly supported by customers. To understand this, we assess the extent and quality of customer engagement on asset health issues and the level of challenge from the Customer Challenge Groups (CCGs).

We also check that companies can demonstrate that customers support any outperformance payments, that there is no double-counting of ODIs between the direct service measures, and that companies can demonstrate that the balance between short-term service gains is not at the expense of long-term asset health.

- **The Issues we found**

The best companies set appropriate ODIs (and in particular, sufficient underperformance payments), demonstrate that they understand their past performance challenges, engage with customers effectively on asset health issues and respond well to CCG challenges. However, there is significant variation across all companies in the quality of the evidence in their business plans.

All companies propose the four common asset health PCs and most companies propose more than two PCs from the asset health long-list. The majority of companies propose some additional bespoke PCs, although few companies explain their overall approach to asset health explicitly. In general, the PCs selected as part of the asset health packages align to past performance issues, with very few exceptions, hence most companies adequately demonstrate that they understand past performance challenges, and that they will manage continuing issues through appropriate PCs.

The quality of customer engagement on asset health is mixed. The companies that did engage effectively find that customers strongly support the concept of maintaining healthy assets. However, most companies struggle to determine meaningful WTP values on specific asset health PCs, which in some cases results in low ODI rates. Very few companies carried out additional triangulation to increase the robustness of WTP values

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on asset health. Despite customers supporting asset health improvements in general, companies typically fail to gain strong support for outperformance payments above committed service levels.

Only around half the companies propose asset health ODI packages which we consider to offer sufficient customer protection against underperformance so that the company has appropriate incentives to maintain asset health and recompense customers if it does not efficiently invest sufficient maintenance expenditure – this is partly because of the generally low ODI rates proposed on asset health PCs.

Historically, there have been only underperformance payments on asset health type PCs, which does not provide a strong incentive for companies to improve performance beyond the level of the PC.

Some companies' asset health PCs are directly linked to a service impact, e.g. mains repairs are linked to supply interruptions, low pressure and leakage; sewer collapses and blockages are linked to sewer flooding and pollution incidents. Others, such as unplanned outages, have less of a direct service impact as the impact will depend on the overall network resilience. If the service elements of the 'system' have outperformance incentives, and the asset failure elements don't, this can lead to short-termism (i.e. improve short-term operational performance at the expense of longer-term asset health, for example companies could repair pipes rather than replace them).

- **Our Response**

We will ensure that companies are adequately incentivised to address concerns about historical under-investment and potential poor performance in the future (as a result) for asset health by:

- Making sure companies have suitable PCs in place - these include the four common PCs. In addition, we consider what additional commitments may be required to address the issues of each company and their historical performance.
- Setting appropriate and stretching asset health PC levels - we take account of the company's past performance, including issues identified in the 2010-15 period⁴⁴, and performance during 2015-18, to ensure there are appropriate levels. In particular, for companies with historical under-performance issues, we expect companies to calibrate PC levels so that these reflect levels we would expect if companies had well-maintained assets.

⁴⁴ <https://www.ofwat.gov.uk/publication/updated-2010-15-reconciliation/>

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- Setting appropriate underperformance payments – we may intervene in our determinations to make sure that companies are setting appropriate levels of underperformance payments to protect customers against past under-investment and provide appropriate incentives to maintain asset health.

In order to justify outperformance payments on asset health PCs, companies need to:

- Demonstrate that customers support the inclusion of such payments (including understanding the impacts of asset health performance on customers). Companies should clearly demonstrate customer support for payments for each individual PC rather than general support for asset health outperformance payments.
- Demonstrate a commitment to stable asset health at levels that are not low due to either historical underperformance or previous asset health issues. We may intervene to ensure companies are not rewarded for previous underperformance or neglect of their assets. There will be a high bar to allowing outperformance payments for companies with known asset health issues at PR14 (2010-2015) or where issues have emerged in 2015-2018.
- Demonstrate that there is no double-counting between the asset health and associated service measures. Companies have flexibility to propose outperformance payments that provide the appropriate balance of incentives across the 'system'. They are required to demonstrate that the balance between short-term service gains is not at the expense of long-term asset health.

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Customer protection against unexpectedly high outperformance payments

- [What we said in the Final Methodology](#)

We said in the final methodology that we expect companies to propose approaches to protecting customers in case their ODI payments turn out to be much higher than expected. These could involve companies demonstrating their understanding of the drivers of potential returns and the probability of extreme outcomes, and proposing protections for customers from these extreme outcomes (for example caps and collars, or sharing the returns from outperformance with customers).

- [The Issues we found](#)

For the majority of companies, we identify areas where insufficient protections from higher than expected outperformance payments are offered to customers, or where protections such as reinvestment schemes are proposed but insufficiently evidenced. In many cases, we do not have confidence that what the company proposed will sufficiently protect customers.

Some companies provide insufficient information or consideration of approaches to protect customers such as bill reductions, reinvestment of returns or their overall approach to caps and collars.

In some cases, companies propose consultations with their CCG, customers, or other stakeholders, should certain RoRE levels be achieved or exceeded, however do not provide evidence as to how these would work in practice to protect customers or whether the outputs of such consultation exercises would be binding. There is insufficient evidence as to how some companies will reinvest excess payments in line with customers' priorities. In addition, it is difficult to be sure that the level of funds "reinvested" in an area will be above what would otherwise have been delivered by the company as "business as usual".

Some companies do not appear to consider customer protections on particular ODIs that have large incentives and which are potentially a significant proportion of the company's possible returns.

Some companies propose ODI RoRE packages which are much smaller than our indicative range of +/-1% to 3%. However, we still expect to see from the company an approach to protecting customers in case payments turn out to be much larger than expected.

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- **Our Response**

We are therefore asking all companies to commit to put in place additional protections for customers, where we consider protections are not adequate to protect customers from high outperformance payments. These include:

- sharing with customers through bill reductions 50% of their incremental outperformance payments once the outperformance payments in any year reach 3% of their wastewater or water RoRE for that year. This is the RoRE assumed in our PR19 price determinations for wastewater (wastewater “network plus” activities and bioresources) or water (water “network plus” activities and water resources). The mechanism will exclude any PCs at the retail price control level, including C-MeX and D-MeX; and
- putting caps and collars on potentially financially significant PCs (common and bespoke). We are expecting companies to put caps and collars at their P10/P90⁴⁵ performance levels on an annual performance basis, where:
 - P90 value is forecast to be at least 10% of the total P90s for either wastewater (wastewater “network plus” activities and bioresources) or water (water “network plus” activities and water resources); or
 - there is considerable uncertainty, e.g. where current industry data is likely to be unreliable or sparse.

The company should demonstrate that it has considered the following factors in particular:

- The magnitude of the P90 outperformance payments associated with each ODI, and its size relative to P90 payment estimates of other ODIs proposed by the company. We consider that outperformance caps are particularly important for ODIs with large P90 outperformance payments.
- The potential for outperformance beyond the P90 performance level. There may be certain cases where there are natural limits to outperformance, which limit the maximum possible outperformance payments that can be achieved. There is less of a need for the company to apply outperformance caps in these cases.

⁴⁵ P90 and P10 are points on a risk distribution. The P90 point means there is only a 10% chance that the outturn RoRE will be above the threshold provided.

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- The level of certainty associated with the company's forecast future performance for each ODI. If there is considerable uncertainty about the trajectory of future performance relative to current performance levels, then the company should consider setting an outperformance cap to protect customers from very large outperformance payments that exceed P90 estimates. We consider that factors affecting uncertainty include the availability of historical data for an ODI, as well as the existence of a robust baseline performance estimate for the start of the 2020-25 period.
- The uniqueness of each of the company's ODIs, and the extent to which other companies have proposed similar ODIs. The company should examine the PCs proposed by other companies, and assess whether there are any benchmarks against which to evaluate its projections of future performance. In cases where ODIs are unique to the company, we would expect the company to consider applying outperformance caps or otherwise justify why it has not done so.

Annex 1

- Further detail on the companies' proposed performance commitment levels for common PCs

We present data provided by the companies for a number of common PCs in this annex.

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1. Leakage – proposed service levels (which are 3 year averages) in relation to leakage per property per day and leakage per kilometre of main per day in 2024-

25 are presented together with upper quartile values.

Company	Leakage	
	m3/km/d	l/prop/d
Affinity Water	8.42	91.91
Anglian Water	4.13	68.70
Bristol Water	5.42	65.83
Hafren Dyfrdwy	4.28	104.94
Northumbrian Water	6.55	81.90
Portsmouth Water	8.96	94.34
SES Water	5.95	68.50
South East Water	5.14	73.31
Southern Water	6.32	75.02
South Staffs Water	7.59	86.06
Severn Trent Water	7.01	88.13
South West Water	5.58	97.48
Thames Water	17.35	133.25
United Utilities Water	9.56	117.79
Dŵr Cymru	5.29	99.29
Wessex Water	5.61	104.18
Yorkshire Water	5.64	75.25
Upper quartile	5.42	75.02

2. Per capita consumption (PCC) - proposed service levels in litres per person per day for 2024-25 are presented below.

Company	PCC (l/person/d)
---------	------------------

Technical appendix 1: Delivering outcomes for customers

Affinity Water	133.00
Anglian Water	130.70
Bristol Water	136.40
Hafren Dyfrdwy	151.00
Northumbrian Water	136.00
Portsmouth Water	135.72
SES Water	136.20
South East Water	140.30
Southern Water	120.00
South Staffs Water	128.33
Severn Trent Water	128.61
South West Water	128.70
Thames Water	136.00
United Utilities Water	137.10
Dŵr Cymru	139.00
Wessex Water	127.90
Yorkshire Water	120.20
Minimum	120.00
Maximum	151.00
Upper quartile	128.61

3. Water supply interruptions – proposed service levels in terms of the average number of minutes lost per customer for the whole customer base for interruptions that lasted 3 hours or more are presented below.

Company	Water supply interruptions duration (hh:mm:ss)				
	2020-21	2021-22	2022-23	2023-24	2024-25
Affinity Water	00:05:00	00:04:30	00:04:00	00:03:30	00:03:00
Anglian Water	00:07:27	00:06:55	00:06:26	00:05:59	00:05:34
Bristol Water	00:04:12	00:03:36	00:03:00	00:02:24	00:01:48

Technical appendix 1: Delivering outcomes for customers

Hafren Dyfrdwy	00:15:00	00:13:00	00:13:00	00:13:00	00:13:00
Company	Water supply interruptions duration (hh:mm:ss)				
	2020-21	2021-22	2022-23	2023-24	2024-25
Northumbrian Water	00:04:20	00:04:20	00:04:20	00:04:20	00:04:20
Portsmouth Water	00:03:00	00:03:00	00:03:00	00:03:00	00:03:00
SES Water	00:02:40	00:02:31	00:02:23	00:02:14	00:02:06
South East Water	00:06:29	00:05:45	00:05:05	00:04:30	00:03:58
Southern Water	00:06:11	00:06:01	00:05:51	00:05:40	00:05:30
South Staffs Water	00:05:30	00:05:20	00:05:10	00:05:00	00:04:50
Severn Trent Water	00:08:49	00:08:47	00:08:45	00:08:43	00:08:41
South West Water	00:07:14	00:06:15	00:05:55	00:04:59	00:04:41
Thames Water	00:10:28	00:10:21	00:10:14	00:10:06	00:09:59
United Utilities Water	00:06:00	00:06:00	00:06:00	00:06:00	00:06:00
Dŵr Cymru	00:11:12	00:10:24	00:09:36	00:08:48	00:08:00
Wessex Water	00:04:17	00:03:58	00:03:40	00:03:22	00:03:07
Yorkshire Water	00:03:36	00:03:12	00:02:48	00:02:24	00:02:00
Upper quartile	00:04:17	00:03:58	00:03:40	00:03:22	00:03:00

4. Pollution incidents – proposed service levels expressed in the number of incidents per 10,000 km of sewer are presented below.

Company	Pollution incidents (Number of incidents per 10,000 km of sewer)				
	2020-21	2021-22	2022-23	2023-24	2024-25
Anglian Water	25	24	23	22	21
Hafren Dyfrdwy	138	137	117	117	116
Northumbrian Water	24.01	22.35	20.35	18.01	14.34
Southern Water	27.8	26.4	24.5	22.8	20
Severn Trent Water	26.43	25.45	24.47	23.48	22.49
South West Water	34	30	27	23	19

Technical appendix 1: Delivering outcomes for customers

Thames Water	27	26	25	24	23
United Utilities Water	23.73	23.472	23.214	22.956	22.698
Dŵr Cymru	28	27	26	25	24
Wessex Water	21	20	19	18	17
Yorkshire Water	25	24	23	23	22
Upper quartile	24.51	23.74	23.00	22.40	19.50

5. Internal sewer flooding – proposed service levels expressed in the number of incidents per 10,000 connections are presented below.

Company	Internal sewer flooding (Number of incidents per 10,000 connections)				
	2020-21	2021-22	2022-23	2023-24	2024-25
Anglian Water	1.64	1.55	1.46	1.38	1.31
Dŵr Cymru	2	2	2	2	2
Hafren Dyfrdwy	1.69	1.65	1.61	1.25	1.22
Northumbrian Water	1.97	1.92	1.87	1.82	1.77
Severn Trent Water	1.66	1.62	1.58	1.54	1.51
South West Water	1.78	1.69	1.65	1.53	1.37
Southern Water	1.83	1.78	1.73	1.69	1.65
Thames Water	1.89	1.87	1.8	1.73r	1.66
United Utilities Water	2.203	2.185	2.173	2.159	2.138
Wessex Water	1.54	1.47	1.41	1.34	1.24
Yorkshire Water	1.72	1.64	1.57	1.5	1.43
Upper quartile	1.68	1.63	1.58	1.44	1.34

Annex 2

- Company ODI rates for common and comparable PCs

We present the ODI rates proposed by companies for all common PCs and the comparable external sewer flooding PC below. All rates are expressed on a per

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household basis. Blank cells denote where a company has not proposed a financial incentive (or outperformance incentive) for the relevant PC.

1. Leakage – the out and underperformance ODI rates proposed by each company (expressed as a percentage of distribution input) are shown below, along with the mean, standard deviation and our current assessment of a reasonable range (defined as ± 0.5 standard deviations from the mean).

Company	Underperformance rate (£/HH/% Distribution Input)	Outperformance rate (£/HH/% Distribution Input)
AFW*	-2.938	2.173
ANH	-1.898	1.140
BRL	-0.878	0.836
HDD	-0.016	0.016
NES*	-0.945	0.642
PRT	-0.076	0.137
SES	-4.200	4.043
SEW	-3.887	2.160
SRN	-0.941	0.844
SSC*		
SVE	-1.705	1.705
SWB	-3.509	4.144
TMS	-2.431	1.989
UUW	-0.733	0.733
WSH*	-5.922	7.402
WSX	-1.838	1.226
YKY	-0.474	1.117
Mean	-1.681	1.481
Standard Deviation	1.376	1.264
Lower bound of range	-0.993	0.849

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Company	Underperformance rate (£/HH/% Distribution Input)	Outperformance rate (£/HH/% Distribution Input)
Upper bound of range	-2.369	2.113

* Rates for AFW, NES, SSC and WSH excluded from calculation of mean and standard deviations due to issues of comparability.

2. Per capita consumption (PCC) – the out and underperformance ODI rates proposed by each company (expressed in litres per person per day) are shown below, along with the mean, standard deviation and our current assessment of a reasonable range (defined as ± 0.5 standard deviations from the mean).

Company	Underperformance rate (£/HH/l/person/d)	Outperformance rate (£/HH/l/person/d)
AFW*	-0.363	0.270
ANH	-0.084	0.084
BRL	-0.046	0.027
HDD		
NES	-0.056	0.056
PRT	-0.005	0.005
SES	-0.545	0.548
SEW	-0.152	0.152
SRN	-0.182	0.165
SSC*	-0.129	0.090
SVE		
SWB	-0.283	0.259
TMS	-0.544	0.539
UUW	-0.064	0.064
WSH*		
WSX	-0.222	0.155
YKY*	-0.006	0.004
Mean	-0.198	0.187

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Standard Deviation	0.190	0.191
Lower bound of range	-0.103	0.091
Upper bound of range	-0.294	0.282

*Rates for AFW, SSC, WSH and YKY excluded from calculation of mean and standard deviations due to issues of comparability.

3. Water quality compliance (CRI) - the out and underperformance ODI rates proposed by each company (expressed as an index point of compliance) are shown below, along with the mean, standard deviation and our current assessment of a reasonable range (defined as ± 0.5 standard deviations from the mean).

Company	Underperformance rate (£/HH/index point)	Outperformance rate (£/HH/index point)
AFW	-0.338	
ANH		
BRL	-0.167	
HDD		
NES	-0.727	
PRT	-0.159	
SES	-1.355	
SEW	-0.778	
SRN	-0.640	
SSC*	-0.115	
SVE		
SWB	-0.288	
TMS		
UUW	-0.098	
WSH	-0.318	
WSX	-1.023	
YKY	-1.092	
Mean	-0.582	
Standard Deviation	0.417	

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Lower bound of range	-0.373	
Upper bound of range	-0.791	

*Rates for SSC excluded from calculation of mean and standard deviations due to issues of comparability.

4. Supply interruptions - the out and underperformance ODI rates proposed by each company (expressed in minutes per property) are shown below, along with the mean, standard deviation and our current assessment of a reasonable range (defined as ± 0.5 standard deviations from the mean).

Company	Underperformance rate (£/HH/minute per property)	Outperformance rate (£/HH/minute per property)
AFW*	-0.229	0.209
ANH	-1.246	0.724
BRL	-0.199	0.197
HDD	-0.068	0.068
NES	-1.614	0.821
PRT	-0.038	0.048
SES	-0.923	0.857
SEW	-0.110	0.110
SRN*	-0.063	0.063
SSC*	-0.188	0.376
SVE	-0.321	0.321
SWB	-0.467	0.093
TMS	-0.961	0.894
UUW	-0.071	0.071
WSH*	-0.434	0.970
WSX	-0.066	0.118

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YKY*	-2.096	2.096
Mean	-0.507	0.360
Standard Deviation	0.542	0.352
Lower bound of range	-0.236	0.184
Upper bound of range	-0.778	0.536

*Rates for AFW, SRN, SSC, WSH and YKY excluded from calculation of mean and standard deviations due to issues of comparability.

5. Mains repairs - the out and underperformance ODI rates proposed by each company (expressed in repairs per 1000km of mains) are shown below, along with our current assessment of a lower bound underperformance rate (defined as **upper quartile**) and an upper bound outperformance rate (defined as **median**).

Company	Underperformance rate (£/HH/repair per 1000km of mains)	Outperformance rate (£/HH/repair per 1000km of mains)
AFW	-0.063	
ANH		
BRL	-0.037	
HDD	-0.069	0.069
NES	-0.097	0.051
PRT	-0.008	0.008
SES	-0.094	0.055
SEW	-0.093	
SRN	-0.073	0.051
SSC	-0.041	0.081
SVE	-0.167	0.167
SWB	-0.031	0.006
TMS	-0.037	0.055

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UUW	-0.003	0.003
WSH	-0.033	
WSX	-0.131	
YKY	-0.274	0.274
Median	-0.066	0.055
Upper Quartile	-0.095	0.075

6. Unplanned outage - the out and underperformance ODI rates submitted by each company (expressed in % of maximum production capacity) are shown below along with our current assessment of a lower bound underperformance rate (defined as **upper quartile**).

Company	Underperformance rate (£/HH/% of maximum production capacity)
AFW	-1.217
ANH	-0.299
Company	Underperformance rate (£/HH/% of maximum production capacity)
BRL	-0.734
HDD	
NES	
PRT	
SES	
SEW	
SRN	-0.494
SSC	-0.388
SVE	
SWB	-1.601
TMS	-0.233
UUW	-0.897
WSH	

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WSX	-0.002
YKY	
Upper Quartile	-0.897

7. Pollution incidents - the out and underperformance ODI rates proposed by each company (expressed in incidents per 10,000km of sewers) are shown below, along with the mean, standard deviation and our current assessment of a reasonable range (defined as ± 0.5 standard deviations from the mean).

Company	Underperformance rate (£/HH/incident per 10,000km of sewer)	Outperformance rate (£/HH/incident per 10,000km of sewer)
ANH	-0.149	0.108
HDD	-0.001	0.001
NES	-0.443	0.270
SRN	-0.176	0.167
SVE	-0.155	0.155
SWB	-0.126	
TMS	-0.198	0.157
UUW	-0.449	0.449
WSH*	-0.354	0.428
Company	Underperformance rate (£/HH/incident per 10,000km of sewer)	Outperformance rate (£/HH/incident per 10,000km of sewer)
WSX	-0.238	0.214
YKY	-0.404	0.203
Mean	-0.234	0.192
Standard Deviation	0.150	0.122
Lower bound of range	-0.159	0.131
Upper bound of range	-0.309	0.253

*Rates for WSH excluded from calculations due to issues of comparability.

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8. Internal sewer flooding - the out and underperformance ODI rates proposed by each company (expressed in incidents per 10,000 connections) are shown below, along with the mean, standard deviation and our current assessment of a reasonable range (defined as ± 0.5 standard deviations from the mean).

Company	Underperformance rate (£/HH/incident per 10,000 connections)	Outperformance rate (£/HH/incident per 10,000 connections)
ANH	-7.766	4.042
HDD	-0.789	0.789
NES	-1.444	1.444
SRN	-2.840	2.603
SVE*	-5.874	5.874
SWB	-13.154	8.623
TMS*	-0.007	0.005
UUW	-0.729	0.729
WSH*	-75.916	78.676
WSX	-10.110	5.836
YKY	-3.925	3.925
Mean	-5.095	3.499
Standard Deviation	4.700	2.732
Lower bound of range	-2.745	2.133
Upper bound of range	-7.445	4.865

* Rates for TMS, SVE and WSH excluded from calculation of mean and standard deviations due to issues of comparability.

9. External sewer flooding - the out and underperformance ODI rates proposed by each company (expressed per incident) are shown below, along with the mean, standard deviation and our current assessment of a reasonable range (defined as ± 0.5 standard deviations from the mean).

Company	Underperformance rate (£/HH/incident)	Outperformance rate (£/HH/incident)
ANH	-0.431	0.431

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HDD		
NES	-0.340	0.200
SRN	-0.798	0.397
SVE*	-2.422	2.422
SWB	-1.003	0.617
TMS		
UUW*	-0.066	0.066
WSH*	-0.220	0.216
WSX	-0.649	0.395
YKY	-2.075	2.075
Mean	-0.883	0.686
Standard Deviation	0.632	0.693
Lower bound of range	-0.567	0.339
Upper bound of range	-1.199	1.032

* Rates for SVE, UUW and WSH excluded from calculation of mean and standard deviations due to issues of comparability.

10. Sewer collapses - the out and underperformance ODI rates proposed by each company (expressed in incidents per 1000km of sewer) are shown below along with our current assessment of a lower bound underperformance rate (defined as **upper quartile**) and an upper bound outperformance rate (defined as **median**).

Company	Underperformance rate (£/HH/incident per 1000km of sewer)	Outperformance rate (£/HH/incident per 1000km of sewer)
ANH	-0.845	
HDD	-0.289	0.289
NES	-0.020	0.020
Company	Underperformance rate (£/HH/incident per 1000km of sewer)	Outperformance rate (£/HH/incident per 1000km of sewer)
SRN	-1.521	

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SVE	-0.255	0.255
SWB	-0.080	0.055
TMS	-0.085	0.090
UUW	-0.102	0.102
WSH	-0.103	
WSX	-0.156	
YKY	-0.049	0.049
Median	-0.103	0.090
Upper Quartile	-0.272	0.052

11. Treatment works compliance - the out and underperformance ODI rates submitted by each company (expressed in % compliance) are shown below, along with our current assessment of a lower bound underperformance rate (defined as **upper quartile**)

Company	Underperformance rate (£/HH/%)
ANH	-0.496
HDD	-0.093
NES	-1.112
SRN	-8.473
SVE	-0.409
SWB	-0.259
TMS	-0.346
UUW	-0.232
WSH	-0.515
WSX	-0.452
YKY	-0.196
Upper Quartile	-0.505

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Appendix OC.A11.1

Action ref [AFW.OC.A11; A19](#)

Atkins Assurance Report rdWRMP

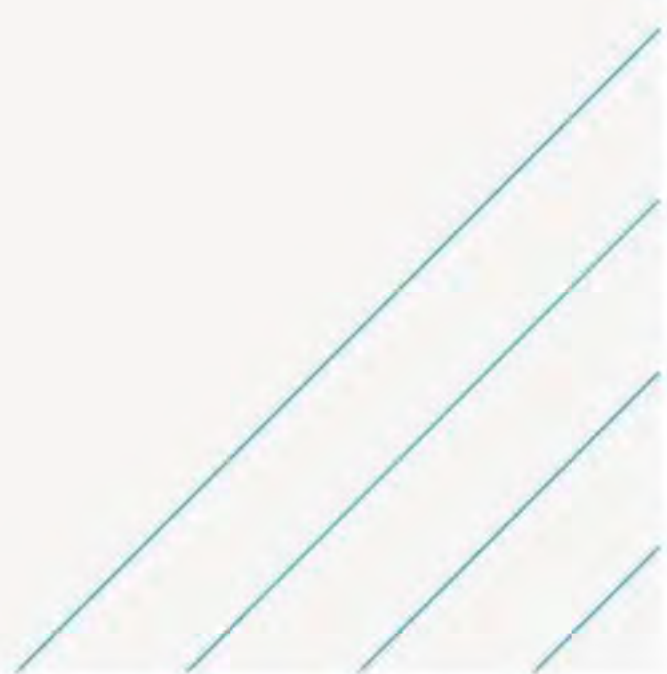


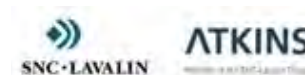
Technical Assurance of revised draft WRMP19

Assurance Report

Affinity Water

21 February 2019





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This document has 43 pages including the cover.

- **Document history**

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Rev 2.0	Final draft for Atkins review	EE, MB, BSP	JJ	BPA	JPA	18/02/2019
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Rev 3.1	Final report	EE, MB, BSP	JJ	BPA	JPA	21/02/2019

- **Client signoff**

Client	Affinity Water
Project	Technical Assurance of revised draft WRMP19
Job number	5160860
Client signature / date	Email approval from Julie Smith 20 th February 2019

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Assurance Statement

Based upon our review of Affinity Water's Revised Draft Water Resources Management Plan 2019 (rdWRMP19), the supporting Technical Reports and other data/model outputs/information we saw over a programme of reviews and audits from December 2018 to February 2019 (See Appendix A.), we conclude that for the reporting of areas we covered, except where indicated otherwise in our report:

- at a component level the various Affinity Water technical teams compiling the documents and information had an appropriate understanding of and were following industry best practice guided by Affinity Water's Project Director;
- the Company has applied processes and systems of control to meet its reporting obligations unless otherwise indicated in our report;
- the Company's Technical Reports and the rdWRMP19 document show that it is following current regulatory guidance, and in its use of its approach to the decision-making methodologies now allowed for in the current EA Water Resource Planning Guideline, it is one of the companies leading industry best practice;
- because of the specific external circumstances which pose unique challenges to the Company, Affinity Water has had to move beyond conventional least-cost planning for the rdWRMP19. 'Extended' approaches to decision-making for water resource planning are now allowed for in the current EA Water Resource Planning Guideline and have been used by the Company for its rdWRMP19;
- the justification for the 'Extended' approach followed in the development of the rdWRMP19 is well set out and follows regulatory guidance, however the approach has not been used for previous Water Resource Management Plans;
- the balance of technical material in Sections of the main rdWRMP19 document could be improved, as could the clarity of some of the Technical Reports. There would benefit in further editorial review and revisions before the documentation is re-issued for consultation;
- the Company has undertaken additional work in the light of consultation responses to dWRMP19 and in particular to address the challenges posed by the 12 Recommendations made by the EA in its representation on dWRMP19. It is understood that the Company is producing an Addendum to its Statement of Response. This should provide additional signposting to cross-reference the specific EA Recommendations with the evidence now presented in the relevant sections of the main rdWRMP19 document and in the supporting Technical Reports.

Our overall impression from our review was that the process of preparing Affinity Water's rdWRMP19 and the supporting information has been based upon the application of the appropriate methodologies and regulatory guidance. We consider that the approach followed not only complies with standard water industry practice, but also it uses new methodologies allowed for in regulatory guidance that are particularly appropriate to the challenges faced by Affinity Water and hence for the level of investment that is proposed within the rdWRMP19.

Our assessment is based upon the Company implementing its processes and completing revisions to its rdWRMP19 and the supporting Technical Reports to address issues raised during this Technical Assurance thus implementing the proposed actions as explained to us at the time of the reviews.

During the assurance activities, we have had free access to the people responsible for preparing and reporting rdWRMP19 technical components and the supporting information.

Ben Piper

Technical Assurance Lead
21st February 2019

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Executive Summary

Introduction

This report summarises the independent Technical Assurance (Reporter) services Atkins has provided in relation to aspects of Affinity Water's revised draft Water Resource Management Plan 2019 (rdWRMP19). This is our 8th year of providing assurance services to Affinity Water and the second time that we have provided assurance for the WRMP, following a review of the technical components of the draft WRMP19 in August to October 2017.

We understand that Affinity Water's Board has placed particular emphasis on Technical Assurance of the rdWRMP19, given the context of the need for new water supplies which have impacts on other water companies in South East England. There has already been considerable reaction to Thames Water's revised draft Water Resource Management Plan 2019, which was issued for consultation at the beginning of October 2018. In particular, some of the responses and media coverage to date have challenged the need for the South East Strategic Reservoir (SESR), which is in part required to supply Affinity Water.

The purpose of this Technical Assurance is to report to the Board with an assessment of whether the rdWRMP19 has been developed in accordance with regulatory guidance⁴⁶ and that it satisfies the following key objectives:

1. Reliability and transparency of the processes used;
2. Technical suitability; and
3. Robustness of the decision making.

Throughout, we have received the cooperation of the Company and have had the freedom to express our opinions.

Approach

Methodology and Data Reviews have been undertaken with Affinity Water technical staff and where relevant, with Affinity Water's consultants. The scope of each face-to-face review was determined after considering the rdWRMP19 consultation responses and following an initial review of the supporting Technical Reports.

We carried out a series of structured reviews, which we tailored to the different technical areas covered. Our methodology and data reviews were combined due to the nature of the technical submission. The WRMP is a highly technical document and our approach to reviewing and auditing reflected that. Our focus on particular areas was risk-based and derived through our own experience of developing WRMP guidance and submissions, plus our understanding of data management, quality assurance (QA) and associated risks and sensitivities gained as part of our general audit activities. As instructed by Affinity Water, specific attention was paid to aspects of the technical work that might be open to challenge by Regulators and third parties. In general, these areas were where methodologies such as adaptive pathways and risk-based planning (that have been used for other types of environmental planning) that have now been brought into the current Environment Agency Water Resource Planning Guideline (WRPG) on which the rdWRMP19 has been based.

⁴⁶ EA WRPG have been produced in collaboration with Defra, the Welsh Government, and Ofwat.

Ofwat issued supplementary guidance on whether non-household customers in England and Wales are eligible to switch their retailer NHH

Ofwat and Water UK set out leakage reporting requirements in March 2018



Summary of Findings

Based upon our audits of aspects of Affinity Water's rdWRMP19 we conclude that, for the reporting of areas we covered, and except where noted specifically below, the Company has undertaken the technical work and collated the outputs from that work into its rdWRMP19 submission in accordance with the EA Water Resource Planning Guideline (WRPG) and the associated methodologies developed in the UK Water Industry Research (UKWIR) WRMP19 Methods programme and referred to in the EA guideline. On the basis of the documents, interviews, email exchanges and other information provided during the course of our work, we also consider that the technical approaches that have been followed comply with standard water industry practice to a level that is appropriate to the challenges faced by the company. As with the draft WRMP19, at this stage we cannot reasonably comment on the likelihood that rdWRMP19 will ultimately be acceptable to the Secretary of State. However, based on the documentation that has been made available during this Technical Assurance, and provided that the data issues we have raised during audit of the WRP Tables have been addressed prior to the release of the rdWRMP19 and supporting WRP Tables for reconsultation, we do not consider the plan is at risk of being fundamentally flawed because it did not follow regulatory guidance. Nevertheless, we consider that the clarity of some of the documentation could be clearer; this, combined with specific sign-posting and cross-references to material that provides evidence of how the EA Recommendations have been met would aid interpretation by regulators and demonstrate that representations on dWRMP19 have been addressed in the revised draft.

Each technical component reviewed has been allocated an overall rating of Red, Amber or Green (RAG) to reflect our assessment of risk, with separate ratings for the methodology, data and the clarity of reporting. An issues log has been maintained – see Appendix B. We have received responses to most of the issues raised, however we note that some are not considered by the Company to be material and so it has advised that they will not be addressed until the final WRMP19 is produced following re-consultation.

Descriptions for each RAG category used in this report are given in Table 1.

Table 2 provides a summary of our audit findings under the following column headings:

- Technical component (these are each of the headings of Section 3.3 to 3.12 of this report);
- Compliance with EA WRPG;
- Data;
- Clarity of reporting; and
- Assurance summary/Implications and Regulatory Risk.

The use of innovative and less-conventional approaches for water resource planning is allowed for in EA WRPG. Such approaches are well suited to the challenging and uncertain environmental and other planning circumstances that Affinity Water has to address throughout the 25-year WRMP planning period and beyond. Through the Technical Reports, Affinity Water has explained and justified its use of such methodologies to develop the building blocks for the decision-making analysis, although as noted above some of the reports should be reviewed and edited to provide greater clarity. In particular, there need to be better cross-references between the rdWRMP19 itself, the supporting Technical Reports and the Statement of Response (SoR). The QA sign-off sheets on each report need to be completed prior to release of the final versions into the public domain.

During the Technical Assurance, Affinity Water asked Atkins to consider the adequacy of the material presented in the rdWRMP19 and Technical Reports to address the 12 Recommendations made by the Environment Agency in its representation on the dWRMP19. Recommendation 12 concerns adherence to the WRMP Direction.

Our reading of the rdWRMP19 and the supporting Technical Reports suggests that the headline recommendations given in the EA representation appear to have been acted on in the rdWRMP19 and the supporting Technical Reports. However, we also note that the EA Evidence Report to its



representation provides more details of the issues from which its Headline Recommendations have been made.

We now understand that Affinity is in the process of preparing an Addendum to its SoR to report on the status of its actions to address the issues raised by those who provided consultation responses to dWRMP19. During the course of our work we advised Affinity Water that explicit sign-posting should be given in the rdWRMP to the relevant sections of the main report and to the relevant Technical Reports that give evidence of how the Headline Recommendations have been addressed.

We advise that the Addendum should include such sign-posting to each of the issues identified in the EA Evidence Report from which the headline Recommendation has been made. Without such signposting it is difficult to demonstrate to the regulators and to confirm from an assurance perspective that every issue has been adequately addressed. We are not able to comment on legal compliance with EA Headline Recommendation 12.

Table 1 Descriptions for RAG categories

Category	Description
RED	High Risk - One or more of: Failure to comply with statutory or other requirements; Major failure of process; and/or Material data errors.
AMBER	Medium Risk - One or more of: Shortfalls in methodology and/or documentation; Methodology ill-defined or unclear; Incomplete data set, minor errors identified that should be resolved before submission and/or errors that cannot be resolved but are not considered to be material.
GREEN	Low Risk - One or more of: Minor revisions to documentation needed; Issue(s) that have been identified are not judged to be material; or No issues identified.

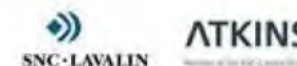


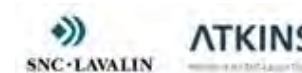
Table 2 Technical components assured – overall assessment

Technical component	Compliance with EA WRPG	Data	Clarity of reporting	Assurance summary Implications and Regulatory Risk
Demand forecast	GREEN	GREEN	GREEN	<p>The methodology used complies with the UKWIR WRMP19 Methods which are as recommended in EA WRPG. Some aspects of the analysis, such as the use of multiple linear regression (MLR) to forecast unit consumption in terms of per property (PHC), rather than micro-components for per capita (PCC) require careful explanation and justification in the relevant Technical Reports.</p> <p>We have made specific suggestions to improve the clarity of the documentation; provided that the required editorial changes have been made, this will demonstrate that the demand forecast has been developed using the methodologies allowed for in EA WRPG which include UKWIR WRMP19 Methods.</p> <p>The latest Local Authority Plans population and property forecast have been used to update the demand forecast. GLA forecasts have been used for sensitivity analysis.</p> <p>We consider that the updated forecasts for rdWRMP19 address EA Headline Recommendation 8 - "Include the latest population and property forecasts of Local Authority Plans".</p> <p>We recommend that cross-comparison of Affinity Water's population and property forecasts with those undertaken by a different consultant for Thames Water is undertaken to expose whether or not different growth rates in the forecast could be open to external challenge.</p>
Technical component	Compliance with EA WRPG	Data	Clarity of reporting	Assurance summary Implications and Regulatory Risk

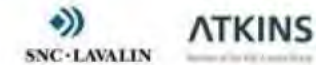
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<p>Supply forecast</p>	<p>GREEN</p>	<p>GREEN</p>	<p>AMBER</p>	<p>We consider that the sustainability reductions have been updated in line with WINEP3, to meet the Environment Agency requirements and satisfy EA Headline Recommendation 3.</p> <p>The Deployable Output and Climate Change assessment has been undertaken in accordance with regulatory guidance. However, there remains concern that the DO assessment work undertaken has not been presented sufficiently clearly in the rdWRMP19 and that the Environment Agency may still feel that some aspects are not adequately explained or justified in the text. We understand that during a meeting with the Environment Agency on 21st January 2019, there was verbal agreement with the approach, however this may not necessarily preclude further EA comments during consultation on the rdWRMP19 and review of the text. The current rdWRMP19 reporting does not clearly present the rdWRMP19 DO values for each of the drought scenarios by water resource zone.</p> <p>The Climate Change impact assessment has been undertaken for the worst historic drought but has not been updated for the 1 in 200-year drought scenario which the rdWRMP19 is based on. Although this approach has been explained and justified in the text, it could still potentially attract criticism.</p> <p>The climate change figures have been built up from data at an individual source level under the worst historic drought scenario but climate change impacts on DO are shown at a WRZ level. Clearer reporting is recommended to reduce the risk of regulatory challenge on any apparent inconsistencies.</p>
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Technical component	Compliance with EA WRPG	Data	Clarity of reporting	Assurance summary Implications and Regulatory Risk
<p>Assessment of target headroom</p>	<p>GREEN</p>	<p>GREEN</p>	<p>AMBER</p>	<p>Methodology compliant with good practice with the exception that the Target Headroom has been calculated for the worst drought on record rather than the 1 in 200-year drought scenario which the rest of the rdWRMP19 is based on.</p> <p>In terms of scale, Affinity has provided an email explanation of the likely scale of change were headroom to be recalculated based on the 1 in 200-year drought scenario. This indicates that the difference is not likely to be material. Affinity has also provided draft text within an email for inclusion within the headroom reporting which will help address this issue, however this text has not been included in reports we have reviewed to date.</p> <p>Based on the evidence provided, although, the use of a different drought scenario does not appear to be large enough to justify reevaluation of the Plan at this stage, it could still attract criticism, especially as the company identified in the dWRMP19 text that such work could be undertaken for the final WRMP19.</p> <p>Further editorial changes to the Target Headroom report have also been recommended to ensure that consultation responses raised from the EA and Ofwat are fully addressed.</p>
<p>Development of supply-side options, options appraisal and the shortlisting process</p>	<p>GREEN</p>	<p>AMBER</p>	<p>GREEN</p>	<p>Option Dossiers used for dWRMP19 have been reviewed and updated where necessary for rdWRMP19. New dossiers have been developed for the strategic supply-side options. This has required working with the potential donors.</p> <p>Our audit identified some apparent inconsistencies in unit costs assumed for some of the environmental and social costs and the on-costs and uplifts used for the option dossiers. The Company has advised us that these issues will be addressed for the final WRMP19.</p> <p>The work undertaken is considered to satisfy EA Headline Recommendations 4 and 6.</p>



Technical component	Compliance with EA WRPG	Data	Clarity of reporting	Assurance summary Implications and Regulatory Risk
Development of demand-side options	GREEN	GREEN	GREEN	<p>Household demand-side options were developed by external consultants. The dWRMP19 assumptions were challenged through robust internal Affinity Water reviews and where necessary costs and savings were updated for rdWMP19. We have seen evidence of the reviews and challenges.</p> <p>There is now more detail in the supporting Technical Reports on the development of demand-side options using the Company's own Water Saving Programme (WSP), its experience with metering, and wider industry experience.</p>
Development of leakage options	GREEN	AMBER	AMBER	<p>rdWRMP19 targets for future leakage levels have been informed by Government, regulator and other stakeholder aspirations and indicative targets. As already advised, the basis of the selection of the target levels and how these have been built into the baseline supply/demand balance is not clear from the Technical Reports. There appears to be over reliance on in-house costs for development of Active Leakage Control (ALC) costs and little discussion of the in-house costs compared to the wider industry. Ofwat's publication of 31st January 2019 indicates that there is further work to do, which leaves the company open to possible further regulatory challenge.</p> <p>More ambitious leakage targets have been included in the most recent analysis as set out in the rdWRMP19 text. Revisions to leakage Technical Reports are required to demonstrate clearly that the substance of EA Headline Recommendation 11 has been addressed adequately.</p>

Technical component	Compliance with EA WRPG	Data	Clarity of reporting	Assurance summary Implications and Regulatory Risk
Economic modelling and associated decision-making processes	GREEN	GREEN	GREEN	<p>Some minor issues were identified with summaries of output from the EBSD model; these have been resolved and were not considered to be material to development of the plan.</p> <p>The 'extended' Approach to decision-making used for drWRMP19 is compliant with UKWIR WRMP19 Methods and hence EA WRPG. Clear and robust justification is given in rdWRMP19 and supporting Technical Reports.</p> <p>Refinements made to the decision-making process to take customer feedback into account through Multi-criteria analysis (MCA).</p> <p>We consider that the work undertaken is to satisfy EA Headline Recommendation 5 on MCA.</p>
rdWRMP19 - Development of plan	GREEN	GREEN	GREEN	We consider that the work undertaken has created a robust and well-presented rdWRMP19 that can be issued for re-consultation to satisfy EA Headline Recommendation 5.
rdWRMP19 – Main Report	GREEN	GREEN	AMBER	Commentary was made on Sections 1 to 6 of the WIP version of the rdWRMP19 issued to Counsel on 1 st February. The further WIP draft (15 th February) included revisions to Sections 1 to 6 which appear to provide additional explanations and clarity of the processes followed to develop the rdWRMP19.
Compliance with EA Recommendations set out in its representation on dWRMP19	N/A	N/A	AMBER	We advised Affinity Water that it would be beneficial to include text and a summary Table to signpost the reader to sections of the rdWMP19 and supporting Technical Reports to where these issues have been addressed and resolved. We understand that an Addendum to the Statement of Response (SoR) is being written – we also recommend that the Addendum follows the format of the SoR and responds to each area of issue and not just the headroom recommendation.



Technical component	Compliance with EA WRPG	Data	Clarity of reporting	Assurance summary Implications and Regulatory Risk
WRP Tables	GREEN	AMBER	AMBER	<p>Company's methodology for populating tables is not captured. There are some outstanding challenges and queries about approaches to populating a small number of entries. There are also some corrections still to be made to the tables.</p> <p>An error was identified with regards to the carbon cost data for some options which requires the model to be re-run and the tables re-populated. The company is planning to do this for the final plan as it is not expected to affect scheme selection.</p>
QA and Sign-off records for Technical Reports	N/A	N/A	AMBER	<p>The Version/Revision numbers and Revision/Issue dates for Technical Reports are not always clearly stated.</p> <p>All report Cover Sheets, both for Affinity Water and for documents produced by external consultants, should be completed prior to wider circulation.</p>



1. Introduction

1.1. Background

Atkins Limited has been appointed by Affinity Water to provide technical assurance on all the main components of the revised draft Water Resource Management Plan 2019 (rdWRMP19) including:

- The demand forecast;
- The supply forecast;
- The assessment of target headroom and outage;
- The development of options, the options appraisal and shortlisting process; • The economic modelling and associated decision-making processes; and
- The associated WRP Tables.

During the course of the Technical Assurance, Affinity Water asked Atkins to include consideration of the adequacy of the response to the 12 Recommendations made by the Environment Agency in its representation on dWRMP19 and in particular Headline Recommendation 12 – “Ensure your plan is legally compliant by adhering to the WRMP Directions”.

This report summarises the external technical assurance services Atkins has provided in relation to aspects of Affinity Water’s revised draft Water Resource Management Plan (rdWRMP19).

Our approach has been shaped by our experience of developing the technical methodologies that are a regulatory requirement of the Environment Agency Water Resource Planning Guideline (WRPG – note that WRPG has undergone progressive updates from the Final version published in May 2016 and the Interim Update published in July 2018). Our work has comprised desk-based review of a range of Technical Reports, meetings with Affinity Water technical staff followed up by email and telephone exchanges, and on-screen audit of spreadsheets. A Table of the face-to-face meetings is given in Appendix A: - Meeting Record. The Table also includes the dates of the regular weekly telephone calls to discuss progress and raise any significant issues.

A summary of the issues raised following review of the documentation provided, during the face-to-face meetings and in email follow-up to the meetings is maintained as a spreadsheet. This is kept as a live document with the current version included as Appendix B: - Issues Log.

A list of the rdWRMP19 supporting Technical Reports and some other documentation is given in Appendix C: List of Technical Reports.

The WRMP is a highly technical document so the purpose of our assurance is to comment on the compliance of the process and methods that Affinity Water has used with the regulatory requirements of EA WRPG and the good practice technical documents that are referred to in that guidance. The WRPG have been produced in collaboration with Defra, the Welsh Government, and Ofwat.

Where we have identified possible issues, we have sought to gain an understanding of the materiality of those issues by evaluating the impact that they might have on the regulatory and stakeholder acceptance of the WRMP and on the overall level of interventions and investments proposed within the plan.

We report on an exception basis – i.e. we concentrate on issues or concerns identified during the review. We discussed all of these issues with Affinity Water during the progress of the review process. We understand that the text of the rdWRMP19 and key Technical Reports are being subject to legal review. We have not undertaken an editorial review of documentation, but where our technical review has revealed inconsistencies and lack of clear explanations, these have been referred to the Affinity Water for action. Subject to the issues being addressed and further clarity provided in the final versions of the rdWRMP19 and its supporting Technical Reports, we are able to provide assurance to the Board on the WRMP19 submission, although there are a number of risks associated with the Plan that we have highlighted in Section 3.

1.2. Scope

The scope of our Technical Assurance review was as follows:

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- A check on the methods used to derive the components of the supply/demand balance (supply capability, demand forecasts, outage and Target Headroom) to determine if they are in line with EA Water Resource Planning Guideline and hence constitute industry good practice;
- A review of the overall concepts and methods used to develop both supply-side and demandside options available for the maintenance of a positive supply demand balance over the planning period;
- A review of the decision-making process used to develop the rdWRMP19 adaptive plan, and the underlying risks that uncertainties or methodological issues could represent to regulator acceptability of that plan;
- A review of whether the recommendations in the Environment Agency's representation on the dWRMP19, to determine, where appropriate, whether the recommendations have been adequately addressed through the rdWRMP19 submission; and
- An audit of the reliability and completeness of the WRP Tables, and a check that they are consistent with the concepts, forecasts and adaptive Plan presented within the rdWRMP19 text.

Our review process consisted of a series of audit checks on the WRP Tables and table calculations, cross comparisons with underlying technical reports, and comparison of methodologies against industry good practice. Where supporting data were provided through technical reports we applied our experience and carried out sense checks on the outputs to test their credibility, but it should be noted that the scope of our review did not extend to any detailed checks of the models or calculations used in generating those reports.

The scope of this review covered the technical elements of the revised plan shown in Table 3 and the text of the main plan document. A list of the Technical Reports provided by Affinity Water for the purpose of this Technical Assurance is given in Appendix C.

Table 3 Scope of assurance – revised draft WRMP

Technical component	Methodology and Data
Demand forecast	
Supply forecast	
Assessment of target headroom and outage	
Development of options and the options appraisal and shortlisting process	
Economic modelling and associated decision-making processes	
WRP Tables	

Our assurance did not cover the technical components given in Table 4. The outputs from these components were however used in the decision-making process.

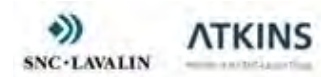
Table 4 Technical components not reviewed for revised draft WRMP

Technical component	Explanation
Strategic Environmental Assessment (SEA)	Specifically excluded from scope
Habitats Regulation Appraisal (HRA)	Specifically excluded from scope
Water Framework Directive (WFD)	Specifically excluded from scope

1.3. Structure of Assurance Report

This report is structured as follows:

- Assurance Statement
- Executive Summary



- Section 1 – Introduction
- Section 2 – Approach
- Section 3 – Summary of Findings
- Appendix A – Meeting Record
- Appendix B – Issues Log
- Appendix C – List of Technical Reports that informed the Technical Appraisal

2. Approach

2.1. Reviews and Deliverables

Our overall approach to assurance is based around a two-stage review - methodology and data. For all reviews for the revised draft WRMP19 we carried out a combined methodology and data review.

The purpose of each stage is as follows:

Methodology Reviews: To assess whether the Company’s methodology aligns with appropriate guidance, reporting requirements, licence conditions or industry practice and whether appropriate checks, controls and explanatory documents exist.

Data Reviews: To assess whether methodologies/procedures are applied as indicated including data trailing to source documents to ensure alignment/consistency with the reported number, checks and controls and appropriateness of confidence grades assigned to reported information (where applicable). This approach is consistent with Ofgem’s Data Assurance Guidance (DAG) which identifies external methodology audit and external data audit as potential ‘assurance responses’, described as follows:

External Methodology Audit: Not responsible for ensuring that returns are complete and accurate but to provide an independent challenge to the methodology to produce the submission. Review of the adequacy and effectiveness of the internal control systems to ensure returns are timely, complete and accurate. Formal report produced. Control gaps/areas for improvement identified and issues logged.

External Data Audit: Responsible for providing evidence of verification of Data; Intends to determine the level of confidence that can be placed on the figures; Formal report produced.

The process flow followed for each review is summarised as follows:

Figure 2-1 Review meeting process



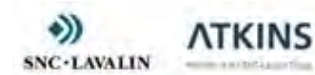
The deliverables for each stage of the process are summarised below in Table 2-1.

Table 5 Description of Deliverables

Deliverable	Description
Notification of Audit Form (NAF)	Issued in advance of reviews. Details arrangements, scope and agenda.
Email summary	Feedback including detail of any material issues including work in progress RAG risk assessment.
Technical Assurance Report	Report setting out key issues identified as part of the review process, including final RAG risk assessment.

Our assessment of the Company’s work for each technical component has been assigned an overall rating of Red, Amber or Green (RAG) to reflect the risk that the work represents to achieving regulatory compliance and hence the possible vulnerability of the plan to further external challenge. Separate ratings have been given to the application of methodology and to the data.

Table 6 sets out the definitions for the different Red-Amber-Green (RAG) categories.

**Table 6 Descriptions for RAG categories**

Category	Description
RED	High Risk - One or more of: Failure to comply with statutory or other requirements; Major failure of process; and/or Material data errors.
AMBER	Medium Risk - One or more of: Shortfalls in methodology and/or documentation; Methodology ill-defined or unclear; Incomplete data set, minor errors identified that should be resolved before submission and/or errors that cannot be resolved but are not material.
GREEN	Low Risk - One or more of: Minor revisions to documentation needed; Issue(s) that have been identified are not judged to be material; or No issues identified.

Our focus on particular areas was risk-based. It was directed by Affinity Water's own analysis and instructions and supplemented by our experience in identifying and quantifying the elements of the journey from raw to published data that introduce material errors. Our approach has also been framed by the tone and strength of the EA representation on dWRMP19. We have been particularly mindful that the EA considered that dWRMP19 put unacceptable pressure on the environment and that there were shortcomings in the consideration of new sources of supply from neighbouring companies. The EA also considered that dWRMP19 was unambitious in its planned delivery of demand-side options to reduce consumption and to reduce leakage.

2.2. Context of Affinity Water's rdWRMP19

The current water resource planning round has posed specific and unique challenges to Affinity Water, namely:

- Rising demand for water from growth in the number of domestic customers;
- Sustainability Reductions imposed on existing abstraction licences that severely restrict the availability of supplies from the company's own sources;
- Very limited options for new water resources within the company's supply area;
- Reliance on securing new sources of supply from outside the company's supply area;
- More demanding targets and aspirations from Government, regulators and customers alike for demand-side options to reduce leakage and to reduce personal consumption; and
- Increased risks from climate change.

The company's dWRMP19 attempted to address these issues by developing a "Preferred plan" and an "Alternative plan" and seeking consultation responses. The consultation responses showed that this approach was confusing to many.

The company has therefore adopted a radically different approach to rdWRMP19 in its development of an 'Adaptive plan'. Although such an approach is fully compliant with EA WRPG, it has not been tried in regulatory practice, so many of the water resource practitioners who scrutinise the plan on behalf of Government, regulators and other interested parties may be unfamiliar with the innovative approaches used and could tend to fall back on their knowledge and experience of the more conventional approaches used in previous water resource planning rounds. The starting point for the 'Adaptive plan' was a benchmark least-cost plan developed using the Economics of Balancing Supply and Demand (EBSM) methodology (UKWIR, 2004). This provides a baseline against which the flexibility, benefits, advantages and costs of the 'Adaptive plan' can be compared.

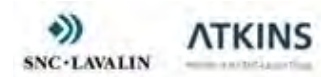
It is therefore extremely important that the reader of the plan is taken through the process in a clear and well-structured way so that decision points and the justification for those decisions are set out very clearly. The Technical Reports and the work in progress (WIP) main rdWRMP19 document that were made available at the time of this Technical Assurance achieve this objective to some extent.

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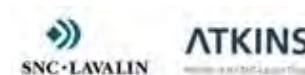
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However, further revisions to the documentation would help to improve the clarity of the approach that has been followed, and hence the robustness of the plan that has been developed. It is understood that the rdWRMP19 itself and the supporting Technical Documents are undergoing review by Affinity Water's legal team.



3. Summary of Findings

3.1. Development of WRMP19

The Affinity Water dWRMP19 and rdWRMP19 have followed the overall process set out in the EA WRPG. Affinity Water has retained specialist consultants to undertake specific technical tasks including bespoke modelling applications. The consultants retained are known to be industry experts in the technical areas covered and have in some cases developed the methodologies incorporated into the EA WRPG. Some technical aspects of the work have been undertaken by Affinity Water’s own technical teams.

The work undertaken for each technical area has been reported in a series of Technical Reports. Affinity Water has taken the outputs from the analyses and models described in these Technical Reports as the input data for economic modelling and decision making.

The scope of the work undertaken between dWRMP19 and rdWRMP19 has been informed by the EA’s representation on the dWRMP19 which included 12 Recommendations. The Company’s response to the representation and its intended actions to address the recommendations were set out in its Statement of Response (SoR), dated 31st October 2018). We understand that the Company is preparing an Addendum to the SoR; this was not available for this Technical Assurance. We recommend that this Addendum provides further information and sign-posting to evidence of how each of the recommendations has been addressed

Government, regulators and the UK Water Industry have recognised the increasing challenges that need to be addressed to provide resilient water supplies whilst at the same time protecting the environment. The current EA WRPG includes methodologies developed under the UWKIR WRMP19 Methods programme that were developed in part to address the challenges. Some of the methodologies draw on experience and examples used in practice for other sectors such as Thames Estuary 2100 and the Climate Change Adaptation Sub-Committee. The practical application of these methodologies for WRMPs nevertheless represents a step-change in the standard approach to water resource planning in the UK

As noted in Section 2.2, Affinity Water’s WRMP19 has to address a range of new challenges that have surfaced and/or become more significant since WRMP14. It is to meet these challenges that Affinity Water decided to not to rely exclusively on standard approaches for rdWRMP19, but to use the ‘Extended’ approach that is allowed for in regulatory guidance.

Following Ofwat’s July 2016 guidance on the definition of Non-Household (NHH) customers to be used for Business Plan 2019⁴⁷ and hence WRMP19, a number of customers who at PR14/WRMP14 were classified as NHH have for PR19/WRMP19 been classified as Household (HH) customers. This means that strict comparison of customers forecast at PR14/WRMP14 for the PR19/WRMP19 is not possible.

3.2. Technical components assured

Each of the technical components identified in Section 1.1 have been assured for the rdWRMP19. As part of this work, the changes to the Plan that Affinity Water has undertaken to address consultation responses to the dWRMP19 have been considered; in particular, the adequacy of its responses to the 12 Recommendations made by the Environment Agency in its representation on dWRMP19 (12th May 2018); the 12 recommendations which are listed in Table 7.

Table 7 Headline Recommendations in EA representation on dWRMP19

Number	Headline Recommendation
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⁴⁷ <https://www.ofwat.gov.uk/publication/eligibility-guidance-whether-non-household-customersengland-wales-eligible-switch-retail>



1	Present a new plan that delivers secure supplies and protects the environment and consults with its customers
2	Invest to provide customers with a higher level of resilience that does not damage the environment
3	Ensure that the plan protects the environment by delivering the Water Industry National Environment Programme
4	Seek new strategic options by developing new shared resources with neighbouring companies
5	Consult on a new plan that is clear to customers on its future strategy
6	Ensure that the resilience benefits of strategic options with neighbouring companies are fully considered in the option selection
7	Promote options that deliver a resilient plan and do not risk damaging the environment
8	Include the latest population and property forecasts of the Local Authority plans
9	The company must carry out a full review of its SEA of both the preferred plan and the alternative plan
10	Ensure the deployable output of the company's 'FRIA' source reflects local licensing conditions
11	Be more ambitious by reducing leakage further in both the short and long term
12	Ensure your plan is legally compliant by adhering to the WRMP Directions

Summary headings from EA document dated 12th May 2018

Our findings for each of the technical components assured are summarised in Sections 3.3 to Section 3.9 below together with a cross-reference to the relevant EA recommendation.

Section 3.10 deals with the response to EA Recommendation 12 – “Compliance with WRMP Directions”. Section 3.11 specifically considers the WRP Tables.

3.3. Demand-side forecasts

3.3.1. Property and population

The dWRMP19 property and population forecasts have been reviewed and revised to take account of the latest Local Planning Authority (LPA) figures and the draft London Plan. It was recognised that LPA and GLA planning forecasts are under regular review and update; rdWRMP has therefore taken account of possible changes in growth rates in sensitivity analyses.

For the current round of WRMPs and Business Plans, Ofwat has revised its definition of nonhousehold properties. This definition change has been used for rdWRMP19 base year and forecasts and means that direct comparison of household property numbers with the corresponding WRMP14 values is not possible. The approach taken to rebalance base year property values is considered to be appropriate.

The use of different consultants to provide property and population forecasts for different water companies in South East England presents a possible risk for external challenge. Affinity Water and three other companies retained Experian; Thames Water retained Edge Analytics. We have recommended that a comparison between the forecasts is undertaken to assess whether there are any differences in the forecast growth rates, and if so is the difference material for the supply



demand balance in volumetric terms. If the differences are considered to be material, then separate sensitivity testing should be carried out.

The updated forecasts for rdWRMP19 address EA Recommendation 8 – “Include the latest population and property forecasts of the Local Authority Plans”.

3.3.2. Unit household consumption: Per Property or Per Capita?

For past WRMPs it has been usual practice to base household demand forecasts on population and per capita consumption. EA WRP Tables require the forecasts of unit household consumption to be expressed as Per Capita Consumption (PCC expressed in l/head/day) and for PCC to be broken down into micro-components, again expressed in l/h/d. The current WRPG, which is based on UKWIR WRMP19 Methods, allows alternative approaches to forecasting future unit consumption. The rdWRMP19 uses Per Household Consumption (PHC expressed in l/property/day) and Multiple Linear Regression (MLR) instead of the more conventional micro-components approach to forecast unit household consumption for each year of the forecast.

In response to EA Improvement 3 – “Explain Demand Forecast uncertainties” further details of the MLR/PHC approach are given in the relevant Technical Reports, though as advised during the audit the structure and wording of the documents could be revised to present the approach and results more clearly.

In any case the value of unit consumption in the final year of the 25-year planning process is to some extent fixed through interpretation of Government, regulator and other stakeholder aspirations. The two different modelling approaches (MLR for PHC and micro-components for PCC) provide a glidepath from base-year values to final year values.

3.3.3. Non-households

The approach taken is considered to be appropriate for the magnitude of the Non-household (NHH) sector supplied by Affinity Water. Estimates of uncertainties around the forecasts are considered to be appropriate for input to the calculation of headroom uncertainty.

3.3.4. Leakage

As described in the Technical Reports, leakage is already below the Sustainable Economic Level of Leakage (SELL). Values for leakage at fixed points in the 25-year planning horizon were informed by Government, regulator and customer targets and aspirations.

As advised during the audit, it would be useful to explain both in the rdWRMP and in the relevant Technical Reports how the stated percentage reductions from the baseline condition convert to volumes.

The review has not included a detailed audit trail of costs; this was not in the scope of the rdWRMP19 Technical Assurance and it would be a major trailing exercise through supporting technical and financial information. The focus of the review has therefore been to identify obvious inconsistencies and to expose those parts of the documents that invite question and undermine the case being made. As a general comment and particularly in the light of the Ofwat publication of 31st January 2019 which indicates that there is further work to do, there appears to be over reliance on in-house costs to develop cost curves for Active Leakage Control (ALC) which is one of the main demand-side options. There is little discussion of the in-house costs compared to the wider industry. With DataShare and assuming Affinity has access to anonymised comparator data, it should have been possible to consider capex and opex efficiency. The narrative of the Technical Reports suggests that the approach used for rdWRMP19 has been to use more recent data with the approach that had been used for previous Business Plans/WRMP. It appears that the approach itself and the in-house costs have not been subject to detailed scrutiny and challenge.

Future levels of leakage built into the baseline Distribution Input forecast have been informed by the aspirations and possible targets and published and expressed in terms of percentage reductions by Government, regulator and other stakeholders.

On the basis of the Technical Reports made available to date, we have concerns that there is insufficient evidence to show that the specific requirements of EA have been addressed in relation



to its Headline Recommendation 11 – “Be more ambitious by reducing leakage further in both the short and the long-term”.

We understand that Report 4.8 – ‘Leakage Strategy’ is undergoing a further review and update.

3.4. Supply forecast

3.4.1. Deployable Output

The Deployable Output assessment has been undertaken in accordance with regulatory guidance and the methods used have been shared with the EA. However, in the dWRMP19 consultation, this component of the supply forecast attracted several regulatory comments. In particular, in their consultation response and in subsequent communications, the EA appear to have been seeking additional clarification on the methodology and looking for additional evidence and discussion in the rdWRMP text to provide further confidence in the DO figures presented in the plan.

Although there have been further discussions between Affinity Water and the EA on Deployable Output since the dWRMP19 consultation and additional explanations have been given and verbally accepted, there remains concern that the work undertaken has not been presented sufficiently clearly in the rdWRMP19 and that the Environment Agency may still feel that some aspects are not adequately explained or justified in the text.

We recommended that the DO assessment work was consolidated into a single updated DO technical report to present the methodology and approach clearly, together with the 1 in 200-year drought scenario results. Instead a revised technical addendum has been drafted. Whilst this provides an improvement, the DO methodology and approach could be presented more clearly. It would also be beneficial to have summary tables presenting the rdWRMP19 DO values for each of the drought scenarios by water resource zone.

3.4.2. Climate Change

Based on the information we have been provided, it appears that the Climate Change assessment is compliant with good practice guidelines. However, the Climate Change impact assessment has been undertaken for the worst historic drought and has not been updated for the 1 in 200-year drought scenario on which the rdWRMP19 is based. We have been advised that Affinity Water are using the worst historic climate change analysis with the 1 in 200-year drought DO for the following reason:

“We consider that since between the worst historic and 1 in 200 groundwater levels, the rate of recession decreases (i.e. GWLs plateauing), the same will take place with the CC impacts for a 1 in 200-year drought, so the difference will be negligible if we were to carry out this analysis.”

Similar text has been included in Technical Report 1.1.1 Deployable Output and WRMP-DMP Links. Regardless of whether the use of a different drought scenario would make any material change or not, this approach could still attract criticism and there is some regulatory risk that the EA could challenge this.

The EA representation on the dWRMP19 noted that climate change figures are built up from data at an individual source level but that this information is not presented; instead climate change impacts on DO are shown at a WRZ level. Clearer reporting is recommended to reduce the risk of regulatory challenge.

3.4.3. Sustainability Reductions

The Technical Report 1.4: Sustainability Reductions has been cross-checked against the Environment Agency’s representation on the dWRMP19 and all the Recommendations appear to have been addressed:

- R3.1 Revised plan reflects the latest version of WINEP;
- R3.3 Delivery mechanisms and timing of sustainability changes. Timing of Misbourne sustainability changes has been amended. A 2MI/d reduction for Amersham from December 2024 has been included in rdWRMP19;
- R3.4 Sustainability date corrected to 22 December 2024; and



- R10.1 Licence details. The baseline DO of the Friars Wash source has been reviewed and discussed.

Some minor revisions to documentation have been made as recommended to address a few remaining gaps in the text and ensure consistency of reporting. As a result, it appears that EA Headline Recommendation 3 – “Ensure that the plan protects the environment by delivering WINEP” has been actioned.

3.5. Assessment of target headroom and outage

3.5.1. Target headroom

Although the methodology used to estimate headroom uncertainty and hence target headroom is compliant with good practice guidelines, headroom uncertainty has been calculated for the worst drought on record rather than the 1 in 200-year drought scenario which the rest of the rdWRMP19 is based on. This includes the components considering uncertainty around deployable outputs and climate change. One of the EA comments on the dWRMP19 was that the company had not adequately assessed the uncertainty in its alternative plan through target headroom assessment. Although some aspects of the target headroom calculation have been updated, there is a danger that the EA may still think that the company has not adequately assessed the uncertainty in its rdWRMP19 plan due to the mismatch in planning scenarios.

In terms of scale, Affinity have provided data and an explanation by email that indicates that there would be minimal difference in the DO uncertainty if the target headroom calculations were based on the 1 in 200-year drought scenario rather than the worst historic drought scenario. To date, however, the reports we have seen do not reference this.

Although, based on the evidence provided, the use of a different drought scenario does not appear to be large enough to justify re-evaluation of the Plan at this stage, this approach may attract criticism. There is a risk that the EA could challenge this, especially as the company had identified in the dWRMP19 headroom text that such work could be undertaken for the final WRMP19.

Additional explanation and/or signposting within the rdWRMP19 technical report has been recommended to ensure that items of further work are clearly documented, outstanding items listed and that consultation responses from the EA and Ofwat associated with target headroom are fully addressed. In particular, additional explanation needs to be added to the headroom technical report to satisfy Direction 3 (e)(i). The Affinity Water SoR stated that “the uncertainty element associated with climate change on option yields will be included within the WRP tables within headroom, but to satisfy the Direction it will be presented as a separate element within the headroom technical report.” This element is currently not included within the headroom technical report and no signposting has been included to indicate where else the information might be found.

3.5.2. Outage

The methodology used to estimate Outage follows good practice guidelines. One of the Ofwat comments on the dWRMP19 was that outage had increased since the previous plan bringing it above the industry average and the increase was material to the company supply-demand balance. The changes to the outage methodology (magnitude and duration) which have been made between dWRMP19 and rdWRMP19 appear logical and justified. Outage has reduced for rdWRMP19 and (for DYAA) is more closely aligned with the WRMP14 figures.

The consultation responses raised by Ofwat have been largely addressed, however greater clarity could still be provided in this regard.

3.6. Development of options and the options appraisal and shortlisting process

The methods that have been used to carry out the options appraisal process are standard for the initial screening process. The development of costs and benefits for supply-side and demand-side options appear to have been carried out in accordance with standard practice, however as noted in Section 3.11 some inconsistencies have been identified. In response to the EA’s representation to



dWRMP19, we note that a thorough reworking of the strategic options has been undertaken informed by meetings and technical exchanges with the donor companies (Thames Water and Anglian Water) and the Canal & River Trust (CRT), although we noted that the costs and benefits associated with leakage control and demand management options are very uncertain.

3.6.1. Strategic supply-side options

Additional work has been undertaken to review the five long-term strategic options (South East Strategic Reservoir (SESR); River Severn to River Thames Transfer; Effluent Re-use Transfer; Grand Union Canal (GUC) Transfer; and South Lincolnshire Reservoir), to bring the components of each option up to an equivalent level of technical understanding, planning and environmental risks, deliverability and hence costs. This has been an iterative process with meetings, other dialogue and exchanges of information between Affinity Water technical teams and the donor companies (Thames Water, Anglian Water and the Canal & River Trust (CRT)).

Option Dossiers for the three transfers and for the South Lincolnshire Reservoir have been developed to a similar level of detail as the SESR. Where the necessary information and data does not yet exist, conservative assumptions have been made. Such assumptions will be researched and tested more fully under AMP7 Enabling Actions programme.

We note that a desalination option for Affinity Water East has been developed as a possible option to meet the unanticipated Sustainability Reduction notified by EA after release of WINEP3.

We consider that the additional work on strategic supply-side options undertaken for rdWRMP19 satisfies EA Recommendation 4 – “Seek new strategic options by developing shared resources with neighbouring companies”.

3.6.2. Other supply-side options

dWRMP19 included some relatively small supply-side options, including infrastructure schemes that would allow abstraction to be increased from current levels up to existing licensed quantities. In response to consultation feedback, and in particular discussions with EA relating to its Recommendations concerning environmental protection, such options for Chalk groundwater sources in Affinity Central have been excluded from the rdWRMP19 list of feasible options.

We have been shown evidence that other supply-side options have been taken through from dWRMP19 to rdWRMP19, following internal Affinity Water review and, where necessary, updates have been made to the Option Dossiers.

We consider that the additional work on strategic supply-side options undertaken for rdWRMP19 satisfies EA Headline Recommendation 2 – “Invest to provide customers with a higher level of resilience that does not damage the environment”.

3.6.3. Demand-side options

Implementation of demand-side options to reduce leakage further and to promote water efficiency to reduce consumption were strongly endorsed by regulators and customers alike. Since publication of dWRMP19, Government, the National Infrastructure Commission (NIC) and others have stated challenging aspirations and targets for leakage and household consumption.

The savings and associated costs of the various household demand-side options are set out in Technical Report 4.7 - Water Demand Management Framework – Assessment of Demand Side Options. We consider that the work has been undertaken in line with current practice.

Two types of leakage options have been developed for rdWRMP19: discrete options such as pressure relief valves (PRV), communication pipe renewals, and mains with communication pipe renewals; and active leakage control (ALC). The discrete options are assumed to deliver given increments of volumetric saving for a given cost, whereas ALC options are defined by the continuous ALC cost curves. Refinements to the EBSD model (see Section 3.7.1) have allowed non-discrete ALC options to be modelled.

As noted in Section 3.3.4 we do have some concerns regarding the basis for the ALC cost curves.



3.7. Economic modelling and approach to decision-making

3.7.1. Economics of Balancing Supply and Demand (EBSD) modelling

EBSD has been the conventional approach for WRMPs for several planning cycles. The EBSD model used for rdWRMP is a revised version of the standard model used since 2004 for previous WRMPs. Incremental refinements have been made over time to improve the model's functionality, processing time, and outputs. The kernel of the model has been used for other water companies and for Water Resources in the South East (WRSE).

The scope of this technical assurance did not include audit of the EBSD model. We have however examined typical output files and consider that the model provides plausible outputs to inform decision making and to provide the costs of rdWRMP19 in WRP Table formats.

3.7.2. Decision-making

EA WRPG and the supporting UWKIR WRMP19 Methods offers a range of approaches for companies to follow. The choice of appropriate method depends on the Problem Characterisation step which is the industry standard method used for identifying modelling and analysis needs. It both defines the level of complexity of the planning 'problem' to be addressed and informs the identification of the type of decision making methods that are appropriate to that problem.

The dWRMP19 Problem Characterisation step has been fully revised for rdWRMP19. The outcome of the revised Problem Characterisation step identifies that an "aggregated" approach is appropriate for Affinity Central. We consider that the decision to use Adaptive Pathways analysis for an "aggregated" approach is justified and for consistency across all 8 WRZs it is appropriate to use the same approach for Affinity Water South East (WRZ7) and Affinity Water East (WRZ8).

Adaptive Pathways is one of the 'Extended' approaches now included in the EA WRPG. These are new approaches for many water resource practitioners in the UK, so there may be regulatory resistance to a WRMP that is based on a new approach that may be perceived to be unconventional. We consider that the rationale for using Adaptive Pathways follows the UKWIR Decision-making guidance is sound and is logically presented in the text of rdWRMP19 and the associated Technical Reports. The starting point of the Adaptive Pathways is the standard EBSD model which was used to develop the baseline least-cost plan. This provides a reference point for those more familiar with the conventional 'least-cost' approach to water resource planning.

Technical Reports on the work undertaken on SEA, HRA and WFD were excluded from the scope of this Technical Assurance. However, we consider that the outputs arising from that work (for example Section 6 of Report 4.9 – "EBSD Modelling and Decision Making process" and Section 5.5 – "Incorporating Environmental Considerations into our Decision-Making Process" of rdWRMP19 have been used appropriately to inform options appraisal and decision-making.

We consider that rdWRMP19 and its supporting Technical Reports demonstrates an appropriate response to EA's Headline Recommendation 2 – "Invest to provide customers with a higher level of resilience that does not damage the environment", Recommendation 6 – "Ensure that the resilience benefits of strategic options with neighbouring companies are fully considered in the option selection" and Recommendation 7 – "Promote options that deliver a resilient plan and do not risk damaging the environment".

3.8. Development of adaptive plan

Respondents to dWRMP19 appear to have been confused by the "Preferred Plan" and the "Alternative Plan". In order to remove the risk of such confusion, a single plan has been developed for rdWRMP.

As noted in feedback on a draft of rdWRMP19 the use of the following terms can be confusing: "Preferred Plan"; "Alternative Plan"; "Adaptive Plan"; best value "Preferred Plan". Nevertheless, on the basis of the Technical Reports that have been provided for this Technical Assurance, we consider that the plan for Affinity Water Central set out in Section 6.4 "Our adaptive plan for the Central region" and illustrated in Figure 34 of that Section to meet WRPG requirements and the EA Recommendations.



3.9. rdWRMP19 – main report

The main report of the rdWRMP19 follows the general structure of dWRMP19 in setting the scene and describing the challenges that Affinity Water faces. The main changes are from Section 4 “Appraisal of future options” onwards.

3.9.1. rdWRMP19 Section 4 – Appraisal of future options

Whilst the bulk of the work on future options does not appear to have undergone substantial revision since dWRMP19, as explained in Section 3.6 of this report the Option Dossiers have all been reviewed and where necessary updated. Particular attention has been given to the strategic supplyside options.

In its Section 4.5 – “Assessing the environmental impact of options – Stage 4”, rdWRMP19 now includes additional material on Strategic Environmental Assessment (SEA), Habitats Risk Assessment (HRA), and the Water Framework Directive (WFD).

3.9.2. rdWRMP19 Section 5 – Formulating our plan

The text explains how the company has followed UKWIR guidance to identify the appropriate approach to its decision-making. We consider that the text and supporting diagrams give a logical and robust basis for the company’s decision to use an ‘aggregated’ approach.

Section 5.5 ‘Incorporating Environmental Considerations into our Decision-Making Process’ is new material that draws on Section 4.5.

Section 5.6 ‘Results and key decisions – Central region’ gives a clear explanation of the decisionmaking challenges faced in Central region and then the steps followed in the decision-making process. The text is well illustrated and supported with clear schematics and diagrams.

Section 5.7 ‘Results and key decisions – East and Southeast regions’ presents the conventional EBSD analysis that is appropriate to these regions.

Section 5.8 ‘Testing the Plan’ describes the sensitivity analysis undertaken to assess the vulnerability to different assumptions and uncertainties.

3.9.3. Section 6 -Our best value Plan

Section 6 explains how the best value Plan is a combination of ambitious demand-side options and supply-side options and why reliance on demand-side options alone would be unable to maintain the supply demand balance throughout the planning period.

Section 6 sets out the risks to delivering a plan that maintains security of supplies. In particular, given the combination of uncertainty about the speed of delivery and magnitude of demand savings from demand-side options together with lead times for delivering strategic supply-side options the text explains how the plan would be adapted at key time horizons. Such decision points take account of how successful demand management measures might have turned out in practice and also allow enabling works to be undertaken to resolve some of the uncertainties around the cost and deliverability of strategic supply-side options.

We consider that the approach followed is consistent with the methodologies and guidance produced under the UKWIR WRMP19 Methods programme.

3.9.4. Later sections

At the time of this report the elements of Section 6 onwards had not been drafted, so we have not been able to comment on these.

3.9.5. Appraisal of approach followed for rdWRMP19

On the basis on the Technical Reports that have been provided and a substantial part of the rdWRMP19 text we consider that Affinity Water has used a process and methodologies that are consistent with regulatory guidance and that are appropriate to its specific circumstances and challenges.



We consider that the work undertaken since dWRMP19 is sufficient to meet the following EA Headline Recommendations: 1 – ‘Present a new plan that delivers secure supplies and protects the environment and consults with its customers’; 2 – ‘Invest to provide customers with a higher level of resilience that does not damage the environment’; and 5 – ‘Consult on a new plan that is clear to customers on its future strategy’.

3.10. Checks against EA Headline Recommendation 12 in its representation on dWRMP19 consultation

In its Statement of Response (31st October 2018) Affinity summarised its proposed responses to address Recommendation 12 – “Ensure your plan is legally compliant by adhering to the WRMP Directions”. Our review of the Technical Reports that have been reviewed and where necessary reworked and updated to inform rdWRMP19 shows that work to address these recommendations has been undertaken. However as advised in the assurance meetings, follow-up emails and progress conference calls, some of the documentation that explains the work undertaken and how this has informed the adaptive plan is not always clear. It is essential that the final rdWRMP19 should explain how the recommendations have been acted upon and provide signpost the reader to the relevant Technical Reports where more detail can be found.

In the progress call of Monday 28th January Affinity Water asked Atkins to comment specifically on how Recommendation 12 – “Ensure your plan is legally compliant by adhering to the WRMP Directions”. Following that call we recommended that the rdWRMP19 should include signposting to the relevant parts of the main plan and to the Technical Reports where the work to address these points is described; On the basis of the documentation that we have been provided with for this Technical Assurance, our opinion of the technical basis on which the company’s responses to the recommendations have been based is summarised in Table 8; we are not however able to give a legal opinion on compliance.

As noted in Section 3.1 we recommend that the Addendum to the Statement of Response that is being prepared gives explicit cross-references to the rdWRMP19 text and the relevant Technical Documents to direct the reader to where evidence of compliance with the WRMP Directions is given.

Table 8 Summary assessment of compliance with WRMP Directions EA Recommendation 12 – “Ensure your plan is legally compliant by adhering to the WRMP Directions

EA Recommendation 12	WRMP Direction
R12.1	Direction 3(b) Describe the annual average risk of all restrictions as a percentage, and how they change through the planning period
Affinity Water response	Within our revised dWRMP we will amend Table 12 to ensure the annual risk is presented as a percentage and how we expect this percentage to change in response to the implementation of options selected within the plan.
Summary of any change to our revised dWRMP (from Affinity Water SoR)	Table 12 to be amended.
Assessment of material now given in rdWRMP19 and supporting documentation	dWRMP19 Table 12 now appears in rdWRMP19 Section 3.3 “Levels of Service in water resource management” as Table 6. Table 6 includes additional information on annual risk.
R12.2	Direction 3(c) Describe the assumptions it has made to determine the annual average risk of all restrictions
Affinity Water response	We shall ensure the current section 4 of our draft WRMP is updated to include an explanation of how our levels of service have been estimated making an explicit link to the work carried out for our Drought Management Plan.

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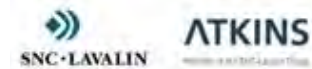
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Summary of any change to our revised dWRMP (from Affinity Water SoR)	As per 'Our response'.
Assessment of material now given in rdWRMP19 and supporting documentation	rdWRMP19 Section 3.3 includes additional text that sets out links to the Drought Management Plan
R12.3	R12.3 Direction 3(d) Describe the emission of greenhouse gases likely to arise as a result of each measure in its plan
Affinity Water response	We recognise at draft plan we only included a 'tonnes of Carbon' graph for the Preferred Plan and not the Alternative Plan.
Summary of any change to our revised dWRMP (from Affinity Water SoR)	We will include this graph in our revised dWRMP
Assessment of material now given in rdWRMP19 and supporting documentation	rdWRMP19 does not appear to include an equivalent graph to dWRMP19 Figure 60 Preferred Plan (PP), carbon footprint DYAA
EA Recommendation 12	WRMP Direction
R12.4	Direction 3(e)(i) Describe the assumptions made regarding the implications of climate change, including in relation to the impact on each of its supply and demand measures
Affinity Water response	This direction was placed on the agenda and discussed at an Affinity Water /Environment Agency meeting in August 2018. We proposed to take the climate change uncertainty elements from the headroom assessment and present this data at the option level to satisfy this legal direction (3ei). The uncertainty element associated with climate change on option yields will be included within the WRP tables within headroom, but to satisfy the direction it will be presented as a separate element within the Headroom technical report. The Environment Agency acknowledged this work had already been completed, but presentation needs to be improved.
Summary of any change to our revised dWRMP (from Affinity Water SoR)	We will improve the presentation of the work undertaken in our revised dWRMP.
Assessment of material now given in rdWRMP19 and supporting documentation	This is not included in the Headroom technical report and there is no crossreference within the Headroom technical report to where else it might be reported.
R12.5	Direction 3(f) Describe its metering programme, including costs, approach, implementation and timing of the programme
Affinity Water response	We will disaggregate the costs of the metering programme from our wider Water Saving Programme.
Summary of any change to our revised dWRMP (from Affinity Water SoR)	We will present those costs in isolation in our revised dWRMP.
Assessment of material now given in rdWRMP19 and supporting documentation	rdWRMP19 Technical Report 4.7 "Water Demand Management Framework - Assessment of Demand options" includes Section 5.2 "Metering": not clear from the information on the Artesia cover sheet "Final V8" whether dWRMP19 Report 4.7 included details now included in Section 5.2.
R12.6	Direction 3(h) Describe its assessment of the cost-effectiveness of domestic metering types



Affinity Water response	We will include a cost benefit assessment for household metering types (e.g. Dumb metering, Automatic Meter Reading (AMR), Advanced Metering Infrastructure (AMI)). It should be noted that the company is already a significant way into its baseline universal metering programme to be completed by 2025.
Summary of any change to our revised dWRMP (from Affinity Water SoR)	We will include a cost benefit assessment for household metering types (e.g. Dumb, AMR, AMI metering).
Assessment of material now given in rdWRMP19 and supporting documentation	New report since dWRMP19: Technical Report 2.6 Metering Cost Benefit Analysis (CBA)

1st line: Summary from EA document dated 12th May 2018
 2nd & 3rd lines: Summary from Affinity Water Statement of Response
 4th line: Assessment from Atkins Technical Assurance

3.11. WRP Tables

Our audits of the WRP Tables The following table provides a summary of our findings: **Table 9 Summary of WRP Tables assurance**

Table	Data	Documentation of methodology	Comments and queries raised
1 BL Licences	GREEN	AMBER	Methodology for populating the table is not documented.
2 BL Supply	AMBER	AMBER	Methodology for populating the table is not documented. Audit trail for calculation of annual climate change values is unclear. Base year figures currently outstanding.
3 BL Demand	RED	AMBER	Methodology for populating the table is not documented. Some lines still to be corrected.
4 BL SDB	GREEN	AMBER	Methodology for populating the table is not documented.
5 Feasible Options	AMBER	AMBER	Methodology for populating the table is not documented and outstanding queries and updates relating to financing, carbon, environmental and social costs. Company is planning to re-run models for the final WRMP to reflect corrected carbon costs for some options.
6 Preferred (Scenario Year)	GREEN	AMBER	Methodology for populating the table is not documented. Company agreed to compare model outputs to table figures.
7 FP Supply	GREEN	AMBER	Table is auto-populated from previous tables.
8 FP Demand	RED	AMBER	Methodology for populating the table is not documented. Some lines still to be corrected.
9 FP SDB	GREEN	AMBER	Methodology for populating the table is not documented.

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10 Drought plan links	GREEN	AMBER	Methodology for populating the table is not documented.
Company commentary	N/A	AMBER	Commentary to be submitted to EA alongside WRP Tables. Some text still to be revised.

It is recommended that Affinity Water documents its methodologies for populating the Tables. This would include but not be limited to capturing end-to-end processes in generating the data, identifying source data, exposing any assumptions and/or calculations being made and detailing the checks and controls built into the process. This would allow the Company to respond quickly and accurately to queries and requests from stakeholders and would reduce any risks associated with staff churn or unavailability. It also aligns with recognised best practice. This activity does not require completion before the consultation period commences but it is advisable that it should be completed in advance of the formal submission.

3.12. rdWRMP19 Technical Reports

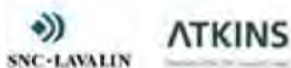
Where possible we have noted and fed back to Affinity editorial comments and typographical and/or spelling errors. Final review of all documentation is recommended.

Some of the reports were written near the start of the WRMP19 process and have not been subject to review and where necessary updated. Where possible, the issue dates and Version/Revision numbers of the documents have been included in the summary Table of Appendix C: - List of Technical Reports.

It is understood that the rdWRMP19 and supporting Technical Reports will be reviewed by Affinity Water’s legal team. Once this review has been completed and the required changes made, the QA and sign-off of all reports should be completed before they are circulated more widely.

Appendices

draft: Work in Progress



Appendix A. Meeting Record

Purpose/Type	Affinity Water	Atkins	Date
Start-up meeting	Julie Smith, Mumin Islam,	Ben Piper, Emma Everard, Julian Jacobs	13/12/18
Initial meeting Baseline Demand	Andrea Farcomeni Artesia (telecon)	Ben Piper, Emma Everard,	13/12/18
Initial meeting Baseline Supply	Ilias Karapanos	Ben Piper, Emma Everard,	13/12/18
Review telecon	Julie Smith, Mumin Islam	Ben Piper, Emma Everard, Julian Jacobs	20/12/18
Review telecon	Julie Smith, Mumin Islam Doug Hunt	Ben Piper, Julian Jacobs	7/1/19
Initial meeting headroom	Ritchie Carruthers Artesia (telecon)	Emma Everard	14/1/19
Initial meeting outage	Ritchie Carruthers	Emma Everard	14/1/19
Review telecon	Julie Smith	Ben Piper, Julian Jacobs	14/1/19
Audit Demand Forecast	Andrea Farcomeni Artesia (telecon)	Ben Piper	15/1/19
Initial meeting Leakage	Patrick Campbell Ritchie Carruthers	Ben Piper	15/1/19
Initial meeting Demand-side options	Ritchie Carruthers Artesia (telecon)	Ben Piper	15/1/19
Initial meeting Supply-side options	Nick Honeyball Ritchie Carruthers	Ben Piper	15/1/19
Review telecon	Mumin Islam	Emma Everard, Julian Jacobs	21/1/19
Options follow-up	Ritchie Carruthers Nick Honeyball	Ben Piper	21/1/19

Decision Making	Doug Hunt Andrea Farcomeni	Ben Piper	21/1/19
Review telecon	Julie Smith Mumin Islam	Ben Piper, Julian Jacobs, Emma Everard	28/1/19

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WRP Tables	Ritchie Carruthers, Andrea Farcomeni	Julian Jacobs Emma Everard	28/1/19 and 29/1/19
WRP Tables	Ritchie Carruthers, decisionLab	Julian Jacobs Monica Barker	31/1/19
Decision-Making	Doug Hunt Andrea Farcomeni	Ben Piper	31/1/19
Review telecon	Julie Smith Mumin Islam	Ben Piper, Emma Everard, Monica Barker	4/2/19
Review telecon	Julie Smith	Ben Piper, Julian Jacobs, Emma Everard	11/2/19
WRP Tables	Ritchie Carruthers	Monica Barker	Postponed from 7/2/19 to 14/2/2019
Review telecon	Julie Smith Mumin Islam	Ben Piper, Julian Jacobs, Emma Everard	18/2/19
Review telecon	Julie Smith Mumin Islam	Ben Piper, Julian Jacobs, Emma Everard	25/2/19
Presentation of findings to Affinity Water	Board Sub Committee	Ben Piper	26/2/19

Note: meetings highlighted are those scheduled for later dates

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Appendix B. Issues Log

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Affinity Water rdWRMP19 Issues Log

Date revised: 21/02/2019

Issue	Ref	Date raised	Raised by	Response Due Date	Observation/Risk	Action	Priority (R/A/G)	Response received	Company response	Owner	By when	Issue Open / Closed	
Supply	001	Supply meeting 13/12/2018. Summarised by email 18/12/2018	E Everard	23/12/2018	Given consultation responses and further queries raised by the EA there is currently concern that there may be shortfalls in DO methodology and/or documentation.	Affinity to provide and Atkins to review the following: o AECOM DO report produced for rdWRMP19 o WRMP and Drought Links reports Most recent EA comments (document dated 10th December 2018)	Amber	Y	Outstanding documents provided. Verbal acknowledgment of issues by Mumin Islam and Julie Smith in weekly progress telecon call	Ilias Karapanos		Closed - superseded	
	002	19/12/2018	E Everard	24/12/2018	Additional queries raised by email regarding clarifications on Drought Plan	Clarification from Affinity Water required	Green	Y	Individual queries answered by email	Ilias Karapanos	19/12/2018	Closed	
	003	10/01/2019	E Everard	15/01/2019	Additional queries raised by email regarding DO & Climate Change Impact Assessment report and DO Addendum report	Clarification from Affinity Water required	Green	Y	Individual queries answered by email	Ilias Karapanos	15/01/2019	Closed	
	004	10/01/2019	E Everard	15/01/2019	Following review of documents consultation responses and further EA queries and Affinity responses there is concern that there may be shortfalls in DO documentation.	Our recommendation is that the DO assessment work is consolidated into a single updated DO technical report. This report should present the methodology and approach clearly and include additional evidence and discussion in the text to satisfy the EA's outstanding concerns. The DO assessment report should have a clear Executive Summary which is then utilised in the rdWRMP19 text.	Amber	Y	We have decided to merge the 1.1.1 and 1.1.2 reports into one which will also touch on the EA queries raised in the preconsultation. We will keep you updated about the EA's response following Monday's meeting.	Ilias Karapanos	18/01/2019	Open	
	005	04/02/2019	E Everard	07/02/2019	Technical Report 1.4: Sustainability Reductions checked and no major issues identified although there are a few remaining gaps and highlighted areas of text in some parts of the report and a few points to check. Also minor editorial changes to AMP6 NEP Progress and Summary of WINEP PR19 Schemes and Problem Characterisation Summary Report	Further checks and minor revisions to documentation needed	Green	Y	Revised version of AMP6 NEP Progress and Summary of WINEP PR19 Schemes sent to Atkins 12/2/19 and revised Sustainability Reductions report sent to Atkins 15/2/19			Closed	
Demand	006	Demand Forecast meeting 13/12/2018. Summarised email by 19/12/2018	B Piper	24/12/2018	The different approaches to population and property forecasts for Affinity rdWRMP (Experian) and for Thames Water rdWRMP (Edge Analytics) mean that there could be a perception of inconsistency between the two plans and hence challenge to estimates of the volumes of additional supplies required.		Amber	Superseded	Affinity to consider whether to undertake this.			Closed - superseded	
	007	Demand Forecast meeting 13/12/2018. Summarised email by 19/12/2018	B Piper	24/12/2018	Consultation responses raised by the EA on demand management baseline and option assumptions to be fully addressed and clearly explained in the rdWRMP and supporting technical reports.	Atkins to undertake review of supporting documentation	Amber	Superseded				Closed - superseded 011	
	008	09/01/2019	B Piper	15/01/2019 (mtg)	Re: Report 2.5 Dry Year Annual Average (DYAA) and Critical Period Factor Analysis. Although the approach described in the report meets EA Water Resource Planning guideline, the report raises a number of queries about the meteorological data used and comparison of PR14 and WRMP19 results.	Responses to queries required. It may be that these can be dealt with through additional text and revisions to improve clarity justification for assumptions made and key messages/data to take through to the demand forecast and later analysis.	Amber		Reports returned to Artesia for action			Closed - superseded 009	
	009	Demand Forecast meeting 15/01/2019. Summarised in email on 15/01/2019	B Piper		Technical methodology is soundly based however some assumptions and interpretation of analysis and outputs need to be expressed more clearly in the supporting Technical Documents and in particular in the summary report and main rdWRMP	Artesia to draft additional text.	Amber	Not yet	Reports returned to Artesia for action Reports 2.1 2.3 and 2.7 revised to address comments raised			Closed	
	010	Demand Forecast meeting 15/01/2019. Summarised in email on 15/01/2019 and 17/01/2019	B Piper		The different approaches to population and property forecasts for Affinity rdWRMP (Experian) and for Thames Water rdWRMP (Edge Analytics) mean that there could be a perception of inconsistency between the two plans and hence challenge to estimates of the volumes of additional supplies required.	Affinity Water to consider and draft additional text	Amber	Under consideration				Open	
	011	Demand Forecast meeting 15/01/2019. Summarised in email on 15/01/2019	B Piper		Consultation responses raised by the EA on demand management baseline and option assumptions to be fully addressed and clearly explained in the rdWRMP and supporting technical reports.	Affinity and Artesia to draft additional text	Amber		Details of demand management options set out in Report 4.7 - 'Water Demand Management Framework - Assessment of Demand options'	Andres Farcomeni			Closed
	012	Email on 29/1/2019	B Piper		MLR - report. There are some areas where clarification of the text would be helpful and I have picked up various editing points though these should not be taken as a formal review of the document. MLR may be unfamiliar to some EA staff who may be more used to the conventional micro-component approach to FCC forecasts so it is important that the advantages of the MLR approach are clearly set out.	Affinity to pass on to Artesia for action	Amber		Reports returned to Artesia for action Report 2.1 Artesia MLR Forecast report reissued	Andres Farcomeni			Closed
013	Email on 5/2/2019	B Piper		Carbon costs for demand management options	Affinity to pass on to Artesia for action	Amber		Query to Artesia	Andres Farcomeni			Closed - superseded 013	

Issue	Ref	Date raised	Raised by	Response Due Date	Observation/risk	Action	Priority (R/A/G)	Response Received	Company response	Owner	By when	Issue Open / Closed
Options	014	Demand Management Options meeting 15/01/2019. Summarised in email on 15/01/2019	B Piper		Technical methodology appears to be soundly based. Report 4.7 and option cost spreadsheet to be reviewed	Atkins to undertake review of documentation (Report 4.7)	Amber	Review comments to Affinity via email				Closed - superseded
	015	Supply side Options meeting 15/01/2019. Summarised in email on 17/01/2019	B Piper		Strategic supply-side options; it is not yet clear that EA recommendations and other consultation responses have been adequately dealt with	Atkins to undertake review of documentation (Report 4.6)	Amber					Closed - superseded
	016	Unconstrained to constrained options meeting on 22/01/2019. Summarised in email on 25/01/2019	B Piper	N/a	Rigorous approach followed with internal reviews and challenge	No action	Green					Closed
	017	Unconstrained to constrained options meeting on 22/01/19. Summarised in email on 25/01/2019	B Piper	31/01/2019	It was not clear from the Option Dossiers how option on-costs and up lifts have been allowed for in the data that feeds through into the EBSD model	1. Affinity to provide updated rdWRMP19 Report 4.6 Supplyside and Constrained Options Volume 2 which includes Options Dossiers on the 5 major supply-side options 2. Affinity to check with AECOM how on-costs and up lifts have been allowed for in the Option Dossiers	Amber		Opportunity to review when E&S costs are reviewed in interval between rdWRMP19 is issued for consultation and publication of final plan			Open
	018	Follow-up to query about strategic supply-side options: email from N Honeyball	B Piper		Further detail on Strategic supply-side options in order to meet EA Recommendations 4 and 6	Additional drafting of an Addendum to existing Technical Reports	Amber			Nick Honeyball		Open
	019	Email on 5/2/2019	B Piper		Carbon costs for demand management options	Affinity to pass on to Artesia for action	Amber		Query to Artesia	Andrea Farcomeni		Open
EBSD and Decision Making	020	EBS and Decision Making meeting on 22/01/2019. Summarised in email on 24/01/2019	B Piper	N/a	Standard EBSD approach replicated in model to reproduce the outputs from conventional modelling for use in EA WRP Tables and hence regulatory comparisons	No action	Green		Opportunity to review when E&S costs are reviewed in interval between rdWRMP19 is issued for consultation and publication of final plan			Open
	021	EBS and Decision Making meeting on 22/01/2019. Summarised in email on 24/01/2019	B Piper	31/01/2019	Report 4.9 now well structured with clear narrative of the approach followed and its consistency with EA WRMP guideline. More attention to be given in next draft to how EA consultation responses have been dealt with and why the Severn to Thames transfer supported by GARD does not provide the operational functionality required for the Affinity Water supply system that relies on run-of-river abstractions and groundwater rather than surface water storage reservoirs. Such narrative also needs to feed into the main rdWRMP	Amendments required during further drafting also to feed into main rdWRMP	Amber		Addressed in updated rdWRMP19 main text			Closed
	022	EBS and Decision Making meeting on 31/01/2019	B Piper		Some additional runs might be needed to inform actions in response to Ofwat's IAP published on 31/01/2019	Doug Hunt to advise	Green		Affinity to consider what additional runs might be useful and could be completed in the time available			Open
Headroom	023	Headroom meeting 14/01/2019. Summarised email 15/01/2019	E Everard	18/01/2019	Confirmation is required that the target headroom assessment has been based on the 1 in 200 year drought event and that the target headroom risk profile has been agreed and is adequately justified in the text.	<ul style="list-style-type: none"> Atkins (EE) to review draft Headroom report for rdWRMP19 in further detail and request any further clarifications where necessary Affinity (RC) to discuss with others (Affinity and Artesia) regarding assumptions around 1 in 200 year event DO components and risk profile and best way to address 	Amber	15/01/2019	On the 1 in 200 year DO aspect I think there is a fundamental technical mis-understanding there. Headroom is about uncertainty (epistemic risk) not the level of drought risk (aleatory risk) that is planned to. This is analysed in detail within the UKWIR Risk Based Methods report. Moving to a 1 in 200 year level of drought resilience will theoretically tend to increase the level of Target Headroom not reduce it as there is more uncertainty. I will leave the final absolute outputs to the team but it is clear that there is no technical basis for reducing the Target Headroom due to the increase in drought resilience.			Closed - superseded
	024	Headroom meeting 14/01/2019. Summarised email 15/01/2019	E Everard	18/01/2019	Additional explanation and/or signposting required in the headroom technical report to ensure consultation responses from EA and Ofwat associated with target headroom are fully addressed and clearly explained in the headroom technical report.	Affinity (RC) to clarify from EA exact requirements in terms of headroom to satisfy reporting for Direction 3(e)(i).	Amber					Closed - superseded
	025	24/01/2019	E Everard	31/01/2019	Target headroom assessment has been based on the worst historic drought DO rather than the 1 in 200 year scenario which the rest of the rdWRMP19 is based on. Having previously indicated that this could be updated for rdWRMP19 the company could be criticised for not having done so.	In process terms the headroom assessment should be based on the 1 in 200 year DO. Affinity need to be clear why this hasn't been done and provide some explanation and quantification of the likely magnitude to provide reassurance that it won't have a material impact on the supply/demand balance or the choice of options in the rdWRMP19 adaptive plan.	Amber	28/01/2019 and 11/02/2019 and 13/02/2019	Doug Hunt queried why the issue was red. In email response it was explained that it was the basis of the headroom calculation not its application in later analysis that is a possible issue. The possible magnitude of any change in Headroom uncertainty seems likely to be small and therefore not influence later aspects of the analysis but the wording of the various documents does need to show that Affinity has undertaken the additional analysis that it said it would or if not to explain why not and why not doing so is not material. The company response is that uncertainty will tend to increase when expressed as a percentage as the drought severity increases due to the uncertainties involved in the extrapolation. Rather than doing that we have maintained the value at the worst historic in absolute terms - we recognise that it should increase as a percentage but have not done this as the estimation becomes very subjective and have instead assumed that the increasing percentage uncertainty is offset by the smaller quantum of the absolute DO between worst historic to 1 in 200. Verbal Doug agreed that the need for more careful drafting and to make sure that the company is not leaving itself open to possible criticism. The text in the revised headroom report received 11/02/2019 has been amended to remove all reference to worst drought on record instead saying it is based on design drought. One additional paragraph has been added in 3.5.1 Accuracy of Supply Side data to explain target headroom remaining same for 1 in 200 year DO. Text for quantification of the difference of calculating headroom for worst historic instead of 1 in 200 year has been suggested (13/02/2019) but not yet seen in the text.	Doug Hunt		Open

Issue	Ref	Date raised	Raised by	Response Due Date	Observation/risk	Action	Priority (R/A/G)	Response Received	Company response	Owner	By when	Issue Open / Closed
	026	24/01/2019	E Everard	31/01/2019	Additional explanation and/or signposting required to ensure: (i) items of further work are clearly documented and outstanding items listed; and (ii) consultation responses from EA and Ofwat associated with target headroom are fully addressed and clearly explained in the headroom technical report.	Outstanding queries to be addressed and text updated	Green		The text in the revised headroom report received 11/02/2019 has not addressed these issues. There is an editorial review comment in the document regarding adding in reporting on climate change to satisfy Direction 3e(i) which says this is being tackled separately outside the headroom report.			Open
Leakage	027	Leakage meeting 15/1/2019 Summarised by email 17/01/2019	Ben Piper	24/01/2019	Leakage Strategy Report is very high level – further explanation required of how rdWRMP19 baseline and options have been developed to match Defra and regulatory targets in particular expressing to what starting value the stated percentage reductions have been applied to.	Revise leakage strategy report	Amber	27/01/2019	Revised leakage report	P Campbell		Closed - superseded 028
	028	email 31/1/2019	Jonathan Archer Ben Piper		As a general comment and particularly in the light of the Ofwat publication of 31st January 2019 which indicates that there is further work to do there appears to be over reliance on in-house costs and little discussion of the in-house costs compared to the wider industry. With DataShare and assuming Affinity are using cost consultants with anonymised comparator data it should have been possible to consider capex and opex efficiency. The narrative of the documents suggests that the approach has been an update of the approach that had been used for previous Business Plans/WRMP so the approach itself and the in-house costs have not been subject to detailed scrutiny and challenge.	Internal Affinity Water discussions scheduled for 07/02/2019	Amber		Report has been heavily redrafted since the audit in line with Ofwat feedback and IAP document rdWRMP19 main text to be updated to reflect any new assumptions and wording from Technical Report	P Campbell		Open
Outage	029	Outage meeting 14/01/2019. Summarised by email 15/01/2019	E Everard	29/01/2019	Revisions to documentation needed - to ensure outage figures are reported consistently and consultation responses raised by Ofwat are fully addressed.	Further checks and minor amendments required by Affinity Water.	Amber-Green	13/02/2019	Revised report received from Affinity Water 13/02/2019 in which further checks have been made and the main issues identified have been addressed. Minor revisions to documentation recommended to ensure Ofwat comments are more fully addressed	R Carruthers		Open
	030	Outage meeting 14/01/2019. Summarised by email 15/01/2019	E Everard	29/01/2019	Minor revisions to documentation recommended.	Minor edits to documentation	Green	13/02/2019	Revised report received from Affinity Water 13/02/2019 in which some of the minor issues raised have been addressed.	R Carruthers		Closed
WRMP Tables Assurance	031	01/02/2019	J Jacobs M Barker	07/02/2019 14/02/2019	Errors in data population in Table 5 Feasible Options – Errors noted as a result of macros not working correctly. Affinity Water is in discussion with decisionLab to address issues identified.	Affinity to complete actions identified on 1/2/2019. Atkins to review Tables once revised to check issues addressed	Red		Updated tables were reviewed during audit on 14/02. We were able to follow the audit trails of figures except for the financing costs (see below).	R Carruthers		Closed
	032	01/02/2019	J Jacobs	07/02/2019	Potential risk with reliability and accuracy of inputs to EBSD model – Outstanding queries relating to calculation/treatment of capex financing carbon environmental and social costs. Company to confirm if models (Run 8: Expected Future and Run 13: Optimistic Adaptive Future) need to be re-run as a result of issues identified above.	Affinity to complete actions identified on 1/2/2019. Atkins to review Tables once revised to check issues addressed /if further action required.	Amber	11/02/2019	Affinity confirmed that errors had been found in some of the carbon costs as a result of the audit. The company has investigated the scale of the error and this was found to be less than 1% of the option's fixed capex in most cases with a maximum impact of 4%. The company is planning to re-run the model for the final plan but will not do so for the consultation as the error is not expected to affect scheme selection. Information still outstanding on carbon costing approach. Affinity confirmed that Air Quality had not been included in E&S costs. Technical report requires updating to clarify this. Affinity provided audit trail for financing costs 18/02/19 although the approach requires further explanation. Affinity to clarify approach for scaling climate change impacts.	R Carruthers		Open
	033	01/02/2019	J Jacobs	07/02/2019	Commentary – Awaiting sight of commentary. Highlighted that where data does not reconcile with previously submitted data in Annual Performance Report for baseline/historic years this needs to be exposed and explained in the Company commentary.	Atkins to review commentary that will accompany Tables once ready	Green	21/02/2019	Affinity provided Atkins with commentary to accompany Tables 21/02/2019. Outstanding query/amendment to be made.	R Carruthers		Open
	034	01/02/2019	J Jacobs	To be confirmed by Affinity Water – not immediate priority	Methodology for populating tables – The end-to-end processes need to be documented for a number of reasons: 1. It is good practice 2. There is lack of clarity/visibility how some data is derived which makes assurance (both internal and external) more challenging 3. There could be an issue if staff are unavailable later in the WRMP process to repeat/replicate processes or even explain how numbers were generated 4. There is potential at a later date that Affinity Water is asked to provide such documentation e.g. at a Public Inquiry	We suggest that this can be undertaken at a later date once the work on the main submission for 1 st March deadline has been completed? It would be helpful to have a formal response to our recommendation as this is an issue which will be flagged up in our report.	Amber			R Carruthers		Open
	035	14/02/2019	M Barker	18/02/2019	Final versions of tables outstanding with corrections to tables including Table 2 (base year data) Table 5 and Table 8. Further errors found in Tables 3 and 8 on 19/02/19 - mismatch between PCC and microcomponents values.	Affinity to provide corrected tables.	Amber	19/02/2019	Affinity has provided updated Tables still a few queries outstanding.	R Carruthers		Open

Appendix C. List of Technical Reports

Note that for reports that have been prepared by external consultants, the original Author has been given in the following Tables, although they may have been packaged in Affinity Water's covers. Not all reports have completed QA and sign-off sheets, so it is sometimes difficult to track version numbers.

This list is for reports provided by the start of Monday 18th February 2019.

• Technical Reports supplied – Supply-side

Number	Title	Author	Date provided	Version
1.1	Deployable Output and Climate Change Impact Assessment	Aecom	17/12/2018	V1.3 Nov 2018 (Affinity amendment history 17/11/2017)
1.1.1	Deployable Output Addendum report for the revised draft WRMP19	Affinity	04/01/2019 Revised 15/02/2019	V1.0 Dec 2018 (amendment history and sign off 02/01/19)
1.1.2	WRMP and Drought Plan Links	AECOM	17/12/2018	V1.0 April 2018
N/A	Response to EA preconsultation on DO for rdWRMP19	Affinity	04/01/2019	V1.0 04/01/19
1.2	Climate Change Assessment report - Basic and intermediate (HRW)	HRW	21/12/2018	Aug 2017
1.3	Climate Change Vulnerability Assessment	HRW	21/12/2018	Oct 2017
1.4	Sustainability Reductions	Affinity	23/01/2019 Revised 14/02/2019	V2.3 Jan 2019 rdWRMP_release Atkins 23-01-19
1.4.1	AMP6 NEP Progress and Summary of WINEP PR19 Schemes	Affinity	04/01/2019 Revised 11/02/2019	Dec 2018
N/A	WISER PR19	Affinity	17/08/2018	Report to EA 17/08/18
1.4.2	WISER Addendum	Affinity	04/01/2019	Dec 2018
1.5	Water Resource Zone Integrity	Affinity	04/01/2019	Dec 2018

1.6	Drought Management Plan 2018	Affinity	21/12/2018	Nov 2018
1.7	Problem Characterisation Report	Affinity	04/01/2018	Dec 2018

rdWRMP Technical Reports schedule as updated

• **Technical Reports supplied – Demand-side**

Number	Title	Author	Date provided	Version
2.1	Household Demand Forecast - MLR Modelling Report	Artesia	18/01/2019 Revised 11/02/2019	Not given
2.2	Household Demand Forecast - Micro-Component Report	Affinity	07/01/2019	Ver 5.0
2.3	Domestic Housing and Population Forecast	Affinity	04/01/2019 Revised 11/02/2019	Ver 0.1 Draft
2.3.1	Population, Household and Dwellings Forecasts (Experian)	Experian	04/01/2019	Dated June 2018
2.4	Non-Household Demand Forecasting Summary Report	Servlec	04/01/2019	Ver 5 May 2018
2.5	Dry Year Annual Average (DYAA) and Critical Period Factors Analysis	Artesia	04/01/2019	Ver 13 Jan 2019
2.6	Metering Cost Benefit Analysis	Motts	04/01/2019	Rev B Dec 2018
2.7	Overarching Demand Forecast Report	Artesia	04/01/2019 Revised 11/02/2019	Ver 4.0 Dec 2018

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• **Technical Reports supplied – Risk and Uncertainty**

Number	Title	Author	Date provided	Version
3.1	Outage	Affinity	04/01/2019 Revised 12/02/2019	Ver 2.3 Dec 2018
3.2	Headroom	Artesia	18/01/2019 Revised 11/02/2019	Ver 21 Jan 2019 Ver 22

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- Technical Reports supplied – Options**

Number	Title	Author	Date provided	Version
4.1	Unconstrained Options Report - Supply Options	Affinity	04/01/2019	Ver 4.0 Nov 2018
4.2	Unconstrained Options Report and Screening Results - Demand Management Options	Artesia	11/01/2019	Ver 3.1 May 2017??
4.3	AECOM Screening Methodology (Supply Options)	Aecom	04/01/2019-	Ver 3.0 June 2016
4.4	LRMC Cost Model Update	Aecom	04/01/2019	Ver 4.0 Sept 2017
4.5	Supply Side and Constrained Options Report Vol 1	Aecom	04/01/2019	Rev 4 Dec 2018
4.6	Supply Side and Constrained Options Report Vol 2	Aecom	30/01/2019	Rev 3 Jan 2019
4.7	Water Demand Management Framework - Assessment of Demand Options	Artesia	15/01/2019	Final Ver 8 Dec 2018
4.8	Leakage	Affinity	27/01/2019	PC update Jan 2018
4.8.1	ELL and SELL Determination 2016	RPS	04/01/2019	Rev 3 Sept 2018
4.9	EBSO and Demand Modelling and Decision-making process	Affinity	17/01/2019	Ver 3.2 Jan 2019
4.14	Supply 2040	Affinity	23/01/2019	Ver 2.1 Dec 2018

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- Technical Reports supplied – Others**

Number	Title	Author	Date provided	Version
5.1	National and Regional Water Resources Modelling Report	Affinity	30/01/2019	Report dated Jan 2018
5.1.1	WRSE Phase 4 and 5 Modelling		Not yet provided	
5.2	Water Company and ThirdParty Bulk Transfers		Not yet provided	
6.1	WRP Tables and Commentary & Exception Report		Not yet provided	

7.1	Engaging with Customers, Communities and Stakeholders		12/02/2019	
N/A	Stage 1 Affinity Water rdWRMP Pre-consultation Customer Focus Groups 1 FINAL	IPSOS	04/02/2019	
N/A	Stage 1 Affinity Water rdWRMP Pre-consultation Customer Focus Groups 1 FINAL	IPSOS	04/02/2019	

rdWRMP Technical Reports schedule as updated

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Appendix OC.A11.2

Action ref AFW.OC.A11

NERA Economic Consulting - Assessing Ofwat's Funding and Incentive Targets for Leakage Reduction



Assessing Ofwat's Funding and Incentive Targets for Leakage Reduction

Prepared for SES Water in collaboration with Affinity Water, Anglian Water, Dwr Cymru, South East Water, South Staff Water, Southern Water, Thames Water and Yorkshire Water

26 March 2019

CONFIDENTIALITY

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Executive Summary

NERA Economic Consulting (NERA) has been commissioned by SES Water, in collaboration with Affinity Water, Anglian Water, Dwr Cymru, South East Water, South Staffs Water, Southern Water, Thames Water and Yorkshire Water, to review the Office for Water Services' (Ofwat) PR19 Initial Assessment of Plans (IAP).¹

Specifically, SES Water has asked us to review the basis for Ofwat's proposed targets for leakage reduction over the next Asset Management Period (AMP), and the proposed funding arrangements for achieving leakage reduction.

Ofwat's Approach to Funding Leakage Reduction at PR19

Leakage reduction is a high-profile output provided by water companies, and has been given a great deal of prominence in Ofwat's "Delivering Outcomes for Customers" regime at PR19. Ofwat therefore expected companies "to propose stretching performance commitment levels for leakage".²

At PR19, Ofwat requires all companies to have a Performance Commitment (PC) and a financial Outcome Delivery Incentive (ODI) for leakage. Ofwat standardises the definition of leakage targets and prescribes a method for how companies should set their target at PR19, or justify why they have not adopted the prescribed method. Ofwat "expect[s] companies to propose forecast upper quartile performance levels" for four PCs, including leakage.³

As well as its expectation that companies propose UQ performance, it also sets out instructions on the minimum target for leakage improvement that companies are required to achieve,⁴ including that the target must be for at least 15 per cent reduction, "one percentage point more than the largest reduction commitment at PR14",⁵ and to "achieve the largest actual percentage reduction achieved by the company since PR14".⁶

Ofwat has not allowed the enhancement expenditure for leakage reduction requested by half of the companies for achieving the leakage reduction targets set out in their business plans. However, Ofwat partially allowed enhancement expenditure for leakage reduction by 10 companies forecasting leakage reduction beyond defined thresholds.

¹ Ofwat (January 2019), PR19 initial assessment of plans.

² Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, page. 65.

³ Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, page. 61 and page 65.

⁴ Ofwat namely states that "Companies should set stretching leakage performance commitment levels to: [...] achieve at least achieve at least a 15% reduction in leakage (one percentage point more than the largest reduction commitment at PR14) – or justify why this is not appropriate". Source: Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, page. 65.

⁵ Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, page. 65

⁶ Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, page. 65

By disallowing companies' enhancement expenditure below its target, Ofwat has proposed that companies should fund leakage reduction through their base cost allowances.⁷ Ofwat's stated rationale for this approach to funding leakage reduction is that: "[c]ustomers should not pay extra costs for companies to deliver stretching targets" for leakage reduction.⁸

As we set out in this report, there are several reasons why Ofwat's proposed funding for leakage reduction will not result in regulated revenues sufficient for companies to finance the efficient costs of meeting the "stretching" PCs on leakage reduction which Ofwat has itself asked companies to target.

Ofwat's Base Allowances Do Not Allow Funding of Leakage Reduction to Attain the More "Stretching" PR19 Targets

It may be intuitively appealing for Ofwat to argue that companies have been reducing leakage in recent years, so base allowances calibrated to historical levels of expenditure must necessarily fund ongoing leakage reduction. However, as we explain in this report, this statement rests on assumptions that do not hold in reality.

It is correct that some companies have reduced leakage during the historical period over which Ofwat calibrated its econometric models. Also, cost targets established through comparative benchmarking may (to some extent) identify the level of leakage expenditure required to minimise water companies' costs.

However, the econometric modelling performed to set base allowances has a number of limitations that mean it will not identify the level of expenditure required to achieve leakage targets set over the next AMP. They do not identify how the optimal level of leakage varies over companies, they may be distorted by variation in companies' historical investment cycles, and they do not capture the required increase in leakage reduction activity by the industry over the next AMP.

We have conducted empirical analysis that supports these arguments, demonstrating that controlling for differences between companies' actual leakage and SELL has a statistically significant impact on companies' costs.

We have also shown that the marginal cost of leakage reduction rises as companies reduce leakage to lower levels than observed historically, which is another factor not accounted for by Ofwat's base expenditure modelling.

We therefore conclude that base expenditure forecasts generated from Ofwat's models will systematically understate companies' investment requirements in a period in which companies are accelerating the rate of leakage reduction, as they will not capture the required step-change in companies' leakage reduction expenditure.

⁷ Ofwat rejected enhancement expenditure for reducing leakage for Bristol Water, SES, Severn Trent, South East Water, South West Water, Southern Water, Wessex Water, Yorkshire Water. Source: Ofwat (2019), Action summary tables for each affected company.

⁸ Ofwat (January 2019), PR19 initial assessment of plans, Technical appendix 2: Securing cost efficiency, page. 18.

Failure to Allow for Enhancement Expenditure to Fund Leakage Reduction Contradicts with Ofwat's Approach at PR14 and Regulatory Precedent

Ofwat's decision not to provide companies with allowances for enhancement to bridge the gap between SELL and its "stretched" leakage targets means that the funding package as a whole does not fund achievement of the leakage reduction targets. In essence, there is an inconsistency between Ofwat's cost allowances (both base allowances and enhancement) and its targets.

By contrast, there was no such inconsistency in Ofwat's approach at PR14, as PCs for leakage reduction were set to reflect local conditions affecting leakage/SELL, with funding for companies stretching their performance beyond the PCs coming through ODIs. Past regulatory determinations by Ofgem have also allowed companies to recover the costs of new regulatory requirements that trigger significant investment.

Ofwat's Single Median Unit Cost Approach to Enhancement Funding is Flawed

Ofwat's approach of allowing enhancement expenditure based on a single median unit cost across the industry is flawed on several grounds.

Ofwat's single unit cost approach fails to capture any potential variation across companies' marginal costs because of differences in the costs companies face to reduce leakage, and the level of leakage reduction efforts conducted historically. It also fails to capture the tendency of unit costs to be increasing for maintaining or attaining lower levels of leakage.

Ofwat's approach may undermine companies' incentives to reduce leakage at least-cost, as companies achieving the median do not benefit from doing so in terms of higher allowances.

Also, Ofwat's allowed unit cost for leakage reduction is based in part on ODI out/underperformance rates proposed by companies, which tend to capture marginal benefits, which as Ofwat itself notes are likely to be less than marginal costs. ODI rates are also scaled by a 50 per cent sharing factor, so Ofwat's calculation may understate the efficient unit costs of leakage reduction.

We Recommend Changing the Funding Package for Leakage Reduction to Allow Companies to Recover Efficiently Incurred Costs

Based on the above, change to Ofwat's funding package for leakage reduction is therefore required to ensure companies can fund the efficient costs of meeting the industry's leakage reduction targets. One option would be to develop its cost assessment modelling tools, so that companies' base allowances better-reflect the growing need for work to reduce leakage. Alternatively, Ofwat could revise its "gated" approach to allowing companies' claims for enhancement expenditure to reduce leakage in a way that provides funding for them to bridge the gap between their proposed PCs and the levels of leakage reduction activity conducted historically.

We have also shown that the marginal cost of leakage reduction rises as companies reduce leakage to lower levels than observed historically, which is another factor not accounted for by Ofwat's base expenditure modelling, or its allowances for enhancement expenditure for companies exceeding the target.

A possible solution to this problem could lie in modelling more thoroughly the unit cost of leakage reduction, as a function of the levels of leakage reduction companies target and other factors influencing the cost of leakage reduction. Essentially, we recommend that Ofwat considers improving on its approach of basing allowances on proposed ODI rates (which are in any event inappropriate as a guide to the cost of leakage reduction) and industry median unit costs.

1. Introduction

NERA Economic Consulting (NERA) has been commissioned by SES Water, in collaboration with Affinity Water, Anglian Water, Dwr Cymru, South East Water, South Staffs Water, Southern Water, Thames Water and Yorkshire Water, to review the Office for Water Services' (Ofwat) PR19 Initial Assessment of Plans (IAP).⁹

Specifically, SES Water has asked us to review the basis for Ofwat's proposed targets for leakage reduction over the next Asset Management Period (AMP), and the proposed funding arrangements for achieving leakage reduction.

This report is structured as follows:

- Chapter 2 provides an overview of Ofwat's IAP proposals on how to set targets for leakage reduction and how to fund companies' leakage reduction efforts;
- Chapter 3 assesses the extent to which Ofwat's approach to setting base allowances funds companies' proposed leakage reduction targets;
- Chapter 4 assesses whether Ofwat's approach to appraising companies' requests for enhancement expenditure funds leakage reduction targets;
- Chapter 5 assesses Ofwat's approach to setting the allowed unit cost of leakage reduction; and
- Chapter 6 concludes and makes recommendations.

⁹ Ofwat (January 2019), PR19 Initial Assessment of Plans.

2. Overview of Ofwat's IAP Proposals on Leakage

2.1. Background on Ofwat's Leakage Proposals

Leakage reduction is a high-profile output provided by water companies, and has been given a great deal of prominence in Ofwat's "Delivering Outcomes for Customers" regime at PR19. Ofwat therefore expected companies "to propose stretching performance commitment levels for leakage".¹⁰

At PR19, Ofwat requires all companies to have a Performance Commitment (PC) and a financial Outcome Delivery Incentive (ODI) for leakage. Ofwat standardises the definition of leakage targets and prescribes a method for how companies should set their target at PR19, or justify why they have not adopted the prescribed method. Ofwat "expect[s] companies to propose forecast upper quartile performance levels" for four PCs, including leakage.¹¹

As well as its expectation that companies propose UQ performance, it also sets out instructions on the minimum target for leakage improvement that companies are required to achieve,¹² including that the target must be for at least 15 per cent reduction, "one percentage point more than the largest reduction commitment at PR14",¹³ and to "achieve the largest actual percentage reduction achieved by the company since PR14".¹⁴

At PR14, Ofwat also required all companies to set common targets on leakage.¹⁵ However, Ofwat did not intervene to standardise targets for all companies, or set targets to reflect an UQ level of performance. In response, most companies proposed caps and collars and deadbands on the incentive, to limit rewards and penalties if outturn leakage diverged materially from the PC.

By specifying a 15 per cent leakage reduction target at PR19, Ofwat has diverged from the approach it expected companies to use when setting leakage targets at PR14. Ofwat accepted lower leakage reduction targets at PR14 "because companies' proposals on leakage aligned with the sustainable economic level of leakage (SELL) and local issues (such as availability of water resources and statutory abstraction reductions) significantly influence the SELL".¹⁶ Under the SELL approach at PR14, companies set leakage targets such that the marginal cost

¹⁰ Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, page. 65.

¹¹ Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, page. 61 and page 65.

¹² Ofwat namely states that "Companies should set stretching leakage performance commitment levels to: [...] achieve at least achieve at least a 15% reduction in leakage (one percentage point more than the largest reduction commitment at PR14) – or justify why this is not appropriate". Source: Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, page. 65.

¹³ Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, page. 65

¹⁴ Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, page. 65

¹⁵ Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, page. 8.

¹⁶ Ofwat (December 2014), Setting price controls for 2015-20, Final price control determination notice: policy chapter A2 - outcomes, page. 21.

of water leakage would equal to the marginal cost of leakage control, reflecting both the private costs (i.e. the operating and capital costs of leakage control) and the external social and environmental costs of leakage.

By contrast, at PR19 Ofwat is now concerned that the SELL approach “has not driven sufficient efficiency improvements or innovation in leakage reduction”, and that it therefore is no-longer a sufficient leakage target.¹⁷

Reflecting this Ofwat policy, companies proposed leakage reductions broadly in accordance with Ofwat's 15 per cent target in their PR19 business plans: the proposed reductions ranged between -14.4 per cent and -25.4 per cent.¹⁸ Correspondingly, companies also requested additional enhancement expenditure to fund the leakage reduction targets, which “stretched” beyond the SELL that reflects local conditions.¹⁹

2.2. Ofwat's Approach to Funding Leakage Reduction

In its IAP, Ofwat does not grant enhancement expenditure allowances for reducing leakage to seven companies,²⁰ stating that “Customers should not pay extra costs for companies to deliver stretching targets. The delivery of stretching performance is to be funded from base costs”.²¹

During its webinar, Ofwat further clarified its position stating that companies' have been engaging in “network maintenance and leakage reduction” in the past and therefore the costs of these activities “are included in [...] base allowances”.²² To support its statement, Ofwat mentions that two companies have not requested enhancement funding to deliver the 15 per cent leakage reduction target, and that the 3 fast tracked companies “have accepted [Ofwat's] base allowance to achieve a 15% leakage reduction”.²³

Ofwat defines base costs as “routine, year on year costs, which companies incur in the normal running of their business” including operational and capital maintenance costs.²⁴ The base cost allowance consists of an unmodelled and a modelled cost component, with the modelled component determined by an econometric benchmarking exercise (see Section 3.1).

While Ofwat rejected many companies' requests for enhancement allowances to fund leakage reduction, Ofwat partially approved enhancement expenditure to support leakage reduction

¹⁷ Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, page. 63.

¹⁸ Ofwat (January 2019), Supply-demand balance enhancement: Feeder model summaries, page. 13.

¹⁹ Ofwat describes the leakage reduction targets at PR19 as “stretching performance commitment levels for leakage”. Source: Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, page. 65.

²⁰ This includes: Affinity Water, Hafren Dyfrdwy, SES Water, Southern Water, South West Water, United Utilities Water and Wessex Water. Ofwat (January 2019), Supply-demand balance enhancement: Feeder model summary, page 16.

²¹ Ofwat (January 2019), PR19 initial assessment of plans, Technical appendix 2: Securing cost efficiency, page. 18.

²² Ofwat (7 February 2019), Ofwat webinar: Securing cost efficiency, Q&A, p.3.

²³ Ofwat (7 February 2019), Ofwat webinar: Securing cost efficiency, Q&A, p.3.

²⁴ Ofwat (January 2019), PR19 initial assessment of plans, Technical appendix 2: Securing cost efficiency, page. 9.

for 10 companies.²⁵ The partial funding is set by multiplying an allowed unit cost of leakage reduction (£1.6m/MI/d) by an allowed volume of leakage reduction, conditional on passing one of two tests:

- If a company forecast leakage reduction in excess of the 15 per cent target, but does not achieve an upper quartile level of leakage, it receives funding for leakage reduction *beyond* 15 per cent.
- If a company achieves the upper quartile level of leakage by 2024-25, in both normalised measures (per km of main and per property), it receives funding for leakage reduction *beyond* the upper quartile level.
- If a company passes both the above tests, it receives the maximum of the funding under the two tests.

Ofwat has set the allowed unit cost of leakage reduction that applies to allowed enhancement expenditure through its Supply-Demand Balance (SDB) enhancement modelling that uses data from companies' business plans. The proposed allowed unit cost at PR19 is £1.6m/MI/d, and is the average of:²⁶

- median leakage unit costs derived from the PR19 SDB enhancement analysis;
- median incentive rate for underperformance reported in companies' business plans; and
- median incentive rate for outperformance reported in companies' business plans.

2.3. Conclusion

Ofwat has disallowed the enhancement expenditure for leakage reduction requested by half of the companies for achieving the leakage reduction targets set out in their business plans. However, Ofwat partially allowed enhancement expenditure for leakage reduction by 10 companies forecasting leakage reduction beyond defined thresholds, with allowances calculated at an allowed unit cost set by Ofwat, multiplied by the volume beyond the threshold.

By disallowing companies' enhancement expenditure below its target, Ofwat has proposed that companies should fund leakage reduction through their base cost allowances. Ofwat defines base cost as "routine, year on year cost, which companies incur in the normal running of their business", and estimates the efficient level of base costs through five econometric benchmarking models.²⁷

Ofwat's stated rationale for this approach to funding leakage reduction is that: "[c]ustomers should not pay extra costs for companies to deliver stretching targets" for leakage reduction.²⁸

²⁵ This includes: Anglian Water, Bristol Water, Northumbrian Water, Portsmouth Water, South East Water, South Staff Water, Severn Trent Water, Thames Water, Welsh Water, Yorkshire Water. Source: Ofwat (January 2019), Supply-demand balance enhancement: Feeder model summary, page 16.

²⁶ Ofwat (January 2019), Supply-demand balance enhancement: Feeder model summary, page. 15.

²⁷ Ofwat (January 2019), PR19 initial assessment of plans, Technical appendix 2: Securing cost efficiency, page. 9.

²⁸ Ofwat (January 2019), PR19 initial assessment of plans, Technical appendix 2: Securing cost efficiency, page. 18.

As we discuss in the sections below, there are several reasons why Ofwat's proposed funding for leakage reduction will not result in regulated revenues sufficient for companies to finance the efficient costs of meeting the "stretching" PCs on leakage reduction which Ofwat has itself asked companies to target.

3. Assessing the Funding of Leakage Reduction through Base Allowances

As explained above, Ofwat states that its base allowances are sufficient to fund companies' leakage reduction targets. In this section, we therefore review Ofwat's econometric methods and assess whether its approach to setting base allowances will produce revenues sufficient for efficiently operated companies to fund the leakage reduction targets Ofwat has set. As discussed below, in performing this assessment, we consider factors such as the ability of Ofwat's models to control for the determinants of companies' leakage performance, as well as the effects of different historical leakage reduction expenditure and investment cycles across companies.

3.1. Econometric Models Used to Set Base Allowances

Ofwat set total expenditure (totex) allowances for each company using four main building blocks:²⁹

- *modelled base cost*, including operating and capital maintenance expenditure;
- *unmodeled base costs*, including business rates, abstraction charges, Traffic Management Act costs, wastewater industrial emissions directive costs;
- *enhancement costs* reported in PR19 business plans; and
- *adjustments* based on claims submitted by companies.

As discussed in Section 2, Ofwat proposes that water companies should fund leakage reduction through their base costs allowance.³⁰ Ofwat sets modelled base cost allowances for water through the following stages:

- Ofwat's econometric benchmarking models use historical data on base costs and drivers over a seven-year period between 2011-12 to 2017-18. Ofwat constructs 5 econometric models with different cost and cost driver specifications. It regresses "botex" (operating expenditure excluding unmodeled opex, plus capital maintenance) on selected cost drivers, with cost drivers selected to reflect the scale, complexity, topography and density of a water network (see Table 3.1).
- Ofwat then calculates each company's efficiency score, the ratio of each company's actual botex in the modelling period to its modelled botex. It then ranks companies' efficiency score and selects the upper quartile value (95.2 per cent, set by South West Water) to be used as the efficiency challenge during AMP7. This efficiency target "triangulates" the results from Ofwat's 5 econometric models.
- Next, Ofwat forecasts levels of cost drivers for AMP7, generally by extrapolating trends from the historical period, and multiplying forecast drivers by the estimated model coefficients to generate modelled AMP7 botex for each company.

²⁹ Ofwat (January 2019), PR19 initial assessment of plans, Technical appendix 2: Securing cost efficiency, page. 7-8.

³⁰ Leakage reduction is not a component of unmodeled base costs, hence modelled base costs is the relevant building block for assessing whether the base cost allowance provides adequate funding for companies' leakage PCs.

- Ofwat then multiplies modelled AMP7 botex by (1) the efficiency challenge of 95.2 per cent; and (2) an ongoing productivity or frontier shift of 1.5 per cent cost reduction per annum. This calculation produces Ofwat’s view of efficient modelled WW botex.
- Finally, Ofwat adds any company-specific factors which are not adequately controlled for by the econometric models (known as “cost adjustment claims”) as well as allowances for unmodelled botex to arrive at a final view of efficient botex.

Table 3.1: Cost Drivers Included in Ofwat’s Econometric Models for WW

Category	Cost Driver
Scale	Number of properties (log); or length of main (log)
Complexity	% of water treated at treatment works with complexity level 3 or higher; or weighted average treatment complexity level
Topography	Number of booster pumping stations / length of main (log)
Density	Weighted average density (log); and squared term of log of weighted average density

Source: Ofwat³¹

3.2. The Exclusion of Enhancement from the Definition of Botex

Ofwat’s own definition of botex suggests that its base allowances do not allow funding of leakage to attain more “stretching” PR19 targets.

At PR14 Ofwat set companies’ total expenditure (totex) allowance by relying on modelled totex which included operating expenditure and capital expenditure, defined as including both capital maintenance and enhancement expenditure. Any expenditure to reduce leakage beyond base levels would have been captured by enhancement expenditure and therefore be included in baseline modelled costs.

At PR19, Ofwat has decided not to use totex benchmarking and as described above, opted to set companies’ modelled cost using “botex” as a dependent variable in the econometric models, i.e., operating costs plus capital maintenance.

According to the Regulatory Accounting Guidelines (RAGs), at PR19 capital expenditure is defined as “expenditure to maintain the long-term capability of the assets and to deliver base levels of service”.³² Any capital expenditure therefore deployed to deliver levels of service beyond the base, including expenditure to reduce the levels of leakage beyond the base, is classified as “enhancement expenditure”.³³ It follows that Ofwat’s botex models will not account for the any expenditure that is required to deliver enhancements in the level of

³¹ Ofwat (January 2019), PR19 initial assessment of plans, Supplementary technical appendix, Econometric approach, page. 12-14.

³² Ofwat (November 2017), RAG 4.07 – Guideline for the table definitions in the annual performance report, p.12.

³³ Ofwat’s RAG also note that “Where projects have drivers both of enhancement and capital maintenance, companies should apply a method of proportional allocation to allocate costs between enhancement and capital maintenance”. Source: Ofwat (November 2017), RAG 4.07 – Guideline for the table definitions in the annual performance report, p.12.

leakage of companies. This contradicts Ofwat’s own assertion that companies’ leakage reduction efforts “are included in [...] base allowances”.³⁴

3.3. The Ability of Ofwat’s Models to Fund Current Levels of Leakage

3.3.1. The levels of leakage achieved by each company will affect their performance in comparative benchmarking models

Leakage rates are (to some extent) within management control, and choices made about companies’ target levels of leakage reduction may affect their performance in comparative benchmarking models.

If companies minimise their own costs, and the models capture the drivers of leakage, then the base allowances emerging from the models will fund the levels of leakage consistent with minimising water companies’ own costs. However, as we explain below, this conclusion does not hold in practice and Ofwat’s models may fail to fund efficient leakage reduction.

3.3.2. In practice, companies do not target the least cost level of leakage

In practice, over Ofwat’s cost assessment period companies have not been targeting the least-cost level of leakage, but targeted levels of leakage that are consistent with the Sustainable Economic Level of Leakage (SELL) and other local issues.

As noted in Section 2.1, the concept of SELL identifies the point at which companies set leakage targets such that the marginal cost of water leakage equals to the marginal cost of leakage control. This definition captures both the operating and capital costs of the company to control leakage, and the *external* social and environmental costs of leakage. These include for instance the environmental impact of reduced leakage (e.g. the benefit of reduced abstraction), the environmental and social impact of leakage control (e.g. disruptions, low pressure) and the carbon impact of leakage and active leakage management (the cost of carbon due to electricity/fuels for power for abstraction, treatment and pumping).³⁵

A 2012 study by the Environment Agency, Ofwat and Defra acknowledges that “a key factor in determining SELL is believed to be costs which are external to the company”.³⁶ The study highlights that although these factors may “have a relatively small impact on the calculation of SELL”, they should be accounted for in setting leakage targets.³⁷ In line with Ofwat’s PR14 decision, companies included measures of external costs when setting SELL and their leakage targets.³⁸

³⁴ Ofwat (7 February 2019), Ofwat webinar: Securing cost efficiency, Q&A, p.3.

³⁵ Environmental Agency, Ofwat and Defra (October 2012), Review of the calculation of sustainable economic level of leakage and its integration with water resource management planning, page 14-15.

³⁶ Environmental Agency, Ofwat and Defra (October 2012), Review of the calculation of sustainable economic level of leakage and its integration with water resource management planning, page 5.

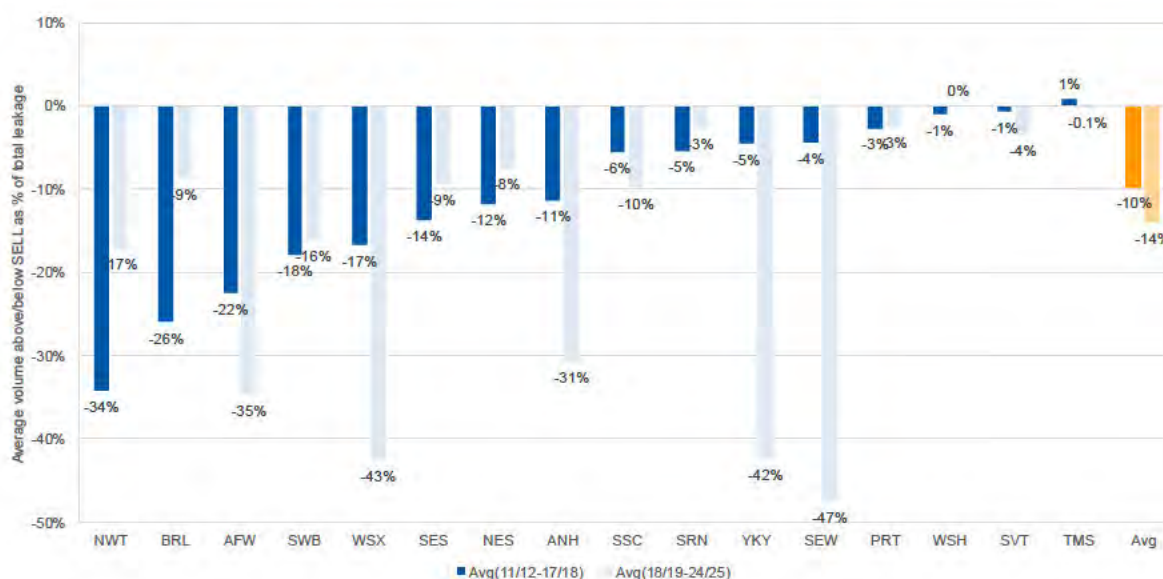
³⁷ Environmental Agency, Ofwat and Defra (October 2012), Review of the calculation of sustainable economic level of leakage and its integration with water resource management planning, page 7.

³⁸ Ofwat states: “The final methodology statement specifically required companies to include incentives in only two areas. These were: leakage, reflecting its importance to customers and the potential environmental and efficiency benefits of

Leakage targets set to achieve SELL are therefore calibrated to provide other benefits to society beyond minimising water companies’ costs, so achieving SELL implies companies will reduce leakage beyond the level that would optimise their performance in econometric benchmarking models.

In practice, as Figure 3.1 shows, over Ofwat’s cost assessment period (2011/12 – 2017/18) all companies have been operating on average below SELL, except for Thames Water which has been operating marginally above SELL.³⁹ Likewise, over the next AMP on average companies across the industry forecast that they will remain below SELL.⁴⁰

Figure 3.1: Collectively Companies Have Been Operating Below SELL Over the Cost Assessment Period (2011/12 – 2017/18)



Source: NERA analysis of Ofwat’s Stata Input file for water.

Therefore, because companies have been operating beyond the level of leakage that minimises companies’ own costs, companies achieving the lowest levels of leakage will tend to appear less efficient in Ofwat’s modelling as a result. Moreover, target levels of expenditure implied by Ofwat’s modelling are likely to be influenced by those companies which relatively high levels of leakage, closer to the levels that minimise water companies’ private costs.

As we explain in Section 3.4.4, Ofwat implicitly acknowledges this feature of its modelling to set base allowances by allowing Anglian Water a cost adjustment for achieving and maintaining lower levels of leakage.

its reduction”. Source: Ofwat (December 2014), Setting price controls for 2015-20, Final price control determination notice: policy chapter A2 – Outcomes, page10.

³⁹ Note the figure provides for each company the total volume of leakage above/below SELL as a percentage of total leakage over the 2011/12 – 2017/18 period.

⁴⁰ Note the figure provides for each company the total volume of leakage above/below SELL as a percentage of total leakage over the 2018/19 – 2024/25 period.

3.3.3. Ofwat's models also fail to capture the differences between companies that affect the least cost level of leakage

Ofwat's selection of cost drivers (see Table 3.1) has a material effect on what proportion of variation in companies' costs appear to be inefficient.

Some of the variables included in Ofwat's benchmarking models may be related to the amount of leakage companies experience. For instance, companies with longer mains or more customers may have higher underlying levels of leakage. However, none of the variables included in the botex models control directly for *normalised* leakage, i.e. a measure of leakage volumes that controls for differences in companies' scale.

None of the cost drivers included in Ofwat's models reflect companies' historical efforts to reduce leakage. Ofwat decided not to include cost drivers in its models which reflect leakage directly. Ofwat did not include the volume of water treated as cost driver, as companies can influence it "through leakage reduction and water efficiency schemes, which [Ofwat] wish[es] to incentivise".⁴¹ Instead, Ofwat selected length of mains and number of connections as the "scale" cost drivers, as discussed in Section 3.1.

In a similar vein, Ofwat's cost drivers fail to capture characteristics of water companies' assets like the age, condition and type of mains, which influence efficient levels of leakage and the costs of leakage reduction and are largely driven by asset inheritance. Also, for companies serving areas of the country with a relatively tight supply-demand balance, it might be economic to target lower levels of leakage as the value of the water lost through leakage is greater.

Ofwat argued against including the volume of water abstracted as a cost driver because it is under management control through leakage reduction, and hence "could send the wrong signal or create a perverse incentive for the regulated companies".⁴² Ofwat explains the perverse incentives as "the model will imply higher costs for the company that is less water efficient (and therefore abstracts more water)".

Failure to account for variation in leakage across companies was one of the reasons cited by the CMA in support of its conclusion that Ofwat's PR14 cost assessment "did not adequately reflect Bristol Water's costs".⁴³ One of CMA's recommendations was to define cost drivers in terms of distribution input per household. The CMA stated that one improvement of this decision that it "does not overlook the additional costs of achieving lower levels of leakage".⁴⁴

⁴¹ Ofwat (January 2019), PR19 initial assessment of plans, Supplementary technical appendix, Econometric approach, page 12.

⁴² Ofwat (March 2018), Cost assessment for PR19: a consultation on econometric cost modelling, page. 10.

⁴³ CMA (6 October 2015), Bristol Water plc, A reference under section 12(3)(a) of the Water Industry Act 1991, Report, para. 24.

⁴⁴ CMA (6 October 2015), Bristol Water plc, A reference under section 12(3)(a) of the Water Industry Act 1991, Report, para 4.135-4.136.

3.3.4. Ofwat's model cannot differentiate expenditure to reduce leakage from expenditure to maintain a relatively low level of leakage

Another reason why Ofwat's models may not fund efficient leakage reduction is the possibility of asynchronous investment cycles across companies.

Suppose two water companies that are otherwise identical have asynchronous investment cycles, the UQ target in Ofwat's base cost models will be set by those companies that happen to be conducting relatively little expenditure during the modelling period in question. Conversely, any company that is currently at a high-point in an investment cycle will appear relatively inefficient and be disadvantaged.

As described above, Ofwat's base allowance includes capital maintenance expenditure. The CMA noted at PR14 that, because capital maintenance includes "a greater proportion [...] of non-recurring costs from year-on-year", "one year's capital maintenance, or even one regulatory period's capital maintenance, will not necessarily be a good predictor of the future".⁴⁵

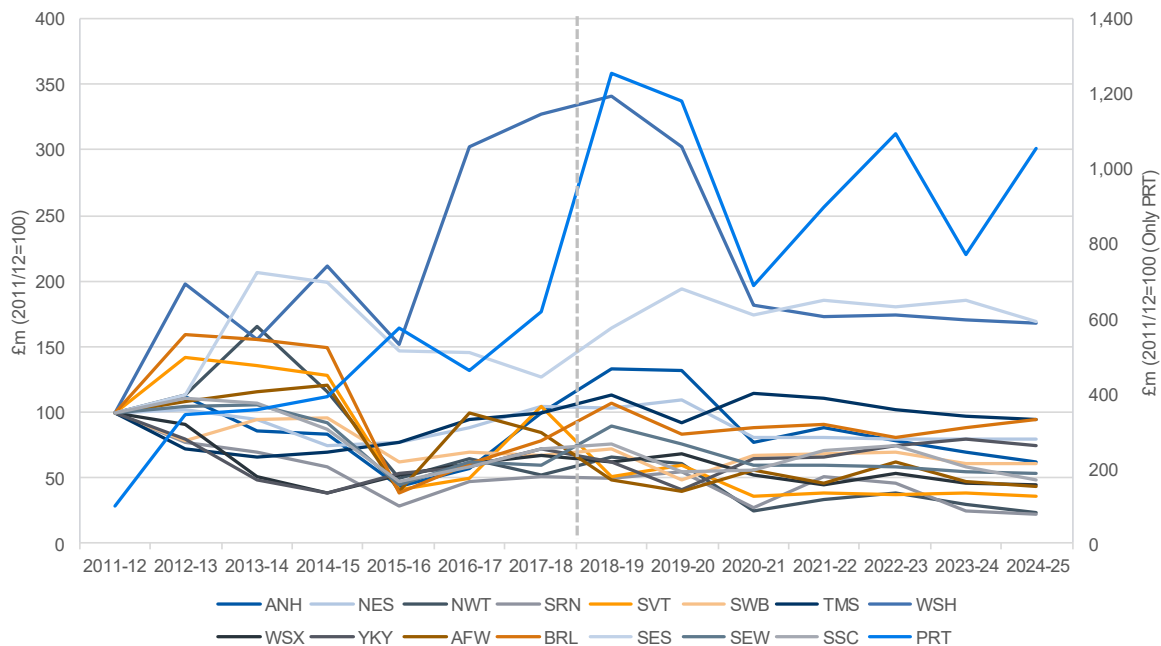
As Figure 3.2 shows, over Ofwat's relatively short assessment period capital maintenance is relatively lumpy and fluctuations in expenditure levels across companies do not appear to follow a synchronous pattern. Some companies such as Portsmouth Water, have increased capital maintenance expenditure over the modelling period, while other companies (e.g. Affinity Water) have reduced their capital maintenance expenditure.

A corollary of this feature of Ofwat's base cost models is that, if it is repeated over time and all companies have different investment cycles, the frontier will tend to be set by those companies that conduct relatively little capital expenditure at any point in time. Hence, if the benchmarking is conducted repeatedly, no company should expect to recover its efficient investment costs over the investment cycle as a whole.

Because companies' efforts to reduce leakage may entail lumpy expenditure (e.g. capital maintenance activities), differences in leakage reduction effort in a particular AMP could appear as inefficiency in Ofwat's models, and cost targets may be influenced by those companies performing relatively little leakage reduction work in a particular modelling period.

⁴⁵ CMA (6 October 2015), Bristol Water plc, A reference under section 12(3)(a) of the Water Industry Act 1991, Report, para. 124.

Figure 3.2: Capital Maintenance Expenditure Tends to be Lumpy and Asynchronous Across the Industry



Note: Portsmouth Water (PRT)'s capital maintenance expenditure is reported on the secondary axis.
 Source: NERA analysis of Ofwat data.

3.3.5. Modelled allowances are probably determined by the companies spending least on leakage reduction during the modelling period

As we explain above, Figure 3.1 shows that companies have typically achieved a level of leakage close to, or beyond, SELL. Hence, most of the industry is probably achieving a level of leakage beyond the level that would minimise their own costs, which has historically been justified based on customers' preferences and the externalities associated with leakage. However, the benchmarking models do not capture differences in companies' leakage performance, or remunerate those choosing to go beyond SELL. Hence, those sustaining the lowest levels of leakage will tend not to be provided with base allowances to cover the costs of doing so.

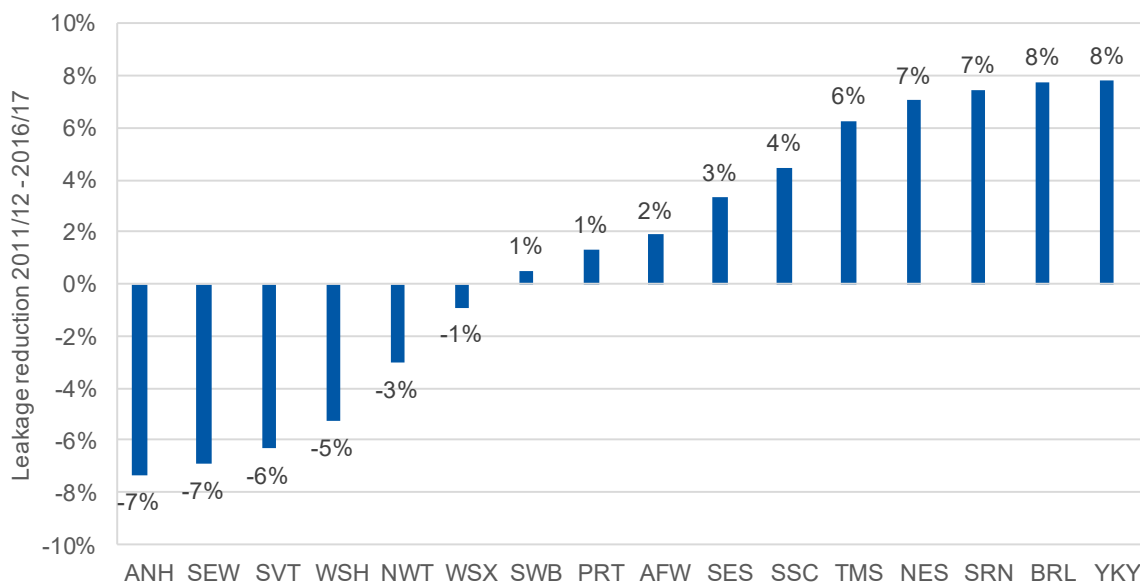
In addition to this evidence discussed in Section 3.3.1, the trajectory of leakage reduction also affects companies' expenditure. The expenditure targets emerging from Ofwat's models will tend to reflect the expenditure incurred during the historical modelling period to reduce leakage. If all companies had incurred similar levels of expenditure to reduce leakage during the historical modelling period, the allowances predicted for AMP7 would reflect a continued level of expenditure by company. However:

- Variation in companies' investment cycles, as we discuss in Section 3.3.4, means modelled costs will tend to be determined by the companies' spending relatively little to reduce leakage during the historical modelling period.

- Also, as Figure 3.3 below shows, half of all companies have increased or reduced leakage by less than 3 per cent over the 2011/12 – 2016/17 period.⁴⁶ As such, if the funding provided through the base allowances reflects the typical levels of leakage reduction achieved during the historical period, the base allowances for leakage reduction in AMP7 will continue to be minimal.

Therefore, Ofwat is wrong to argue that companies’ have been engaging in “network maintenance and leakage reduction” in the past and therefore the costs of these activities “are included in [...] base allowances”.⁴⁷ Ofwat’s base allowances will only tend to fund current levels of leakage and leakage reduction.

Figure 3.3: Leakage Reduction by Company Over the 2011/12 – 2016/17 Period



Source: NERA analysis of Ofwat’s Stata Input datafile for water.

3.4. The Ability of Ofwat’s Models to Fund PR19 Leakage Reduction Targets

While Section 3.3 explains that Ofwat’s base allowances will fund companies for achieving current levels of leakage and historical rates of leakage reduction, we also consider below whether its approach will fund the more stretching levels of leakage reduction targeted by the industry at PR19.

⁴⁶ 2017/18 leakage data for some companies (e.g., SVT) is substantially different from leakage volumes in the previous years. We therefore rely on 2016/17 as the latest available year for total leakage volumes. However, we cross-check our results with leakage reduction over Ofwat’s entire assessment period (2011/12 - 2017/18). Accordingly, we find that half of the companies experienced an increase in leakage volumes (in MI/d), with only four water companies reducing total leakage by no more than 8 percent. Source: NERA analysis of Ofwat’s Stata Input datafile for water.

⁴⁷ Ofwat (7 February 2019), Ofwat webinar: Securing cost efficiency, Q&A, p.3.

3.4.1. Ofwat's approach to setting base allowances does not fund the more stretching PR19 leakage reduction targets

As explained in Section 3.2, Ofwat's selected drivers do not reflect variation – either across time or companies – in leakage reduction expenditure. As such, the predicted values from the models that define water companies' allowances will not change in a way that reflects changes in effort by the industry to reduce leakage.

Nonetheless, it would still be possible for Ofwat's base allowances to include the costs of leakage reduction, to the extent the historical cost data used to calibrate the model includes the required level of leakage reduction expenditure over the next AMP. However, this is not the case.

In fact, Ofwat expects companies to stretch their leakage reduction targets beyond the most ambitious leakage reduction proposal at PR14. As discussed in Chapter 2, Ofwat recommended that companies set 15 per cent leakage reduction targets between 2019-20 – 2024-25. This target is “one percentage point more than the largest reduction commitment at PR14”.⁴⁸

Ofwat's recommended target also represents a step change compared to recent historical leakage reduction performance. As Figure 3.3 above shows, none of the water companies in the sample have achieved a level of reduction of 15 per cent over Ofwat's cost assessment period. The largest reduction over the 2011-12 – 2016-17 period is equal to 7 per cent by Anglian Water, almost half the target set by Ofwat.⁴⁹

It follows that models used by Ofwat to set base allowances will not produce predicted values that reflect the more stretching (unobserved) level of leakage reduction effort in the next AMP. Rather, they will reflect (at most) the historical efforts to reduce leakage during the modelling period.

3.4.2. Even if Ofwat's models included leakage reduction variables, they would still not reliably estimate the costs of meeting PR19 targets

Even if Ofwat's base cost models took leakage reduction into account, e.g. by including explanatory variables reflecting companies' historical leakage reduction efforts, the base cost allowance could still be inadequate to fund the efficient costs of Ofwat's proposed 15 per cent leakage target. The proposed leakage targets are higher than leakage reduction observed in the past, so the benchmarking method might not be able to capture the true cost of achieving the target because more rapid reductions in leakage could be costlier than leakage reduction efforts in the past. In essence, Ofwat's modelled allowances are likely to be unrealistic if they are used for “out of sample” prediction when using models calibrated using historical data to predict how leakage reduction costs will change in the future.

⁴⁸ Ofwat, *Delivering Water 2020: Our methodology for the 2019 price review*. Appendix 2: Delivering outcomes for customers, page. 65

⁴⁹ 2017/18 leakage data for some companies (e.g., SVT) is substantially different from leakage volumes in the previous years. We therefore rely on 2016/17 as the latest available year for total leakage volumes. However, we cross-check our conclusions using 2017/18 data and find that largest reduction over the entire assessment period is equal to 8 percent, i.e., around half of the reduction target requested by Ofwat.

As shown above and further below, the level of leakage (in percentage terms) that Ofwat is targeting for the industry has not been observed in the historical data used to calibrate its model. Requiring companies to reduce leakage to new lows in relative terms could increase the marginal cost of achieving and sustaining its desired leakage reduction targets, as companies undertake more expensive measures to reduce leakage.

3.4.3. Ofwat's base allowances fail to consider that more demanding PCs are associated with more expensive leakage reduction schemes

A further reason why Ofwat's models may not provide a sound basis for predicting how the costs of leakage reduction efforts will change is that they fail to capture the tendency for the marginal cost of leakage reduction to rise as companies reduce leakage further beyond SELL.

As noted above, Ofwat's cost models set base allowances that cover the costs associated with (at most) existing levels of effort in the industry to reduce leakage, which as Figure 3.3 shows, means its base allowances will only fund very low levels of leakage reduction.

However, in addition to this problem, Ofwat's models fail i) to account for the incremental cost of achieving leakage reduction beyond SELL, and ii) to capture any potential variation across companies' incremental costs because of differences in companies' leakage control programmes. For instance, companies that have attained SELL may incur higher incremental costs for any additional unit of leakage reduction; compared to companies that have not achieved SELL.

In practice, there are a range of leakage reduction measures companies can undertake. First, at high levels of leakage, companies may implement "find and fix" processes and pressure management that have low marginal costs. Then, once all leakage reduction achievable through such measures has been achieved, companies may resort to more ambitious and innovative solutions (e.g. accelerating their mains replacement programmes) to achieve more ambitious leakage reduction targets. Hence, companies face an "upward sloping supply curve" of leakage reduction projects, with an increasing marginal cost of leakage reduction as they target lower levels of leakage.

The slope of each company's "supply curve" of leakage reduction projects will also differ because of other factors, e.g. network configuration, geography, network age etc. For instance, companies with a larger proportion of older networks may have to resort more quickly, i.e. at lower leakage reduction targets, to expensive leakage reduction solutions like accelerated mains replacement.

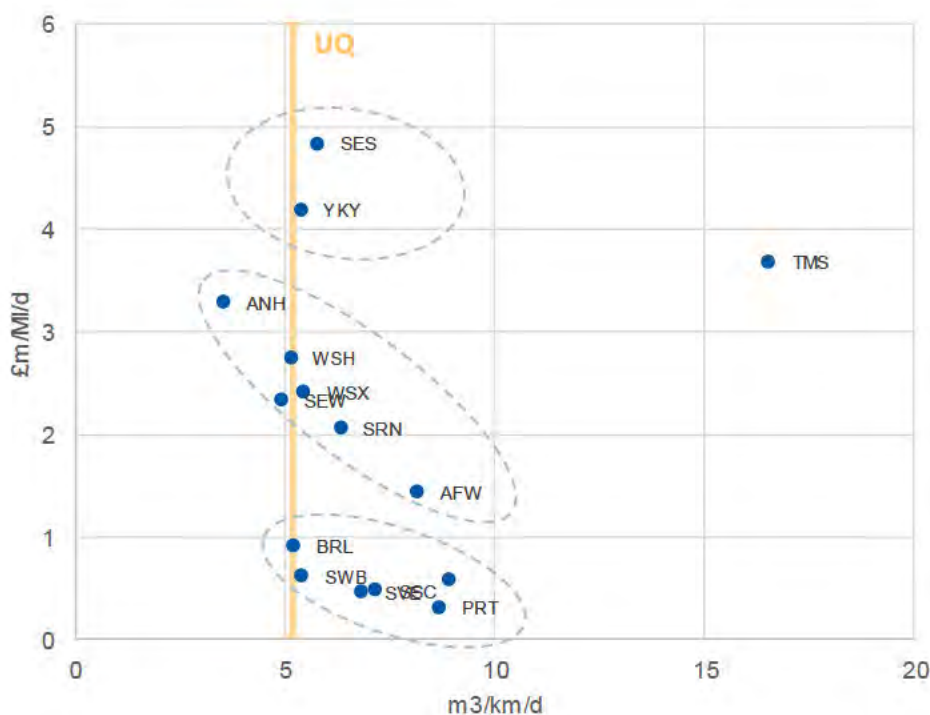
In its IAP, Ofwat defined the UQ performance by using two measures of leakage which control for scale: litres per property per day (l/prop/d) and cubic metre per kilometre per day (m³/km/d). Figure 3.4 and Figure 3.5 below show the relationship between companies' planned leakage targets at the end of PR19 (2024-25), after controlling for scale, and the marginal cost they expect to incur to provide these levels of leakage reduction. As the figures show, companies closer to the upper quartile leakage performance target tend to expect higher unit costs of leakage reduction compared to companies that are further away the UQ target. At lower levels of leakage reduction, marginal costs appear to be lower.

Optically, the negative correlations shown in the figures between unit costs and leakage rates appear relatively weak, suggesting other factors are also affecting companies' marginal costs of leakage reduction. However, this appearance of weak negative correlation may be

misleading. For instance, there appear to be some outliers (notably Thames Water, possibly due to the relatively high costs of serving a dense urban area in London). Also, the scatter diagrams in the figures suggest downward sloping relationships between leakage levels and unit costs may exist for “clusters” of companies, as indicated by the dashed lines around some of the data points in the figure. Such clustering of companies may reflect factors such as differences in their asset inheritance, availability of water resources and statutory abstraction reductions.

However, despite these potential differences, we have tested the significance and direction of this effect by running a number of regressions of the unit costs of leakage reduction in £m/MI/day on the level of leakage targeted at the end of the AMP,⁵⁰ measured in l/prop/day and m³/km/d and a cross-product term, using a simple cross-sectional Ordinary Least Squares regression across all companies, except Thames Water. We exclude Thames Water on grounds that it is an outlier based on a visual inspection of the scatterplots below. We find that there is a statistically significant negative relationship between companies’ unit cost and leakage reduction (see Appendix A). This confirms that across all companies, excluding Thames Water, marginal costs tend to increase as leakage reduction targets become more stretching.

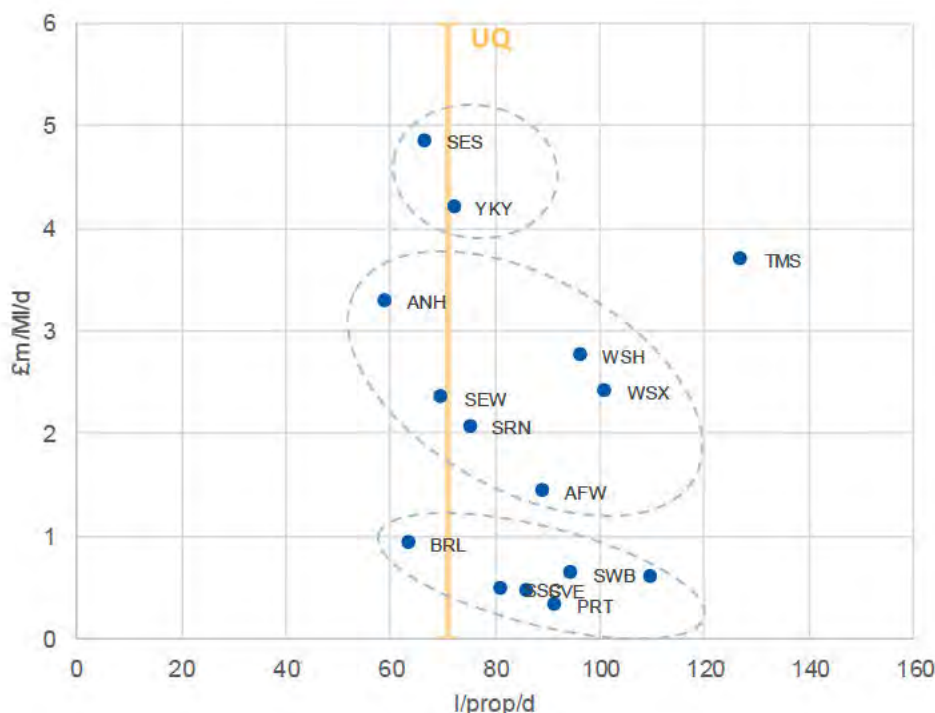
Figure 3.4: Correlation between Leakage Reduction Targets and Marginal Cost of Leakage Reduction Schemes



Source: NERA analysis of Ofwat data as reported in the Wholesale Water Supply-demand balance enhancement – feeder model.

⁵⁰ Ofwat’s test relies upon the forecast 3-year average leakage positions in 2024-25 that companies have provided as part of their common performance commitments. We have cross-checked our results using this measure of leakage instead of leakage at the end of AMP7 (i.e., 2024-25). As Appendix A shows, the results are consistent across all models.

Figure 3.5: Correlation between Leakage Reduction Targets and Marginal Cost of Leakage Reduction Schemes



Source: NERA analysis of Ofwat data as reported in the Wholesale Water Supply-demand balance enhancement – feeder model.

Failure to account for this systematic relationship between companies’ marginal cost of leakage reduction and the underlying level of leakage implies that Ofwat’s base allowance, set using historical costs and drivers, does not reflect the true economic costs of achieving more demanding leakage reduction targets beyond SELL.

3.4.4. Anglian Water’s special factor claim shows that Ofwat’s base allowances would not fund leakage performance

Ofwat’s IAP has already recognised the increasing marginal cost of achieving and sustaining lower levels of leakage in its assessment of a special factor claim submitted by Anglian Water. However, Ofwat has not recognised this feature of the cost pressures facing water companies in setting base allowances.

In its business plan submission, Anglian Water requested a special factor adjustment of £147.9 million over AMP7 to maintain frontier leakage performance.⁵¹ Ofwat partially accepted Anglian Water’s claim.⁵² Anglian Water argued that it is currently at the frontier of the sector in terms of leakage reduction and that maintaining frontier leakage performance therefore “requires greater expenditure compared to maintaining, for instance, the industry

⁵¹ Anglian Water, PR19 Water Data Tables Commentary, page 172.

⁵² Ofwat, Excel file “M_CAC_ANH_IAP.xlsx”.

average level of leakage”.⁵³ Anglian Water’s special factor claim therefore covers “the additional expenditure that will be required to maintain leakage at the current frontier level rather than at [SELL]”.⁵⁴

Anglian Water’s special factor adjustment reflects the inability of Ofwat’s base cost modelling to predict required expenditure levels to achieve more stretching (above-industry average) targets of leakage reduction at AMP7. By relying on historical costs and cost drivers, and not including leakage-specific cost drivers, Ofwat’s cost modelling will therefore penalise companies with above industry-average leakage reduction rates by allowing lower base costs than actually required to meet such target. Conversely, all else equal, Ofwat’s base allowance will be more generous for those companies that perform below industry average.

However, by accepting Anglian Water’s cost adjustment claim Ofwat is implicitly acknowledging increasing marginal costs of maintaining and/or achieving low levels of leakage and that base allowances not capture this feature of companies’ incremental leakage costs.⁵⁵

3.5. Empirical Assessment of the Impact of Leakage on Modelled Efficiency Gaps

As set out above, Ofwat’s models may conflate companies’ level of leakage performance (relative to SELL) and/or their leakage reduction efforts during the modelling period with variation in companies’ relative efficiency. Specifically, the omission of companies’ efforts to reduce leakage to a level beyond SELL means the predicted values generated from the modelling cannot reflect the costs companies will incur to further reduce leakage over the next AMP. As such, Ofwat’s models do not fund through base allowances the increased level of leakage reduction that companies and Ofwat are targeting.

While the theoretical basis for this argument is clear from examining Ofwat’s model specifications, we have also demonstrated this empirically by adding leakage reduction beyond SELL into Ofwat’s Treated Water Distribution (TWD) and Wholesale Water (WW) econometric models. To do this, we took data on companies’ historical SELL and leakage reduction from Ofwat’s PR19 input files, and tested whether this factor has a material effect on companies’ botex in a number of ways.

First, we regressed the residuals from Ofwat’s TWD model on the difference between companies’ SELL and leakage. We perform this calculation in MI/day (i.e. in levels) because for some companies this variable is negative, so cannot be logged (Model 1a in Table 3.2). We include the difference between SELL and leakage in both linear and squared form, to capture the possibility that, as leakage falls further from SELL, the marginal cost of reducing and maintaining lower levels of leakage could rise (see Section 5).

As the results below show, we find that the coefficients on the linear and quadratic terms of the difference between SELL and leakage are statistically significant at the 5 and 10 per cent significance levels respectively. They are also positive, suggesting companies with leakage

⁵³ Anglian Water, PR19 Water Data Tables Commentary, page 174.

⁵⁴ Anglian Water, PR19 Water Data Tables Commentary, page 172.

⁵⁵ Ofwat, Excel file “M_CAC_ANH_IAP.xlsx”.

performance beyond SELL have higher costs than companies with leakage closer to SELL, and the further beyond SELL companies reduce leakage, the more their costs tend to rise.

To test the effect of logging this variable, we also regressed residuals from Ofwat's TWD model on the natural logarithm of the difference between SELL and leakage, plus 200 MI/day (Model 1b in Table 3.2). The purpose of adding 200 MI/day was to ensure this variable was positive for all companies so we could run the model in logarithmic form.⁵⁶ As for Model 1a in which we include these variables without logging them, we find positive and statistically significant coefficients at the 10 per cent significance level.

We have also included these same variables directly within the Ofwat TWD and WW models, as shown in Table 3.2. In all cases, we find that including these variables gives statistically significant coefficients. The impact on the other modelled coefficients is relatively small, as the results below show. We also find no material changes in the statistical robustness tests applied by Ofwat. For instance, like Ofwat's base models, none of these adapted models violate the Ramsey RESET or normality of errors tests.

⁵⁶ We have added a value of 200MI/day to ensure positive values for this variable (necessary for a logarithmic transformation). However, any other larger number would achieve the same affect, and the choice of any adder is inherently arbitrary. The choice affects the estimated elasticities but not the underlying relationship, so we tested the effect of adding (arbitrarily) 1,000 instead of 200, and found it made little difference to our finding of statistically significant coefficients.

Assessing the Funding of Leakage Reduction through Base Allowances

Table 3.2: Econometric Modelling of the Link Between (SELL-Leakage) on Companies' TWD and WW Botex

Model Description:	(1a) Residuals + Leakage1	(1b) Residuals + Leakage2	(2) Ofwat TWD Model	(2a) = (2) + Leakage1	(2b) = (2) + Leakage2	(3) Ofwat WW1 Model	(3a) = (3) + Leakage1	(3b) = (3) + Leakage2	(4) Ofwat WW2 Model	(4a) = (4) + Leakage1	(4b) = (4) + Leakage2
Dependent Variable:	Ofwat TWD Model Residuals	Ofwat TWD Model Residuals	TWD Botex (Log)	TWD Botex (Log)	TWD Botex (Log)	WW Botex (Log)	WW Botex (Log)	WW Botex (Log)	WW Botex (Log)	WW Botex (Log)	WW Botex (Log)
<i>Independent Variables:</i>											
Leakage above SELL	0.00133** (0.000666)			0.00149** (0.000706)			0.00141*** (0.000353)			0.00145*** (0.000338)	
Sq Leakage above SELL	5.97e-06* (3.49e-06)			7.27e-06** (3.31e-06)			1.08e-05*** (2.16e-06)			1.08e-05*** (2.14e-06)	
Leakage above SELL + 200 (Log)		-1.544* (0.926)			-1.794** (0.875)			-1.836*** (0.517)			-1.834*** (0.514)
Sq Leakage above SELL + 200 (Log)		0.175* (0.105)			0.202** (0.0998)			0.200*** (0.0581)			0.200*** (0.0573)
Lengths of Main (Log)			1.013*** (0.0277)	1.016*** (0.0280)	1.019*** (0.0278)						
Boosters per Length (Log)			0.465*** (0.150)	0.463*** (0.151)	0.460*** (0.151)	0.515*** (0.122)	0.534*** (0.127)	0.533*** (0.126)	0.517*** (0.0976)	0.531*** (0.0998)	0.529*** (0.0996)
Density (Log)			-3.068*** (0.412)	-2.857*** (0.482)	-2.860*** (0.484)	-1.711*** (0.378)	-1.541*** (0.390)	-1.565*** (0.386)	-1.473*** (0.287)	-1.337*** (0.306)	-1.371*** (0.306)
Sq Density (Log)			0.245*** (0.0287)	0.230*** (0.0342)	0.230*** (0.0343)	0.126*** (0.0250)	0.114*** (0.0258)	0.116*** (0.0256)	0.109*** (0.0191)	0.0994*** (0.0204)	0.102*** (0.0205)
Properties (Log)						0.993*** (0.0239)	0.987*** (0.0283)	0.991*** (0.0282)	0.984*** (0.0208)	0.980*** (0.0244)	0.983*** (0.0242)
% Treated 3-6						0.00311*** (0.00101)	0.00281*** (0.00102)	0.00275*** (0.00101)			
Average Treatment Comp.									0.371*** (0.0726)	0.351*** (0.0762)	0.351*** (0.0743)
Constant	0.0143 (0.0369)	3.289* (1.969)	5.777*** (1.274)	5.039*** (1.567)	8.842*** (1.972)	-1.273 (1.236)	-1.679 (1.328)	2.457 (1.890)	-2.267** (0.988)	-2.586** (1.099)	1.579 (1.755)
Observations	124	124	124	124	124	124	124	124	124	124	124
Overall R2	0.000287	1.92e-05	0.968	0.967	0.967	0.978	0.978	0.978	0.979	0.980	0.980

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

We have also considered the materiality of the effect on Ofwat's cost modelling that comes from omitting this factor. We have used the coefficients estimated in Table 3.2 (models 2a, 3a and 4a in place of 2, 3 and 4) to quantify the change in allowances over the next AMP due to all companies' reducing leakage by 15 per cent below current levels. When averaged across all companies, we estimate that botex allowances would increase by £647 million (around 4 per cent) over AMP7 if Ofwat were to control for cost increases resulting from 15 per cent leakage reduction.

The analysis shown above is not sufficient to prove that this particular variable (the difference between SELL and actual leakage) should be included in Ofwat's econometric models. For instance, the inclusion of this variable would ideally require Ofwat to re-examine other choices it made during its model selection process. There may also be other measures of leakage reduction that would yield more robust models. Before these results were used for setting allowances, it would also be important to cross check the coefficient estimates against other sources that have sought to estimate the marginal cost of leakage reduction.

Nonetheless, the calculations shown above demonstrate the importance of companies' level of leakage reduction in driving their efficient costs. Hence, the use of models that omit this factor to set base allowances cannot capture the expenditure required for companies to further reduce leakage over the next AMP. Addressing this limitation of Ofwat's existing base expenditure modelling could be achieved through adjustments to this modelling, or through other changes to the price control such as allowing enhancement expenditure to fund leakage reduction or through additional financial incentives to remunerate leakage reduction (see Section 6).

3.6. Conclusion

It may be intuitively appealing for Ofwat to argue that companies have been reducing leakage in recent years, so base allowances calibrated to historical levels of expenditure must necessarily fund ongoing leakage reduction. However, as explained in Section 3.3, this statement rests on assumptions that do not hold in reality.

It is correct that some companies have reduced leakage during the historical period over which Ofwat calibrated its econometric models. Also, cost targets established through comparative benchmarking may (to some extent) identify the level of leakage expenditure required to minimise water companies' costs.

However, the econometric modelling performed to set base allowances has a number of limitations that mean it will not identify the level of expenditure required to achieve leakage targets set over the next AMP. They do not identify how the optimal level of leakage varies over companies, they may be distorted by variation in companies' historical investment cycles, and they do not capture the required increase in leakage reduction activity by the industry over the next AMP.

We have conducted empirical analysis that supports these arguments, demonstrating that controlling for differences between companies' actual leakage and SELL has a statistically significant impact on companies' costs.

We have also shown that the marginal cost of leakage reduction rises as companies reduce leakage to lower levels than observed historically, which is another factor not accounted for by Ofwat's base expenditure modelling.

We therefore conclude that base expenditure forecasts generated from Ofwat's models will systematically understate companies' investment requirements in a period in which companies are accelerating the rate of leakage reduction, as they will not capture the required step-change in companies' leakage reduction expenditure.

A possible solution to this problem could lie in adjusting the modelling procedure used to set base allowances, though we do not necessarily advocate the particular changes in base expenditure models presented in Section 3.5. Alternatively, as discussed in the following chapters, Ofwat could adjust its assessment of companies' claims for enhancement expenditure related to leakage reduction.

4. The Need for Allowed Enhancement Expenditure to Fund Leakage Reduction

As demonstrated in Chapter 3, Ofwat’s base allowances do not provide adequate funding for companies to finance their efficient costs of delivering UQ leakage levels nor meeting the proposed leakage reduction target. Despite this, Ofwat has rejected 7 companies’ proposed enhancement expenditure for leakage reduction, while allowing some funding for 10 companies to reduce leakage at an allowed unit cost.⁵⁷

To ensure companies can fund the efficient costs of achieving Ofwat’s leakage reduction target, it will be necessary to allow them some enhancement expenditure. Indeed, it is common regulatory practice to allow for additional funding when regulated companies are asked to deliver investment programmes which would not be required to minimise costs and go beyond the levels of investment that have been required in the past.

4.1. Ofwat’s Proposals to Partially Fund Leakage Reduction through Enhancement Expenditure

4.1.1. Ofwat only allows part of companies’ requests for enhancement expenditure

As stated above, Ofwat approved partial enhancement expenditure for leakage reduction for 10 firms at PR19. The partial funding is conditional on passing one of two tests:

- Test A: Does the company forecast leakage reduction in excess of the 15 per cent recommended target, but not in the UQ of companies when ranked according to the leakage reduction targets in their business plans?
- Test B: Will the company be in the UQ by 2024-25 (again, when ranked according to the leakage reduction targets in their business plans), in both normalised measures of leakage: per km of main and per property?

Ofwat allows enhancement expenditure for companies passing Test A or B, with funding determined by an allowed unit cost multiplied by a funded volume of leakage reduction. The allowed unit cost is equal to the minimum of the industry forecast median unit cost (£1.6m/MI/d) or the company’s proposed unit cost. The funded volume of leakage reduction is set as:

1. All leakage reduction *beyond 15 per cent*, if the company passes Test A;
2. All leakage reduction *beyond the UQ level*, if the company passes Test B; or
3. The maximum of (1) and (2), if the company passes both tests.

4.1.2. Ofwat’s “gated” approach is inconsistent with its base allowances, which do not fund leakage reduction

As set out in Section 4.1.1, Ofwat applies a “gated” assessment of companies’ requests for additional leakage funding. Specifically, companies only receive funding for their enhancement required to reduce leakage beyond the 15 per cent target and/or the upper

⁵⁷ Ofwat (January 2019), Supply-demand balance enhancement: Feeder model summaries, page. 12.

quartile. This approach is inconsistent with the methods it has used to set base allowances. As demonstrated in Section 3, which shows that Ofwat’s models are only likely to provide companies with allowances for maintaining the rate of leakage reduction achieved over the modelling period, which as Figure 3.3 shows, has been close to zero.

As such, for companies to fund an accelerated rate of leakage reduction, some additional allowances above the those provided by Ofwat’s base expenditure modelling will be required. This need for additional funding is not recognised by Ofwat’s decision only to fund the leakage reduction above 15 per cent target and/or the upper quartile through allowed enhancement.

4.2. Regulatory Precedent on Funding New Performance Targets

In its IAP, Ofwat has allowed for additional “reasonable” funding requests by companies, both to base allowances and enhancement expenditure, to deliver levels of service beyond what was required in the past. This includes, for instance, additional allowances for some water companies to accommodate more demanding safety regulations (e.g. Dŵr Cymru and Hafren Dyfrdwy) or customer expectations (e.g. South Staff Water).⁵⁸ Failure to follow the same approach for leakage therefore appears inconsistent with Ofwat’s broader approach at PR19 and regulatory practice in the UK.

More broadly across the regulated industries, there are a number of precedents of regulated companies being asked to meet new requirements imposed on them by regulators, in a similar way to Ofwat’s requirement for faster leakage reduction, in areas that require investment that would not form part of an efficient (i.e. least-cost) solution in order to provide improved outcomes. In such cases, and in contrast to Ofwat’s proposed approach to leakage reduction, regulators have made specific allowances to fund the investments required to meet such new targets.

4.2.1. At PR14 Ofwat’s “cap and collar” system remunerated companies for reducing leakage beyond targets reflecting SELL

At PR14, Ofwat provided additional funding for leakage reduction beyond companies’ PCs (referred to as stretching performance improvements beyond commitments) through ODIs providing financial rewards for “delivering stretching performance improvements beyond commitments”.⁵⁹

The companies’ commitments themselves were set to reflect SELL. Ofwat stated that the threshold for receiving additional funding for leakage reduction was in line with companies’ SELL and regional conditions affecting leakage reduction. The PC on leakage reduction was not subject to UQ benchmarking at PR14. Instead, Ofwat accepted the leakage reduction targets “because companies’ proposals on leakage aligned with the sustainable economic

⁵⁸ NERA analysis of Ofwat’s Cost adjustment claim feeder models for each company.

⁵⁹ Ofwat (December 2014), Setting price controls for 2015-20, Final price control determination notice: policy chapter A2 - outcomes, page. 21.

level of leakage (SELL) and local issues (such as availability of water resources and statutory abstraction reductions) significantly influence the SELL”.⁶⁰

Specifically, companies committed to reduce leakage by 158 MI/d (a 5 per cent reduction in leakage) at PR14. In contrast, Ofwat’s new leakage reduction standard has led to companies to propose a 489 MI/d reduction in leakage during AMP7, a 16.3 per cent reduction over the period and a 209 per cent increase in the leakage reduction commitment compared to PR14.

Hence, at PR14 Ofwat provided funding for companies going beyond SELL, via payment for outperformance on ODIs. By contrast, Ofwat’s IAP has set more demanding targets than SELL, and provided no funding that allows companies to bridge the gap between SELL and the proposed targets.

4.2.2. Ofgem has allowed replacement expenditure at RIIO-GD1 to fund replacement of iron mains to achieve higher safety outcomes

Gas Distribution Networks (GDNs) are obliged to follow the Health and Safety Executive’s (HSE) iron mains replacement programme to reduce the risk of leakage, which require decommissioning of all iron mains within 30 metres of a building by 2032. In essence, this programme requires GDNs to provide a higher level of safety outcomes.

As part of its RIIO-GD1 determination, Ofgem has put in place a number of mechanisms to ensure GDNs can fund the efficient costs of iron mains replacement, which would not be required solely to minimise the costs of gas distribution. For instance, it included a cost driver reflecting repex workload, and made specific allowances for funding investment requirements over the control period estimated using unit costs differentiated by iron main type.⁶¹

Ofgem’s approach to funding GDNs’ repex programmes to meet the HSE’s targets is analogous to the challenge Ofwat faces when funding water companies’ leakage reduction beyond SELL. The HSE requirement was a regulatory mandate to achieve certain targets that were not least-cost for the GDNs. Similarly, Ofwat’s specific leakage reduction recommendations at PR19 require companies to be ambitious, setting leakage reduction targets beyond the most ambitious company at PR14. This requires companies to provide levels of investment beyond the least-cost option.

4.2.3. At RIIO-ED1, Ofgem also recognised the need to fund investments to provide improved outputs outside of base allowances

Ofgem has faced a similar challenge in the electricity distribution industry. Similar to the iron mains replacement in gas, Ofgem also recognised a mandate on Distribution Network Operators (DNOs) to conduct a large volume of safety-related work that would not have been

⁶⁰ Ofwat (December 2014), Setting price controls for 2015-20, Final price control determination notice: policy chapter A2 - outcomes, page. 21.

⁶¹ Ofwat included a “bottom-up” repex analysis which regressed repex workload on repex for all types of mains. Only repex, which did not have a sensible cost driver were excluded from the analysis.

Ofwat (17 December 2012), RIIO-GD1: Final Proposals – Supporting document - Cost efficiency, page 27, 52 and 91.

least-cost for the companies due to the Electricity Safety, Quality and Continuity Regulations (ESQCR) requirements.

These regulations required DNOs to incur maintenance and replacement expenditure to meet new standards. Ofgem required DNOs to submit costs for each maintenance activity category, accepted the volumes and remunerated DNOs by multiplying these volumes by an allowed unit cost.⁶² Ofgem remunerated efforts to comply with ESQCR using as unit cost the industry median (at each relevant voltage level) over 13 years (including therefore both historical and forecast unit costs).⁶³

Ofgem also sought to ensure consistency between its outcome targets and its cost assessment. For instance, for its “secondary deliverables targets”, which concerns the health, criticality and risks of network assets,⁶⁴ Ofgem cross-checked its cost assessment modelling results, and made qualitative adjustments to its targets where appropriate to ensure companies were only obliged to deliver the level of service for which they were remunerated under the price control.⁶⁵

4.3. Conclusion

From the discussion above in Chapter 3, we concluded that Ofwat’s methods for setting base allowances do not fund the expenditure required to achieve its stretching leakage reduction targets. As discussed in this chapter, Ofwat’s decision not to provide companies with allowances for enhancement to bridge the gap between SELL and its “stretched” leakage targets means that the funding package as a whole does not fund achievement of the leakage reduction targets. In essence, there is an inconsistency between Ofwat’s cost allowances (both base allowances and enhancement) and its targets.

By contrast, there was no such inconsistency in Ofwat’s approach at PR14, as PCs for leakage reduction were set to reflect local conditions affecting leakage/SELL, with funding for companies stretching their performance beyond the PCs coming through ODIs. As discussed above, past regulatory determinations by Ofgem have also allowed companies to recover the costs of new regulatory requirements that trigger significant investment.

Change to Ofwat’s funding package for leakage reduction is therefore required. One option would be to develop its cost assessment modelling tools, so that companies’ base allowances better-reflect the growing need for work to reduce leakage. Alternatively, Ofwat could revise its “gated” approach to allowing companies’ claims for enhancement expenditure to reduce

⁶² Ofgem (28 November 2014), RIIO-ED1: Final determinations for the slow track electricity distribution companies Business plan expenditure assessment, page. 86-87.

⁶³ Ofgem (28 November 2014), RIIO-ED1: Final determinations for the slow track electricity distribution companies Business plan expenditure assessment, page. 35.

⁶⁴ Secondary Deliverables targets relate to asset health, criticality and risk, and were defined for the RIIO-ED1 period in Standard Condition 51 (Network Asset Indices Methodology) of the electricity distribution licence. Ofgem (18 June 2015), RIIO-ED1 regulatory instructions and guidance: Annex A – Glossary, page 119.

⁶⁵ Ofgem cross-checked its modelling results using “against historical and forecast information, condition information contained in the secondary deliverables for asset health and criticality, scheme papers and other justification”.

Ofgem (28 November 2014), RIIO-ED1: Final determinations for the slow track electricity distribution companies Business plan expenditure assessment, page. 29.

The Need for Allowed Enhancement Expenditure to Fund
Leakage Reduction

leakage in a way that provides funding for them to bridge the gap between their proposed PCs and the levels of leakage reduction activity conducted historically.

5. Ofwat's Allowed Unit Costs of Leakage Reduction

As discussed in Chapter 2, Ofwat sets a constant unit cost for leakage reduction beyond either 15 per cent leakage reduction, or the UQ level of leakage reduction.

This chapter assesses whether Ofwat's method of setting unit cost is consistent with the need for efficiently operated companies to fund their leakage reduction targets. We also consider whether Ofwat's approach provides incentives for water companies to reduce leakage efficiently.

5.1. Ofwat's Allowed Unit Costs of Leakage Reduction

Ofwat has set the allowed unit cost of leakage reduction that applies to allowed enhancement expenditure using the marginal costs from its Supply-Demand Balance (SDB) enhancement modelling and companies' proposed ODI incentive rates. The proposed allowed unit cost is £1.6m/MI/d, and is the average of:⁶⁶

- median leakage unit costs derived from the PR19 SDB enhancement analysis;
- median incentive rate for underperformance reported in companies' business plans; and
- median incentive rate for outperformance reported in companies' business plans.

5.2. Accounting for the Increasing Marginal Cost of Leakage Reduction

5.2.1. Ofwat's approach fails to account for the increasing marginal cost of leakage reduction

Ofwat's approach fails to consider that the marginal cost of leakage reduction potentially increases, as companies reduce leakage. As mentioned in Section 3.4.3 above, historically, companies may have reduced their leakage by "picking the lowest-hanging fruit" to achieve their leakage reduction targets.

However, as evidence in Figure 3.4 above shows, more demanding leakage reduction targets are associated with higher marginal costs related to the more expensive leakage reduction solutions companies must deploy. Hence, requiring companies to meet more ambitious targets will increase the marginal cost of reducing leakage.

As we explain in Section 3.4.3, Ofwat's approach of allowing enhancement expenditure based on a single median unit cost across the industry fails to capture any potential variation across companies' marginal costs because of differences in the costs companies face to reduce leakage, and the level of leakage reduction efforts conducted historically.

5.2.2. A solution is to link allowed unit costs to a modelled estimate that controls for differences between companies

It is therefore important that, in order to fund the efficient costs of leakage reduction through enhancement, Ofwat sets unit costs in a way that addresses the factors causing unit costs to vary across companies. In particular, to address the tendency for the marginal cost of leakage

⁶⁶ Ofwat (January 2019), Supply-demand balance enhancement: Feeder model summaries, page. 15.

reduction to rise as leakage falls, and for the costs of leakage reduction to vary across companies for other reasons related to network characteristics, Ofwat could consider developing a targeted, disaggregated model of leakage reduction costs. Such a model would, for instance, link allowed unit costs of leakage reduction to an increasing function of companies' leakage reduction performance capturing both the rate and speed of change of companies' unit costs, and possibly control for other external factors.

5.3. Impact on Companies Incentives for Efficient Leakage Reduction

5.3.1. Ofwat's approach may undermine companies' incentives to reduce leakage at least-cost

Setting targets at the minimum of company's *proposed* unit costs and the industry median is likely to affect incentives for cost reduction detrimentally, as companies achieving the median do not benefit from doing so in terms of higher allowances. Firms with median or lower unit costs of leakage reduction do not benefit from being more efficient, beyond the totex sharing factor at the end of the relevant AMP. There is no additional benefit for a company to reduce its unit cost beyond the median (e.g. reducing a unit cost of £1.6m/MI/d to £1.4m/MI/d). Hence, under this structure companies do not have an incentive to improve their unit cost of leakage reduction to achieve industry median or lower unit costs.

This problem also could be addressed by setting all companies' allowed enhancement based on a unit cost predicted by a targeted leakage reduction unit cost model, as suggested in Section 5.2.2.

5.3.2. Ofwat's rationale for using out/under-performance unit rates is not justified

As explained above, Ofwat used leakage ODI outperformance and underperformance rates in setting the allowed unit costs for leakage reduction. For the reasons set out below, this approach is unlikely to produce an accurate estimate of the marginal cost companies face to reduce leakage.

In its final methodology, Ofwat presents companies with a series of options for how they should calculate their ODI incentive rates.⁶⁷ Ofwat states companies can use the incentive rate formulas used at PR14:⁶⁸

$$\text{ODI(underperformance)} = \text{Incremental benefit} - (\text{incremental cost} \times p)$$

$$\text{ODI(outperformance)} = \text{Incremental benefit} \times (1 - p)$$

Where 'p' is the customer share of totex outperformance (50%). Ofwat also stated that companies could use other customer evidence to propose changes to the ODI outperformance

⁶⁷ Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, p. 90-91.

⁶⁸ Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, p. 91.

and underperformance payment rates calculated according to the existing formulas, “provided the changes are well justified”.⁶⁹

From reviewing Ofwat’s IAP documents, we understand that most companies have based their incentive rates on Ofwat’s standard formula, meaning that underperformance incentive rates are based on a combination of marginal costs and marginal benefits, and outperformance incentives are based on marginal benefits.

The first problem with Ofwat’s use of these ODI rates is that both outperformance and underperformance incentive rates discount the proportion of out/underperformance which is shared with consumers (i.e. ‘p’ in the formulas above). It is not appropriate to discount the customer share when applying these rates to enhancement expenditure, since allowances for enhancement expenditure are subject to the totex outperformance sharing mechanism as a component of controllable totex.

Further, Ofwat incorrectly uses incentive rates which take account of marginal benefits as well as marginal costs, and, in the case of the outperformance formula, Ofwat takes account only of marginal benefits, such as marginal willingness to pay, and not marginal costs.

Ofwat does not explain its rationale for using the outperformance incentive rate as a proxy for the marginal cost of reducing leakage, although in its outcomes methodology, Ofwat explains that in its outperformance formula, it effectively assumes that incremental cost is equal to marginal benefit.⁷⁰ However, Ofwat goes on to explain that while this assumption is appropriate for setting an incentive rate for performance above a PC, it is not likely to hold in practice. Ofwat states that assuming marginal cost equals marginal benefit “allows for the fact that in reality a company is only likely to outperform its performance commitment if it reduces its marginal cost”, but that “typically you would expect beyond the performance commitment for marginal cost > marginal benefit”. In other words, since Ofwat explains that marginal benefits are likely to be less than marginal costs, it is inconsistent for Ofwat to use marginal benefits as an estimate of the efficient unit costs of leakage reduction.

Finally, while Ofwat states that it has taken incentive rates directly from companies’ business plan data tables, for some companies we have been unable to reconcile the “leakage under/out performance unit rates” which Ofwat has reported in its calculation of unit costs, with the data in companies’ business plan data tables. For instance, United Utilities and Yorkshire Water’s business plan Data Table reports different incentive rates for its leakage ODI to those which Ofwat reports in its “Supply demand balance enhancement feeder model”.

5.4. Conclusion

Ofwat has set the allowed unit cost of leakage reduction that applies to allowed enhancement expenditure through its SDB enhancement modelling that uses data from companies’ business plans. The allowed unit cost at PR19 is £1.6m/MI/d and reflects an average of

⁶⁹ Ofwat (January 2019), PR19 initial assessment of plans, Technical appendix 1: Delivering outcomes for Customers, p. 9.

⁷⁰ Ofwat, Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers, p. 92.

median of unit costs submitted by companies and ODI incentive rates. Ofwat's approach is flawed for several reasons.

First, Ofwat's approach of allowing enhancement expenditure based on a single median unit cost across the industry fails to capture any potential variation across companies' marginal costs because of differences in the costs companies face to reduce leakage, and the level of leakage reduction efforts conducted historically. It also fails to capture the tendency of unit costs to be higher when companies maintain or attain lower levels of leakage.

Secondly, setting targets at the minimum of company's *proposed* unit costs and the industry median is likely to affect incentives for cost reduction detrimentally, as companies achieving the median do not benefit from doing so in terms of higher allowances. Hence, Ofwat's approach may undermine companies' incentives to reduce leakage at least-cost.

Also, Ofwat's rationale for using ODI out/under-performance rates to set allowed unit costs for leakage reduction is not well-justified and unlikely to produce an accurate estimate of the marginal cost companies face to reduce leakage. The ODI underperformance formula takes into account both marginal benefits as well as marginal costs, and the ODI outperformance formula only accounts for marginal benefits. However, Ofwat itself notes that beyond the performance commitments marginal benefits are likely to be less than marginal costs. It is therefore inconsistent for Ofwat to use marginal benefits as an estimate of the efficient unit costs of leakage reduction.

Finally, ODI outperformance and underperformance incentive rates discount the proportion of out/underperformance which is shared with consumers. It is however not appropriate to discount the customer share when applying these rates to enhancement expenditure, since allowances for enhancement expenditure are subject to the totex outperformance sharing mechanism as a component of controllable totex.

It is therefore important that, in order to fund the efficient costs of leakage reduction through enhancement, Ofwat sets unit costs in a way that addresses the factors causing unit costs to vary across companies.

To address the tendency for the marginal cost of leakage reduction to rise as leakage falls, and for the costs of leakage reduction to vary across companies for other reasons related to network characteristics, Ofwat could consider developing a targeted, disaggregated model of leakage reduction costs. Such a model would, for instance, link the allowed unit costs of leakage reduction to an increasing function of companies' leakage reduction performance capturing both the rate and speed of change of companies' unit costs, and possibly control for other external factors.

6. Conclusions and Recommendations

For PR19, Ofwat expects companies to target more stretching levels of leakage reduction than they have achieved historically, which targets a level of leakage reduction that requires additional expenditure by the industry to achieve.

Despite requiring companies to enhance their leakage reduction efforts, Ofwat has disallowed many companies' requests for enhancement expenditure, funding leakage reduction that goes beyond a defined target. Ofwat has not allowed any enhancement expenditure to bridge the gap between current levels of leakage reduction and the target. By disallowing this enhancement expenditure, Ofwat relies on companies' ability to fund leakage reduction through their base cost allowances,⁷¹ stating that “[c]ustomers should not pay extra costs for companies to deliver stretching targets” for leakage reduction.⁷²

This aspiration, that companies should fund higher levels of service that require rising expenditure without funding for enhancement represents wishful thinking by Ofwat.

Leakage reduction is a material expense that companies need to fund. Indeed, our own empirical analysis supports these arguments, demonstrating that controlling for differences between companies' actual leakage and SELL has a statistically significant impact on companies' costs.

Ofwat's methods for setting base allowances do not fund the expenditure required to achieve its stretching leakage reduction targets. These will allow companies to fund a level of leakage reduction effort commensurate with the levels of leakage reduction achieved during the historical modeling period. Because average industry leakage reduction over this period was low on average, Ofwat's base allowances are unlikely to fund any material leakage reduction work at all.

As such, by only allowing enhancement expenditure for leakage reduction when companies exceed a target that itself exceeds the levels of leakage reduction achieved historically, Ofwat's funding package for leakage reduction is inconsistent with its targets.

By contrast, there was no such inconsistency in Ofwat's approach at PR14, as PCs for leakage reduction were set to reflect local conditions affecting leakage/SELL, with funding for companies stretching their performance beyond the PCs coming through ODIs. As discussed above, past regulatory determinations by Ofgem have also allowed companies to recover the costs of new regulatory requirements that trigger significant investment.

Change to Ofwat's funding package for leakage reduction is therefore required. One option would be to develop its cost assessment modelling tools, so that companies' base allowances better-reflect the growing need for work to reduce leakage. Alternatively, Ofwat could revise its “gated” approach to allowing companies' claims for enhancement expenditure to reduce leakage in a way that provides funding for them to bridge the gap between their proposed PCs and the levels of leakage reduction activity conducted historically.

⁷¹ Ofwat rejected enhancement expenditure for reducing leakage for Bristol Water, SES, Severn Trent, South East Water, South West Water, Southern Water, Wessex Water, Yorkshire Water. Source: Ofwat (2019), Action summary tables for each affected company.

⁷² Ofwat (January 2019), PR19 initial assessment of plans, Technical appendix 2: Securing cost efficiency, page. 18.

We have also shown that the marginal cost of leakage reduction rises as companies reduce leakage to lower levels than observed historically, which is another factor not accounted for by Ofwat's base expenditure modelling, or its allowances for enhancement expenditure for companies exceeding the target. We have also identified a number of other problems with the way Ofwat set its allowed unit costs, specifically related to the way it combined unit costs from its SDB modelling with information from companies' ODI incentive rates.

A possible solution to this problem could lie in modelling more thoroughly the unit cost of leakage reduction, as a function of the levels of leakage reduction companies target and other factors influencing the cost of leakage reduction. Essentially, we recommend that Ofwat considers improving on its approach of basing allowances on proposed ODI rates (which are in any event inappropriate as a guide to the cost of leakage reduction) and industry median unit costs.

Appendix A. Regression Analysis of Unit Costs and Leakage Reduction Targets

Table A.1 below set out the results of our regression analysis of the unit costs of leakage reduction in £m/MI/day on the level of leakage targeted at the end of the AMP across all companies, excluding Thames Water.⁷³ We used the following variables:

- Regression 1, 2 and 3 rely on forecast leakage at the end of the AMP7 (i.e., 2024-25), measured in l/prop/day (“F_leakage_prop_2425”) and m3/km/d (“F_leakage_km_2425”) and a cross-product term (“F_product_2425”).
- Regression 4, 5 and 6 rely on forecast 3-year average leakage positions in 2024-25 that companies have provided as part of their common performance commitments, measured in l/prop/day (“F_leakage_prop_avg”) and m3/km/d (“F_leakage_km_avg”) and a cross-product term (“F_product_avg”).
- All regression models use unit cost (£m/MI/day) as dependent variable.

Table A.1: Regression Analysis Results

Variables	(1)	(2)	(3)	(4)	(5)	(6)
F_leakage_km_2425	-0.549** (0.223)					
F_leakage_prop_2425		-0.0465* (0.0243)				
F_product_2425			-0.00436** (0.00167)			
F_leakage_km_avg				-0.519** (0.209)		
F_leakage_prop_avg					-0.0440* (0.0227)	
F_product_avg						- 0.00377** (0.00148)
Constant	5.317*** (1.417)	5.742** (2.032)	4.194*** (0.934)			
Observations	14	14	14	14	14	14
R-square	0.337	0.234	0.361	0.339	0.238	0.351

Note: Standard errors in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: NERA analysis of Ofwat data.

⁷³ Data on unit costs for leakage reduction for HDD and NES is not available. We have therefore only included companies in the sample for which both unit cost and leakage data is available in the public domain.

Qualifications, assumptions and limiting conditions

NERA Economic Consulting (“NERA”) was commissioned by SES Water to analyse proposals published by Ofwat for the funding of leakage reduction as part of the PR19 price control review process. The primary audience for this report includes Ofwat and other parties with an interest in the water industry.

NERA shall not have any liability to any third party in respect of this report or any actions taken or decisions made as a consequence of the results, advice or recommendations set forth herein.

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Appendix OC.A12.1

Action ref AFW.OC.A12

Leakage customer engagement evidence



Phase 3 Triangulation

14th August 2018

Leakage evidence

Customers want leakage minimised

Making sure customers and communities have enough water while leaving more water in the environment

0: Scoping and Immersion

1: Listening and learning

2: Testing and valuing

3: Revisiting and assuring

- 71% of customers strongly back continuing to find ways to reduce leakage, 89% support. Leakage reduction proposals were supported by customers. *[phase 2 dWRMP survey]*
- In terms of the different options proposed to reduce leakage, 38% of customers prefer Option 1 - reducing leakage by a further 11% - compared to 31% who choose the more expensive Option 2 which would target a further 15% reduction *[phase 2 dWRMP survey]*
- Leakage is an emotive issue. Customers shocked at level of leakage, perceive it as 'very high' and do not appreciate being asked to save water or temporary restrictions because of this. *[phase 0 signpost focus group, phase 1 community - leakage survey, phase 2 future customers schools survey]*
- Customers feel their responsibility is to not waste water, but it is the water companies' responsibility to avoid excess wastage from burst mains or leaks *[phase 1 community - leakage survey, Phase 2 BP focus groups]*
- Leakage is seen as a visible sign of underperformance and a key part of the 'contract' between company and customers. *[phase 1 community - leakage survey, phase 2 dWRMP/BP focus groups]*
- Customers want more comparative information to be shared on leakage. *[phase 1 community - leakage survey, Phase 2 dWRMP focus groups]*
- Many participants felt that both 11% and 15% leakage reductions were too modest. *[phase 2 BP focus groups]*
- A large proportion of customers think that Affinity Water should meet or exceed Ofwat's leakage expectations *[phase 1 community - leakage survey]*
- Leakage the reason customers would most likely support an increase in water bills *[phase 1 community - omnibus survey]*
- Customers make the connection between reducing leakage and protecting the environment but also recognise the individual benefit of keeping costs low. *[phase 2 BP focus groups]*
- Relatively high cause for operational contact through all sources *[phase 1 operational data]*
- Customers recognise different severity of leaks and some necessitating faster response than others *[phase 1 community - leakage survey & stepboard]*
- Operational data shows there has been a little more claimed contact on external leaks in 2017/2018 with 27% claiming this as the main reason for contact. *[VFM 2017/2018 Summary]*
- There is high support for compulsory metering, 65% if it helps with addressing water leaks *[ipsos Mori research for NIC, May 18]*
- Maintenance of pipes and fixing leakage are all perceived as important areas for Affinity Water to consider in future plans. *[phase 3 Online Resilience Survey]*

...but

- Varying views from stakeholders on leakage. Higher leakage reduction was more popular with some seeing it as a top priority while others worried about short term fixes. Some saw leakage as being of little interest to customers. *[phase 2 stakeholder BP/dWRMP focus groups]*
- Costs for leaks were presented in % (not the number) and customers struggle to trade off against other areas. They don't understand the investment required *[phase 2 BP acceptability survey]*
- Business Plan with highest level of leakage less acceptable to customers (but still 74% support) *[Phase 2 BP acceptability survey]*
- Difficult to interpret and understand leakage data without any context. Data was unfamiliar and unintuitive *[phase 2 BP focus groups]*

PC: Leakage

Leakage reduction of 11%(preferred dWRMP) or 15% (alternative dWRMP)

- 82% of customers consider Clean Water (Only) very or fairly acceptable. This includes 15% leakage reduction. [\[phase 3 Final Bill Acceptability Survey\]](#)
- 71% of customers strongly back continuing to find ways to reduce leakage, 89% support. Leakage reduction proposals were supported by customers. [\[phase 2 dWRMP survey\]](#)
- In terms of the different options proposed to reduce leakage, 38% of customers prefer Option 1 - reducing leakage by a further 11% - compared to 31% who choose the more expensive Option 2 which would target a further 15% reduction. [\[phase 2 dWRMP survey\]](#)
- Leakage is an emotive issue. Customers shocked at level of leakage, perceive it as 'very high' and do not appreciate being asked to save water or temporary restrictions because of this. [\[phase 0 signpost focus group, phase 1 community – leakage survey, phase 2 future customers schools survey\]](#)
- Customers feel their responsibility is to not waste water, but it is the water companies' responsibility to avoid excess wastage from burst mains or leaks [\[phase 1 community – leakage survey\]](#)
- Leakage is seen as a visible sign of underperformance and a key part of the 'contract' between company and customers. [\[phase 1 community – leakage survey, phase 2 dWRMP/BP qual research\]](#)
- Customers want more comparative information to be shared on leakage. [\[phase 1 community – leakage survey\]](#)
- Many participants felt that both 11% and 15% leakage reductions were too modest. [\[phase 2 BP focus groups\]](#)
- A large proportion of customers think that Affinity Water should meet or exceed Ofwat's leakage expectations [\[phase 1 community – leakage survey\]](#)
- Leakage the reason customers would most likely support an increase in water bills [\[phase 1 community – omnibus survey\]](#)
- There is high support for compulsory metering, 65% if it helps with addressing water leaks [\[Ipsos Mori research for NIC, May 18\]](#)
- Customers make the connection between reducing leakage and protecting the environment but also recognise the individual benefit of keeping costs low. [\[phase 2 BP focus groups\]](#)
- Relatively high cause for operational contact through all sources [\[phase 1 operational data\]](#)
- Customers recognise different severity of leaks and some necessitating faster response than others [\[phase 1 community – leakage survey\]](#)
- Operational data shows there has been a little more claimed contact on external leaks in 2017/2018 with 27% claiming this as the main reason for contact [\[VfM 2017/2018 Summary\]](#).

Making sure customers and communities have enough water while leaving more water in the environment

0: Scoping and Immersion

1: Listening and learning

2: Testing and valuing

3: Revisiting and assuring

...but

- Varying views from stakeholders on leakage. Higher leakage reduction was more popular with some seeing it as a top priority while others worried about short term fixes. Some saw leakage as being of little interest to customers. [\[phase 2 stakeholder BP/dWRMP focus groups\]](#)
- Costs for leaks were presented in % (not the number) and customers struggle to trade off against other areas. They don't understand the investment required [\[phase 2 BP acceptability survey\]](#)
- Business Plan with highest level of leakage less acceptable to customers (but still 74% support) [\[Phase 2 BP acceptability survey\]](#)
- 61% opposes compulsory metering if it means higher bills [\[Ipsos Mori research for NIC, May 18\]](#)
- Difficult to interpret and understand leakage data without any context. Data was unfamiliar and unintuitive [\[phase 2 BP focus groups\]](#)

Appendix OC.A19.1

Action ref AFW.OC.A19

Drought resilience matrix

This appendix contains the interim calculations for the risk of restrictions in a severe drought PC. It has been put together with reference to Ofwat’s technical guidance:

<https://www.ofwat.gov.uk/wp-content/uploads/2018/03/Drought-resilience-metric-March-18.pdf>

Section 2 specifies 4 tables for each of our eight Water Resource Zones (WRZs). We interpret table 3 as an example calculation table, so we show tables 1,2 and 4 for each WRZ. They are as follows

It should be noted that the baseline assessment *includes* Drought Orders and Permits as part of the baseline supply. In line with our rdWRMP these are then removed for the Performance Commitment in 2024/25, where we achieve balance across all WRZs without reliance on Drought Orders and Permits. As required by the technical guidance, we have included the benefits of Temporary Use Bans as a reduction in demand, rather than as an increase in supply (which is what we are required to do for the rdWRMP tables).

WRZ1

Table 1: simplified calculation of baseline performance (WRZ1)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Supply		112.06	112.06	112.06	112.06	103.68	103.68	103.68	103.68	103.68	103.68	103.68	103.68	103.68	103.68	103.68
Demand		97.84	95.51	94.10	93.94	93.78	93.61	93.42	93.21	93.14	93.06	92.96	92.88	92.80	92.74	92.67
SDB		14.22	16.55	17.96	18.12	9.90	10.07	10.26	10.47	10.54	10.62	10.72	10.80	10.88	10.94	11.01
Risk		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average %	0															

Table 2: simplified calculation of final year target performance (WRZ1)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Supply	99.31	107.07	105.33	110.11	109.84	109.71	110.28	111.02	112.74	112.67	111.43	110.58	109.59	109.34	108.98	
Demand	97.84	95.51	94.10	93.94	93.78	93.61	93.42	93.21	93.14	93.06	92.96	92.88	92.80	92.74	92.67	
SDB	1.47	11.57	11.23	16.17	16.06	16.09	16.86	17.81	19.60	19.61	18.47	17.70	16.79	16.60	16.31	
Risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	
%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Average %																0

Table 4: simplified performance commitment projection trend (WRZ1)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Performance commitment (average risk %)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

WRZ2

Table 1: simplified calculation of baseline performance (WRZ2)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Supply		129.42	128.32	127.23	126.14	116.04	114.95	113.86	112.77	111.68	110.59	110.13	109.79	109.44	109.10	108.75
Demand		128.03	125.61	124.11	124.09	124.07	124.04	124.00	123.95	124.09	124.23	124.37	124.52	124.66	124.82	124.98
SDB		1.38	2.72	3.12	2.05	-8.03	-9.09	-10.14	-11.18	-12.41	-13.65	-14.24	-14.73	-15.22	-15.72	-16.23
Risk		No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
%		0	0	0	0	100	100	100	100	100	100	100	100	100	100	100
Average %	73															

Table 2: simplified calculation of final year target performance (WRZ2)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Supply	132.29	131.46	145.28	147.31	147.87	147.56	147.62	147.68	147.88	148.10	148.28	148.49	148.70	147.94	149.16
Demand	128.03	125.61	124.11	124.09	124.07	124.04	124.00	123.95	124.09	124.23	124.37	124.52	124.66	124.82	124.98
SDB	4.26	5.85	21.17	23.22	23.80	23.52	23.63	23.73	23.79	23.87	23.91	23.97	24.04	23.13	24.19
Risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average %															0

Table 4: simplified performance commitment projection trend (WRZ2)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Performance commitment (average risk %)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

WRZ3

Table 1: simplified calculation of baseline performance (WRZ3)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Supply		210.11	210.03	209.94	209.85	227.96	227.73	227.51	227.28	227.05	226.83	226.65	226.47	226.31	226.14	225.97
Demand		190.27	191.05	191.87	192.66	193.41	194.15	194.86	195.51	196.65	197.78	198.89	200.00	201.11	202.22	203.34
SDB		19.84	18.97	18.07	17.19	34.55	33.58	32.65	31.76	30.40	29.05	27.77	26.48	25.19	23.92	22.63
Risk		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average %		0														

Table 2: simplified calculation of final year target performance (WRZ3)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Supply	190.57	191.35	207.77	224.97	231.03	231.77	232.79	233.10	234.95	236.15	237.36	237.67	238.94	240.17	241.43	
Demand	190.27	191.05	191.87	192.66	193.41	194.15	194.86	195.51	196.65	197.78	198.89	200.00	201.11	202.22	203.34	
SDB	0.30	0.30	15.89	32.30	37.63	37.62	37.94	37.58	38.30	38.37	38.48	37.67	37.83	37.95	38.08	
Risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	
%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Average %																0

Table 4: simplified performance commitment projection trend (WRZ3)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Performance commitment (average risk %)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

WRZ4

Table 1: simplified calculation of baseline performance (WRZ4)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Supply		254.57	254.57	254.57	254.57	254.57	254.57	254.57	254.57	254.57	254.57	254.57	254.57	254.57	254.57	254.57
Demand		271.93	272.34	270.12	264.78	259.74	256.61	254.21	254.41	255.58	256.76	257.94	259.12	260.31	261.51	262.73
SDB		-17.36	-17.77	-15.54	-10.21	-5.17	-2.04	0.37	0.17	-1.01	-2.19	-3.36	-4.55	-5.74	-6.94	-8.16
Risk		Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
%		100	100	100	100	100	100	0	0	100	100	100	100	100	100	100
Average %		87														

Table 2: simplified calculation of final year target performance (WRZ4)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Supply	272.44	272.76	270.54	264.82	260.05	267.93	266.90	264.70	261.48	258.71	261.45	262.35	262.77	265.43	270.91	
Demand	271.93	272.34	270.12	264.78	259.74	256.61	254.21	254.41	255.58	256.76	257.94	259.12	260.31	261.51	262.73	
SDB	0.51	0.42	0.43	0.04	0.31	11.32	12.69	10.29	5.90	1.95	3.52	3.23	2.45	3.92	8.18	
Risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	
%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Average %																0

Table 4: simplified performance commitment projection trend (WRZ4)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Performance commitment (average risk %)	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

WRZ5

Table 1: simplified calculation of baseline performance (WRZ5)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Supply		57.40	57.40	57.40	57.40	56.98	56.98	56.98	56.98	56.98	56.98	56.98	56.98	56.98	56.98	56.98
Demand		80.20	80.26	80.51	80.83	81.13	81.43	81.72	81.99	82.42	82.85	83.27	83.66	84.06	84.45	84.84
SDB		-22.80	-22.86	-23.11	-23.43	-24.15	-24.45	-24.74	-25.01	-25.44	-25.86	-26.29	-26.68	-27.08	-27.46	-27.86
Risk		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
%		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Average %	100															

Table 2: simplified calculation of final year target performance (WRZ5)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Supply	81.28	81.18	81.57	82.19	88.21	89.82	91.21	93.58	94.07	95.58	97.20	98.80	100.23	100.92	102.83	
Demand	80.20	80.26	80.51	80.83	81.13	81.43	81.72	81.99	82.42	82.85	83.27	83.66	84.06	84.45	84.84	
SDB	1.08	0.92	1.06	1.36	7.08	8.38	9.49	11.59	11.65	12.73	13.92	15.13	16.17	16.48	17.99	
Risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	
%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Average %																0

Table 4: simplified performance commitment projection trend (WRZ5)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Performance commitment (average risk %)	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

WRZ6

Table 1: simplified calculation of baseline performance (WRZ6)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Supply		164.80	164.80	164.80	164.80	164.80	164.80	164.80	164.80	164.80	164.80	164.80	164.80	164.80	164.80	164.80
Demand		145.74	146.14	146.55	146.72	146.07	143.87	140.14	138.05	138.67	139.26	139.83	140.42	141.01	141.61	142.23
SDB		19.06	18.66	18.25	18.08	18.73	20.93	24.66	26.75	26.13	25.54	24.97	24.38	23.78	23.19	22.57
Risk		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average %		0														

Table 2: simplified calculation of final year target performance (WRZ6)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Supply	165.25	165.86	149.46	150.07	151.02	153.54	155.50	156.97	157.89	158.88	160.16	161.81	163.58	165.05	166.38	
Demand	145.74	146.14	146.55	146.72	146.07	143.87	140.14	138.05	138.67	139.26	139.83	140.42	141.01	141.61	142.23	
SDB	19.50	19.72	2.91	3.36	4.94	9.67	15.37	18.92	19.22	19.62	20.33	21.39	22.56	23.44	24.15	
Risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	
%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Average %																0

Table 4: simplified performance commitment projection trend (WRZ6)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Performance commitment (average risk %)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

WRZ7

Table 1: simplified calculation of baseline performance (WRZ7)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Supply		42.45	42.45	42.45	42.45	42.45	42.45	42.45	42.45	42.45	42.45	42.45	42.45	42.45	42.45	42.45
Demand		41.05	40.99	40.96	40.92	40.87	40.84	40.80	40.76	40.81	40.87	40.92	40.99	41.05	41.12	41.21
SDB		1.40	1.45	1.49	1.53	1.58	1.61	1.65	1.69	1.64	1.58	1.52	1.46	1.40	1.33	1.24
Risk		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average %		0														

Table 2: simplified calculation of final year target performance (WRZ7)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Supply	42.63	43.03	44.25	44.48	44.71	45.06	45.27	45.29	45.31	45.34	45.39	45.30	45.41	45.53	45.82
Demand	41.05	40.99	40.96	40.92	40.87	40.84	40.80	40.76	40.81	40.87	40.92	40.99	41.05	41.12	41.21
SDB	1.58	2.04	3.29	3.57	3.83	4.22	4.47	4.53	4.50	4.48	4.46	4.32	4.35	4.41	4.61
Risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average %															0

Table 4: simplified performance commitment projection trend (WRZ7)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Performance commitment (average risk %)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

WRZ8

Table 1: simplified calculation of baseline performance (WRZ8)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Supply		37.89	37.89	37.89	37.89	37.89	37.89	37.89	37.89	37.89	37.89	37.89	37.89	37.89	37.89	37.89
Demand		30.70	30.66	30.64	30.62	30.59	30.57	30.60	30.63	30.71	30.78	30.86	30.93	31.01	31.09	31.17
SDB		7.19	7.23	7.25	7.27	7.30	7.33	7.29	7.26	7.19	7.11	7.04	6.96	6.88	6.80	6.72
Risk		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average %	0															

Table 2: simplified calculation of final year target performance (WRZ8)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Supply	38.03	38.25	38.45	38.64	38.81	39.15	39.17	39.39	39.41	39.45	39.48	39.54	39.42	39.52	39.57	
Demand	30.70	30.66	30.64	30.62	30.59	30.57	30.60	30.63	30.71	30.78	30.86	30.93	31.01	31.09	31.17	
SDB	7.33	7.58	7.80	8.02	8.22	8.58	8.57	8.76	8.71	8.67	8.63	8.60	8.41	8.43	8.40	
Risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	
%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Average %																0

Table 4: simplified performance commitment projection trend (WRZ8)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Performance commitment (average risk %)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Section 4 requests a table as follows:

Table 5: company level risk reporting for measure at PR19 (all values in this table are 25 year average risks over the 2020-21 to 2044-45 period)

	201 9-20	202 0-21	202 1-22	202 2-23	202 3-24	202 4-25	202 5-26	202 6-27	202 7-28	202 8-29	202 9-30	203 0-31	203 1-32	203 2-33	203 3-34	203 4-35	203 5-36	203 6-37	203 7-38	203 8-39	203 9-40	204 0-41	204 1-42	204 2-43	204 3-44	204 4-45
Baseline performance (start of period) - Total company population at risk (number)	1,798,000																									
Baseline performance (start of period) - Percentage of company customers at risk (%)	42.5																									
PR19 commitment - Total company population at risk (number)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PR19 commitment - Percentage of company customers at risk (%)		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

For clarity the baseline calculation calculates the average of the 25 year period 2020/21 to 2044/45. We note that the first year of the table in the guidance is labelled (2019/20) above, and presume that the label is in error.

Section 5 asks for calculations of the baseline risk:

Table 6: calculation of baseline risk based on SDB for water resource zone 1

	202 0-21	202 1-22	202 2-23	202 3-24	202 4-25	202 5-26	202 6-27	202 7-28	202 8-29	202 9-30	203 0-31	203 1-32	203 2-33	203 3-34	203 4-35	203 5-36	203 6-37	203 7-38	203 8-39	203 9-40	204 0-41	204 1-42	204 2-43	204 3-44	204 4-45
Supply-demand balance (Ml/d)	14.22	16.55	17.96	18.12	9.90	10.07	10.26	10.47	10.54	10.62	10.72	10.80	10.88	10.94	11.01	11.08	11.15	11.22	11.29	11.34	11.40	11.40	11.40	11.38	11.37
Risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Population at risk (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 6: calculation of baseline risk based on SDB for water resource zone 2

	202 0-21	202 1-22	202 2-23	202 3-24	202 4-25	202 5-26	202 6-27	202 7-28	202 8-29	202 9-30	203 0-31	203 1-32	203 2-33	203 3-34	203 4-35	203 5-36	203 6-37	203 7-38	203 8-39	203 9-40	204 0-41	204 1-42	204 2-43	204 3-44	204 4-45
Supply-demand balance (Ml/d)	1.38	2.72	3.12	2.05	-8.03	-9.09	-10.14	-11.18	-12.41	-13.65	-14.24	-14.73	-15.22	-15.72	-16.23	-16.73	-17.24	-17.75	-18.27	-18.79	-19.31	-19.92	-20.52	-21.13	-21.75
Risk	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population at risk (number)	-	-	-	-	472,644	475,809	478,721	481,375	484,158	486,791	489,219	491,613	493,785	496,284	498,700	501,053	503,276	505,462	507,684	509,947	512,194	514,491	516,827	519,202	521,603

Table 6: calculation of baseline risk based on SDB for water resource zone 3

	202 0-21	202 1-22	202 2-23	202 3-24	202 4-25	202 5-26	202 6-27	202 7-28	202 8-29	202 9-30	203 0-31	203 1-32	203 2-33	203 3-34	203 4-35	203 5-36	203 6-37	203 7-38	203 8-39	203 9-40	204 0-41	204 1-42	204 2-43	204 3-44	204 4-45
Supply-demand balance (Ml/d)	19.84	18.97	18.07	17.19	34.55	33.58	32.65	31.76	30.40	29.05	27.77	26.48	25.19	23.92	22.63	21.35	20.05	18.76	17.45	16.13	14.87	13.44	12.02	10.58	9.13
Risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

	202 0-21	202 1-22	202 2-23	202 3-24	202 4-25	202 5-26	202 6-27	202 7-28	202 8-29	202 9-30	203 0-31	203 1-32	203 2-33	203 3-34	203 4-35	203 5-36	203 6-37	203 7-38	203 8-39	203 9-40	204 0-41	204 1-42	204 2-43	204 3-44	204 4-45
Supply-demand balance (M/d)	19.06	18.66	18.25	18.08	18.73	20.93	24.66	26.75	26.13	25.54	24.97	24.38	23.78	23.19	22.57	21.96	21.33	20.71	20.06	19.40	18.76	18.00	17.24	16.47	15.68
Risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Population at risk (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 6: calculation of baseline risk based on SDB for water resource zone 7

	202 0-21	202 1-22	202 2-23	202 3-24	202 4-25	202 5-26	202 6-27	202 7-28	202 8-29	202 9-30	203 0-31	203 1-32	203 2-33	203 3-34	203 4-35	203 5-36	203 6-37	203 7-38	203 8-39	203 9-40	204 0-41	204 1-42	204 2-43	204 3-44	204 4-45
Supply-demand balance (M/d)	7.67	7.72	7.76	7.80	7.85	7.88	7.92	7.96	7.91	7.85	7.79	7.73	7.67	7.60	7.51	7.41	7.31	7.21	7.09	6.98	6.87	6.73	6.58	6.43	6.28
Risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Population at risk (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 6: calculation of baseline risk based on SDB for water resource zone 8

	202 0-21	202 1-22	202 2-23	202 3-24	202 4-25	202 5-26	202 6-27	202 7-28	202 8-29	202 9-30	203 0-31	203 1-32	203 2-33	203 3-34	203 4-35	203 5-36	203 6-37	203 7-38	203 8-39	203 9-40	204 0-41	204 1-42	204 2-43	204 3-44	204 4-45
Supply-demand balance (M/d)	7.25	7.27	4.70	4.73	4.69	4.66	4.59	4.51	4.44	4.36	4.28	4.20	4.12	4.04	3.96	3.88	3.80	3.72	3.64	3.53	3.43	3.32	3.22	0.00	0.00
Risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Population at risk (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

This results in the following overall table:

Table 7: calculation of baseline risk based on SDB for all water resource zones

	202 0-21	202 1-22	202 2-23	202 3-24	202 4-25	202 5-26	202 6-27	202 7-28	202 8-29	202 9-30	203 0-31	203 1-32	203 2-33	203 3-34	203 4-35	203 5-36	203 6-37	203 7-38	203 8-39	203 9-40	204 0-41	204 1-42	204 2-43	204 3-44	204 4-45
Zone 1 risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Zone 1 Population at risk (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zone 2 risk	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zone 2 Population at risk (number)	-	-	-	-	472,644	475,809	478,721	481,375	484,158	486,791	489,219	491,613	493,785	496,284	498,700	501,053	503,276	505,462	507,684	509,947	512,194	514,491	516,827	519,202	521,603
Zone 3 risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Zone 3 Population at risk (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zone 4 risk	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zone 4 Population at risk (number)	988,093	998,462	1,009,062	1,019,769	1,030,190	1,039,988	-	-	1,066,228	1,074,660	1,083,173	1,091,796	1,100,195	1,108,887	1,117,561	1,126,149	1,134,626	1,143,079	1,151,594	1,160,144	1,168,637	1,177,247	1,185,893	1,194,579	1,203,306
Zone 5 risk	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zone 5 Population at risk (number)	320,268	325,101	329,627	333,955	338,001	342,045	345,926	349,339	352,689	355,921	359,089	362,445	365,854	369,003	372,247	375,414	378,452	381,456	384,463	387,501	390,502	393,557	396,632	399,707	402,793
Zone 6 risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Zone 6 Population at risk (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zone 7 risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Zone 7 Population at risk (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zone 8 risk	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Zone 8 Populati on at risk (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

This results in the following company level 25-year average risk calculation:

Table 8: calculation of baseline performance at company level

	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35	2035-36	2036-37	2037-38	2038-39	2039-40	2040-41	2041-42	2042-43	2043-44	2044-45
Baseline annual performance - Total company population at risk (number)		1,308,361	1,323,563	1,338,689	1,353,724	1,840,836	1,857,842	824,647	830,714	1,903,074	1,917,372	1,931,481	1,945,854	1,959,834	1,974,174	1,988,508	2,002,616	2,016,354	2,029,998	2,043,741	2,057,591	2,071,333	2,085,296	2,099,351	2,113,488	2,127,703
Baseline annual performance - Percentage of company customers at risk (%)		34.1	34.2	34.2	34.2	46.1	46.2	20.3	20.3	46.2	46.3	46.4	46.4	46.5	46.5	46.6	46.6	46.7	46.7	46.8	46.8	46.9	46.9	47.0	47.0	47.1
Baseline performance – average customers	1,798,000																									
Baseline performance – average risk %	42.5%																									

This results in the following baseline performance

Table 9: reporting of baseline performance at company level

	2019-20 (25 year average)
Baseline performance – average customers	1,798,000
Baseline performance – average risk (%)	42.5%

And the following performance commitment at company level

Table 10: reporting of performance commitment at company level

	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35	2035-36	2036-37	2037-38	2038-39	2039-40	2040-41	2041-42	2042-43	2043-44	2044-45
PR19 commitment – Total company population at risk (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PR19 commitment - Percentage of company customers at risk (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Finally, this results in the in period performance at company level

Table 11: reporting of in-period performance at company level

	201 9-20	202 0-21	202 1-22	202 2-23	202 3-24	202 4-25	202 5-26	202 6-27	202 7-28	202 8-29	202 9-30	203 0-31	203 1-32	203 2-33	203 3-34	203 4-35	203 5-36	203 6-37	203 7-38	203 8-39	203 9-40	204 0-41	204 1-42	204 2-43	204 3-44	204 4-45
Baseline commitment – Total company population at risk (number)	1,798,000																									
Baseline commitment - Percentag e of company customers at risk (%)	42.5 %																									
Performa nce commitment – Total company population at risk (number)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Performa nce commitment - Percentag e of company customers at risk (%)		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Metric Certainty grading

	<i>Certainty Grade</i>
WRZ1	B3
WRZ2	B3
WRZ3	B3
WRZ4	B4
WRZ5	B1
WRZ6	B1
WRZ7	B1
WRZ8	B1

Commentary

The purpose of this work is to assign a certainty grade in the reported values of the metric "the percentage of the population the company serves that would experience severe supply restrictions (e.g. standpipes or rota cuts) in a 1 in 200 year drought". The technical note "Drought Resilience Metric: Development of a Certainty Grade" prepared by Atkins as part of the UKWIR Resilience Metrics project has been used to compile the assessment.

Two elements make up the certainty grade: a letter (A to D) that summarises the methodological rigour or sophistication of the drought definition process; and a number (1 to 4) that identifies the magnitude of the surplus or deficit. The resulting colour coded matrix and colour band definitions are shown in Table 5 and Table 6 below.

Drought definition process (1 in 200 year drought)

The method adopted to derive a 1:200 year drought event in our WRMP DO assessment has been classed as falling within band B of the methodology, i.e. it uses stochastic processes and UKCP09 Regional Climate predictions.

Risk score

Assigning a risk score has been more challenging because it has not been always possible to fit the result of the assessment within the risk labels provided by the methodology. For this reason, we have applied a degree of judgment and, where the results are not conclusive, a

cautious approach has been taken and in line with the caveats explained in this commentary. The following water resource zones do not belong to any of the risk labels provided: WRZ2, WRZ3 and WRZ4.

We have also assumed that the Risk Label 1 pessimistic deficit of a non-resilient WRZ should be more than 100% and not less than 100% as shown in Table 4 of Atkins methodology. We believe this interpretation fits with the narrative and explanation provided by the methodology that risk label "1" relates to the greatest or most secure surplus or the largest deficit.

The certainty grade may be revised in the future as Affinity Water improves its understanding of 1 in 200 year drought events

Appendix OC.A32.1

[Action ref AFW.OC.A32; A34](#)

SMS Feedback analysis (PC2)

Company vs PSR&LI (Social Tariff)

Company Responses #	Total	Monthly Avg																		
			Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18
Charges and Billing	128,718	7,151	6,300	7,317	7,294	6,941	6,825	6,610	7,120	6,722	5,352	7,156	7,080	9,153	7,620	7,543	7,200	7,301	7,785	7,399
Metering	22,363	1,242	1,277	1,368	1,347	1,280	1,250	1,168	1,166	1,218	976	1,400	1,417	1,805	1,297	1,151	1,011	974	1,098	1,160
Clean Water	24,029	1,335	946	1,189	1,607	1,404	1,422	1,158	1,243	1,338	1,087	1,109	1,198	1,559	1,179	1,250	1,375	1,904	1,596	1,465
Other	1,768	98	72	68	93	93	90	89	99	119	63	82	108	147	100	126	102	113	103	101
Total	176,878	9,827	8,595	9,942	10,341	9,718	9,587	9,025	9,628	9,397	7,478	9,747	9,803	12,664	10,196	10,070	9,688	10,292	10,582	10,125

PSR	Total	Monthly Avg																		
			Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18
Charges and Billing	2,760	153	167	149	168	160	168	146	182	165	108	175	167	163	151	144	135	129	140	143
Metering	485	27	33	34	40	37	27	29	28	29	20	36	26	32	26	13	16	18	22	19
Clean Water	742	41	29	42	51	42	79	39	42	50	30	39	26	39	27	32	38	53	38	46
Other	58	3	1	4	2	4	2	1	6	6	6	2	5	4	1	5	2	5	0	2
Total	4,045	225	230	229	261	243	276	215	258	250	164	252	224	238	205	194	191	205	200	210

LI	Total	Monthly Avg																		
			Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18
Charges and Billing	12,400	689	817	809	774	714	701	712	767	716	537	851	791	878	653	579	530	499	517	555
Metering	695	39	44	48	38	38	45	38	39	43	35	41	38	50	35	32	27	29	32	43
Clean Water	656	36	30	27	39	42	66	29	33	41	25	28	24	49	28	30	39	58	32	36
Other	269	15	4	4	5	18	17	12	10	27	13	28	37	41	9	10	12	8	10	4
Total	14,020	779	895	888	856	812	829	791	849	827	610	948	890	1,018	725	651	608	594	591	638

PSR & LI Responses #	Total	Monthly Avg																		
			Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18
Charges and Billing	14,519	807	935	910	894	837	832	817	915	849	619	984	921	1,007	771	695	639	592	636	666
Metering	1,117	62	72	77	72	72	70	64	65	72	50	71	62	74	57	45	42	43	51	58
Clean Water	1,303	72	56	65	87	80	114	66	71	79	54	65	49	84	53	61	74	105	65	75
Other	310	17	4	8	6	20	19	12	14	31	18	28	39	45	10	15	14	11	10	6
Total	17,249	958	1,067	1,060	1,059	1,009	1,035	959	1,065	1,031	741	1,148	1,071	1,210	891	816	769	751	762	805

of Responses

Appendix OC.A32.2

Action ref AFW.OC.A32; A34

Financially vulnerable by channel (PC1)

Contact received by channel for customers in vulnerable circumstances

Billing Contact

		Sum: Jan 18 - Jan 19
A	SOCIAL MEDIA CONTACT	132
E	E-MAIL	15351
F	FAX	8
G	INTERNET	58141
H	AUTOMATED IVR	26260
I	INTERNET	15773
L	LETTER	30388
N	WEB CHAT	1271
S	SMS	3810
T	TELEPHONE	162418
V	VOICEMAIL	68
Sum:		313620

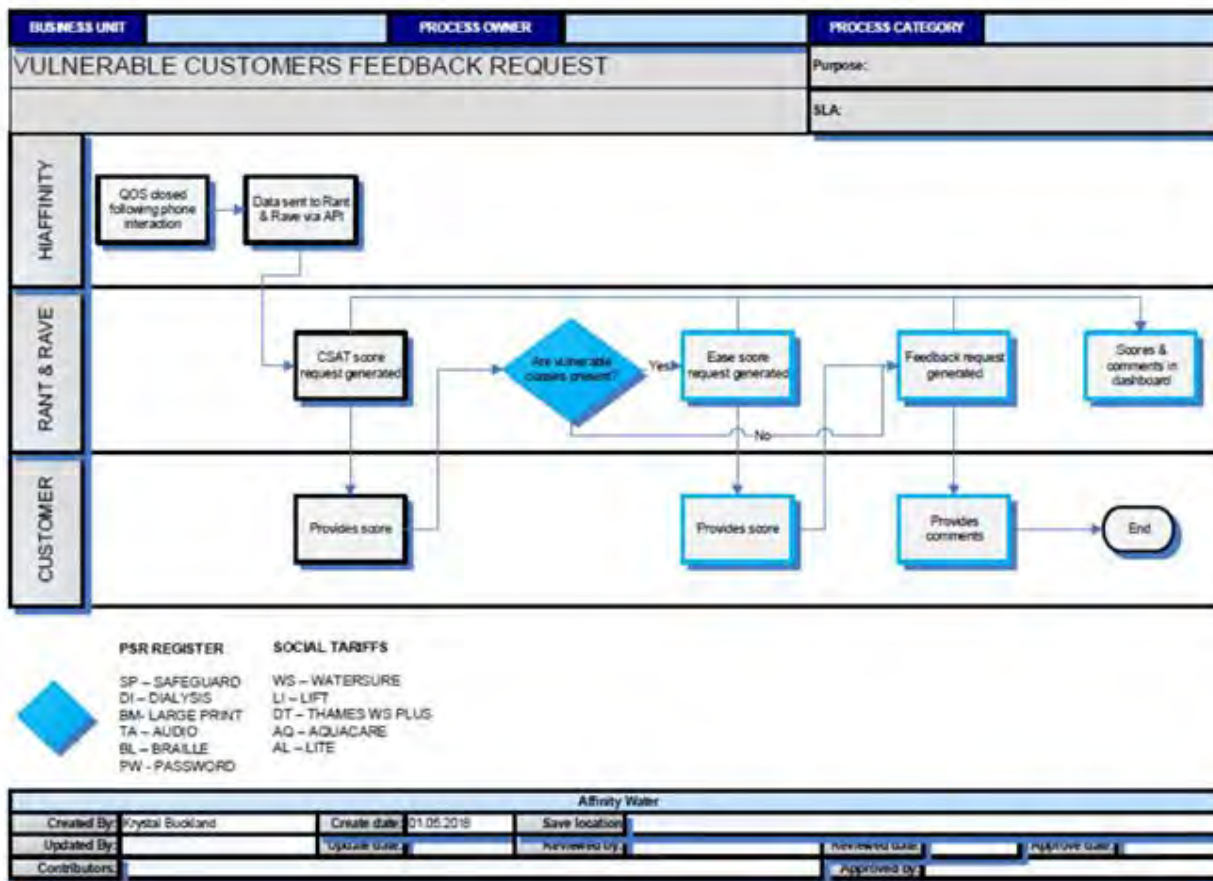
Operations Contact

		Sum:
A	SOCIAL MEDIA CONTACT	32
E	E-MAIL	499
G	INTERNET	165
I	INTERNET	101
L	LETTER	30
N	WEB CHAT	2
S	SMS	51
T	TELEPHONE	6141
V	VOICEMAIL	4
Sum:		7025

Appendix OC.A32.3

Action ref AFW.OC.A32; A34

SMS Example process flow chart for satisfaction and ease



Appendix OC.A32.4

Action ref [AFW.OC.A32; A34](#)

MRS research guidelines



MRS Guidelines for Online Research

January 2012

Updated September 2014

MRS is the world's largest association for people and organisations that provide or use market, social and opinion research, business intelligence and customer insight.



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Introduction

These Guidelines interpret the MRS Code of Conduct (revised 2014) and provide additional best practice guidance. Unless otherwise stated, Guidelines are not binding. Their aim is to promote professionalism in the conduct of research.

Research is founded upon the willing co-operation of the public and of business organisations. It relies on the confidence of those involved that it is conducted honestly, objectively, without unwelcome intrusion and without harm to participants. Its purpose is to collect and analyse information and not to create sales or to influence the opinions of anyone participating.

Every participant must be assured that research projects are carried out in strict accordance with the Code of Conduct and that their rights of privacy are respected.

Rules from the Code of Conduct applicable in each section of this document are stated in bold. These rules are binding on MRS members and breaches may result in disciplinary action. The guidance that follows the rules provides interpretation and additional best practice. Members are reminded that this document is designed to complement the MRS Code of Conduct and should not be consulted in isolation.

As specified in the Code, it is the responsibility of the researcher to keep abreast of any legislation which could affect research and to ensure that all those involved in a project are aware of and agree to abide by the MRS Code of Conduct.

This material is provided for information only. It is not legal advice and should not be relied upon as such. Specific legal advice should be taken in relation to specific issues.

The Principles of the MRS Code of Conduct:

1. Researchers shall ensure that participation in their activities is based on voluntary informed consent.
2. Researchers shall be straightforward and honest in all their professional and business relationships.
3. Researchers shall be transparent as to the subject and purpose of data collection.
4. Researchers shall respect the confidentiality of information collected in their professional activities.
5. Researchers shall respect the rights and well being of all individuals.
6. Researchers shall ensure that participants are not harmed or adversely affected by their professional activities.

7. Researchers shall balance the needs of individuals, clients, and their professional activities.
8. Researchers shall exercise independent professional judgement in the design, conduct and reporting of their professional activities.
9. Researchers shall ensure that their professional activities are conducted by persons with appropriate training, qualifications and experience.
10. Researchers shall protect the reputation and integrity of the profession.

Definitions

Online Research

Online Research is defined as research in which a participant, either on a single occasion or as part of a panel, is involved in any of the following:

- Completing research documentation (e.g. survey, diary, questionnaires etc) online via any internet connected device;
- Downloading research documentation from a server on the internet and returning it by email;
- Receiving research documentation incorporated into an email and returning it in the same way;
- Participating in an online qualitative interview or discussion;
- A measurement system which tracks web usage;
- Participating in an online message board;

Online research also includes:

- Collecting information from a social networking service;
- Any other collection of personal data in the online environment for the purpose of research.

Anonymisation:

Anonymisation is the process of removing, obscuring, aggregating or altering identifiers to prevent the likely identification using reasonable means of the individuals to whom the data originally related.

Child:

A child is a person under the age of 16.

Client:

Client includes any individual, organisation, department or division, including any belonging to the same organisation as the member, which is responsible for commissioning or applying the results from a research project.

Data Collection Process:

A data collection process is any process used to obtain information from or about participants. It includes, but is not limited to, interviews, questionnaires, discussion guides, and stimulus materials, as well as passive data collection.

Identity:

The identity of a participant includes, as well as their name and/or address, any other information which offers a reasonable likelihood that they can be identified by any person or organisation who has access to the information.

Informed consent:

Informed consent is a process by which a participant voluntarily confirms his or her willingness to take part in a particular project, after having been informed of all aspects of the project that are relevant to their decision to participate.

Member:

A Member is an individual who has been admitted to membership of MRS in one of the categories set out the MRS Articles of Association.

For the purposes of applying this Code, an organisation with MRS members that has signed the MRS Company Partner Service Quality Commitment that applies throughout the organisation shall be treated as a Member.

Monitoring

Monitoring is the supervising of activities (such as data collection) to ensure that they meet required objectives and performance targets.

Participant:

A participant is any individual or organisation from or about whom data are collected.

Research:

Research is the collection, use, or analysis of information about individuals or organisations intended to establish facts, acquire knowledge or reach conclusions.

Responsible Adult:

A responsible adult is an individual who has personal accountability for the well-being of a child, for example a parent, guardian, teacher, nanny or grandparent.

Definitions from the Data Protection Act 1998 used in the MRS Code of Conduct

Personal Data

Data which relate to a living individual who can be identified-

(a) from those data, or

(b) from those data and other information which is in the possession of, or is likely to come into the possession of, the data controller,

and includes any expression of opinion about the individual and any indication of the intentions of the data controller or any other person in respect of the individual. Data

Subject

An individual who is the subject of personal data.

Data Controller

A person who (either alone or jointly or in common with other persons) determines the purposes for which and the manner in which any personal data are, or are to be, processed.

Data Processor

Any person (other than an employee of the data controller) who processes the data on behalf of the data controller.

Processing

Obtaining, recording or holding the information or data or carrying out any operation or set of operations on the information or data, including—

- (a) organisation, adaptation or alteration of the information or data,
- (b) retrieval, consultation or use of the information or data,
- (c) disclosure of the information or data by transmission, dissemination or otherwise making available, or
- (d) alignment, combination, blocking, erasure or destruction of the information or data.

Third party

Any person other than—

- (a) the data subject,
- (b) the data controller, or
- (c) any data processor or other person authorised to process data for the data controller or processor.

Guidelines

1: Conducting the research A: Co-operation is voluntary

The Rules

16. Members must ensure that participants give their informed consent where personal data are collected directly from them.
17. Members must ensure that they have a fair and lawful basis for the collection and processing of personal data from sources other than the data subject themselves.
40. Members must ensure that any responses given by participants are deleted if requested by participants, and if this is reasonable and practicable.

Guidance

1. Researchers should avoid intruding on the privacy of online participants. Personal information (other than that which has already been made available for purposes including research) should not be sought from, or about, participants without their prior knowledge and agreement. This includes the use of passive data collection techniques such as digital fingerprinting.
2. In accordance with B23, researchers must conform to any reasonable requests from participants to delete data collected via online research.

1.1 B. Participants must not be inconvenienced

The Rules

3. Members must act honestly in their professional activities.
18. Members must ensure that participants are provided with sufficient information to allow informed consent to be given. This includes:
 - a. the name of the organisation or individual responsible for data collection;
 - b. the general subject of the data collection;

- c. the purpose of the data collection;
- d. whether the data collection is to be recorded and/or observed;
- e. who is likely to have access to live or recorded information;
- f. the likely length in minutes of the data collection, if asked;
- g. any costs likely to be incurred by the participant; and
- h. an assurance that the activity is being conducted in accordance with the MRS Code of Conduct.

Comment: the organisation or individual responsible for data collection is the data controller as defined under the Data Protection Act 1998.

33. Members must take reasonable steps to ensure all of the following:

- a. that data collection processes are fit for purpose and clients have been advised accordingly;
- b. that the design and content of data collection processes are appropriate for the audience being researched;
- c. that participants are able to provide information in a way that reflects the view they want to express, including don't know/ prefer not to say where appropriate;
- d. that participants are not led towards a particular point of view;
- e. that responses are capable of being interpreted in an unambiguous way; and
- f. that personal data collected are relevant and not excessive.

34. Members must ensure that participants are informed about any recording, monitoring or observation at recruitment and at the beginning of a data collection process.

Comment: This does not include monitoring (listening to but not recording) telephone interviews for the purpose of quality control where interviewers have been informed that such monitoring takes place.

35. Members must ensure that participants are not misled when being asked to take part in a project.

36. Members must ensure that a participant's right to withdraw from a project at any stage is respected.

37. Members must ensure that participants are able to check without difficulty the identity and bona fides of any individual and/or their employer conducting a project (including any sub-contractors).

Guidance

1. Where visitors to a particular website are asked to take part in research, either through clicking through to a research site or via a pop-up window, care should be taken to ensure that those who do not wish to take part could easily exit or delete the research. In accordance with 26, participants who have refused or completed research documentation must not be re-presented with the same research for completion, as far as this is technically possible.

2. In accordance with rule 18, for online research the likely length of the data collection and thus the likely time commitment from participants must be clearly explained. Participants must not be deliberately misled regarding the likely time commitment.

3. For non-pop-up online research it should be made clear that participants can complete the research at a time convenient to them, within the schedule dictated by the time frame of the project.

4. Participants should be given the opportunity to give a considered response (e.g. to amend responses where necessary) and use 'Don't know' or 'Not applicable' responses where appropriate.
5. At the end of the research documentation or project, researchers should provide a thank you statement or send a thank you email, unless participants have refused email contact.

1.2 C: Participants must give their informed consent

The Rules

1. Members must ensure that research conforms to the national and international legislation relevant to a given project, including in particular the Data Protection Act 1998 or other comparable legislation applicable outside the UK.
3. Members must act honestly in their professional activities.
 16. Members must ensure that participants give their informed consent where personal data are collected directly from them.
 17. Members must ensure that they have a fair and lawful basis for the collection and processing of personal data from sources other than the data subject themselves.
 18. Members must ensure that participants are provided with sufficient information to allow informed consent to be given. This includes:
 - a. the name of the organisation or individual responsible for data collection;
 - b. the general subject of the data collection;
 - c. the purpose of the data collection;
 - d. whether the data collection is to be recorded and/or observed;
 - e. who is likely to have access to live or recorded information;
 - f. the likely length in minutes of the data collection, if asked;
 - g. any costs likely to be incurred by the participant; and
 - h. an assurance that the activity is being conducted in accordance with the MRS Code of Conduct.

Comment: the organisation or individual responsible for data collection is the data controller as defined under the Data Protection Act 1998.

19. Members must ensure that all of the following are undertaken during remote data collection in spaces accessible by the public:

- a. Clear and prominent notices or statements must be displayed or presented in spaces where the data collection is taking place.
- b. Notices and statements must include the individual/organisation responsible for the data collection, including contact information and the purpose(s) of the data collection.
- c. Data collection must be limited to the spaces intended to be included in the project.

Comment: this rule applies to remote data collection in physical spaces, such as shopping centres, and online spaces, such as forums and social networking pages.

31. Members must ensure that follow-up contact with a participant is carried out only if the participant's permission has been obtained at the previous point of data collection. The only exception to this is re-contact for quality control purposes.

Comment: Any re-contact question should be agreed at the design stage with the client to cover any planned or possible consequential projects.

32. Members must ensure that any re-contact matches the assurances given to participants at the time that permission was

gained e.g. when re-contact was to occur, the purpose and by whom.

Guidance

1. All the information listed in 18 should be given at the start of the research, as should any links to Data Protection or Privacy Policies (see Special Considerations B). This will ensure that should participants fail to complete the research for any reason, they will have been aware of their rights.
2. Further to 18, participants must be told the identity of the researcher/organisation conducting the research and/or client carrying out the project along with a contact name and email address at which they can be contacted. This could include a hyperlink to the researcher's home page for more information.
3. It is recognised that there are occasions on which, in order to prevent biased responses, the purpose of the research cannot be fully disclosed to participants at the beginning of the interview. In accordance with 3, the researcher must avoid deceptive statements (that would be harmful or create a nuisance to the participant), for example about the likely length of the interview or about the possibilities of being re-interviewed on a later occasion.
4. Further to 3 and 16, researchers must not make use of surreptitious, misleading or unsolicited data collection or recruitment techniques. For example, researchers must not use automated systems to gather personal data from online environments where users have an expectation of privacy without the informed consent of the individuals concerned.
5. If repeat or follow-up research is intended, consent must be sought in accordance with 31 and a statement concerning data protection and storage of address data should be displayed on the participant's screen by the end of the first interview. Participants should be given the opportunity to print out this statement. The participants must be able to refuse further participation in the research and to refuse further contact by email in connection with the research.

6. When recruiting members for an online panel, a short “how we will use your information” statement linked to the privacy policy that follows the best practice guidance set out in the ICO Privacy Notices Code of Practice must be clearly displayed on the data collection page. This must expressly state their personal information will be stored and used to send them invitations to take part in further research, that their data will be stored securely and how they can request their information be removed from the panel. Provided that this has been done, further permission for follow-up interviews is not specifically required.

7. On sign up to a panel a potential panellist must be provided with the following information:

1. The purposes for which the panel data may be used;
2. The range of subject matter that projects conducted using the panel may cover;
3. The identity of the data controller, and whether the panel may be transferred to another panel manager in the future.

8. If the panel is incentivised researchers should give panel members a reasonable estimate of the level of commitment and/or length of time required before the incentive will be paid.

2: Treatment of data A. Participants anonymity must be safeguarded

The Rules

26. Members must ensure that the anonymity of participants is preserved unless participants have given their informed consent for their details to be revealed or for attributable comments to be passed on.

27. Members must take reasonable steps ensure that anonymisation is effective, with reference to developments in technology and to the data environment into which data are released.

Comment: This rule applies to anonymisation undertaken by members and to anonymisation of data sets undertaken by clients prior to analysis by members. Members are referred to the ICO's Anonymisation Code of Practice.

Comment: Members should be particularly careful that they do not inadvertently identify participants. For example this may arise:

- where sample sizes are very small (such as business and employee research);
- where data contains sufficient contextual information to permit identification (such as attributes or descriptions of participants);
- where data can be matched with publicly available information (such as social media profiles); or
- where data can be matched with other sources (such as transaction histories held by clients).

28. If participants have given consent for data to be passed on in a form which allows them to be personally identified, members must:

- a. demonstrate that they have taken all reasonable steps to ensure that the data will only be used for the purpose for which the data were collected
- b. and inform participants as to what will be revealed, to whom and for what purpose.

Guidance

1. Researchers can give the purposes for which data is collected via panel terms and conditions, preambles to interviews, etc. No personally identifiable information may be used for subsequent purposes without the informed consent of the participants. If consent is not given, the participant should be reassured that confidentiality will be strictly maintained.
2. A participant's email address is personal data and must therefore be treated as such for the purpose of the MRS Code of Conduct and the Data Protection Act 1998.

1.3 B. Safeguarding data

The Rules

1. Members must ensure that research conforms to the national and international legislation relevant to a given project, including in particular the Data Protection Act 1998 or other comparable legislation applicable outside the UK.

58. Members must take reasonable steps to ensure that all hard copy and electronic files containing personal data are held, transferred and processed securely in accordance with the relevant data retention policies and/or contractual obligations.

59. Members must take reasonable steps to ensure that all parties involved in the project are aware of their obligations regarding security of data.

60. Members must take reasonable steps to ensure that the destruction of data is adequate for the confidentiality of the data being destroyed. For example, any personal data must be destroyed in a manner which safeguards confidentiality.

Guidance

1. Researchers must offer participants adequate security in the transmission of sensitive data, in accordance with 58. Online research should be protected by proper encryption of the online questionnaire connection and data traffic. Researchers must also ensure that any confidential information provided to them by clients or others is protected (e.g. by firewall, encryption, etc.) against unauthorised access.

2. Before personal data is sent over the internet to another country, researchers must check with relevant authorities (e.g. a data protection regulator) that the data transfer is permissible. The recipient may need to provide safeguards necessary for the protection of the data since certain countries do not have equivalent data protection legislation. In accordance with 1, researchers must inform themselves of their obligations under the Data Protection Act 1998, or equivalent national

legislation, in this regard. Researchers must ensure that written data processor agreements are in place where required before any transfer takes place.

3. Further to 58 and 59, researchers must adequately protect personal data collected or stored on websites or servers. Sensitive or valuable information should be protected by reliable encryption techniques. If temporary storage of the personal data collected takes place on a server that is operated by a provider, the researcher must place the provider under the obligation to take the necessary precautions to ensure that third parties cannot access the data on the server or during data transfer. Temporary storage of the collected data on the server must be terminated at the earliest possible time.

4. In accordance with the Data Protection Act 1998 and 58, researchers must have adequate safeguards in place to ensure that when emails are sent in batches the email addresses of the participants are not revealed to other participants. As a minimum measure, emails should be blind copied (BCC) to participants.

5. Clients should be fully informed about the potential risk of posting details of confidential organisation information in online research.

1.4 C. Client-supplied data

The Rules

10. Members must not disclose the identity of clients or any confidential information about clients without the client's permission, unless there is a legal obligation to do so.
11. Where files of identifiable individuals are used, e.g. client databases, members must ensure that the source of the personal data is revealed at an appropriate point, if requested by participants. This overrides the right to client anonymity.
26. Members must ensure that the anonymity of participants is preserved unless participants have given their informed consent for their details to be revealed or for attributable comments to be passed on.

Guidance

1. In accordance with 11, where lists of named individuals are used for sample selection, the source of the list made available to the participant upon request. Where these are derived from website registration databases, researchers should check that registration was voluntary and that the data is accurate and up to date.
2. Clients should be made aware before the project has started that participant details cannot be revealed without the informed consent of the participants.

3: Special considerations A: Research with children and young people

The Rules

6. Members must take all reasonable precautions to ensure that participants are not harmed or adversely affected by the member's professional activities.
21. Where the permission of a responsible adult is required, members must ensure that the responsible adult is given sufficient information about the project to enable them to make an informed decision.

23. Where it is known (or ought reasonably to be known) that participants may include children, members must ensure participants are asked to confirm their age before any other personal information is requested. Further, if the age given is under 16, the child must be excluded from giving further personal information until the appropriate permission from a responsible adult has been obtained and verified.
25. Members must ensure that information about other individuals is not collected from a child unless for the purposes of gaining permission from a responsible adult.

Guidance

1. Recognising the particular difficulties of ensuring consent in online research, further to 23 consent must be obtained in a form that is verifiable. Email communications on their own are considered insecure and must not be accepted as a verifiable form of consent in isolation and so must be supplemented by a second form of consent, for example a telephone call or a letter. Where researchers have a pre-existing relationship with parents (e.g. they are current panel members) it may be possible to verify consent electronically through the use of passwords, exchange of tokens, etc.
2. Further to rule 6, researchers must provide advice of any costs likely to be incurred by participation. This may be a particular problem in the case of research using mobile phones where children may not have unlimited data plans or where significant charges may be incurred if data roaming is used overseas.
3. Further to rule 21, a notice to a parent or responsible adult, seeking their consent for their child to be asked to participate in the research, must be posted on the website or emailed to a parent. This notice should include:
 - a. A heading explaining that this is a notice for parents/responsible adults
 - b. Name and contact details of the researcher/organisation conducting the research.
 - c. The nature of the data to be collected from the child.
 - d. An explanation of how the data will be used.
 - e. An explanation of the reasons the child has been asked to participate and the likely benefits.

- f. A description of the procedure for giving and verifying consent.
 - g. A request for a parent's or responsible adult's contact address or phone number for verification of consent.
4. Prior parental consent will not be required to:
- 1. Collect a child or parent/responsible adult's address or email address solely to provide notice of data collection and request consent.
 - 2. Collect a child's age for screening and exclusion purposes.
5. In accordance with the principle of voluntary informed participation, information identifying children must not be collected from forums, social networking sites, blogs, etc. without their consent and without obtaining the consent of a parent or responsible adult.
6. Where a researcher joins a social network or forum, they must declare their presence, their role as a researcher, the identity of the organization they work for, what information they intend to collect, what it will be used for and who will have access to it. It is not acceptable for a researcher to pose as a child, to lurk on networks or forums, or to passively collect data without prior consent.
7. Where researchers are responsible for the design and administration of sites or forums used by child participants, they should incorporate the "Click CEOP" Internet Advice button to allow children to obtain advice from, and report bullying or inappropriate behaviour to, the Child Exploitation and Online Protection Centre.
8. Researchers should exercise particular care when they use apparently anonymous verbatim quotes obtained online in reported results or in presentations to clients or third parties. Verbatim quotes may be attributed to identifiable participants through the use of search engines to reveal their original source. Researchers should take steps to check that quotes used in reports, etc., cannot be identified in this way.

1.5 B. Privacy Policy Statements

The Rules

1. Members must ensure that research conforms to the national and international legislation relevant to a given project, including in particular the Data Protection Act 1998 or other comparable legislation applicable outside the UK.

Guidance

Researchers/research organisations carrying out research on the internet must develop a Privacy Policy. This statement should be made available as a link for all online research. The purpose of the following section is to guide researchers on the topics to be considered in their Privacy Policies. Some of the privacy policy may vary depending on the nature of the research and sampling method being used. The order and wording of the Privacy Policy statement is a matter for each researcher to decide.

Researchers should put in place a layered approach to privacy policy statements that adheres to the best practice guidance set out in the ICO Privacy policy code of practice.

1. Standard elements for privacy statements:

- Statement of who is doing the research - This could include a hyperlink to the researcher's home page for more information.
- Who is it for? - Explanation that each research project will contain information about the identity of the client, unless there are good reasons for not providing this information.
- A guarantee that in all circumstances identities of individual participants and their answers will be treated as confidential and will be used only for research purposes unless the participant expressly requests or permits disclosure to a third party for other purposes.
- A statement offering assurance the researcher will not mislead the participant.
- Co-operation is Voluntary – As with all forms of research, co-operation is voluntary at all times. No personal information is sought from, or about, the participants without their prior knowledge and agreement.
- Withdrawal – The participant is entitled at any stage of the research, or subsequently, to ask that part or all of the record of the research be destroyed or deleted.

- Cookies & invisible processing – In accordance with the Privacy and Electronic Communications Regulations, cookies or similar devices must not be used unless the subscriber or user of the relevant terminal equipment:
 - a. Is provided with clear and comprehensive information about the purposes of the storage of, or access to, that information; and
 - b. has given his or her consent.

The Regulations are not prescriptive about the sort of information that should be provided but the text should be sufficiently full and intelligible to enable individuals to gain a clear appreciation of the potential consequences of allowing storage and access to the information collected by the device should they wish to do so. See MRS Guidelines on the Privacy and Electronic Communications Regulations 2003¹ for further information on this issue.

- Children – clear statement that interviews with children will be carried out in accordance with applicable legislation and with the permission of a parent or responsible adult.
- Security – the statement should outline measures used, the purposes for which the information provided will be accessed, and limits on the number of employees who can view the information.
- Unsolicited mail - state policy not to send unsolicited mail or pass on email addresses to others for this purpose.

1.6 C. Social Media and passive data collection

The Rules

1. Members must ensure that research conforms to the national and international legislation relevant to a given project, including in particular the Data Protection Act 1998 or other comparable legislation applicable outside the UK.

¹ http://www.mrs.org.uk/standards/downloads/revised/active/2011-0614_PECR_Guidance.pdf

16. Members must ensure that participants give their informed consent where personal data are collected directly from them.
17. Members must ensure that they have a fair and lawful basis for the collection and processing of personal data from sources other than the data subject themselves.

Guidance

1. In accordance with the principle of voluntary informed participation, information identifying participants (personal data) must not be collected from without their consent.
2. Researchers who use techniques to uniquely identify participants such as cookies, unique IP addresses, digital fingerprinting or browser profiling, must provide clear and comprehensive information to participants at the time of collection about the data collected, who will have access to it and the purposes for which it will be used.
3. Where a researcher participates in a social network or forum they must declare their presence, their role as a researcher, the identity of the organization they work for, what information they intend to collect, what it will be used for and who will have access to it. It is not acceptable for a researcher to pose as a non-researcher, to lurk on a network or forum, or to passively collect personal data without prior consent.
4. Researchers conducting social media monitoring, text analytics or sentiment analysis should take steps to avoid collecting personal data. Researcher must ensure that any personal data is not further processed without consent.
5. Researchers purchasing or otherwise accessing datasets or sample containing personal data for analysis must ensure that that the data was fairly and lawfully obtained by the supplier.

4: Other guidance and legislation to be considered whilst conducting online research

Information Commissioner's Office

Personal Information Online Code of Practice

http://www.ico.gov.uk/upload/documents/library/data_protection/detailed_specialist_guides/personal_information_online_cop.pdf

Guidance on the rules on use of cookies and similar technologies

http://www.ico.gov.uk/news/blog/2011/~media/documents/library/Privacy_and_electronic/Practical_application/guidance_on_the_new_cookies_regulations.ashx



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Appendix OC.A32.5

Action ref AFW.OC.A32; A34

Application of MRS research guidelines to our PCs

A review of the Market Research Society Best Practice (see Appendix OC32.A4) shows the research proposed by our Performance Commitments aligns to the MRS definition of conducting research as follows:

- A. Co-operation is voluntary – Responding to the feedback request is optional (Appendix OC32.A3 p10)
- B. Participants must not be inconvenienced - Users will be sent a request to leave feedback, at which point a suppression rule will be applied to avoid over surveying. Furthermore, if the user decides to opt out of receiving further feedback requests they will be added to a suppression list (so no further request is sent out to them) (Appendix OC32.A3 p11)
- C. Participants must give their informed consent – the feedback survey is covered under legitimate interest to improve the service we deliver to customers. They may opt out at any point and this is recorded for any future survey requests (Appendix OC32.A3 p14)

In addition, we regularly review best practice for all customer engagement activity and can demonstrate the Performance Commitment methodology will be guided by the following principles:

- Σ *Capture feedback often* – we capture feedback at initial contact and launching a feedback option at the close of enquiry during March 2019. We set up rules to ensure that customers are not surveyed more than once in a week to ensure they are not overwhelmed. Customers who have opted out are not contacted for feedback
- Σ *Collect insights from every customer touch point* – we collect feedback from web chat, phone (via SMS) and website users, we are in the process of setting up email and will include landline surveys and whitemail paper surveys.
- Σ *Listen and measure using multiple measurement channels* – recruiting a Qualitative Research Executive to expand our capability, to deep dive further into areas of concern highlighted by the quantitative feedback
- Σ *Analyse and understand feedback* – Regular reporting sent to teams to identify areas of low CSAT. Advisors can see scores and comments on their tailored reporting dashboard in real time
- Σ *Share information across the organization* – Included in monthly board reporting and results split by department for benchmarking
- Σ *Act on voice of the customer feedback* – Feeds into Customer Experience Improvement Programme resulting in change initiatives, for example improving our “report a leak” journey where we identified lower CSAT from customers struggling to

use the current process. Team leaders follow up with customers on any contacts where there is dissatisfaction

Appendix OC.A32.6

Action ref AFW.OC.A32; A34

Framework for BSI 18477

BSI 18477 Inclusive Services

Fair, flexible services for all

Inclusive Service Verification demonstrates that our company is compliant to BS 18477 and provides an inclusive service that is available, usable and accessible to all customers equally – regardless of personal circumstances.

How does the standard help customers in vulnerable circumstances?

BS 18477 provides a framework to help companies and their employees understand the underlying factors involved in customer vulnerability, and work to develop processes to help with the problem. Inclusive Service Verification covers topics such as the identification of customer vulnerability, inclusive design of products and services and data collection, protection and sharing.

As a company, we have chosen to comply with the standard and make a serious commitment to providing services that are fair and accessible to all.

The framework followed is:

Policies and planning

- Staff – from senior management to customer-facing staff – are committed to inclusive service and get the training and resources needed to implement this
- Do their best to design services that are flexible and easy to access by as many consumers as possible
- Try to anticipate and prevent potential problems
- Respond to customer feedback and complaints by making changes
- Continually review existing services to see where improvements can be made.

Flexible services

- Give customer-facing staff the power to resolve consumer problems themselves, where possible, so that customers are not passed round different departments and staff
- Allow staff to be flexible when dealing with individual consumer problems – flexible repayment terms for those in financial difficulties
- To never knowingly withdraw basic services, and to thoroughly investigate why bills haven't been paid before taking action
- Have procedures in place to allow third parties (such as carers, or Citizens Advice) to act on behalf of individuals.

Staff training

All customer-facing staff should:

- Be trained in how to recognise signs of vulnerability in individuals, identify their needs and offer appropriate solutions

- Receive full training in relevant legislation, such as the Equality Act, the Disability Act and Data Protection Act

Be told which organisations might be able to help customers with particular issues (for example, debt advice services or Citizens Advice), so that they can tell customers about these.

- Be trained in how to recognise signs of vulnerability in individuals, identify their needs and offer appropriate solutions

Fair marketing

- Make sure that marketing information is clear, jargon free, and not misleading
- Make sure that inappropriate goods and services are not marketed to vulnerable consumers (for example, high interest loans to those in debt)
- Take reasonable steps to ensure that all customers understand their right to cancel contracts.

Contact methods

- Offer several methods for customers to contact the company (for example by email, telephone and post)
- Offer a free or low cost telephone number
- Have a well-publicised procedure for dealing with complaints and target timescales for responding to them
- Keep customers updated on the progress of their enquiry or complaint and when it is expected to be resolved.

Provision of information

- Make sure that bills, letters and other communications are available in a range of accessible formats and do their best to ensure that customers receive information in their preferred format
- To test their products and services for accessibility and usability on end users.

Each year we will be audited by a BSI Auditor to ensure we continue to meet the standard and are able to provide evidence the services we deliver against the above framework.

Appendix OC.A36.1

Action ref AFW.OC.A32

Draft business plan consultation research findings



Ipsos MORI
Social Research Institute

ARUP

June 2018 - FINAL

Draft Water Resources Management Plan (dWRMP)

Research report

Ben Marshall, Kelly Finnerty, Teodros Gebrekal and Paul Carroll

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Executive Summary

Executive Summary

- This report summarises findings from two research projects conducted as part of Phase 2 of the market research programme being delivered by Ipsos MORI and Arup to support PR19. These were designed to measure and understand customers' preferences in respect of Affinity Water's long-term plans outlined in the draft Water Resources Management Plan (dWRMP).
- The projects involved:
 - An **online survey** of 1,000 Affinity Water customers aged 16-75, sourced from the Ipsos MORI panel between 23 April and 14 May 2018. Data were weighted at the analysis stage to the known population profile across areas served by Affinity Water.
 - A series of eight **focus group discussions** lasting 1.5 hours each, undertaken during March 2018. Participants were sampled to include a range of ages and social grades. Groups took place in Collindale/Edgware, Stevenage, Woking and Folkestone. A total of 66 customers were involved.
- The research found Affinity Water customers are broadly positive about different aspects relating to their water supply, including quality and reliability. They are especially positive about reliability; water is assumed to be "always there". Consequently, water is not something that is given much thought, particularly in comparison to other utilities where customers have more choices to make.
- Generally, customers feel they know little about Affinity Water. While they express some interest in what the company does, the most commonly held position - held by 51% - is contentment to "let Affinity Water get on with their job" as long as customers are kept informed about what the company is doing.
- Across several options for inclusion in the dWRMP (presented as options *without* bill impacts), customers back continuing to find ways to reduce leakage more strongly than anything else. Nine in ten, 89%, support this, with 71% doing so *strongly*.
- Building awareness of how everyone can help protect the water environment is also popular; 82% of customers support this, followed by 74% who support improving the information available to customers about the quality of water supplied to their homes. A similar proportion, 73%, support the provision of free water saving devices to customers.
- The least supported proposal is installing water meters in properties that do not already have them but, still, a clear majority of customers - 57% - are in favour of this.
- Customers participating in the survey and, separately, the qualitative research were provided with further detail about the main options being considered by Affinity Water in respect of the management of water resources (several of these were included as questions within the company's

consultation on the dWRMP). They were told the approximate cost for each proposed option to help them make an informed decision but, in contrast with separate research relating to the Business Plan, these were presented in isolation, rather than as a package of commitments within a complete plan.

- Group discussions found few outright objections to the themes but participants had difficulty making decisions as they struggled to understand much of the information provided. This was largely due to a lack of familiarity and context, and the intangibility of some of the content. For example, participants struggled to understand the themes of collaboration and sharing, and of sustainable abstraction. This led customers to query the value of the feedback they could give.
- Further detail is provided in this report but, in summary, the main findings organised thematically are as follows (in the remainder of this report the findings from the quantitative survey and qualitative research are reported separately to provide transparency of the source of insights and the way in which conversations were held with customers):

Leakage

- The majority of customers (89%) support Affinity Water continuing to reduce leakage. 71% strongly support this proposal. This is the highest level of support for any aspect of the Business Plan covered in the survey.
- In terms of the different options proposed to reduce leakage, 38% of customers prefer **Option 1** - reducing leakage by a further 11% - compared to 31% who choose the more expensive Option 2 which would target a further 15% reduction.
- We found leakage resonating strongly with customers and in the focus group discussions proposals to reduce leakage were supported by customers. Fixing leaks is a key priority; it is important as a top-of-mind, instinctively important issue to customers (and seen as a very visible sign of “under-performance” by Affinity Water), and this remains the case after deliberation and trading-off against other potential priorities.
- Calls for efforts and policies to reduce leakage were motivated by recent local experience and sightings of bursts, but those wanting further action were also mindful of the cost and the impact on customers’ bills. There was a sense that investment would reduce wastage, reducing the need to take water out of the environment or sourcing it from other suppliers etc. Tackling leakage is seen as the cornerstone of any plan to better manage water resources whether in the short, or the long term.

Sustainability

- Nine in ten customers (89%) say that the local environment is important to them personally, with half (50%) agreeing *strongly*. Similarly, two-thirds (67%) support Affinity Water reducing the amount of water taken from the water environment.

- Despite the additional cost, customers much prefer **Option 2** - taking 39 million litres per day less from the environment - compared to Option 1 - 10 million litres less (43% choose Option 2, 28% Option 1).
- From group discussions it is clear that protecting the environment, in general, is something customers are willing to say they support and policies in this area appear popular. However, it is hard for customers to engage with, they felt the language used was aimed at commercial companies and lacked detail to make it relevant to them. This made it hard to choose between alternative options. This led to a suspicion that Affinity Water may prioritise the environment over customers, and prompted some concerns about bill rises.

Drought

- **Option 1** - reducing the chance of severe drought to 1.7% - is preferred by 29% of customers while 19% choose Option 2 - moving to a 0.5% chance. However, 22% say that Affinity Water should do nothing because they do not think this is a problem.
- As with the environment, we similarly found scepticism about drought, climate change and demand growth. The UK is thought to have abundant water and some of the proposed changes appeared too far into the future to impact within customers' lifetimes. In our group discussions customers were also sceptical about how the proposals would be regulated and were unsure how they would monitor their own personal water usage.

Demand management

- Just under four in five customers (78%) say that they are careful about how much water they personally use. However, three in five (61%) feel they would be able to make some sort of reduction in their *household* water consumption, although these customers typically say they could only make a *small* reduction in usage.
- While none of the three options presented was able to attract the backing of a majority of customers, the least ambitious - **Option 1** (reducing water use to an average of 126 litres) - was the most preferred one, chosen by 34%.
- The group discussions also found the overall aim of reducing consumption was generally supported and seen as a good idea by customers. Reducing usage by a quarter did, however, feel like a large reduction, especially for older age groups. Older customers tended to support the reduction to 110 litres daily consumption while younger groups supported a cut to 125 litres.
- During the groups, participants challenged Affinity Water's consumption figures, criticising the lack of comparative information and expressing surprise at how high these are. Customers recognised the

importance of this area given its benefits in terms of the environment and lower bills, but expected Affinity Water to encourage progress proactively by providing water saving devices and education.

Community pilot projects

- The more modest **Option 1** - investing £2 million in local projects – is preferred by 39% of customers, ahead of Option 2 (£6million) which is favoured by 30%.
- This theme was not covered in detail in the group discussions but was a feature of discussions with customers in respect of the overall Business Plan (covered in another project and report).

Other themes

- Of the other themes included within the dWRMP and discussed within the groups, water quality tended to be among the most important to participants. However, again, the information lacked enough detail on drinking water standards and comparative information for participants to feel able to make decisions. Metering, water efficiency and consumption are also recognised as important, as well as the environment, and the aim of reducing consumption is also seen as a good idea.

Overview

- Across questions asking customers about the different sets of options being considered by Affinity Water for inclusion within its WRMP, between 10-15% of participants answered 'don't know' and 5-10% made a suggestion to 'do something else'. As the table below shows, drought was mostly readily identified by customers as 'not a problem' - by 22% - four times the proportion who think the same of leakage. This is reflected in the relatively low proportion of customers - 48% - choosing one of the options presented. Otherwise, the majority of customers prefer at least one of the options presented in each theme (all options involved a bill increase of some degree).

Theme	Option	Bill increase*	% prefer	% prefer <u>any</u> option	% 'not a problem' / prefer 'something else' or 'none'
Reduce water leaks	Option 1 – reducing leakage by further 11%	£2.10	38	69	5 / 17
Reduce water leaks	Option 2 – reducing leakage by further 15%	£3.80	31		
Take less water from the environment	Option 1 – taking 10 million litres less	£0.90	28	71	9 / 10
Take less water from the environment	Option 2 – taking 39 million litres less	£1.30	43		
Reduce chance of severe drought	Option 1 – reducing chance to 1.7%	£3.00	29	48	22 / 14
Reduce chance of severe drought	Option 1 – reducing chance to 0.5%	£4.20	19		
Reduce water use by customers	Option 1 – reducing use to 126 litres	£2.40	34	60	13 / 16
Reduce water use by customers	Option 2 – reducing use to 120 litres	£3.70	13		
Reduce water use by customers	Option 3 – reducing use to 110 litres	£3.70+	13		

* Approximate bill increase per household bill every year until 2080

- Levels of preference, range from 43%, at most, to 13% but are higher for the less expensive actions among competing sets of options (shown in the table below). The important exceptions to this are relatively high support for Option 2 to reduce leakage. Also notable is preference for a more ambitious plan to reduce abstraction – Option 2 – reflecting the lower bill increases involved compared to Option 1, and other themes.
- While there is an important caveat to the presentation of data in the table – customers were trading-off options within, not between, themes, and were not choosing between packages or complete plans (which *was* the case in the Business Plan acceptability research) – the survey results further underline the importance of leakage and how relatively more receptive customers are likely to be to bill increases which support reductions.

Theme	Option	Bill increase*	% prefer
Take less water from the environment	Option 1 – taking 10 million litres less	£0.90	28
Take less water from the environment	Option 2 – taking 39 million litres less	£1.30	43
Reduce water leaks	Option 1 – reducing by further 11%	£2.10	38
Reduce water use by customers	Option 1 – reducing use to 126 litres	£2.40	34
Reduce chance of severe drought	Option 1 – reducing chance to 1.7%	£3.00	29
Reduce water use by customers	Option 2 – reducing use to 120 litres	£3.70	13
Reduce water use by customers	Option 3 – reducing use to 110 litres	£3.70+	13
Reduce water leaks	Option 2 – reducing by further 15%	£3.80	31
Reduce chance of severe drought	Option 1 – reducing chance to 0.5%	£4.20	19

* Approximate bill increase per household bill every year until 2080

Conclusions

- The main conclusion from this research is that the aspects of water resources management that impact customers the most, and are most tangible to them, are likely to be their main focus and priorities in respect of the Water Resources Management Plan. As we have found in earlier phases of PR19 market research, the potential for improvement and focus for Affinity Water comes more in operational matters – i.e. 'how' (and 'how much') it does things – rather than in the broad strategy – the 'what'.
- Throughout focus group discussions, customers wanted to know how the proposed plan will impact them e.g. what will be the impact on household bills if Affinity Water does one thing and/or another? There was a sense that they were being prepared for an increase in bills. Customers wanted Affinity Water to focus on reducing bills, making bills clearer, while helping vulnerable customers who may struggle to meet bill payments.
- These findings underline the importance of communicating water resources management in ways which are tangible to customers, building awareness of the premise behind change, and being clear on the detail of what change will involve.
- This research also points to the centrality in customers' eyes of a strong, but affordable, commitment to reducing leakage within Affinity Water's WRMP and the wider Business Plan.

Findings

Introduction

Background

As part of Affinity Water's consultation on the draft Water Resources Management Plan (dWRMP), Ipsos MORI, working with Arup, were commissioned to conduct research with Affinity Water's customers to measure and understand their preferences in respect of Affinity Water's long-term plans for the management of water resources. The research was undertaken along the statutory consultation conducted by Affinity Water.

This research forms part of **Phase 2** of the market research programme being delivered by Ipsos MORI and Arup to support PR19. The final phase has been designed to 'test and value' customer priorities by showing them draft propositions and policies being considered by Affinity Water, including workings and costings to make this as real as possible for those participating in our research.

Methodology

The survey allowed us to understand and measure customer attitudes towards different options being considered for Affinity Water's Water Resources Management Plan. The qualitative research involved smaller samples but provided deeper insights into the reasons why customers hold the views they do

Ipsos MORI conducted a **survey** of 1,000 Affinity Water customers. Interviews were conducted via an online methodology between 23 April and 14 May 2018 with respondents sourced from Ipsos MORI's online panel. Recruitment and quotas targeted a representative sample of adults aged 16-75 resident in Affinity Water's service areas. The achieved sample profile and the effects of weighting are outlined in the Appendices of this report.

We conducted eight **focus group discussions** of 1.5 hours each during March 2018 to explore customers' views on the dWRMP and the key decisions facing Affinity Water. As the table below shows, two groups took place in Collindale/Edgware, Stevenage (Hertfordshire), Woking and Folkestone (Kent). Participants were given an extract of the dWRMP to be read as a **pre-task** before the discussion groups, while showcards summarising the dWRMP themes were used as stimulus, shared during the discussions.

Date	Location	Recruitment quotas	No. of participants
21-Mar-18	Collindale/Edgware	Group 1: 18-34 C2DE	8
		Group 2: 35-54 C2DE	8
26-Mar-18	Stevenage	Group 3: 55+ C2DE	8
		Group 4: 18-34 ABC1	8
26-Mar-18	Woking	Group 5: 55+ ABC1	8
		Group 6: 35-54 ABC1	8
28-Mar-18	Folkestone	Group 7: 55+ C2DE	9
		Group 8: 35-54 C2DE	9

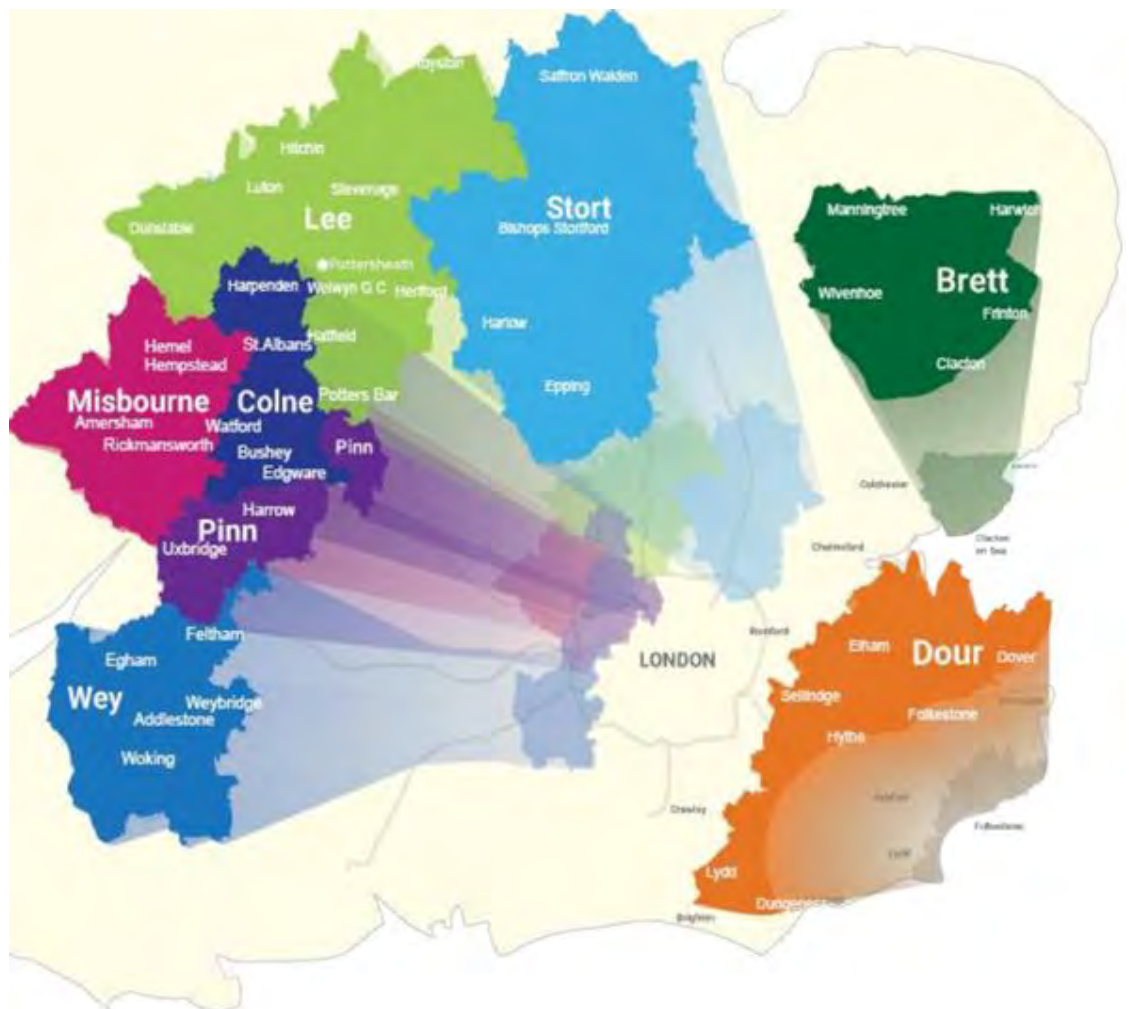
Interpretation of data

Surveys generate estimates of the 'truth' which would only be available if a complete census of customers was undertaken. As a result, findings are subject to sampling tolerances and statistical confidence intervals, shown in the Appendices.

Customers from all 8 of the WRZ's that Affinity Water covers (as shown in the map below) were surveyed. Base sizes for these areas differed, partly depending on their population size.

The two non-central WRZ's, Brett and Dour have survey sample sizes of 45 and 54 respectively compared to the largest sample size of 257 for Pinn.

In general, **any sub group differences described in this report describe statistically significant differences.**



Survey data has been weighted to match the profile of the population living in Affinity Water areas by age, tenure, work status and WRZ, based on **2011 Census data**. Where percentages do not sum to 100, this is due to rounding of figures.

The qualitative research aimed to explore different customer opinions in depth to obtain a breadth of views, however, it does not seek to be quantifiable or statistically representative. Qualitative research is by its nature illustrative, detailed and exploratory. It offers insight into the perceptions, feelings, and behaviours of people rather than quantifiable conclusions from a statistically representative sample.

Much of the evidence in this report is based on participants' perceptions. It is important to remember that even though some perceptions may not be factually accurate, they represent 'the truth' to the participants and, as a result, are vital in understanding their attitudes and views.

Quantitative survey findings

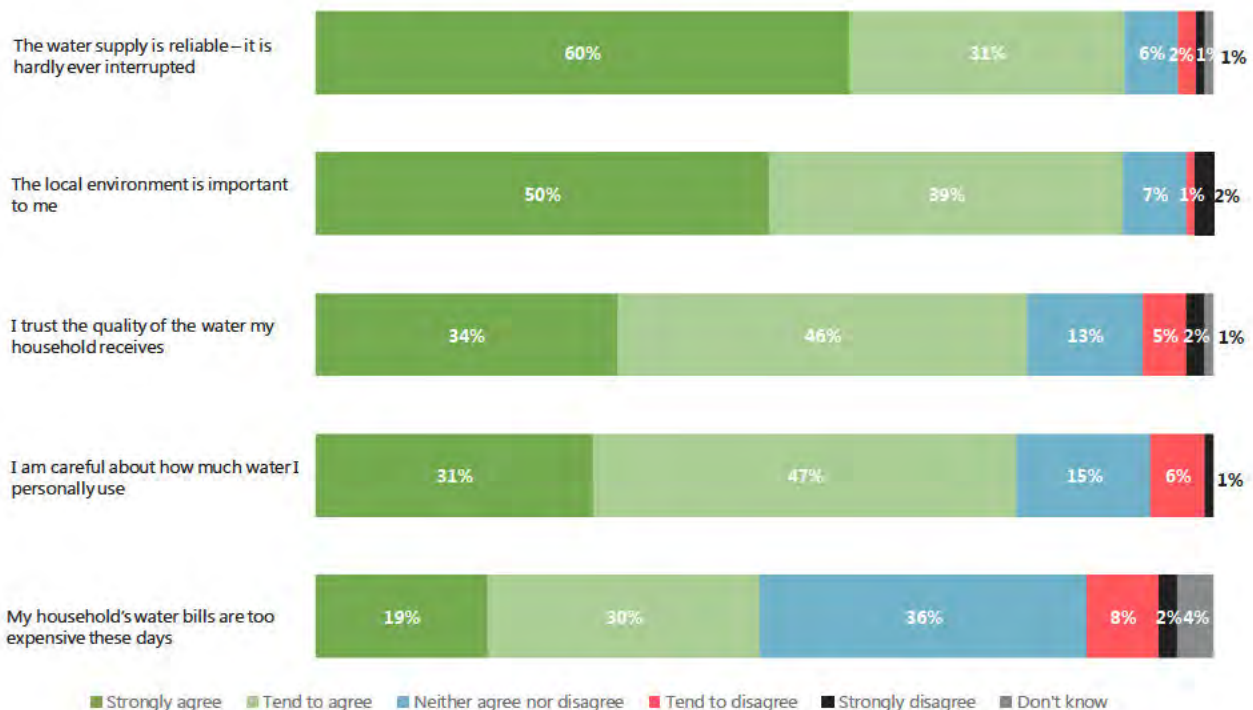
Context

Figure 1 shows that customers are broadly positive about several different aspects of their water supply and service, including quality and reliability. Customers are most positive about the reliability of their water supply, with 91% agreeing that it is reliable, 60% strongly agreeing. The local environment is similarly important, with nine in ten (90%) also agreeing with that it is important to them and half agreeing *strongly*. Only 3% take view that the environment is not important to them.

Eight in ten (80%) say they trust the quality of water their household receives, with only 7% disagreeing with this statement. However, half (49%) think that their household water bills are too expensive, five times the proportion disagreeing (10%). Around two in ten (19%) strongly agree that their water bills are too expensive, which rises to 21% for those aged 35-54, 23% for renters and benefits recipients and 27% for BME customers.

Just under eight in ten customers (78%) report that they are careful about the amount of water they personally use, with only 7% disagreeing. Customers with meters and BME customers are more likely than the average customer to *strongly* agree with this statement.

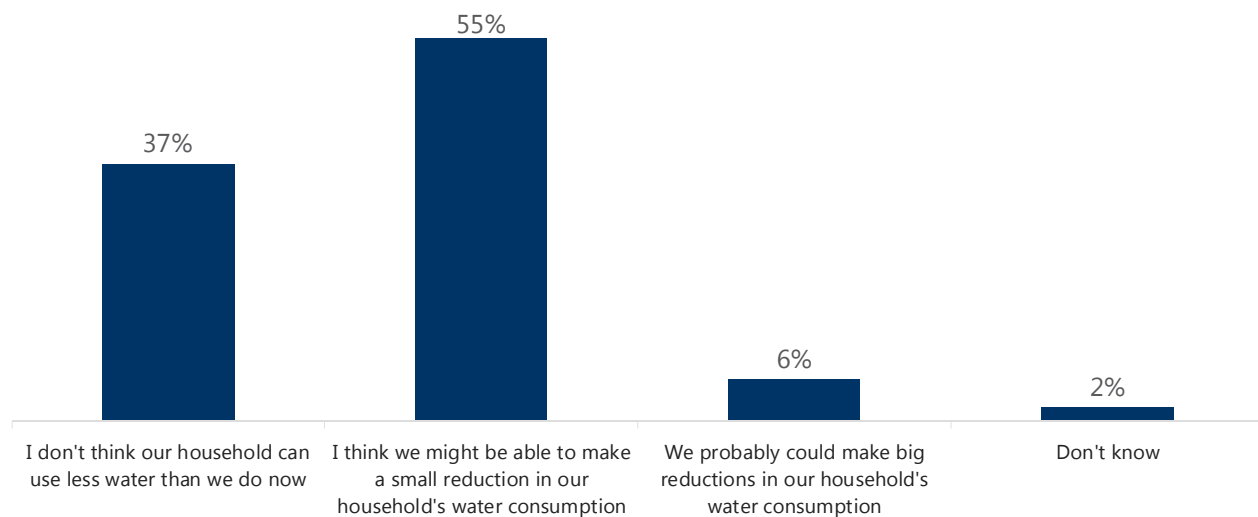
Figure 1: To what extent do you agree or disagree with each of the following statements?



Base: 1,000 adults aged 16-75 from across the Affinity Water customer areas

Although most customers say they are careful about the amount of water they *personally* use, Figure 2 shows that three in five (61%) feel they would be able to make some sort of reduction in their *household* water consumption. Over half (55%) believe they can make a small reduction, whilst 6% imagine they can make a big cutback in the amount of water they use, increasing to 11% of 16-34 year olds. The remaining four in ten customers (37%) feel they are not able to make any reduction in their usage, which rises to 50% of 55-75 year olds.

Figure 2: Which, if any of these statements best fits your opinion of your household’s water consumption?



Base: 1000 adults aged 16-75 from across the Affinity Water customer areas

Q6. Which, if any of these statements best fits your opinion of your household’s water consumption?

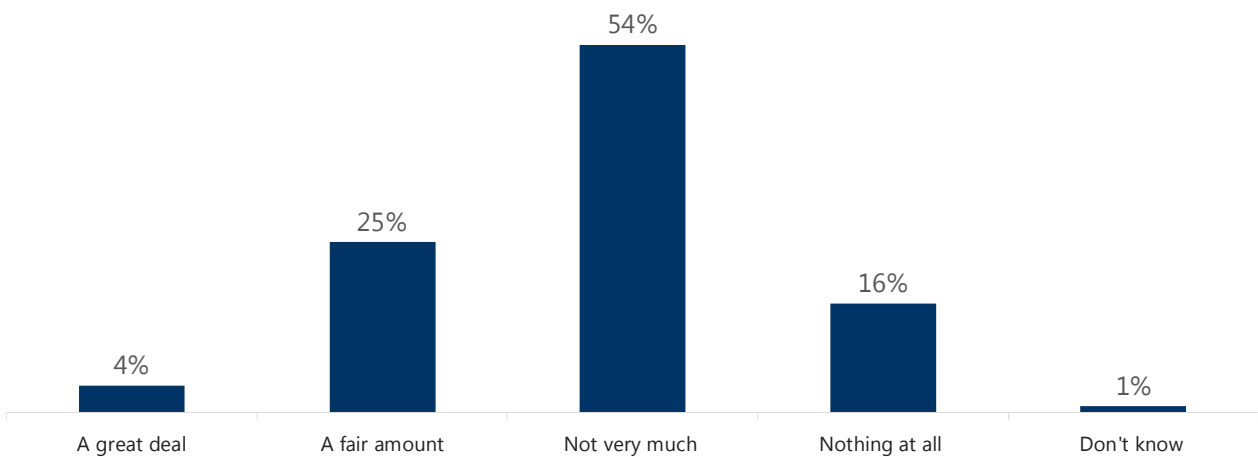
	Total	WRZ 1 – Misbourne	WRZ 2 – Colne	WRZ 3 – Lee	WRZ 4 – Pinn	WRZ 5 – Stour	WRZ 6 – Wey	WRZ 7 – Dour*	WRZ 8 – Brett*
I don't think our household can use less water than we do now	37%	41%	41%	34%	37%	36%	34%	40%	44%
I think we might be able to make a small reduction in our household's water consumption	55%	56%	52%	55%	53%	56%	59%	60%	51%
We probably could make big reductions in our household's water consumption	6%	3%	6%	7%	5%	7%	6%	-	5%
Don't know	2%	-	1%	4%	4%	1%	2%	-	-

* Small base size (Dour, 54; Brett, 45)

Overall, customers do not know very much about Affinity Water, as shown in Figure 3. Seven in ten (70%) say they know little or nothing about the water company; 54% say they do not know very much and a

further 16% say they know *nothing at all*. The oldest group of customers are more likely than average to say they know not very much about Affinity Water, with 65% of 55-75 year olds saying this. A quarter (25%) say they know a fair amount about Affinity Water and 4% say they know a great deal.

Figure 3: How much, if anything, would you say you personally know about Affinity Water?



Base: 1000 adults aged 16-75 from across the Affinity Water customer areas

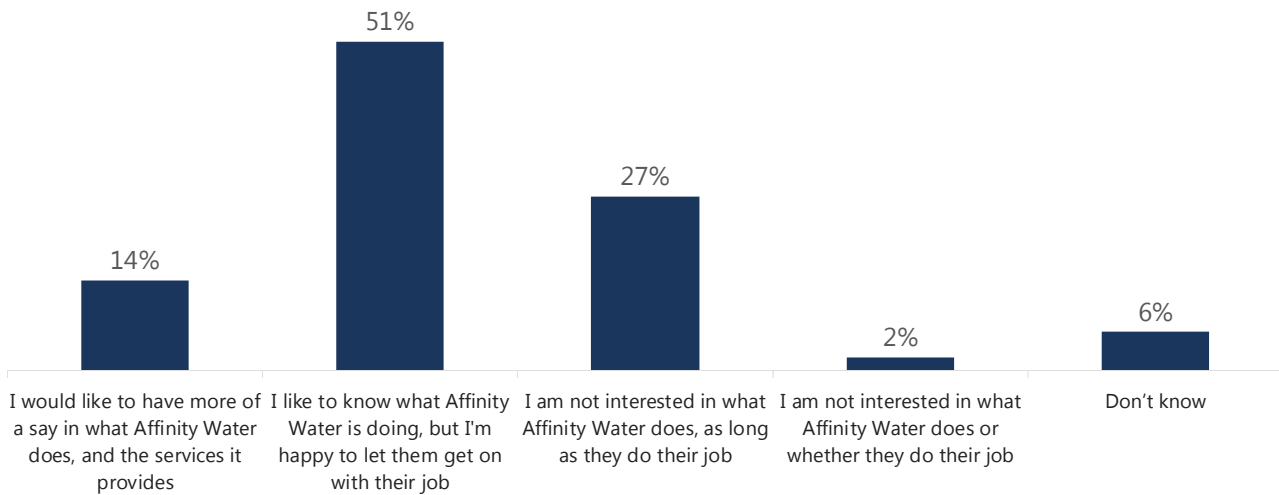
Q7. How much, if anything, would you say you personally know about Affinity Water?

	Total	WRZ 1 – Misbourne	WRZ 2 – Colne	WRZ 3 – Lee	WRZ 4 – Pinn	WRZ 5 – Stour	WRZ 6 – Wey	WRZ 7 – Dour*	WRZ 8 – Brett*
A great deal	4%	5%	1%	4%	5%	3%	2%	5%	2%
A fair amount	25%	19%	25%	26%	26%	33%	22%	24%	15%
Not very much	54%	55%	67%	50%	49%	49%	59%	56%	64%
Nothing at all	16%	20%	7%	19%	18%	12%	17%	16%	17%
Don't know	1%	1%	1%	1%	2%	3%	-	-	2%

* Small base size (Dour, 54; Brett, 45)

Generally, customers have some interest in what Affinity Water does. Sixty five per cent say they are interested about the service provided by their water company, with 14% wanting to be more involved in the company’s decision-making process. This rises to 17% of men, 18% of those aged 16-34 and 19% of BME customers. One in four (27%) say they have no interest in what Affinity Water does but only 2% have no interest in what the company does and whether they do their job.

Figure 4: Which of these statements comes closest to your own attitudes towards Affinity Water?



Base: 1000 adults aged 16-75 from across the Affinity Water customer areas

Q8. Which of these statements comes closest to your own attitudes towards Affinity Water?

	Total	WRZ 1 – Misbourne	WRZ 2 – Colne	WRZ 3 – Lee	WRZ 4 – Pinn	WRZ 5 – Stour	WRZ 6 – Wey	WRZ 7 – Dour	WRZ 8 – Brett
I would like to have more of a say in what Affinity Water does, and the services it provides	14%	15%	13%	13%	17%	11%	13%	13%	9%
I like to know what Affinity Water is doing, but I'm happy to let them get on with their job	51%	52%	52%	52%	48%	49%	57%	54%	51%
I am not interested in what Affinity Water does, as long as they do their job	27%	31%	28%	27%	24%	35%	24%	23%	25%
I am not interested in what Affinity Water does, or whether they do their job	2%	1%	3%	*	3%	-	3%	2%	7%
Don't know	6%	1%	4%	8%	9%	5%	4%	3%	7%

* Small base size (Dour, 54; Brett, 45)

Draft Water Resources Management Plan

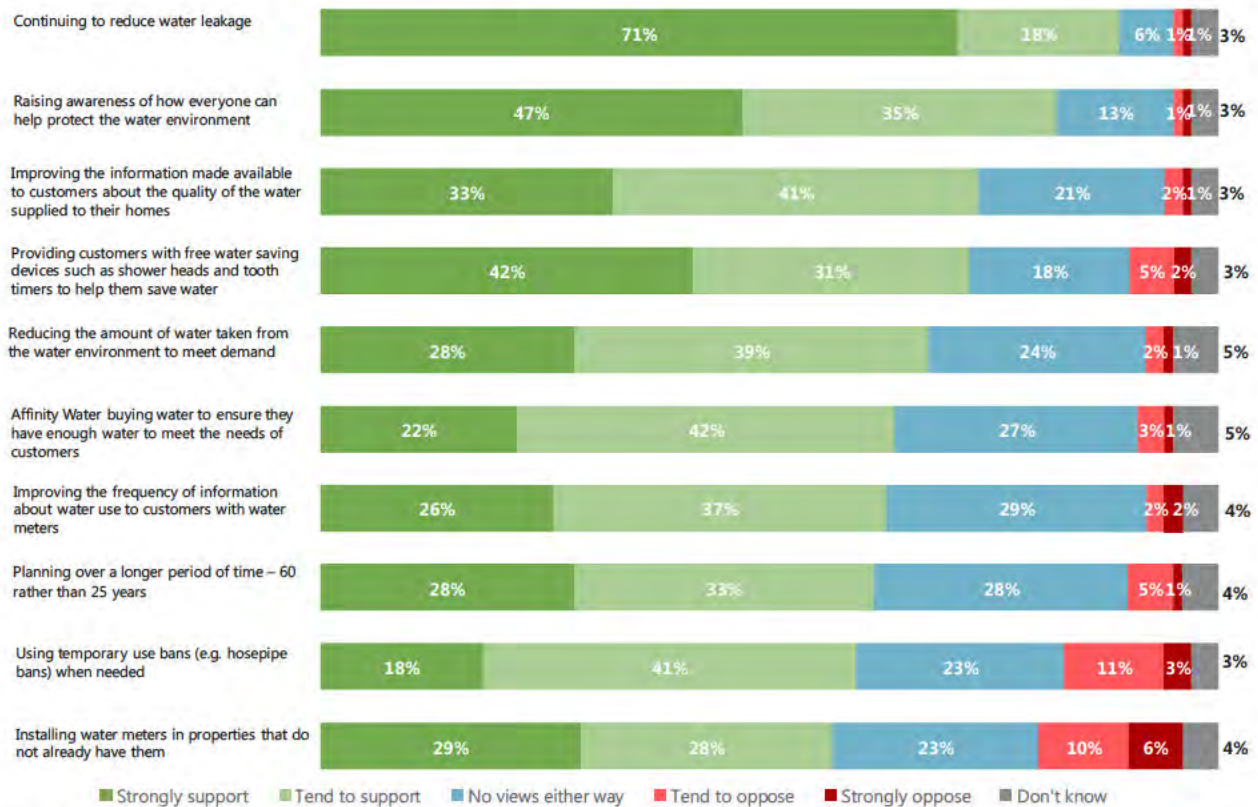
Figure 5 shows that customers are broadly positive about the different proposals offered in the dWRMP; they tend to support rather than oppose these, although the level of support varies from nine in ten (89%) in favour of the most popular proposal down to 57% for the least popular one.

Customers are most supportive of Affinity Water continuing to find ways to reduce water leakage with nine in ten customers (89%) supporting this. Seven in ten (71%) strongly support this – the strongest feeling of support for any of the listed initiatives.

The next most popular proposals were raising awareness of how everyone can help protect the water environment, with 82% support for this, followed by three-quarters support for improving the information available to customers about the quality of water supplied to their homes (74%), and providing customers with free water saving devices (73%).

In contrast, a *relatively* small, three in five (59%) customers support hosepipe bans. Only 18% strongly support this initiative, the lowest of all the proposals in the dWRMP. However, the least supported proposal is installing water meters in properties that do not already have them suggesting that some customers want some control and choice. Still, over half (57%) of customers are in favour of the extension of compulsory metering, and the margin of support to opposition is two to one.

Figure 5: Affinity Water’s dWRMP includes the following proposals. Please indicate the extent to which, in principle, you support or oppose each one.



Base 1,000 adults aged 16-75 from across the Affinity Water customer areas

Customers who have water meters and those in the 35-54 age category are more likely than other age groups to strongly support Affinity Water using hosepipe bans, with 21% of metered customers and 23% of middle-aged customers supporting this, compared with 16% and 15% respectively of the youngest and oldest groups of customers.

Around a third (32%) of the youngest customers and those with meters also tend to support installing water meters in properties without one, compared to 28% who think this overall. In addition, 16-34 year olds (46%), those living in rented accommodation (who tend to be younger) (49%) and customers in receipt of benefits (47%) were all more likely than average to strongly support being given free water saving devices such as shower heads and tooth timers to help them save water.

Specific aspects of the dWRMP

The next few sections discuss customer opinions on different options currently being considered by Affinity Water. This includes questions on reducing water leakage, taking less water from the environment, reducing the chance of severe drought and decreasing the amount of water used by customers. Within preambles to each question, survey participants were provided with the approximate cost associated with each proposed option. These questions were rotated to reduce any 'order effects'.

Customers were also given the following background information about the dWRMP as an introduction to this section of the survey:

We have provided the approximate cost for each option. These were Affinity Water's estimates and were shown as the additional amount each household could pay every year.

Because Affinity Water provides around 1.4 million households with water every day, the increase in bills for all customers will be required to fund different aspects of the Water Resources Management Plan over the entire period, up to 2080.

The estimated increases are for the part of customers' bills that relate to water resources. Whether bills increase will depend on what else Affinity Water decides to do

The following table was also shown to ensure that participants were made aware of the current average bill for clean water. It was also designed to indicate the number of options to be covered, the main areas of their focus and, in overview, their respective impacts on average household bills every year until 2080. The average bill amount was fixed at the top of the screen for each question within this section of the questionnaire. (A full questionnaire is included in our Appendices.)

	Proposed approximate increases per household bill every year until 2080 (The average bill for each household is £167 per year)	
Reduce water leaks	Option 1	£2.10
	Option 2	£3.80
Take less water from the environment	Option 1	£0.90
	Option 2	£1.30
Reduce chance of severe drought	Option 1	£3.00
	Option 2	£4.20
Reduce water use by customers	Option 1	£2.40
	Option 2	£3.70
	Option 3	More than £3.70

Reducing water leakage

Customers were given the following background information about water leakage before being asked a question about specific options:

To tackle water leakage Affinity Water must consider the cost of finding and repairing leaking pipes (and the impact on traffic disruption) compared to the cost of producing and delivering water from other sources.

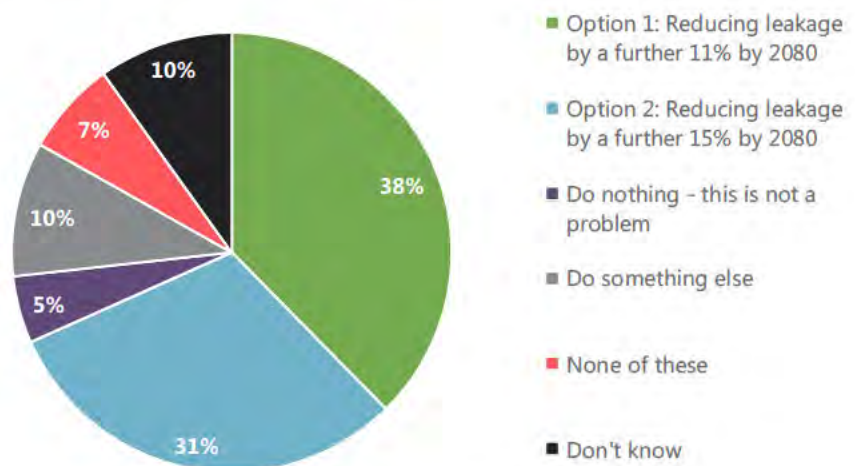
By 2020 Affinity Water will have reduced the amount of water that leaks from their system by 14%. Affinity Water is planning to reduce leakage further by 2080. This will require investment and may mean an increase in the water bills paid by customers.

And were given the following two options to choose from:

Option 1: Reducing leakage by a further 11% by 2080. This would mean approximately £2.10 being added to the average household bill every year until 2080.

Of the two options given to reduce leakage, more customers prefer the first; as Figure 6 below shows, 38% prefer Option 1 compared to 31% who chose the more expensive Option 2. However, one in three customers (32%) still chose one of the other options – that is one of: ‘do nothing’ (5%), ‘do something else’ (10%), ‘none of these’ (7%) or don’t know (10%) – meaning that neither of the two specific options received a majority of the vote.

Figure 6: Affinity Water is considering two main options (1 and 2 below) to deal with leakage. Which of these do you prefer, or would you prefer another option?



Base: 1,000 adults aged 16-75 from across the Affinity Water customer areas

As the following table shows, customers aged 16-34 are more likely than average to support Option 1 with 48% preferring this option compared to 38% of customers overall.

Q10. Which of these plans for dealing with leakage do you prefer, or would you prefer another option?

	Option 1 – Reducing leakage by a further 11% by 2080. This would mean approximately £2.10 being added to the average household bill every year until 2080	Option 2 – Reducing leakage by a further 15% by 2080. This would mean approximately £3.80 being added to the average household bill every year until 2080	Do nothing – this is not a problem	Do something else	None of these	Don't know
Total	38%	31%	5%	10%	7%	10%
Male	34%	29%	6%	13%	8%	9%
Female	41%	31%	4%	8%	5%	11%
Age 16-34	48%	29%	6%	3%	4%	10%
Age 35-54	34%	30%	5%	12%	6%	12%
Age 55 -75	34%	32%	4%	13%	9%	8%
Have Meter	38%	33%	5%	10%	6%	7%
No meter	38%	30%	5%	10%	7%	10%
White	39%	30%	5%	10%	6%	9%
BME	34%	31%	8%	7%	7%	13%
Main bill payer	38%	30%	6%	11%	8%	8%
Not the main bill payer	38%	32%	5%	8%	5%	13%
1 - Misbourne	30%	37%	4%	18%	5%	5%
2 - Colne	35%	27%	4%	14%	10%	10%
3 - Lee	38%	32%	7%	6%	6%	11%
4 - Pinn	41%	28%	4%	8%	5%	14%
5 - Stour	44%	30%	6%	10%	3%	7%
6 - Wey	35%	36%	6%	9%	8%	7%
7 – Dour*	36%	24%	5%	13%	13%	9%
8 – Brett*	47%	22%	8%	4%	7%	12%

* Small base size (Dour, 54; Brett, 45)

Taking less water from the environment

Customers were given the following background information about taking less water from the environment:

Most of the water supplied by Affinity Water comes from the chalk aquifer (porous underground rock where water is stored). Affinity Water needs to take less water from this source in the future in order to protect the environment (rivers and streams) and the water supply, while also ensuring Affinity Water has enough water to meet their customers' demands. The cost of leaving more water in the environment will require investment by Affinity Water in other sources of water and may mean an increase in the water bills paid by customers.

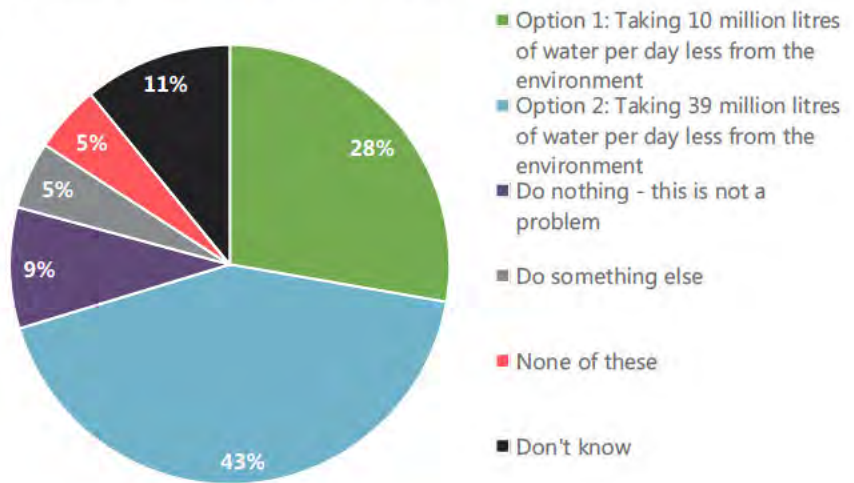
Affinity Water is considering two main options (1 and 2 below) when planning for the long-term:

Option 1: Taking 10 million litres of water per day less from the environment than at present. This would mean approximately £0.90 being added to the average household bill every year until 2080.

Option 2: Taking 39 million litres of water per day less from the environment than at

Despite the additional cost, customers prefer Option 2 compared to Option 1, with over four in ten (43%) choosing this, compared to less than three in ten (28%) for Option 1. However, the difference for the average bill between these two options is only 40p compared to £1.70 for the previous question on leakage which is likely to explain why the additional cost does not seem to be a key factor for customers when choosing between these two options.

Figure 7: Affinity Water is considering two main options (1 and 2 below) when planning for the long-term. Which of these do you prefer, or would you prefer another option?



Base: 1,000 adults aged 16-75 from across the Affinity Water customer areas

Home-owners are more likely to support the more expensive Option 2, with 45% of home-owners supporting this option compared to 38% of renters. Some Affinity Water areas are also relatively more likely to support Option 2 than others, in particular, Misbourne (51%) and Wey (50%).

Q11. Which of these long-term environmental protection options do you prefer, or would you prefer another option?

	Option 1 – Taking 10 million litres of water per day less from the environment than at present. This would mean approximately £0.90 being added to the average household bill every year until 2080	Option 2 – Taking 39 million litres of water per day less from the environment than at present. This would mean approximately £1.30 being added to the average household bill every year until 2080	Do nothing – this is not a problem	Do something else	None of these	Don't know
Total	28%	43%	9%	5%	5%	11%
Male	27%	40%	11%	6%	6%	10%
Female	29%	45%	7%	4%	4%	11%
Aged 16-34	31%	45%	8%	1%	5%	12%
Aged 35-54	27%	43%	8%	6%	5%	11%
Aged 55-75	27%	41%	10%	7%	6%	10%
Have Meter	30%	44%	8%	6%	4%	8%
No meter	27%	43%	9%	3%	6%	11%
White	28%	43%	9%	5%	5%	10%
BME	28%	40%	7%	3%	8%	14%
Main bill payer	29%	41%	10%	5%	7%	8%
Not the main bill payer	27%	45%	7%	4%	3%	14%
1 - Misbourne	20%	51%	9%	6%	7%	6%
2 - Colne	33%	40%	6%	5%	7%	9%
3 - Lee	31%	41%	6%	4%	2%	16%
4 - Pinn	28%	39%	8%	4%	7%	14%
5 - Stour	27%	44%	16%	2%	3%	8%
6 - Wey	23%	50%	12%	5%	4%	6%
7 – Dour*	35%	38%	5%	5%	8%	9%
8 – Brett*	30%	45%	6%	9%	2%	8%

* Small base size (Dour, 54; Brett, 45)

Reducing the chance of severe drought

Customers were given the following background information about droughts:

Drought can have an impact on the environment and this may become more noticeable as a drought becomes more severe. In a severe drought, Affinity Water may apply to the Environment Agency to take additional water from the environment, including rivers and streams. This can extend the amount of time it takes for the river to recover after the drought has ended.

Currently, Affinity Water estimate that there is a 2.5% (a 1 in 40) chance every year that they will need to apply to take additional water.

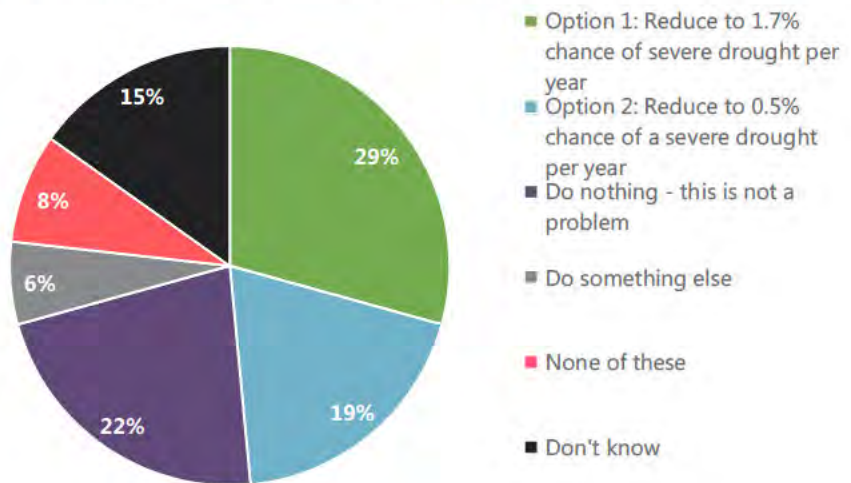
Affinity Water is considering two main options when planning for the long-term (1 and 2 below). Both these options will require investment by Affinity Water and may mean an increase in the water bills paid by customers:

Option 1: Moving from a 2.5% (1 in 40) chance of a severe drought every year to a 1.7% (1 in 60) chance. This would mean approximately £3.00 being added to the average household bill every year until 2080

Option 2: Moving from a 2.5% (1 in 40) chance of a severe drought every year to a 0.5%

Three in ten customers (29%) prefer Option 1 compared with two in ten (19%) who prefer Option 2. However, half (51%) say they would prefer another option than the two specific options given. Just over two in ten (22%) say that Affinity Water should do nothing because they do not think this is a problem, a further 14% suggest doing something else or none of these and the remaining 15% say they do not know.

Figure 8: Which of these options (1 and 2) do you prefer, or would you prefer another option?



Base: 1,000 adults aged 16-75 from across the Affinity Water customer areas

As in previous questions, women and younger customers were more likely to support the cheaper Option 1, with 32% and 34% respectively preferring this option compared to 26% of men and 27% of older customers. In addition, one in ten (10%) of the older cohort (aged 55-75) say that Affinity Water should do something else other than the options presented here, much higher than the 3% and 6% of 16-34 and 35-54 year olds.

Q12. Which of these long-term water sourcing plans do you prefer, or would you prefer another option?

	Option 1 – Moving from a 2.5% (1 in 40) chance of a severe drought every year of to a 1.7% (1 in 60) chance. This would mean approximately <u>£3.00 being added to the average household bill every year until 2080</u>	Option 2 – Moving from a 2.5% (1 in 40) chance of a severe drought every year of to a 0.5% (1 in 200) chance. This would mean approximately <u>£4.20 being added to the average household bill every year until 2080</u>	Do nothing – this is not a problem	Do something else	None of these	Don't know
Total	29%	19%	22%	6%	8%	15%
Male	26%	20%	26%	7%	9%	12%
Female	32%	19%	19%	6%	8%	16%
Aged 16-34	34%	24%	20%	3%	6%	13%
Aged 35-54	27%	20%	20%	6%	8%	18%
Aged 55-75	27%	13%	26%	10%	10%	13%
Meter	31%	19%	22%	7%	9%	12%
No meter	29%	20%	24%	5%	8%	14%
White	30%	18%	23%	7%	8%	13%
BME	26%	23%	18%	5%	7%	20%
Main bill payer	28%	19%	26%	7%	9%	11%
Not the main bill payer	31%	20%	19%	5%	7%	19%
1 - Misbourne	25%	22%	25%	9%	6%	13%
2 - Colne	32%	18%	22%	9%	10%	9%
3 - Lee	32%	15%	21%	6%	10%	16%
4 - Pinn	30%	19%	20%	5%	7%	19%
5 - Stour	29%	26%	21%	3%	5%	16%
6 - Wey	27%	22%	26%	6%	10%	9%
7 – Dour*	29%	17%	22%	8%	11%	13%
8 – Brett*	23%	15%	28%	10%	3%	21%

* Small base size (Dour, 54; Brett, 45)

Reduce water use by customers (PCC)

Customers were given the following background information about the amount of water used by per capita:

At present, Affinity Water's customers use an average of 160 litres per person per day compared to the national average of 141 litres.

Affinity Water is considering three main options when planning for the long-term. These involve taking steps to encourage customers to use less water.

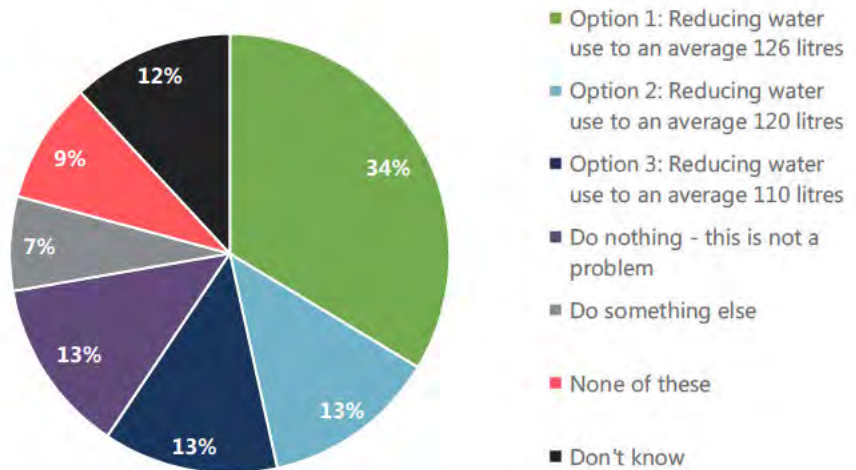
Option 1: Reducing water use to an average 126 litres. This would mean approximately £2.40 being added to the average household bill every year until 2080. It would be done through existing plans to save water.

Option 2: Reducing water use to an average 120 litres. This would mean approximately £3.70 being added to the average household bill every year until 2080. It would be done by providing customers with more frequent information about their water use.

Option 3: Reducing water use to an average 110 litres. This would mean an amount more than £3.70 being added to the average household bill. It would be done through financial support and working in partnership with government, regulators and local

One in three customers (34%) prefer Option 1, compared with one in four (26%) who chose either Option 2 or Option 3 (both 13%). Around four in ten (41%) of all customers surveyed chose none of the three options, with a substantial amount choosing to do nothing (13%) or saying they do not know (12%). While none of the three options was able to attract a majority of customers, option one was the most popular.

Figure 9: Which of these options (1, 2 and 3 below) do you prefer, or would you prefer another option?



Base: 1,000 adults aged 16-75 from across the Affinity Water customer areas

Customers aged between 16 and 34 or whose who do not have a meter were more likely to choose Option 1, with around four in ten (39%) of these customers choosing this option. There are also differences of opinion between the different areas, such as customers in Colne (42%) who are much more likely than other areas to support Option 1.

Q13. Which of these long-term water consumption plans do you prefer, or would you prefer another option?

	Option 1 – Reducing water use to an average 126 litres. This would mean approximately £2.40 being added to the average household bill every year until 2080.	Option 2 – Reducing water use to an average 120 litres. This would mean approximately £3.70 being added to the average household bill every year until 2080.	Option 3 – Reducing water use to an average 110 litres. This would mean an amount more than £3.70 being added to the average household bill. It would be done through financial support and working in partnership with government, regulators and local organisations.	Do nothing – this is not a problem	Do something else	None of these	Don't know
Total	34%	13%	13%	13%	7%	9%	12%
Male	31%	13%	11%	18%	7%	9%	11%
Female	36%	12%	14%	9%	7%	8%	13%
Aged 16-34	39%	15%	16%	10%	3%	8%	10%
Aged 35-54	31%	14%	13%	13%	8%	7%	15%
Aged 55-75	32%	8%	10%	16%	11%	12%	12%
Meter	32%	15%	12%	15%	9%	9%	9%
No meter	38%	10%	14%	11%	6%	8%	13%
White	34%	12%	13%	13%	7%	8%	12%
BME	32%	15%	10%	13%	6%	11%	13%
Main bill payer	32%	13%	11%	16%	8%	10%	10%
Not the main bill payer	36%	12%	15%	9%	6%	6%	16%
1 - Misbourne	29%	15%	21%	12%	12%	5%	6%
2 - Colne	42%	8%	11%	10%	10%	8%	11%
3 - Lee	35%	15%	8%	9%	7%	12%	14%
4 - Pinn	31%	12%	12%	13%	5%	10%	17%
5 - Stour	34%	15%	14%	17%	3%	6%	11%
6 - Wey	30%	12%	19%	17%	9%	5%	8%
7 – Dour*	41%	16%	5%	11%	8%	8%	11%
8 – Brett*	36%	5%	13%	20%	4%	9%	12%

* Small base size (Dour, 54; Brett, 45)

Throughout these questions on specific aspects of the dWRMP, between 10-15% of participants answered 'don't know' and 5-10% made a suggestion to 'do something else'. These suggestions were similar across all of the questions and included the following:

- acting quicker to resolve leaks,
- delivering better maintenance of pipes/supply network,
- buying in extra water,
- using sea water and building desalinisation plants,
- reducing customers' bills and overall Affinity Water profits.

Customers also strongly suggest that Affinity Water bears some if not all of the cost of making these improvements rather than passing this financial burden on to bill payers.

Environmental pilots

Customers were given the following background information and options before being asked a question about investment in environmental pilots:

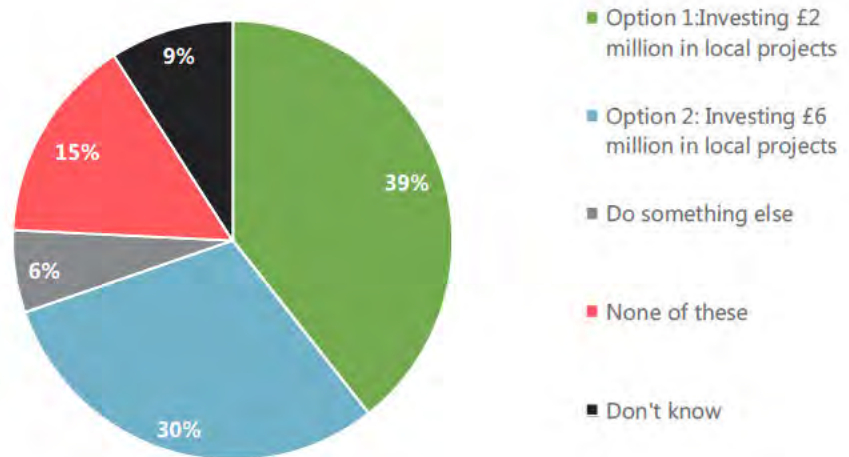
As part of this, Affinity Water is considering running a number of local projects during 2020-2025. These would be designed to test new approaches to helping customers reduce the amount of water they use, enabling Affinity Water to apply what works to all areas. Examples include working in partnership with schools to help them better understand and reduce their water use and to educate pupils about water use, working with community groups, housing associations, planners and developers to develop more water efficient homes.

Option 1: Investing £2 million in local projects. This would mean approximately £0.29 per year being added to the average household bill every year until 2025

Option 2: Investing £6 million in local projects. This would mean approximately £0.86

Figure 10 shows that around four in ten (39%) prefer Option 1 involving investing £2 million, while three in ten (30%) prefer Option 2 of Affinity Water investing £6 million. The remaining three in ten (30%) think that Affinity Water should either do something else (6%), do none of these (15%), or say they do not know (9%).

Figure 10: Which, if any, of these options (1 and 2 below) do you prefer, or would you prefer another option?



Base: 1,000 adults aged 16-75 from across the Affinity Water customer areas

Women are more likely than average (45%) to choose Option 1 for this question along with customers in certain regions, including Misbourne (42%), Colne (45%) and Lee (44%).

Q14. Which option for helping customers reduce the amount of water they use do you prefer or would you prefer another option?

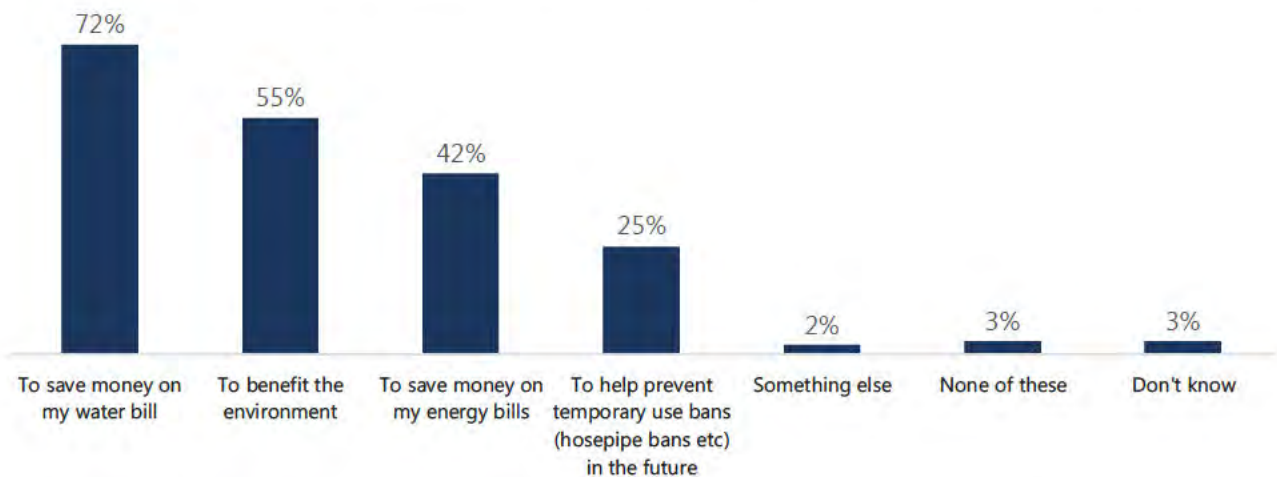
	Option 1 – Investing £2 million in local projects. This would mean approximately £0.29 per year being added to the average household bill every year until 2025	Option 2 – Investing £6 million in local projects. This would mean approximately £0.86 per year being added to the average household bill every year until 2025	Do something else	None of these	Don't know
Total	39%	30%	6%	15%	9%
Male	32%	32%	8%	18%	9%
Female	45%	29%	4%	13%	9%
Aged 16-34	43%	34%	2%	11%	10%
Aged 35-54	39%	29%	5%	17%	9%
Aged 55-75	37%	28%	10%	18%	7%
Meter	42%	29%	7%	15%	7%
No meter	39%	31%	6%	16%	9%
White	39%	30%	7%	16%	8%
BME	43%	30%	2%	11%	14%
Main bill payer	39%	31%	6%	17%	7%
Not the main bill payer	40%	29%	6%	14%	11%
1 - Misbourne	42%	27%	6%	19%	5%
2 - Colne	45%	24%	10%	17%	4%
3 - Lee	44%	21%	5%	16%	13%
4 - Pinn	36%	33%	4%	14%	12%
5 - Stour	40%	34%	3%	14%	8%
6 - Wey	36%	39%	5%	15%	5%
7 – Dour*	27%	41%	11%	14%	7%
8 – Brett*	41%	32%	6%	13%	8%

* Small base size (Dour, 54; Brett, 45)

As Figure 11 shows below, according to customers, and choosing from a list, the biggest incentive to use less water would be savings on water bills. Around three in four (72%) chose this option, rising to 77% of 35-54 year olds.

This is followed by over half (55%) who are motivated by environmental benefits (and 63% of 16-34 year olds). Those who did not have a meter or who were not the main bill payer are also more likely (than average) to say they would be motivated to use less water to benefit the environment, 58% and 59% respectively compared to 55% overall. Saving money on energy bills more generally is also a motivator for using less water with four in ten (42%) selecting this reason, followed by one quarter (25%) saying avoiding hosepipe bans would encourage them.

Figure 11: Which, if any, of the following would motivate you personally to use less water?



Base: 1,000 adults aged 16-75 from across the Affinity Water customer areas

Three per cent say that none of these reasons would personally motivate them to use less water with a further two per cent stating they would be motivated by 'something else'. These other reasons range from better water meters (as with energy meters) so customers can monitor usage more immediately. Also mentioned are specific rewards (reduction in their bills / discounts) for customers who chose not to use a lot of water.

"Better access-visibility of the water meters much like energy companies so you can see the cost of water either by use or time of day."

"Reward households who don't overuse water."

In contrast, other customers say they do not need the lure of rewards in order to want to reduce their personal water consumption; they simply feel they are morally obligated to safeguard water supplies for future generations. These customers also acknowledge the relative abundance of water available in the UK in comparison to other parts of the world and so they felt they should be prepared to do more.

“Knowing I’m doing my bit to help ensure there is less wastage and ensuring water for the rest of the world and future generations”

“Remembering that some people in other parts of the world don’t have the luxury of the good water supply that we have in this country.”

Some customers also noted that they are already using the minimum amount possible so do not feel they can do anymore to reduce their water usage.

“There is not much more I can do.”

Ways in which customers could be encouraged to use less water

Customers suggested several ideas about how people could reduce their water consumption, including ways Affinity Water could help and how customers themselves could reduce their water usage. For example, Affinity Water and other water companies could install more water meters to make sure everyone has a water meter to help monitor their own usage. This would help make people more aware of their water usage and potentially mean they are more likely to take steps to reduce their consumption.

“Make people more aware of how much water they use.”

This could be supplemented by more awareness raising through education, communication and sharing of information. For example, customers suggested that leaflets or flyers could be sent on a periodic basis providing suggestions about how to reduce water.

Financial incentives were also mentioned. Some suggested that people should be fined for using too much water or that incentives should be given if usages decreases over time. There were mixed views regarding the impact of the price of water, with some saying bills should increase to encourage people to use less water whereas others would be more motivated to save water through cheaper prices.

“Give a bonus discount (say £5 off bill) if water usage goes down between meter reading cycles.”

Customers also wanted to see Affinity Water fixing leaks quicker so as not to waste water unnecessarily.

"[Affinity Water should] repair all leaks within a number of hours of notification."

There are also ways in which customers could reduce their personal and household consumption of water, mainly by changing daily habits relating to washing, laundry, cooking and gardening. For example, customers suggested that people could wash themselves less in general, take quicker showers and have a higher proportion of showers to baths. Customers also suggested that the toilet could be flushed less often and that taps should not be left on when doing tasks such as cleaning teeth.

"Turn the tap off when you brush your teeth."

Proving free water butts or other water saving devices could also be useful as well as using quicker cycles on washing machines, doing less laundry and only washing up the dishes once a day.

"Wash up only once a day."

Customers also suggested that savings could be made outside as well as in the house, for example by catching rainwater or recycling water to use to water the garden, avoiding or banning hosepipes or limiting their use for example by implementing a day a week where nobody used a hosepipe.

"Have a dry day once a week during the summer where nobody uses a hosepipe."

Other suggestions about how to manage water supply and meet demand in the future

We also received some suggestions about improving customer service in order to help Affinity Water better manage the water supply and meet demand in the future. For example, better maintenance could be done, including being more efficient and proactive at fixing leaks and replacing old piping. In addition, customers felt that Affinity Water should be more helpful and responsive when people ask for water meters to be installed in their homes.

"I have been trying to get a water meter for over 10 years. Affinity Water have been so inefficient that now I have to have it installed inside my property... There is no space to put a meter. Had they done their job properly initially, I would have had an outside meter installed many years ago."

Customers would appreciate if Affinity Water had better long-term planning including more frequent communication, better education for customers and giving them advance warning of potential shortages

in supply. Customers would also like better information on how to save water and to receive free water saving devices from Affinity Water to help them to reduce their usage.

In addition, customers thought that hosepipe bans should be used and heavy fines should be implemented for those breaking water restrictions.

Ultimately whilst customers acknowledge that there are multiple actions that both Affinity Water and individual customers can take to save water, the issue also needs to be tackled at a national level by the Government.

“Not all topics in the survey are Affinity Water's responsibility. A lot more can be done at the national governmental level.”

Qualitative research findings

Context

- Customers give little thought to water supply
- There is low awareness of Affinity Water and some confusion about services provided
- Positive feedback for Affinity Water service but leaks are a very visual sign of underperformance
- Participants welcomed being consulted and found the pre-task draft plan information helpful. However, there is uncertainty over the value of providing feedback and some fears about bill rises
- Supply and demand factors caused confusion particularly as there is a perception there is enough water for everyone

Participants did not think about water in any detail with clean drinking water assumed to be always available when they turn on the tap. When compared to gas and electricity, participants felt they had less control over water. In particular, knowledge of usage was the area where participants had lower awareness and control due to the difficulties involved in reading a water meter and the lack of smart metering.

"I don't think too much about it. I turn on the tap and expect water to come out. It always has done and it has always been drinkable or good for what I need it for."

Edgware, 35-54, C2DE

Overall, customers had little awareness of who Affinity Water are and what they do beyond supplying water and bills. Customers had little interaction with Affinity Water apart from receiving bill payments and pipe insurance, leading to a sense that Affinity Water feels removed from customers. This was not perceived as negative, but towards the end of discussions customers expressed an interest in receiving more information from Affinity Water, especially around ways to save water.

Older participants drew on memory to mention "previous company" names of Veolia and Lea Valley and awareness that sewerage was a separate service was more pronounced. When asked about Affinity Water, older participants mentioned awareness of plans in place to install meters. Within younger groups there was confusion and uncertainty over whether Affinity Water were responsible for waste water services and also over whether customers were able to change water supplier. Customers had little knowledge of the different Affinity Water areas. This was most marked in Folkestone where there was no awareness that Affinity Water operated outside of the Folkestone/Dover area.

"I don't have a water meter, and my water bill is included in my rent, so I don't have any contact with them. I don't think I've had a letter from them."

Stevenage, 55+, C2DE

Overall, customers have a positive opinion of Affinity Water feeling, on reflection, that they are “doing a good job” of supplying clean water. Customers who had contacted Affinity Water after moving house or to check a bill amount felt they were friendly, helpful, and provided enough information to resolve the query. Customers who had taken part in Affinity Water water-saving checks or activities found them to be very beneficial, however other customers were not aware of such services and expressed a desire to take part.

“I did a water-saving exercise with them a year ago. I’m water-conscious, and found this scheme on their website. You got lots of things for free which would slow down the flow so you didn’t use as much water. There were things to go on taps, in the toilet, and in the shower. It was really interesting. I enjoyed doing it.”

Stevenage, 55+, C2DE

When talking about Affinity Water, customers mentioned everyday issues that impacted them; the price of bills, the difficulty making sense of billing units and hard water were mentioned. Negative feedback about Affinity Water in general is focused on leaks. Leaks are seen as a very visible sign of “under-performance” with customers feeling Affinity Water are not managing their resources well enough meaning water is being wasted.

Reaction to dWRMP

- Customers welcomed the opportunity to engage and provide feedback to Affinity Water and liked that Affinity Water have produced a future plan that addresses challenges sustainably
- However, they questioned the value of their feedback as they felt the plan had already been decided on and customers felt they lacked the expertise to make these decisions
- Customers felt they were supplied with enough detail for them to understand the plans and overall felt it was informative but in some areas, such as leakage they would have liked more detail

Overall, customers welcomed the opportunity to engage and provide feedback to Affinity Water given that they currently had little contact. Having a choice and options that are clear to customers and in simple language are important, especially when customers are made aware Affinity Water is a monopoly. Customers liked that Affinity Water have produced a future looking plan that addresses challenges in a sustainable way especially given the growing population. The extracts of the plan provided to participants was felt to be comprehensive given it was planning until 2080, and yet also reviewed every five years.

Customers felt uncertain about the value of their feedback and providing this to Affinity Water. This was characterised by two views: one that plans has already been decided on, and the other that customers felt they lacked the expertise to make these decisions and were content for the experts (regulators) to decide on their behalf.

“Is it relevant what we think? Although we have a legislative structure where you have to consult, 90% of the time they already know what the outcome will be when going into it.”

Edgware, 35-54, C2DE

Overall, customers felt that what they had been supplied contained enough detail for them to digest without becoming overwhelming and irrelevant. The language was generally considered clear and concise, and the less text-heavy maps and infographics for each theme made the information easier to digest.

Customers felt the plan was informative and they learnt more about Affinity Water from reading the pre-task. In particular, customers were surprised to learn the size of the area that Affinity Water covered was much larger than expected. This led to conversations about the importance of educating customers to save water and the benefits of metering. However, this did lead to an assumption that problems lay elsewhere as their area has “lots of water”. There was also a lack of awareness of the level of regulation involved with customers surprised at the number of regulators involved. These learnings informed and shaped customers’ perceptions of the key themes discussed in the groups.

“I was surprised at how seriously we have to take water. I had no idea. We get so much rain in the UK so I didn’t realise it was a big deal.”

Stevenage, 18-34, ABC1

Customers suspected the draft plan and consultation were merely processes to prepare customers for a rise in the price of water bills. Therefore, there was a level of suspicion with customers wanting to know if Affinity Water was obligated to create the draft plan by regulators or third-parties.

“I wondered who had been consulted how many people had given feedback...what is underlying it? Is it a warning that we are going to have to pay more?”

Stevenage, 55+, C2DE

In some areas of the plan, customers would have liked more detail, especially for leaks in the “challenging the issues we face” section. Customers wanted to know what Affinity Water is doing to improve infrastructure, e.g. reducing leaks by installing new pipes as reducing leaks is very important.

Finally, the naming convention of Affinity Water supply areas - the WRZs - caused confusion. Customers were not aware of local rivers names so the supply area names lacked meaning.

Supply and demand

Water supply and demand was not something customers had previously thought about. This made it difficult for customers to differentiate between the two when asked what factors can impact them. When asked, customers thought that water is sourced from reservoirs, from the ground and by reusing water. Climate change and leaks were thought to impact supply with an increase in population seen as the main factor impacting impact demand. Customers felt that demand is easier to impact than supply as individuals can control how much water they use or Affinity Water could control how much water is supplied to them.

When thinking about water supply, customers generally felt there was enough water for everyone which was a reference point when reviewing the different themes in the draft plan. Also, customers felt unsure how to reduce water usage. Older customers felt they use the minimum amount already and younger customers were unsure of their current water usage levels and how to reduce them.

General view of key themes

- There was difficulty deciding between proposals and options due to lack of context, the length of the timeframe involved, and the lack of customer relevant context
- Leakage and metering, water efficiency, and consumption were focused on
- Customers recognise the importance of fixing leaks and reducing water usage as beneficial to the environment and to lower bills
- Drought and climate change hard to believe given perception of high rainfall
- Customers questioned the value of their feedback for collaboration and sharing and sustainable abstraction

Participants were presented with a show card summarising the key themes. Between three and four themes were covered in each group with priority focus given to the themes of Metering, Collaboration and sharing, Sustainable abstraction, Leakage, and Drought. This chapter covers participants' reactions to the themes in general, then provides feedback on the themes in more detail.

Lack of context and detail

Overall, when customers were presented with extracts from the dWRMP presented on show cards, they found it difficult to make decisions where a choice between options was to be made. This was due to a lack of supporting information to contextualise the content with participants struggling to understand if the proposals were better or worse than other companies or even in comparison how Affinity Water is currently performing. This meant that some participants found it hard to engage with the information.

"I read it through once, like I do with most leaflets I get sent by the Council. It was interesting what it said. There was build-up in what was going to be done, but no sense of what has been done so far."

Edgware, 35-54, C2DE

Customers felt the themes lacked customer-friendly measurements that were easy to understand. For example, they found it difficult to understand the measurement of water usage of 160 litres a day. They felt water usage measurements broken down into daily activities like running a bath uses X amount of water vs. a shower were more relevant and would help them better understand usage.

Additionally, when the themes referenced targets, standards, facts and figures, and other water companies but then did not provide any context, this created suspicion, doubt and the sense that Affinity Water were being intentionally vague. For example, customers expected Affinity Water to spell out what their SLAs are, to identify new water resources that are going to be developed, and explain drinking water standards. Finally, when referencing facts and figures, customers wanted to know where they come from as, without this, numbers lacked meaning and credibility.

A lack of detail also made the proposals hard to choose between, with customers feeling Affinity Water were not providing enough information to be held to account. For example, where the themes stated "water quality is constantly monitored" customers wanted more information and proposed the following: "water quality is x% level above the regulator-advised level of y by monitoring at x place with x approach". Customers also felt the use of terms like "consider" in the draft plan, e.g. on the climate change proposal, lacked action and commitment. They wanted to understand and measure Affinity Water's performance and, without clear actions supported by detail, they felt this to be impossible.

"You always prepare business plans in any industry, talking about partnerships and collaboration, but I want to know how many pipes they will repair in the 60 years and what the consequences would be if they don't meet the targets. It's a one-sided process. How can we hold them to account if they don't start achieving what they plan to? There needs to be more transparency."

Stevenage, 55+, C2DE

Timeframe

Customers struggled to relate to the draft plan timeframe with the year 2080 holding no meaning as it will have no impact for them in their lifetime.

"I can't see how it will impact me. It isn't big enough to bother me, so I would pick the lower cost."

Stevenage, 18-34, ABC1

Participants did not understand why 2080 had been chosen. They questioned the reasons for this feeling over such a long time anything could be achieved and that Affinity Water could "hide behind" a target so far into the future. There were questions over accountability, with customers questioning, if the company changes hands or is nationalised during that period, what will happen to the plan. Generally, customers preferred shorter five year plans, they were felt to be more accountable and relevant to them.

"I don't think these things are tangible anyway. You can't make pricing calls now, and I'm sure they won't be held to when the plan is put in place."

Edgware, 35-54, C2DE

Customer impact

Customers felt the proposals should be more relevant to them. They wanted to know how the proposed plan will impact them, e.g. what will be the impact on household bills if Affinity Water does one thing or another? Given that they felt the plan was preparing them for a bill rise, this caused concern among customers. Also, translation of the impact of costs on each household makes the plan more transparent which is important when customers realised they cannot change water suppliers.

"The pages I've read are all good, but it comes down to how much it's costing me, and what the effect it will have on my bills."

Folkestone, 55+, C2DE

Older customers felt the plan is too focused on how the customer should reduce consumption. Many felt they can only reduce consumption further by adopting drastic measures like using the washing machine less. Therefore, they would like to see more on how Affinity Water is reducing leaks by investing in infrastructure. There was a suspicion that money is going to shareholders rather than to fund investments.

"...it's all about the customer doing something, but not what Affinity Water is doing. Tackling issues beyond the customer's control. With a washing machine, you don't have any say over how much water it uses."

Woking, 55+, ABC1

Leakage

Action on leakage resonated strongly with customers, being the most visible sign of poor service and there was a preference to pay more to fix leaks now. However, this was based on the assumption that bills would fall after this investment due to increased efficiency. Also, customers felt investments in new infrastructure could mean sustainable abstraction or protecting the environment would no longer be necessary. Customers questioned paying more to fix leaks. They felt Affinity Water should fund infrastructure upgrades themselves. Customers also felt there has been a lack of previous investment with old pipes mentioned and money going to shareholders instead.

"It says, 'Keeping bills low,' but I'm sure bills will go up a lot before they come down again. Who is going to pay for it? We would expect a reduction in our bills."

Edgware, 35-54, C2DE

Reducing leaks by 11% by 2080 did not seem enough. Customers in Stevenage felt the leakage percentage seemed low compared to their experiences of recent local leaks. Customers preferred the 15% target but were wary about the greater cost and wanted to know how much it would cost per household. Again, the theme lacked detail, with customers wanting to know the national average for leakage across all water companies to see how Affinity Water compared. Again, the numbers involved - £18 million - were too large to be meaningful to customers. To make the proposal more accountable, customers required a cost benefit analysis, e.g. "pay X amount and we will fix X many pipes over X many years." Without this, the proposals seemed unbelievable and too long-term to be relevant.

"That's a staggering amount of water wasted each day. It's almost an impossible task as the network is so large."

Stevenage, 55+, C2DE

Drought

Customers found this theme hard to relate to given the sense of disbelief that drought would be an issue in the UK as there is so much rain. There was a feeling that without supporting evidence the comment about not having enough rain in UK was "silly."

"I don't think you could put this into print. 'What happens if it doesn't rain.' We're all fed up of rain. It's slightly laughable really."

Woking, 55+, ABC1

Customers were also sceptical about how the proposals would be regulated with a focus on temporary hose pipe bans seen as too weak to incentivise anyone to change their water usage. Also, customers did not know how they would monitor water usage and felt that without a meter similar to an electricity smart meter it would be difficult to monitor daily water usage. There was a feeling that Affinity Water needs to highlight the consequences for customer households of what water usage might look like if a drought happens, in order to shock customers into using less water.

"It doesn't seem like the end of the world if you can't wash your car or fill up your paddling pool. In the back of your mind, you also think that no-one is really going to police it. They should scare you more to get attention."

Stevenage, 18-34, ABC1

Metering, water efficiency and consumption

The overall aim of reducing consumption was generally supported and seen as a good idea by customers. However, reducing water usage by a quarter still felt like a large amount of reduction, especially for older groups who already felt they used as much water as they needed.

"I'd have to not have a shower every day. I don't waste water. What do I do? I don't put the washing machine on. I'm puzzled about what I'm going to do."

Woking, 55+, ABC1

Despite this, older groups tended to support the reduction to 110 litres while younger groups supported a cut to 125 litres with all customers hoping this would be a gradual reduction.

In order to reduce consumption, customers wanted help to reduce their water usage with many feeling without this their bills will rise. There was support for metering in Collindale/Edgware and Woking with older customers feeling bills would be lower as they have smaller households and increase awareness of water usage. There was a strong feeling that the responsibility for reducing consumption should not be solely with the customer without help from Affinity Water. Customers felt Affinity Water should provide smart meters, with which customers could see daily usage. Also, better communication of how to obtain water saving devices and easier explanation of water usage on bill, e.g. how many units a bath vs. shower uses and tips to reduce water usage.

"A bit of education about being mindful of how much water your bath might be using. Knowing the figures...can make you more aware."

Edgware, 35-54, C2DE

The current figure of 160 litres per person per day provoked surprise and confusion with customers not knowing how much they used for everyday activities like showering and flushing the toilet. When customers began to unpack their daily water usage they felt it was more reasonable.

"it seems like a ridiculous amount but it's not just food. There's also the washing machine, cooking water, and all of that. I think because you can't envision what 160 litres looks like, it sounds like a large amount."

Folkestone, 55+, C2DE

Customers also challenged the consumption figures, wanting to know how they were calculated and also why other areas were more efficient. In Folkestone and Woking there was the suspicion that consumption was due to leakage, not personal consumption, and therefore an issue in other Affinity Water areas. Customers also questioned how the 110 target had been reached and a need for comparator figures for elsewhere in the country and the county.

"The question about reducing to 110 litres per person, how did they arrive at that figure? On what basis would they like to see that happen? Are they saying 160 is too much because there is wastage and leakage?"

Folkestone, 55+, C2DE

Collaboration and sharing

Customers either found the theme to be an obvious response to dealing with water supply or found it too far removed to have an opinion. They liked the idea of centralised water networks, with comparisons drawn with the national oil pipe network. It was suggested that it would be a good idea to share knowledge and expertise from wherever in the country managed to hit the 110 litres personal consumption target. However, there were concerns that water transportation costs may result in higher bills.

"You could find out the profit and loss on the bill, based on how much they had transported in and what they had been charged for it. That would show a level of competence."

Stevenage, 55+, C2DE

Again, customers felt the theme lacked detail and was too high level. They felt that a lack of information about who the third-parties are could mean Affinity Water are working with commercial companies not other water suppliers. There was confusion about how this would work and concern over the quality of water from elsewhere.

"Why would you want to do business with somebody else who is not a water company? It would be nice to know who these third-party companies are."

Stevenage, 55+, C2DE

Those customers that could not decide on collaboration and sharing options felt they were never going to have enough information to make a decision. They did not feel the theme was aimed at customers, rather at businesses or third-party interests. There was the feeling that Affinity Water have enough regulators to ensure they make the right decision.

"This is at a level that's above the general homeowner. These are big decisions, business decisions. We don't understand the cost of transport as they're saying. Those decisions have got to be right."

Woking, 55+, ABC1

Sustainable abstraction

Protecting the environment was a topic customers supported and, therefore, the theme was popular. However, the theme was hard to engage with. Customers felt the language used was aimed at commercial companies and lacked detail to make it relevant to customers. This led to the suspicion that Affinity Water may prioritise the environment over customers and led to concerns over bill rises.

Customers felt the language was unclear, jargon heavy and vague, in particular the examples of environmental steps: 'habitat enhancement', 'evaluating local habitats' and 'operational resilience due to high level of sustainability reductions.' Customers simply wanted to know what the risks are to the environment in plain English. Again, customers struggled to understand the large figures involved due to a lack of context.

"How they're going to take it. There's just a figure here, but what percentage is that compared to what we're using now? If they said so, it might make more sense to us."

Folkestone, 55+, C2DE

Customers found it difficult to choose between the preferred and alternative options. They felt the language used in the alternative options was unclear and not customer friendly. This led them to question the value of providing feedback with the feeling that the preferred plan had already been chosen due to the unclear alternative offered.

"It's almost as if it's written by someone who writes bid documents for contracts. It's normal marketing or management consultancy-speak. The preferred option is easy and clear. The alternative option is not a clear way of looking at it. You fall asleep after the second sentence."

Edgware, 35-54, C2DE

Other themes

For the theme "achieving our ambition", the goal of becoming the "leading community focused water company" – and the content of the customer charter – was considered vague by customers and lacking clear actions. Customers required measurable and concrete ambitions supported with details, e.g. responding to customers queries within a certain timeframe and listing what the community focused activities will be, so customers can measure accountability. A lack of detail made customers feel the theme had not been thought through, leading to the impression it was "a box ticking exercise."

"The charter they have written is not measurable. What is high quality drinking water? There should be a measure that OFWAT can test and decide if they are meeting their charter."

Woking, 35-54, ABC1

Also, customers disliked the use of word "challenges" in the context of talking to customers and "taking feedback on board", preferring that Affinity Water pledge to act on feedback.

"It talks about challenges...it's not a challenge to talk and listen to customers..."

Woking, 35-54, ABC1

Water quality was an important area for customers. In Woking, hard water meant that many drank bottled water and experienced lime scale. In Folkestone, there was an assumption that water quality checks were already happened, but this led to a discussion about the fluorination and chlorination of water with customers claiming they could taste when chlorine was added to the water.

"They must be constantly checking the water quality. You couldn't not."

Folkestone, 35-54, C2DE

Customers were disappointed with the lack of detail and accountability, especially on the Drinking Water Standards and how Affinity Water are performing in relation to them. Customers required reassurances on water quality commitments before agreeing to this proposal.

“What are they doing to maintain the quality of the water?”

Woking, 35-54, ABC1

Demand growth caused confusion with the term itself not being understood. In Folkestone, when the term was explained, customers assumed that water would be coming from nearby Bewl Water rather than further afield. The theme also felt very distant and too future focused for customers to engage with.

“The number of households will increase by 65%, how can they say that with it being so far away?”

Woking, 35-54, ABC1

However, after reflection, the 60-year plan was seen as sensible because planning for growth involved building infrastructure meaning a long-term process. It was suggested in Folkestone that water companies should veto new housing if they worried they would not be able to supply water.

Climate change felt too distant to customers and they found it hard to image not having any water.

“We’re an island surrounded by water, not an African country.”

Stevenage, 18-34, ABC1

Also, customers felt the theme was not serious enough given the five challenges to one proposal and the use of the term ‘consider’ in the proposal lacked accountability.

Resilience was seen as a sensible approach and customers supported the proposal in general. However, the theme again felt very future focused and unbelievable with references to drought and floods. Customers wanted to know more detail about the resilience plans, in particular how they compared to other water companies before making a decision.

Affinity Water priorities

- Customers prioritised areas that impacted them most: bills, water quality, leaks and reducing personal water usage
- Priorities were seen as acceptable but not stretching, and lacking in measurable actions
- A stand-alone environmental priority was missing and a priority on educating customers to reduce personal water usage

Participants were initially asked what they felt Affinity Water should focus on when developing a plan for the future. They were then shown the following Affinity Water priorities:

- 'Making sure customers, communities and the environment have enough water;
- Supplying high quality water you can trust;
- Minimising disruption to you and your community and
- Providing a great service that you value'.

Customers focus areas for Affinity Water

When initially asked about focus areas for Affinity Water, customers mentioned they would like to know how the plan will impact the customer. They wanted Affinity Water to focus on reducing bills, making bills clearer and helping vulnerable customers who may struggle to meet bill payments.

"If they're looking for a 5-year plan, think about us in terms of pricing...they need to think ahead, with apps or water meters, so we know what we are paying for."

Folkestone, 35-54, C2DE

Moreover, customers expected Affinity Water to help them to reduce water usage through metering and education.

"Can they evaluate your water habits? They can see what you're doing and tell you how much water you could save by doing something different. You're often not aware of how much you are using."

Edgware, 18-34, C2DE

Improving the quality of drinking water was also important with some customers reporting experiencing hard water with a metallic taste in their area. Leakage was another key focus area with customers wanting Affinity Water to repair leaks or install technology to prevent leaks which would then in turn reduce

water wastage. Finally, a focus on the environment was also important to customers with discussion around ensuring water is sustainable in the future with a growing population

Reaction to Affinity Water priorities

Although customers agreed with the Affinity Water priorities, the priorities were considered fairly underwhelming and predictable; areas that customers expect Affinity Water to focus on. Consequently, customers found the priorities were not stretching enough being neither future focused nor aspirational.

"We all know they've got to give us clean water, but that's their job. What they're saying is a given. There's nothing new there."

Folkestone, 35-54, C2DE

Customers also felt the priorities lacked detail which created the feeling that Affinity Water are being intentionally vague as do not want to over promise. Customers require clear measurable targets that Affinity Water can be held accountable for.

Customers felt the priorities lacked a specific focus on the environment with customers wanting Affinity Water to provide reassurances that there is enough water through planning for the future. One suggestion to make an environmental priority accountable was to include a cost benefit line, e.g. we pay X amount and you invest X amount in creating new ways to harvest water.

Additionally, a priority covering educating customers to reduce water usage was thought to be missing. Customers want Affinity Water to provide information on how to reduce water especially if water meters are being rolled out. Suggestions included distributing water saving devices and developing and promoting a smart meter or app to track water usage, combined with a possible incentive to save water.

"They need to give us a heads up about how we might save water. I pay something like £40 a month for my metered water, and I have a two-bedroom flat. I phoned up and asked why that would be because it's more than doubled over the year, and she said that it's probably my new toilet system. To deal with that, you basically get rid of the water system and start again."

Folkestone, 35-54, C2DE

Customers felt two priorities in particular lacked supporting information. The priority 'Supplying high quality water you can trust' is important to customers. This was more marked in Woking and Stevenage where hard water meant customers avoided drinking tap water. Also, customers worry about water quality, especially the chemicals added to water. Customers wanted to more information on how water quality is measured and tested, the chemicals in water and how Affinity Water quality compares to other

suppliers. Providing this information would make customers better trust the water quality and therefore be more likely to drink tap water.

"That is important as I don't drink tap water. I use filters and it tastes better. The chemicals in water are a problem."

Woking, 35-54, ABC1

Finally, the priority "providing a great service that you value" was seen as vague. Additionally, this priority mentions value but there is no further reference to the price of bills or affordability. This is important given customers felt the draft plan consultation exercise was possibly about making preparations for a bill increase.

Appendices

Appendices

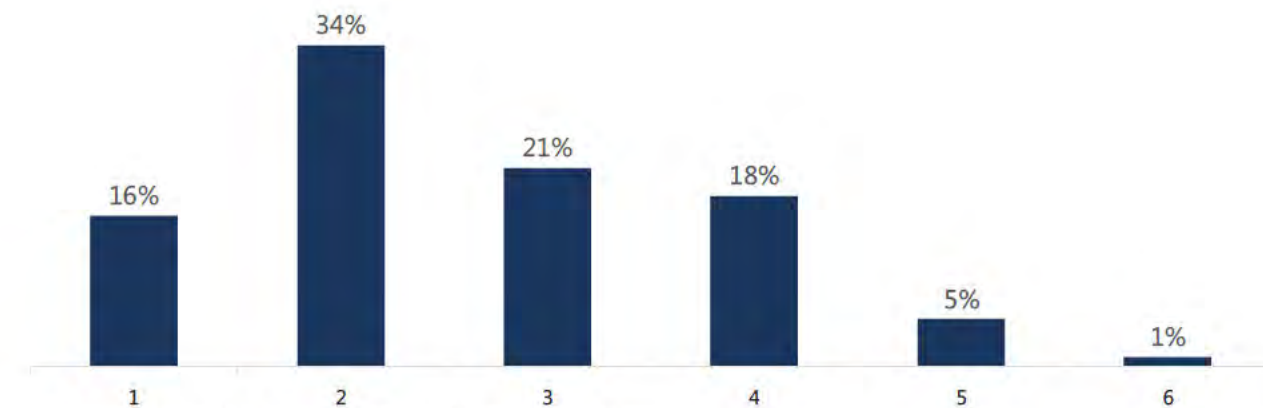
Customer and sample profile

The purpose of the survey was not to provide a profile of customers but rather to gather views from a range of Affinity Water customers on various aspects of the dWRMP. The participants took part in the survey online, from a sample that was sourced from Ipsos MORI's online panel.

This section provides an overview of the type of customers that took part in this survey, including demographic characteristics and information about water usage and views in their household.

As shown in Figure 12, according to our sample of 16-75 year olds (including bill payers and non-bill payers and undertaken online), a third of Affinity Water customers live in two-person households. Just 16% of Affinity Water customers live in single person households. Over four in ten (45%) customers reside in households which includes three or more people living there permanently.

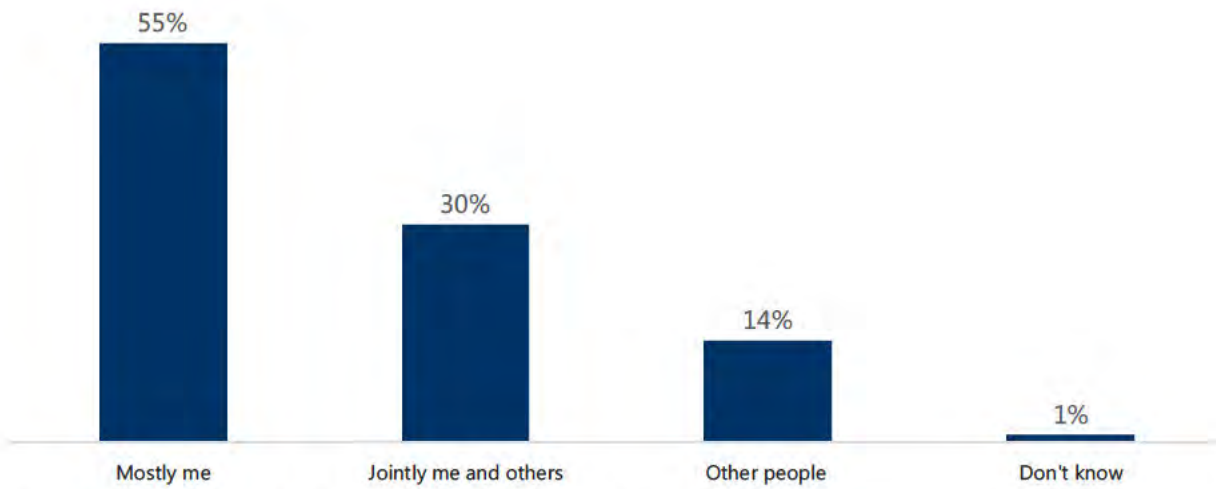
Figure 12: Thinking about where you live, how many people live there on a permanent basis? Please include yourself and all children of any age.



Base: 1000 adults aged 16-75 from across the Affinity Water customer areas

The sampled customers are predominantly bill-payers. Almost six in ten (55%) are mostly responsible for paying their household water bills, and a further three in ten (30%) split the responsibility with other people. Men are more likely than women to say they are responsible for paying the water bills themselves, with two in three men (66%) saying this compared with half of women (47%). Two in three older customers (66%), in the 55-75 age category also pay the bills themselves, significantly more than the 55% of customers overall.

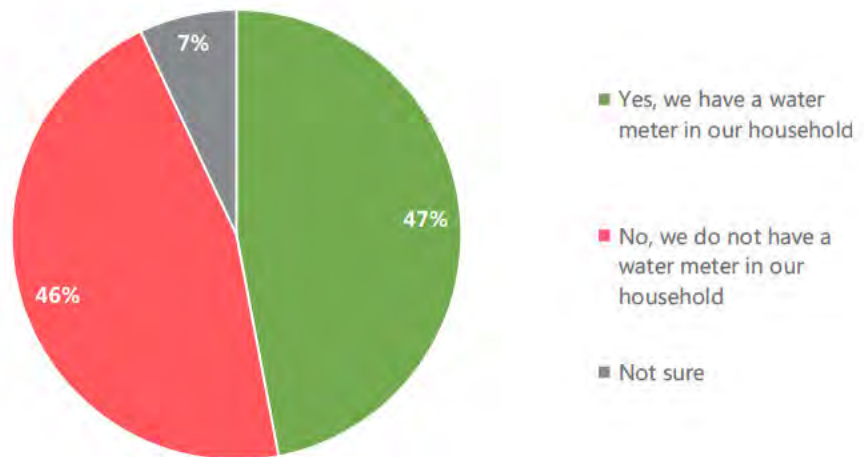
Figure 13: In general, who in your household is mostly responsible for paying water bills?



Base: 1000 adults aged 16-75 from across the Affinity Water customer areas

Among our sample, there is a fairly even split between metered and unmetered properties; 47% of participants say they currently have a meter in their household, compared with 46% who say they do not. Seven per cent – are uncertain about whether they have a meter or not, and this figure rises to 13% among 16-34 year olds.

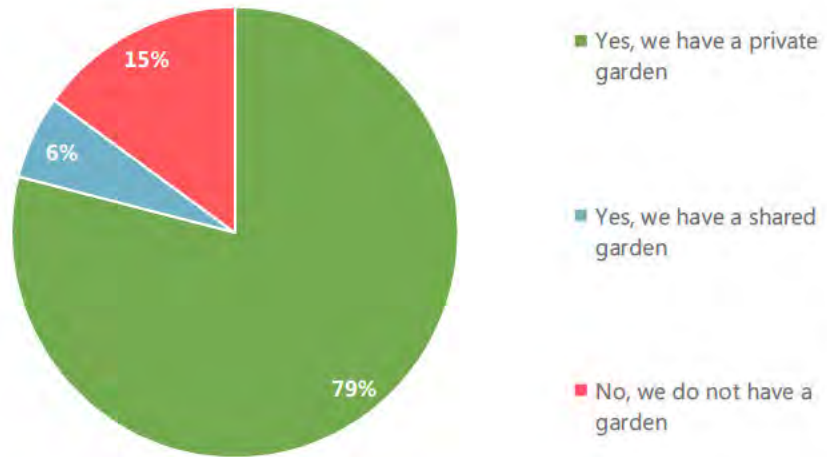
Figure 14: Do you have a water meter?



Base: 1000 adults aged 16-75 from across the Affinity Water customer areas

The majority of customers surveyed have a garden (85%), and around eight in ten (79%) have a private garden. The remaining 15% do not have a garden.

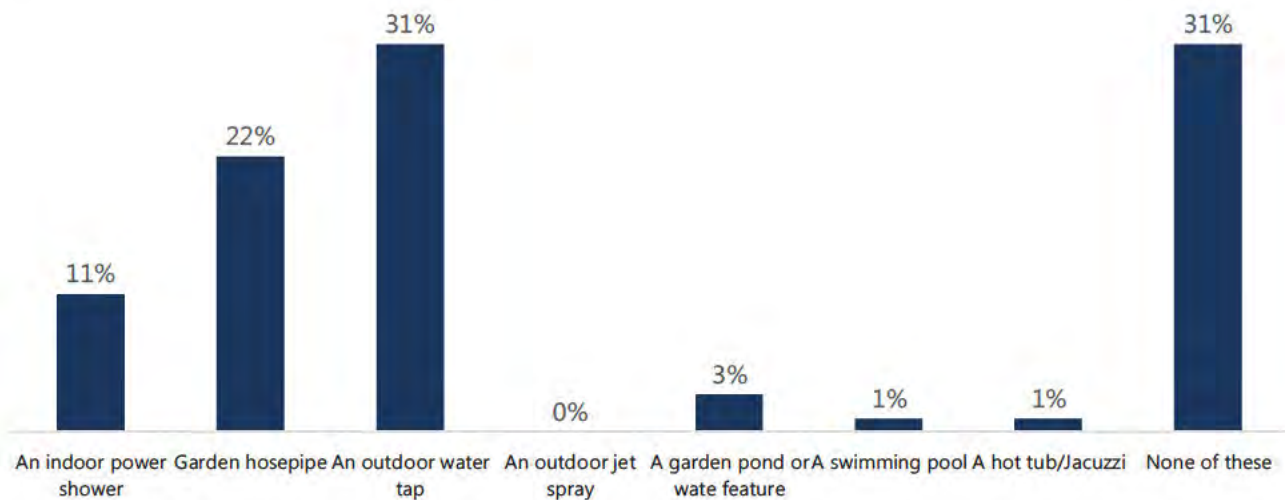
Figure 15: Do you have a garden where you live?



Base: 1,000 adults aged 16-75 from across the Affinity Water customer areas

Figure 16 shows that one in three customers (31%) have an outdoor water tap and the same proportion have none of the specified devices or features in their house or garden. Around two in ten (22%) have a garden hosepipe and half as many customers (11%) have an indoor power shower.

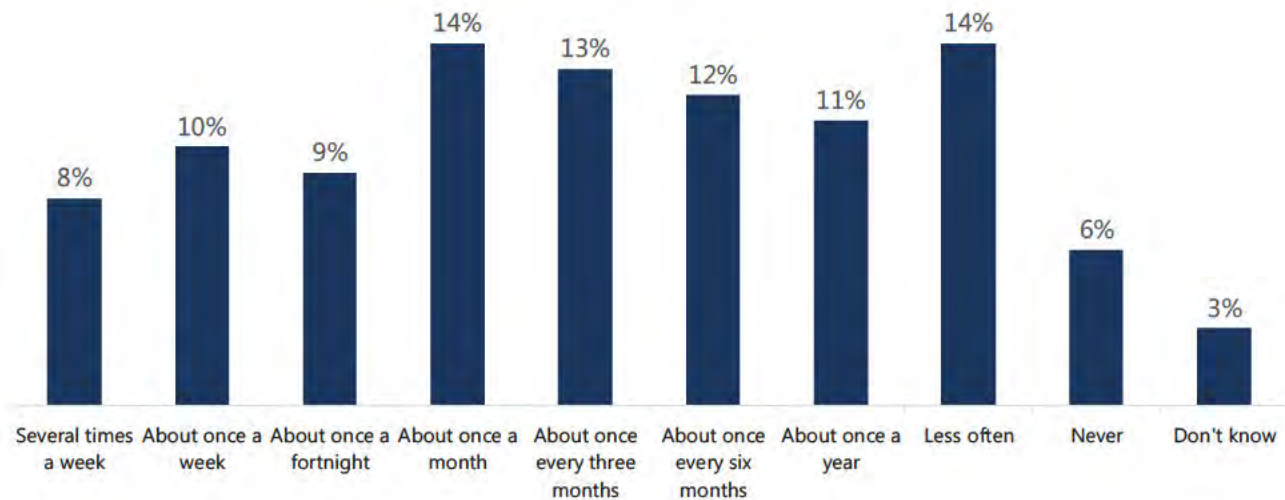
Figure 16: Which, if any, of the following devices and features do you have or use in your home or garden?



Base: 1000 adults aged 16-75 from across the Affinity Water customer areas

The frequency that customers visit the water environment tends to vary, with a similar proportion visiting several times a week (8%), through to about once a month (14%) and never (6%).

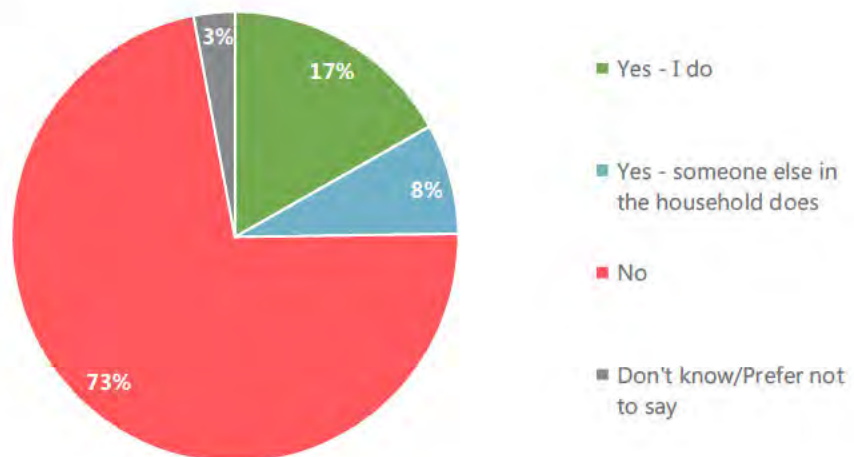
Figure 17: Typically, how often, if at all, do you visit any part of the water environment e.g. rivers, canals, lakes, estuaries and water around the coast?



Base: 1000 adults aged 16-75 from across the Affinity Water customer areas

Three in four customers (73%) do not have a long-term illness, health problem or disability whereas 17% of participants do have a health issues, as well as 8% report this applying to another member of the household.

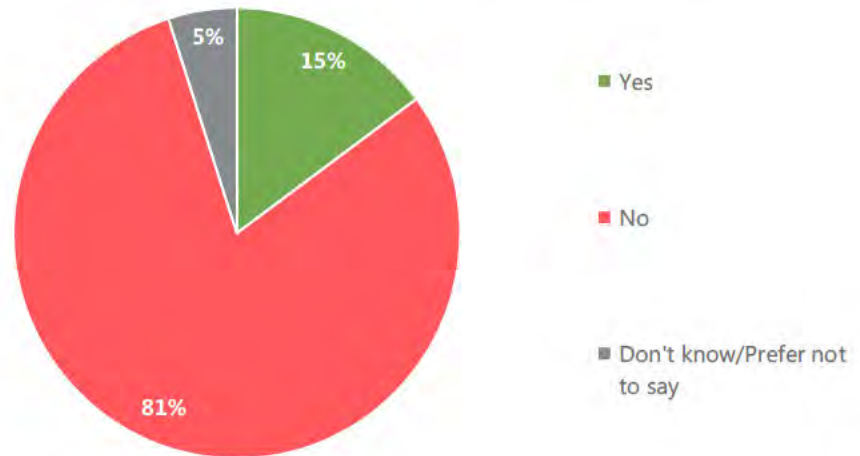
Figure 18: Do you, or does anyone in your household have any long-term illness, health problems or disability which limits your/their daily activities or the work you/they can do, including any problems which are due to old age?



Base: 1,000 adults aged 16-75 from across the Affinity Water customer areas

The majority do *not* live in household in which someone currently receives any Government benefits (81%); only 15% do.

Figure 19: Do you, or anyone in your household, currently receive any Government benefits? These include things like Universal Credit, Job Seekers Allowance, Housing Benefit and Tax Credits.



Base: 1,000 adults aged 16-75 from across the Affinity Water customer areas

Sample profile – summary

		Unweighted		Weighted	
		Base	%	Base	%
Gender	Male	420	42%	409	41%
	Female	580	58%	591	59%
Age	Aged 16 - 34	202	20%	310	31%
	Aged 35 - 54	404	40%	360	36%
	Aged 55 - 75	394	39%	330	33%
Tenure	Home owner	735	74%	713	71%
	Rented/other	265	27%	287	29%
Meter status	Yes	497	50%	472	47%
	No	441	44%	456	46%
Ethnicity	White	854	85%	832	83%
	BME	146	15%	168	17%
Main bill payer	Yes	572	57%	546	57%
	No	422	42%	446	45%
Benefits Recipient	Yes	249	25%	244	24%
	No	725	73%	728	73%
Water Resource Zone	WRZ 1 – Misbourne	83	8%	90	9%
	WRZ 2 – Colne	135	14%	120	12%
	WRZ 3 – Lee	206	21%	200	20%
	WRZ 4 – Pinn	257	26%	270	27%
	WRZ 5 - Stour	84	8%	80	8%
	WRZ 6 – Wey	136	14%	150	15%
	WRZ 7 – Dour	54	5%	50	5%
	WRZ 8 - Brett	45	5%	40	4%

Guide to statistical reliability

Ensuring that the survey results are statistically reliable is important when comparing the data between different years of the survey or between different groups within the sample to ensure that any differences are real (i.e. statistically significant). A sample size of 1,000 permits good level of analysis by key demographic variables (such as age, work status and tenure).

This can be explained in the tables below. To illustrate, those who took part in the survey were only be a sample of the total population of Affinity Water customers adults aged 16+, so we cannot be certain that the figures obtained are exactly those that would have been reached had everyone in the borough been interviewed (the 'true' values). We can, however, predict the variation between the sample results and the 'true' values from knowledge of the size of the samples on which the results to each question is based, and the number of times a particular answer is given. The confidence with which we can make this prediction is usually chosen to be 95% - that is, the chances are 95 in 100 that the 'true' value will fall within a specified range.

Table 1.1: Survey sampling tolerances: overall level

	Approximate sampling tolerances applicable to percentages at or near these levels		
Size of sample on which survey result is based	10% or 90%	30% or 70%	50%
100	5.9	9.0	9.8
500	2.6	4.0	4.4
1,000	1.9	2.8	3.1
2,000	1.3	2.0	2.2

The following table indicates the sampling tolerances when comparing different groups of participants. If we once again assume a '95% confidence interval', the differences between the results of two separate groups must be greater than the values given in the following table in order to be deemed 'statistically significant':

Table 1.2: Survey sampling tolerances: sub-group level

Size of sample on which survey result is based	Differences required for significance at or near these percentage levels		
	10% or 90%	30% or 70%	50%
100 vs.100	8.4	12.8	13.9
300 vs. 300	4.8	7.3	8.0
472 vs. 530 (males vs. females)	3.7	5.7	6.2
1,002 vs. 1,011 (2015 vs 2013 survey)	2.6	4.0	4.4

For example, if 46% of male customers give a particular answer compared with 54% of female ones (assuming sample sizes in the table above), then the chances are 19 in 20 that this eight-point difference is significant (as the difference is more than 6.2 percentage points)

It is important to note that, strictly speaking, the above confidence interval calculations relate only to samples that have been selected using strict probability sampling methods. However, in practice it is reasonable to assume that these calculations provide a good indication of the confidence intervals relating to this survey.



Survey questionnaire

18-005720-01 Affinity Water Water Resources Management Plan (dWRMP) questionnaire

INTRODUCTORY TEXT: **Thanks for taking part in our survey!**

Affinity Water provides clean (tap) water services to around 1.4 million households across some parts of the South of England – including areas of Buckinghamshire, Kent, Essex Hertfordshire, London and Surrey.

In this survey, we want to ask about you and your household's use of water and about Affinity Water's long-term plans, 2020 to 2080, for the future.

Please click below to get started...

STANDARD GENDER CORTEX MODULE FOR UK

ASK ALL - SA

STANDARD AGE CORTEX MODULE

SCREEN OUT IF AGE<16

RECODE AGE IN QUOTAGERANGE AS FOLLOWS:

ASK ALL – SA

1. 16-24 [16-24 yo]
2. 25-34 [25-34 yo]
3. 35-54 [35-54 yo]
4. 55-99 [55- 99 yo]

STANDARD MARKET SIZE CORTEX MODULE

(uk region)

ASK ALL – SA

SCREEN-OUT IF PREFER NOT TO ANSWER (CODE 99 from MARKETSIZE).

SCREEN-OUT IF THE POSTCODE IS DIFFERENT FROM THE EXCEL FILE.

SCREEN OUT IF HCAL_REGION2 IS NOT EQUAL WITH UKH21, UKH23, UKH24, UKH25, UKH33, UKI23, UKJ11, UKJ13, UKJ23 OR UKJ42

RECODE HCAL_REGION2 IN UKREGIONQUOTA AS FOLLOWS:

IF HCAL_REGION2=UKJ42 => UKREGIONQUOTA=1. WRZ 7 Dour

IF HCAL_REGION2=UKH33 => UKREGIONQUOTA=2. WRZ 8 Brett

IF HCAL_REGION2=UKH21, UKH23, UKH24, UKH25, UKI23, UKJ11, UKJ13 OR UKJ23 => UKREGIONQUOTA=3. All other areas

Q1. We'd like to ask a few questions first to ensure we are talking to a wide range of people. Which of the following best describes your home?

ASK ALL. SA. RANDOMISE CODES 1-5.

RECODE Q1 TO TENURE (IF Q1= 1 OR 2 => TENURE=1. owner/occupier; IF Q1=3 OR 4 OR 5 OR 6 OR 7 => TENURE=2. renter/other)

1. Being bought on a mortgage
2. Owned outright by household
3. Rented from Local Authority
4. Rented from Housing Association / Trust
5. Rented from private landlord
6. Other
7. Don't know

ASK ALL – SA

EU01EMP. We'd like to ask a few questions first to ensure we are talking to a wide range of people. To begin with, what is your current employment status?

< Please select one option >

- _1 Employed full-time
- _2 Employed part-time
- _3 Self employed
- _4 Unemployed but looking for a job
- _5 Unemployed and not looking for a job/Long-term sick or disabled
- _6 Looking after the home/family
- _7 Retired
- _8 Student/Pupil/In full time education

RECODE EU01EMP IN WORKSTATUS AS FOLLOWS:

IF EU01EMP=1 then WORKSTATUS=1. Full time employment

IF EU01EMP=2 OR 3 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 then WORKSTATUS=2. Not full-time employment

Q2. Which of these best describes your ethnic group?

ASK ALL. SA.

RECODE Q2 TO ETHNICITY (IF Q2 = 1 OR 2 OR 3 OR 4 => ETHNICITY=1. White; IF Q2=5 - 19 => ETHNICITY=2. BME).

WHITE

1. White – English / Welsh / Scottish / Northern Irish / British
2. White – Irish
3. White – Gypsy or Irish Traveller
4. Any other White background

MIXED

5. Mixed White and Black Caribbean
6. Mixed White and Black African
7. Mixed White and Asian
8. Any other mixed background

ASIAN

9. Asian or Asian British – Indian
10. Asian or Asian British – Pakistani
11. Asian or Asian British – Bangladeshi
12. Asian or Asian British – Chinese
13. Any other Asian/Asian British background

BLACK

14. Black or Black British – Caribbean

15. Black or Black British – African
16. Any other Black/Black British background

OTHER ETHNIC GROUP

17. Arab
18. Any other ethnic group
19. Prefer not to say

NEW PAGE:**Q3. To what extent do you agree or disagree with each of the following statements?**

ASK ALL. SA. ALWAYS a) FIRST

RANDOMISE QUESTIONS 1) – 5). Forward and reverse codes 1 to 5 from scale.

- 1) The local environment is important to me**
- 2) I am careful about how much water I personally use**
- 3) My household's water bills are too expensive these days**
- 4) I trust the quality of the water my household receives**
- 5) The water supply is reliable – it is hardly ever interrupted**

- 1) Strongly agree
- 2) Tend to agree
- 3) Neither agree nor disagree
- 4) Tend to disagree
- 5) Strongly disagree
- 6) Don't know

Q4. Thinking about where you live, how many people live there on a permanent basis? Please include yourself and all children of any age.

ASK ALL. NUMERIC. ENTER NUMBER 1-99.

1. Don't know

Q5. In general, who in your household is mostly responsible for paying water bills? This is probably the person(s) whose name is on the bill.

ASK ALL. SINGLE CODE.

- 1) Mostly me
- 2) Jointly me and others
- 3) Other people
- 4) Don't know

Q6. Which, if any, of these statements best fits your opinion of your household's water consumption?

ASK ALL. SA.

- 1) I don't think our household can use less water than we do now
- 2) I think we might be able to make a small reduction in our household's water consumption
- 3) We probably could make big reductions in our household's water consumption
- 4) Don't know

Q7. How much, if anything, would you say you personally know about Affinity Water?

ASK ALL. SA. FLIP ANSWER CODES 1-4.

- 1) A great deal
- 2) A fair amount
- 3) Not very much
- 4) Nothing at all
- 5) Don't know

Q8. Which of these statements comes closest to your own attitudes towards Affinity Water?

ASK ALL. SA.

- 1) I would like to have more of a say in what Affinity Water does, and the services it provides
- 2) I like to know what Affinity Water is doing, but I'm happy to let them get on with their job
- 3) I am not interested in what Affinity Water does, as long as they do their job
- 4) I am not interested in what Affinity Water does, or whether they do their job
- 5) Don't know

We'd now like to ask you questions about Affinity Water's plans for meeting their customers' demands (how much water is needed) and how this will be supplied (how needs will be met).

Every five years, Affinity Water writes a plan explaining how it will balance demand and supply in the short and longer term. This is called its Water Resources Management Plan.

Q9. Affinity Water's "Draft Water Resources Management Plan" includes the following proposals. Please indicate the extent to which, in principle, you support or oppose each one.

ASK ALL. SA. RANDOMISE QUESTIONS 1) – 5). Forward and reverse codes 1 to 5 from scale.

- 1. Planning over a longer period of time – 60 rather than 25 years**
 - 2. Affinity Water buying water, when necessary, from other water companies to ensure they can have enough water to meet the needs of customers**
 - 3. Using temporary use bans (e.g. hosepipe bans) when needed**
 - 4. Reducing the amount of water taken from the water environment (e.g. underground sources that may affect rivers, streams etc.) to meet demand**
 - 5. Installing water meters in properties that do not already have them**
 - 6. Providing customers with free water saving devices such as shower heads and tooth timers to help them save water**
 - 7. Improving the frequency of information about water use to customers with water meters**
 - 8. Continuing to reduce water leakage**
 - 9. Raising awareness of how everyone can help protect the water environment (pollution of rivers, streams, reducing the amount of water used, etc.)**
 - 10. Improving the information made available to customers about the quality of the water supplied to their homes**
- 1) Strongly support
 - 2) Tend to support

- 3) No views either way
- 4) Tend to oppose
- 5) Strongly oppose
- 6) Don't know

The next questions ask about options being considered by Affinity Water. These are included in the table which follows. Each question will outline the options in more detail later.

We have provided the approximate cost for each option. These are Affinity Water's estimates and are shown as the additional amount each household could pay every year.

Because Affinity Water provides around 1.4 million households with water every day, the increase in bills for all customers will be required to fund different aspects of the Water Resources Management Plan over the entire period, up to 2080.

The estimated increases are for the part of customers' bills that relate to water resources. Whether bills increase will depend on what else Affinity Water decides to do and what it includes in its overall Business Plan.

	Proposed approximate increases per household bill every year until 2080 (The average bill for each household is £167 per year)	
Reduce water leaks	Option 1	£2.10
	Option 2	£3.80
Take less water from the environment	Option 1	£0.90
	Option 2	£1.30
Reduce chance of severe drought	Option 1	£3.00
	Option 2	£4.20
Reduce water use by customers	Option 1	£2.40
	Option 2	£3.70
	Option 3	More than £3.70

ROTATE Qs 10-13.

An average household's water bill is currently £167 per year.

PLEASE BOX THE TEXT THAT SITS AT THE TOP OF EACH NEW SCREEN SO THAT IT IS SET APART FROM THE QUESTIONS AND LOOKS FAMILIAR AS PARTICIPANTS GO THROUGH Q10-Q13.

Q10. This question is about water leakage.

To tackle leakage Affinity Water must consider the cost of finding and repairing leaking pipes (and the impact on traffic disruption) compared to the cost of producing and delivering water from other sources. By 2020 Affinity Water will have reduced the amount of water that leaks from their system by 14%. Affinity Water is planning to reduce leakage further by 2080. This will require investment and may mean an increase in the water bills paid by customers.

Affinity Water is considering two main options (1 and 2 below) to deal with leakage. Which of these do you prefer, or would you prefer another option?

ASK ALL. SA.

- 1) Option 1 – Reducing leakage by a further 11% by 2080. This would mean approximately £2.10 being added to the average household bill every year until 2080
- 2) Option 2 – Reducing leakage by a further 15% by 2080. This would mean approximately £3.80 being added to the average household bill every year until 2080
- 3) Do nothing – this is not a problem
- 4) Do something else (SPECIFY)
- 5) None of these
- 6) Don't know

Q11. This question is about water in the environment...

Most of the water supplied by Affinity Water comes from the chalk aquifer (porous underground rock where water is stored). Affinity Water needs to take less water from this source in the future in order to protect the environment (rivers and streams) and the water supply, while also ensuring Affinity Water has enough water to meet their customers' demands. The cost of leaving more water in the environment will require investment by Affinity Water in other sources of water and may mean an increase in the water bills paid by customers.

Affinity Water is considering two main options (1 and 2 below) when planning for the long-term. Which of these do you prefer, or would you prefer another option?

ASK ALL. SA.

- 1) Option 1 – Taking 10 million litres of water per day less from the environment than at present. This would mean approximately £0.90 being added to the average household bill every year until 2080
- 2) Option 2 – Taking 39 million litres of water per day less from the environment than at present. This would mean approximately £1.30 being added to the average household bill every year until 2080
- 3) Do nothing – this is not a problem
- 4) Do something else (SPECIFY)
- 5) None of these
- 6) Don't know

Q12. This question is about droughts and sourcing water...

Drought can have an impact on the environment and this may become more noticeable as a drought becomes more severe. In a severe drought, Affinity Water may apply to the Environment Agency to take additional water from the environment, including rivers and streams. This can extend the amount of time it takes for the river to recover after the drought has ended.

Currently, Affinity Water estimate that there is a 2.5% (a 1 in 40) chance every year that they will need to apply to take additional water.

Affinity Water is considering two main options when planning for the long-term (1 and 2 below). Both these options will require investment by Affinity Water and may mean an increase in the water bills paid by customers.

Which of these options (1 and 2 below) do you prefer, or would you prefer another option?

ASK ALL. SA.

- 1) Option 1 – Moving from a 2.5% (1 in 40) chance of a severe drought every year to a 1.7% (1 in 60) chance. This would mean approximately £3.00 being added to the average household bill every year until 2080
- 2) Option 2 – Moving from a 2.5% (1 in 40) chance of a severe drought every year to a 0.5% (1 in 200) chance. This would mean approximately £4.20 being added to the average household bill every year until 2080
- 3) Do nothing – this is not a problem
- 4) Do something else (SPECIFY)
- 5) None of these
- 6) Don't know

Q13. This question is about the amount of water used by customers...

At present, Affinity Water's customers use an average of 160 litres per person per day compared to the national average of 141 litres.

Affinity Water is considering three main options when planning for the long-term. These involve taking steps to encourage customers to use less water.

Which of these options (1, 2 and 3 below) do you prefer, or would you prefer another option?

ASK ALL. SA.

- 1) Option 1 – Reducing water use to an average 126 litres. This would mean approximately £2.40 being added to the average household bill every year until 2080. It would be done through existing plans to save water.
- 2) Option 2 – Reducing water use to an average 120 litres. This would mean approximately £3.70 being added to the average household bill every year until 2080. It would be done by providing customers with more frequent information about their water use.
- 3) Option 3 – Reducing water use to an average 110 litres. This would mean an amount more than £3.70 being added to the average household bill. It would be done through financial support and working in partnership with government, regulators and local organisations.
- 4) Do nothing – this is not a problem
- 5) Do something else (SPECIFY)
- 6) None of these
- 7) Don't know

These next questions ask about options being considered by Affinity Water to encourage customers to use less water.

Q14. Affinity Water is considering running a number of local projects during 2020-2025. These would be designed to test new approaches to helping customers reduce the amount of water they use, enabling Affinity Water to apply what works to all areas. Examples include working in partnership with schools to

help them better understand and reduce their water use and to educate pupils about water use, working with community groups, housing associations, planners and developers to develop more water efficient homes.

Which, if any, of these options (1 and 2 below) do you prefer, or would you prefer another option?

ASK ALL. SA.

- 1) Option 1 – Investing £2 million in local projects. This would mean approximately £0.29 per year being added to the average household bill every year until 2025
- 2) Option 2 – Investing £6 million in local projects. This would mean approximately £0.86 per year being added to the average household bill every year until 2025
- 3) Do something else (SPECIFY)
- 4) None of these
- 5) Don't know

Q15. Which, if any, of the following would motivate you personally to use less water?

ASK ALL. MULTICODE.

- 1) To benefit the environment
- 2) To help prevent temporary use bans (hosepipe bans etc.) in the future
- 3) To save money on my water bill
- 4) To save money on my energy bills (e.g. shorter showers mean less water needs heating)
- 5) Something else (specify)
- 6) None of these (EXCLUSIVE CODE)
- 7) Don't know (EXCLUSIVE CODE)

Q16. Affinity Water is considering different ways that people can be encouraged to use less water at home. If you have any ideas or suggestions for ways that could help people reduce their water consumption, please write them in the box below.

ASK ALL. OPEN Q.

Q17. Do you have any other comments or suggestions about how Affinity Water might better manage water supply and meet demand in the future, or about any topics not covered in this survey? If so, please write them in the box below.

ASK ALL. OPEN Q.

Thank you for taking part. Before we finish we have a few additional questions we'd like to ask about you...

Q18. Do you have a water meter in your household?

Properties with a water meter pay for the water they use, and those that do not pay the same amount regardless of water usage

ASK ALL. SA.

- 1) Yes, we have a water meter in our household
- 2) No, we do not have a water meter in our household
- 3) Not sure

Q19. Do you have a garden where you live?

ASK ALL. SA.

- 1) Yes, we have a private garden
- 2) Yes, we have a shared garden
- 3) No, we do not have a garden
- 4) Don't know
- 5) Prefer not to say

Q20. Which, if any, of the following devices and features do you have or use in your home or garden?

ASK ALL. SA. RANDOMISE CODES 1-7.

- 1) An indoor power shower (a shower using an electric pump to produce a high-pressure spray)
- 2) Garden hosepipe
- 3) An outdoor water tap
- 4) An outdoor jet spray
- 5) A garden pond or water feature
- 6) A swimming pool
- 7) A hot tub/Jacuzzi
- 8) None of these **(EXCLUSIVE CODE. DO NOT ROTATE)**

Q21. Typically, how often, if at all, do you visit any part of the water environment e.g. rivers, canals, lakes, estuaries and water around the coast?

ASK ALL. SA.

- 1) Several times a week
- 2) About once a week
- 3) About once a fortnight
- 4) About once a month
- 5) About once every three months
- 6) About once every six months
- 7) About once a year
- 8) Less often
- 9) Never
- 10) Don't know

Q22. Which of the following is the highest educational or professional qualification that you currently hold?

ASK ALL. SA.

- 1) None of these
- 2) GCSE/O Level/CSE
- 3) Vocational qualifications, equivalent to NVQ 1+2
- 4) A Level or equivalent, such as NVQ 3
- 5) Bachelor's Degree or equivalent, such as NVQ 4
- 6) Masters/PhD or equivalent
- 7) Other
- 8) Still studying
- 9) Don't Know/Prefer not to say **(MASKED)**

Q23. Do you or does anyone in your household have any long-term illness, health problems or disability which limits your/ their daily activities or the work you/ they can do, including any problems which are due to old age?

ASK ALL. SA.

1. Yes – I do
2. Yes – someone else in household does

3. No
4. Don't Know/Prefer not to say

Q24. Do you, or anyone in your household, currently receive any Government benefits? These include things like Universal Credit, Job Seekers Allowance, Income Support, Housing Benefit and Tax Credits. ASK ALL. SA.

1. Yes
2. No
3. Don't Know/Prefer not to say

Q25. Into which of the following bands does your annual household income fall, before tax and other deductions? ASK ALL. SA.

	Per MONTH	Per YEAR
1.	£541 or less	£6,499 or less
2.	£542 to £791	£6,500 to £9,499
3.	£792 to £1,342	£9,500 to £16,105
4.	£1,343 to £2,083	£16,106 to £24,999
5.	£2,084 to £3,333	£25,000 to £39,999
6.	£3,334 to £4,999	£40,000 to £59,999
7.	£5,000 to £6,249	£60,000 to £74,999
8.	£6,250 and over	£75,000 and over
9.	Don't know (MASKED)	Don't know (MASKED)
10.	Refused (MASKED)	Refused (MASKED)

On behalf of Ipsos MORI and Affinity Water, thanks for taking part in our survey.

Topic guide

18-005720-01 Affinity Water Water Resources Management Plan (dWRMP) topic guide

Affinity Water are a regulated 'monopoly' business, meaning customers can't switch supplier. Their key aims include making sure customers, communities and the environment have enough water; supplying high quality water you can trust; minimising disruption to you and your community and providing a great service that you value.

The aim of these groups **is to understand customer opinion and priorities in respect of the draft Water Resources Management Plan (dWRMP)**. This plan looks at how Affinity Water will manage water supply and demand from 2020 to 2080.

Eight evening focus groups will be held across SE England on behalf of Affinity Water. Each evening there will be two (focus) group discussions (6.00-7.30pm and 8.00-9.30pm) which will bring together 8-10 customers.

Participants are recruited based on receiving clean/drinking water from Affinity Water (their waste water will be provided by another service e.g. Thames Water), and quotas including those outlined below.

Recruits have been asked to read extracts of the dWRMP as a **pre-task**.

Date	Location	Venue details	Recruitment quotas
21-Mar-18	Collindale/Edgware	Ramada, London North (M1 between Jct 2-4) NW7 3HU	Group 1: 18-34 C2DE Group 2: 35-54 C2DE
26-Mar-18	Stevenage (Herts)	Holiday Inn Express, Stevenage, Herts, SG1 1XB	Group 3: 55+ C2DE Group 4: 18-34 ABC1
26-Mar-18	Woking (Surrey)	Double Tree by Hilton Hotel, Woking, Victoria Way, Woking, GU21 8EW	Group 5: 55+ ABC1 Group 6: 35-54 ABC1
28-Mar-18	Folkestone (Kent)	Express by Holiday Inn, Folkstone (M20 Jct 12) Cheriton Parc, Cheriton High Street, Folkestone, CT18 8AN	Group 7: 55+ C2DE Group 7: 35-54 C2DE

NOTE: 4 KEY THEMES WILL BE EXPLORED IN EACH GROUP

Location	Key themes to be covered Priority themes in <u>bold</u>
Collingdale/Edgware	Group 1: <u>Metering, Collaboration and sharing, Sustainable abstraction,</u> Climate change Group 2: <u>Sustainable abstraction, Leakage, Drought,</u> Achieving ambition
Stevenage	Group 1: <u>Metering, Collaboration and sharing, Leakage,</u> Demand growth Group 2: <u>Sustainable abstraction, Leakage, Drought,</u> Climate change
Woking	Group 1: <u>Metering, Collaboration and sharing, Drought,</u> Resillience Group 2: Climate change, Achieving ambition, Demand growth, Water quality
Folkestone	Group 1: <u>Metering, Collaboration and sharing,</u> Demand growth Group 2: <u>Sustainable abstraction, Leakage, Metering,</u> Water quality

Time	Section, questions, prompts
5.45- 6.00pm	Arrival and registration
6.00- 6.10pm (10 mins)	<p>Introduction</p> <p>The aims of todays discussion is to understand the opinions of Affinity Water customers in relation to the draft Water Resources Management Plan. You'll have seen a summary of this as part of the homework task we set you before coming here tonight.</p> <p>Explain tone and nature of discussion:</p> <ul style="list-style-type: none"> Σ Relaxed and informal Σ No right or wrong answers Σ Keen to hear everyone's views and experiences; we are after a range of opinions, not seeking consensus Σ Please feel free to disagree with one another; just keep it polite Σ The moderator will make sure everyone gets a chance to share their opinion Σ Try to avoid talking over one another – means the recorder does not work so well / note taker may not be able to hear Σ Ask permission to record Σ Plenty to get through, so the moderator may have to move people on from time to time Σ Clarify length of group (1.5 hours) Σ Mention pre-task so have to hand Σ Any other housekeeping – fire alarms, facilities, mobile phones put away, etc. <p>PERMISSION TO RECORD – START DIGITAL RECORDER</p> <p>We'd like to find out a little more about you. In pairs, could you please find out your partner's first name and a little bit about their household – who they live with and what type of property they live in. I'll then ask you to introduce your partner back to the group.</p> <p>PAIRS INTRODUCE BACK TO GROUP</p>
6.10-6.15pm (5 mins)	<p>Context</p> <p>Tell me what you know about Affinity Water and what they do...</p> <p>FLIPCHAT ANSWERS</p> <p>PROBE FOR HOW WATER IS SOURCED AND SUPPLIED, DIFFERENCE BETWEEN SEWERAGE AND</p>

	<p>CLEAN WATER, VIEWS ON BILLS AND AFFORDABILITY</p>
<p>6.15- 6.30pm (15 mins)</p>	<p>Pre-task plus supply and demand</p> <p>Now let’s talk about the pre-task you were given. We asked you to look at an extract of the draft Water Resources Management Plan and make some notes. Firstly, I’d like to know...</p> <ul style="list-style-type: none"> - What were your initial thoughts? FLIPCHART ANSWERS - What parts stood out to you? Why? - Which parts did you like? - Which parts do you not like? - Anything that concerned or worried you? Anything that you were surprised by? - Anything that did not make sense? COLLECT QUESTIONS ON SEPARATE FLIPCHART <p>PROBE FOR DEMAND AND SUPPLY:</p> <ul style="list-style-type: none"> - Where do you think water companies like Affinity Water source their water from? - What can affect water <u>supply</u>? - PROMPT: Environment (drought/climate change), usage and leaks? - How can water companies meet the amount of water needed in the area they serve? How do you think we can manage things that affect water <u>supply</u>? - Who can do this? Water companies, customers or both? <p>Now moving on to think about water <u>demand</u>, that is, how much water is needed by</p> <ul style="list-style-type: none"> - What can affect the <u>demand</u> for water? - How do we manage this <u>demand</u>? - Who can do this? Water companies, customers or both?
<p>6.30- 6.40pm (10 mins)</p>	<p>dWRMP – overview</p> <p>We are now going to talk about the Affinity Water draft Water Resources Management Plan in more depth. Firstly, I’ll explain in the plan in some more detail. READ OUT TEXT BELOW</p> <p>“Every 5 years, water companies prepare a business plan that shows what services they will provide for the next 5 years. They are currently developing plans for the period 2020-2025 and these plans will be submitted to Ofwat who will decide how much companies can charge their customers. The plan has to look beyond the next 5 years,</p>

	<p>Companies consult widely with their customers to help prepare these business plans; this can involve focus groups, surveys, public consultation, and so on.</p> <p>Affinity Water have published their draft Water Resources Management Plan and are consulting on this. Our research is part of this consultation. We want to learn more about your priorities. That information can then be used to ensure the company thinks about the services you value to plan investments accordingly (along with all sorts of other information collected)."</p> <p>What do you think Affinity Water needs to be working towards when developing a plan for the future?</p> <p>What should Affinity Water’s priorities be do you think? PROBE: Why do you say that?</p> <p>PROMPT (ALREADY WRITTEN ON FLIPCHART): What do you think about these?</p> <ul style="list-style-type: none"> Making sure customers, communities and the environment have enough water; Supplying high quality water you can trust; Minimising disruption to you and your community; Providing a great service that you value. <p>Is there anything you would add? Take away? AMEND FLIPCHART (DON'T GO THROUGH INDIVIDUALLY)</p> <p>Do any of these stand-out to you? Why?</p>
<p>6.40- 7.25pm (40 mins)</p>	<p>dWRMP themes</p> <p>REFER TO PAGE 7 OF PRE-TASK (HAVE SPARE COPIES AVAILABLE)</p> <p>There are a number of options and policies that can be used to ensure the water supply is able to meet current and future needs. Each option will have different impacts on people and the environment, varying levels of reliability, and differing costs. We are going to look at some of these options in more detail. These are called the “key themes” in the Water Resources Management Plan.</p> <p>IF £s COMES UP:</p> <p>These options may lead to an increase in customers’ water bills, but that might not be the case. It will depend what else Affinity Water decide to do in terms of the remainder of the Plan and how they run the business. The options we talk about which require greater investment by Affinity Water are more likely to impact on customers’ bills. We’re after your in-principle view on these options.</p> <p>MODERATOR TO COVER KEY THEMES (10 MINS PER THEME) USING <u>SHOWCARDS</u>. STICK SHOWCARDS ON WALL/FLIPCHART AFTER DISCUSSING TO AID FINAL REVIEW IN CONCLUSION. HAND OUT AND EXPLAIN THEME SHOWCARD GIVE PARTICIPANTS TIME TO READ THESE</p> <p>What stands out to you? Which parts did you like?</p>

	<p>Which parts do you not like? What further information would you like? Does this issue matter? PROBE FOR REASONS FOR PREFERENCES ESPECIALLY WHERE THERE ARE OPTIONS PROBE FOR UNDERSTANDING OF INFORMATION</p> <p>PROBE WHERE THERE ARE OPTIONS (AN 'ALTERNATIVE PLAN') REPEAT FOR EACH THEME (COVER ADDITIONAL THEMES IF HAVE TIME)</p>
<p>7.25- 7.30 (5 mins)</p>	<p>Conclusions Thinking about the Affinity Water draft Water Resources Management Plan overall and everything we have talked about this evening, I would like you to take one post-it and, individually, write down the one thing you would like to feedback to Affinity Water about the plan and what they should do in the future. FLIPCHAT POST-ITS AND DISCUSS What should the priorities be for Affinity Water? IF TIME THANK AND CLOSE HAND OUT THANK YOU PAYMENTS WITH INCENTIVE SHEET SWITCH OFF RECORDER</p>

Stimulus material

Metering, water efficiency and consumption

Using less water

Challenges/context

As the strain on water resources increases, due to increasing demand, it makes sense to help people use it more efficiently.

Affinity Water customers use more than the national average (about 160 litres per person per day).



Proposals

- Continue to **install meters in homes** and implement an option to provide customers with detailed information about water usage.
- Implement smart metering in longer term to **reduce usage and tackle leakage** more effectively.
- Inspire customers to **value and protect** our water resources so use less water.
- Continue to provide customers with **free water saving devices**.
- **Partnership approach** with customers, water companies, Defra and regulators to **support using less water** e.g. through the national water saving campaign.

Metering, water efficiency and consumption

Using less water

Consultation options

Do you support or oppose our partnership approach to reduce per capita consumption of water to **110 litres** per person per day?

Support

Oppose



Affinity Water's view

'Preferred' options:

Reduce customer water usage from 160 litres per person per day to **126 litres** in preferred plan or **120 litres** in the alternative plan. This is a 23% reduction or 31 to 37 litres per person per day from current levels.

Government plan:

Reduce to **110 litres** per person per day, a reduction of 50 litres per person per day from current levels.

In this plan, more customers would need to **significantly reduce** their water usage.

Collaboration and sharing

Working with other water companies and third parties

Challenges/context

The South East is highly populated and quite dry. Other parts of the UK are wetter with a lower population.

The majority of Affinity Water areas are short of water.

Sharing water with and between other companies and third parties (a water supplier that is not a water company), can help reduce water shortages.

This is already happening but water is very heavy and uses lots of energy to transport. This could make supplying water more expensive.



Proposals

- Work closely with national bodies and regional water resource groups.
- Continue to share water with neighbouring water companies and actively **develop new water resources**.
- Collaborate with third parties and look for **new opportunities**.
- **Secure reliable water** by transferring water from a new regional reservoir and existing reservoirs
- Explore options with neighbouring companies to **trade around existing agreements more flexibly**.

Demand Growth

A fast growing population

Challenges/context

Providing water in an area with one of the fastest growing populations in the UK.

Affinity Water already provides water to 3.6 million people.

Trends show there will be an increase in water demand in the future. The number of households will increase by 65% and the number of people by 38% by 2080.



Proposals

- Plan over a **longer period** (60 years) to prepare for future changes in population and service demand.
- The plan focuses on using less water through **metering** and **leakage reduction** and using more resources like **regional transfers** and **reservoir use** in the longer term.
- Further develop **strong and effective partnerships** with neighbouring water companies and local authorities in area.

Climate Change

Dealing with foods, drought and climate change

Challenges/context

Demand for water is going to increase while water availability will decrease.

Warmer summers mean more water is used.

Approximately 65% of water comes from underground sources which are topped up yearly by winter rainfall which does not always come.

Heavy rainfall creates runoff, rather than rain soaking into the ground.

Changing weather patterns may mean less water in the future and a changing climate could cause more frequent and severe drought events.



Proposals

- Consider the potential of future uncertainties including **growth in consumer demand** and **climate change**.

Resilience

Maintain supplies at all times

Challenges/context

Resilience = ability to cope when situations change

Climate change and extreme weather events resulting in droughts or floods, population growth, environmental impact, economic and social change and ageing infrastructure.

Being resilient means water companies have already thought about these issues, how likely they are and what to plan to do if they happen.

This means customers will receive a better service and the natural environment will be protected.



Proposals

- Test resilience of proposed solutions so they're prepared to **deal with the challenges ahead**.
- Explore how to **move water more effectively** to where it is needed most at a local level.

Sustainable abstraction

Balancing the needs of the environment and customers

Challenges/context

Abstraction = taking water from water sources including underground sources, rivers etc.

Taking less water to protect the environment while ensuring sufficient supply.

Number of globally rare chalk streams in area.

In some locations, it's more effective to improve/restore the local habitat than to take less water.



Proposals

- Continue to **reduce** the amount of water abstracted at certain sources and ensure it's sustainable for the local environment.
- **Evaluate** local habitats over the next 5yrs to understand the benefit of previous reductions and use this to inform future activity.
- Focus on taking additional supplies from **existing** groundwater abstractions and areas with minimal environmental impact. New abstractions will take place at locations where we can minimise impacts.
- Continue with **river restoration and habitat enhancement** where it makes most sense for customers and the environment.
- Continue to **protect supplies**, recognising there may be an additional environmental impact (carbon footprint) due to replacing water in a different way (e.g. pumping it from further away).

Sustainable abstraction

Balancing the needs of the environment and customers

Consultation options

Which level of sustainability **reductions** do you think Affinity Water should deliver?

- 'Preferred' option of **10million** litres of water per day at a cost of **£93million** by 2080.
- 'Alternative' option **39million** litres of water per day at a cost of **£123million** by 2080.



Affinity Water's view

'Preferred' option:

Includes reductions in abstraction which will achieve environmental benefits that are cost effective.

'Alternative' plan:

Higher cost and considered higher risk. Presents greater challenges to operational resilience due to higher level of sustainability reductions with little time to establish reliable alternatives to ensure supply meets demand.

Drought

What happens if it doesn't rain enough

Challenges/context

Reduced rainfall, prolonged **dry periods** and **climate change** is reducing the amount of water in the environment.

In severe droughts, Affinity Water may apply to **abstract more water** or reduce river support through **drought permits/orders**. Additional abstraction may increase river recovery time once the drought has ended.



Proposals

- Make appropriate use of **temporary bans and drought orders**
- Supply water in drought conditions for longer without using **water sources** that wouldn't usually be used

Temporary bans = previously known as hosepipe bans, restrict 11 mainly domestic hosepipe activities (watering gardens, filling paddling pools)

Ordinary drought orders = restricts 10 activities which may have commercial implications (car washing, window cleaning, filling swimming pools)

Drought

What happens if it doesn't rain enough

Consultation options

Which level of **improved drought service** do you think Affinity Water should deliver?

- 'Preferred' option, spend **£295 million** by 2080 to reduce the need for extra water/bans to **1.7%** (1 in 60 years).
- 'Alternative' option, spend **£410million** by 2080 to build infrastructure to reduce the need for extra water/bans to **0.5%** (1 in 200 years).



Affinity Water's view

There is currently a 2.5% chance every year that additional water and bans would be needed in drought conditions.

Alternative option:

Requires new infrastructure, such as new pipes to be built.

Leakage

Managing leakage, keeping bills low

Challenges/context

Water pipes are deep underground meaning **leaks are difficult to detect**.

To keep bills low and minimise traffic disruption, Affinity Water needs to **balance the cost of finding/repairing leaking pipes with producing/delivering more water**.



Proposals

- Explore more ways of how **technology** can help **detect and tackle leakage**

Leakage

Managing leakage, keeping bills low

Consultation options

Which reduction of leakage would you prefer?

- 'Preferred plan', reduce leakage by **11%** at a cost of **£46 million** by 2025, and **£208million** by 2080
- 'Alternative plan', reduce leakage by **15%** at a cost of **£58 million** by 2025 and **£372million** by 2080



Affinity Water's view

Preferred plan:

Saves 18million litres of water per day

Alternative plan:

Saves 25million litres of water per day

Water quality

Protecting this precious resource

Challenges/context

There are stringent **Drinking Water Standards** for drinking water which help protect the health of our customers.

Maintaining good quality drinking water, and the investment to achieve it, is essential.



Proposals

- Water quality is constantly **monitored**
- **Treatment** can rapidly respond to deterioration in water quality
- **Reduce pollution** and raise awareness of how everyone can protect the water environment
- Improve water quality **information** available to customers

Achieving our ambition

Working together with our communities

Challenges/context

Affinity Water Customer Charter

- Supply high quality drinking water
- Empathy with customers to be effective, efficient and safe
- Talk and listen to customers and stakeholders
- Take pride in delivery and performance
- Provide and affinity for colleagues, customers and the environment



Proposals

- Provide **community focused activities**
- **Liaise** with community groups on the important issues in the plan
- Produce a plan which **represents customer priorities**
- Publicly consult on the plan and take **feedback** on board

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About Ipsos MORI's Social Research Institute

The Social Research Institute works closely with national governments, local public services and the not-for-profit sector. Its c.200 research staff focus on public service and policy issues. Each has expertise in a particular part of the public sector, ensuring we have a detailed understanding of specific sectors and policy challenges. This, combined with our methods and communications expertise, helps ensure that our research makes a difference for decision makers and communities.

Appendix OC.A41.1

Action ref AFW.OC.A41; A42

Desktop review of approach to use EA CBA analysis (Eftec)

Review Note

Affinity Water

Review of PR19 Business Plan

Environmental Valuation Approach



March 2019

Summary

Ofwat's PR19 methodology states that alternative customer valuations can be applied to calibrate under/out-performance incentive rates. This review examines whether the National Water Environment Benefits Survey (NWEBS) is an appropriate evidence source for calculating incremental benefits for river restoration and sustainable abstraction performance commitments. It finds that whilst there are differences between the 'typical' customer WTP study and NWEBS catchment-level values, the definition of outcomes, the geographic context, and the framing of the payment mechanism substantially overlap. The review concludes that – in principle - the NWEBS catchment-level values fit the implied criteria for an alternative source of customer valuation evidence. The values measure an annual flow of benefits to customers and can be applied to either the scope of improvement in the river environment or the timing of the improvement (i.e. outperformance payments for early completion or penalties for delayed delivery).

Purpose of review

The review addresses a query raised in Ofwat's Initial Assessment of Plans (IAP) as to whether the evidence source used for under/out-performance incentive rates for the river restoration and sustainable abstraction PR19 performance commitments is representative of customer preferences for the outcomes that will be delivered. The review focuses on – in principle - the appropriateness of the evidence source, which is the National Water Environment Benefits Survey (NWEBS). It does not examine the data used and calculations undertaken by Affinity Water to design the ODIs and specify the incentive rates.

Requirements for specifying under/out-performance incentive rates

Water companies are funded to meet stretching performance targets at an efficient cost. Outcome Delivery Incentives (ODIs) are mechanism through which companies are incentivised to deliver against their targets and, where there is customer support, out-perform their targets. The Ofwat formula for specifying incentive rates is:

$$ODI \text{ underperformance} = \text{incremental benefit} - (\text{incremental cost} \times p)$$

$$ODI \text{ outperformance} = \text{incremental benefit} \times (1-p)$$

Where p is the customer share of expenditure performance from the totex efficiency sharing incentive.

Conventionally, the value of the incremental benefit is calculated from an estimate of customer willingness to pay (WTP) for the outcomes associated with performance commitment. This represents the value or marginal benefit to customers of an improvement or an avoided deterioration in service. Ordinarily, customer WTP is estimated using stated preference survey methods. Ofwat's PR19 Methodology notes also, though, that in certain circumstances companies can include alternative measures of marginal benefits in the calibration of incentive rates. This includes "*benefits to the environment, biodiversity and natural capital that are not captured in the other methods for customer valuations and which are appropriate to add to it*"².

Performance commitments for River restoration and sustainable abstraction

River restoration and sustainable abstraction are two bespoke performance commitments within Affinity Water's PR19 Business Plan. They are defined as follows:

- River restoration: number of river restoration/habitat enhancement schemes completed in AMP7.
- Sustainable abstraction: reduction in average deployable output (MI/d) by December 2024 from delivery of the sustainability reductions programme.

² Ofwat Delivering Water 2020: Our methodology for the 2019 price review. Appendix 2: Delivering outcomes for customers; Appendix to Chapter 4: Delivering outcomes for customers. 13 December 2019. [p91]

The principle driver for these investments are measures that support implementation of the Water Framework Directive (WFD). The required measures have been identified by the Environment Agency and included in the Water Industry National Environment Programme (WINEP3). They are intended to contribute to improving the status of waterbodies and/or avoiding deterioration in waterbodies from current status levels within Affinity Water's operational area.

The Environment Agency assesses the benefits of the measures in terms of a bundle of outcomes related to improved waterbody status. These are the outcomes that should be reflected in the marginal benefit values that are used to calibrate the river restoration and sustainable abstraction incentive rates. They include impacts on fish; other animals such as invertebrates; plant communities; the clarity of water; the condition of the river channel and flow of water; and the safety of the water for recreational contact³.

National Water Environment Benefits Survey (NWEBS)

Affinity Water's marginal benefit values for the river restoration and sustainable extraction incentive rates are understood to be calculated from National Water Environment Benefits Survey (NWEBS) valuations⁴. Carried out in 2007, NWEBS was a national representative survey funded by the Defra-led WFD collaborative research programme. It used stated preference methods to estimate WTP for water environment improvements from implementation of the WFD, described in terms of impacts on fish, invertebrates, plants, clarity and flow, and recreational use. In 2012/13 the Environment Agency commissioned work to update the NWEBS to provide catchment level values for use in RBMP2⁵. These values are also the basis for the cost-benefit assessments conducted by the Environment Agency for WINEP3 measures.

Appropriateness of NWEBS values for calibrating incentive rates

NWEBS values are effectively the 'default' evidence source for valuing waterbody improvements in England. In addition to being the core valuations used by Environment Agency in catchment planning, national average values for WFD status improvements are reported in

³ These are the outcomes that are assessed in monetary terms in the Environment Agency's catchment-level economic appraisals. See:

Environment Agency (2013) Water Appraisal Guidance. Available from: <http://www.ecrr.org/Portals/27/Publications/Water%20Appraisal%20Guidance.pdf>. The Water Appraisal Guidance also recognises that waterbody measures may also deliver wider benefits and recommends that these are assessed in qualitative terms to support cost-benefit comparisons.

⁴ Based on descriptions provided in Affinity Water (2018) Our Business Plan for 2020 – 2025.

Appendix 4: Our Outcomes and Performance Commitments, September 2018.

⁵ See: Environment Agency (2013) Valuing Environmental Benefits, External Briefing Note, October 2013. Available at <http://www.thames21.org.uk/wp-content/uploads/2013/12/NWEB-Briefing-Notes.pdf>

the HM Treasury Green Book⁶. High-level guidance for applying NWEBS values is also provided in Defra's Environmental Value Look-Up (EVL) Tool⁷.

To judge whether NWEBS values can be interpreted as representative of customers' preferences for river restoration and sustainable abstractions outcomes, it is useful to compare the NWEBS values to a typical water company WTP survey⁷. A previous assessment in this regard concluded that the coverage of benefits in a company WTP survey - in terms of the outcomes associated with waterbody improvements (i.e. river water quality or river flow) – is usually similar to those captured in NWEBS values⁸. This is because both approaches are seeking to value impacts from the same set of measures.

There are though distinctions in wider comparative aspects. This includes the scope of improvement and the set of available substitutes (i.e. investments in other service areas) that are represented in the respective valuation scenarios. These differences are due to the level and decision-settings at which the benefit values are applied. WTP values from a company study are normally applied at the programme level in relation to an overall improvement in the proportion of waterbodies achieving good status across the company region. In contrast NWEBS values are applied to waterbody level measures in specific catchments to value incremental improvements in the individual components of ecological status, such as fish, plants and invertebrates, moving from 'poor' to 'moderate, or 'moderate' to 'good'. In either case, various calculations would be applied to align the marginal benefit value to a performance commitment definition.

From cost-benefit analysis stand-point, part of the difference between companies' studies and NWEBS comes down to the question of 'standing' – i.e. whose benefits are counted. The Environment Agency's use of NWEBS values and cost-benefit assessment for WINEP3 takes a beneficiary population perspective. Benefit values are aggregated over the local level population that is assumed to benefit for improvements in a particular catchment. This follows from the 2012/13 update of the NWEBS values that developed a mechanism to apply the results from the original study at the local level accounting for local population characteristics.

In contrast, the marginal benefit and marginal cost comparisons that feature in a company's Business Plan submissions are framed by a bill payer population perspective. This is consistent with the regulatory setting for the Price Review process, where the cost-benefit comparison is used to demonstrate that the investments that customers are asked to pay for represent value for money in terms of the impact on bills. In general, though, there should be reasonable overlap between the two perspectives. Assessments that use

⁶ HM Treasury (2018) The Green Book. Central Government Appraisal Guidance on Appraisal and Evaluation, 2018.

⁷ Available from:

<http://sciencesearch.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=19514> ⁷ For example, as described in UKWIR (2011) Carrying

Out Willingness to Pay Surveys, Report Ref. 11-RG-07.

⁸ See: eftec (2014) External Evidence for RBMP2, Final Report to the Environment Agency, March 2014. This report reviewed the wider evidence base that could be used to support the application of the Water Appraisal Guidance for RBMP2. A non-confidential version of the report was made available to water companies by the Environment Agency and is available on request.

NWEBS values for catchments in the Affinity Water customer regions are intended to represent the local population's preferences for improvements – i.e. the preferences of Affinity Water customers. Added to this, the original NWEBS study elicited household WTP in terms of increased annual water bills, which is consistent with the approach taken in a company study.

Overall, the main points of comparison are the definition of outcomes, the geographic context, and the framing of the stated preference payment mechanism. The findings here suggest that marginal benefit estimates derived from NWEBS catchment values can be interpreted as representing customer preferences for river restoration and sustainable abstraction outcomes, albeit as captured within the context of the NWEBS survey rather than through primary research conducted by Affinity Water.

Additional considerations

A legitimate supplementary question to consider is whether, given the age of NWEBS source data, it can be considered a reliable representation of customers' preferences. In this regard there are other precedents for using WTP values that are around 10-15 years old. This includes the Business Case for the Thames Tideway Tunnel⁹, which applied and updated values from a 2006 stated preference survey. The approach taken, which included adjustments consistent with the Environment Agency's 2012/13 updates of the NWEBS values, was independently reviewed by the National Audit Office and judged to be consistent with best practice for CBA¹⁰.

Conclusion

Ofwat's PR19 methodology states that alternative customer valuations can be applied to calibrate under/out-performance incentive rates. NWEBS values are an alternative to customer WTP estimates derived from the typical water company stated preference study. The NWEBS values measure benefits to customers and wider society associated with improvements in status of waterbodies. In principle it appears they fit the implied criteria for being considered an appropriate evidence source for calculating incremental benefits for water environment improvements.


The NWEBS values measure an annual flow of benefits to customers. In the design of an ODI they can be applied to both the scope of improvement (i.e. a physical measure such as km river improved or an equivalent translation) or the timing of the improvement (i.e. out-performance payments for early completion of river improvement measures, or conversely, penalties for delayed delivery).

⁹ Defra (2015 Creating a River Thames fit for our future: An updated strategic and economic case for the Thames Tideway Tunnel, October 2015; and Defra (2015) Costs and benefits of the Thames Tideway Tunnel, 2015 update. October 2015. Available at: <https://www.gov.uk/government/publications/thames-tideway-tunnel-strategic-and-economic-case-costs-and-benefits-2015-update> ¹⁰ National Audit Office (NAO) 2017. Review of the Thames Tideway Tunnel. Report by the Comptroller and Auditor General. Available at: <https://www.nao.org.uk/report/review-of-the-thames-tideway-tunnel/>

Appendix OC.A41.2

[Action ref AFW.OC.A41; A42; A45](#)

PC ODI Incentive Testing – Final Report (Verve)



Affinity Water
PC ODI Incentive Testing
Online survey

Research Report

March 2019

Version 1

PC ODI Incentive Testing

Research Report – 25th March 2019

1.1 Background to report

- Σ Verve was commissioned by Affinity Water to undertake survey research as part of a series of work designed to support PR19 and the development of Affinity Water's Business Plan for the period 2020-25 and 2025-30.
- Σ This report is a summary of research into the ODI incentive testing for Affinity Water's proposed Performance Commitment (PC) targets
 - Variations of incentive and penalty payments were tested with customers in each of the 11 Performance Commitment areas, in addition to capturing a measurement of perceived importance for PC .

1.2 Methodology and Sample

- Σ Independent market research agency Verve conducted an online survey of 1,006 Affinity Water customers aged 16+, sourced via an external access panel.
- Σ Fieldwork was conducted between 19th and 25th March 2019.
- Σ Recruitment quotas targeted a representative sample of adults aged 16 and over, resident in Affinity Water's eight service areas. The achieved sample profile and the effects of weighting are outlined in the Appendices of this report.

- Σ The survey was designed to provide a representative sample of customers across all areas served by Affinity Water; quotas were placed and weighting was applied to ensure representation from Affinity Water's eight regional Water Resource Zones (WRZ) and across core customer demographics.
 - Please note the survey was designed to provide a representative sample of customers across all areas served by Affinity Water, rather than a representative sample of customers of the three sewerage providers covering the Affinity Water area (Thames Water, Anglian Water, Southern Water) or within each of Affinity Water's eight Water Resource Zones.
 - The number of customers served by the three sewerage providers and within each WRZ is proportional to the size of the population within each area.

1.3 Considerations for study design and interpretation of data

- Σ The study was designed in conjunction with Verve and Affinity Water to ensure alignment with accepted best practice and guidelines for conducting social research.
- Σ The required timelines for delivery of results naturally drove some pragmatic decisions as to study design; these are discussed below.

- Σ Verve is an independent market research agency, member of the MRS Society and is ISO27001 certified.
 - Verve adheres to MRS Code of Conduct in research - the professional standards that all research practitioners must maintain.
 - This is a comprehensive set of guidelines which has been established for c. 60 years, last updated in 2014 (currently being updated in wake of GDPR for April '19).
 - While provided guidelines are not definitive, they set out accepted best practice across the research lifecycle from inception to design and execution to final use and interpretation.
 - The Code of Conduct is designed to be relevant for all market, social and opinion research.

- Σ The study was designed to take into consideration a number of guideline areas set out by the MRS where surveys are used for consultation (i.e. where seeking the views of the public on an issue of local concern, such as the provision of new services or amenities, or a planning proposal) which we have summarised below:
 - **Independence**
 - The survey was created in an independent and neutral manner.
 - Where information was provided to inform people's responses it was clearly delineated from the rest of the questionnaire, delivered in neutral language and set out as fact rather than opinion.
 - **Clarity**
 - The layout and design of the questionnaire was structured clearly with clear sections and introductory text for new information / areas.
 - The questions themselves were designed to be clear and avoid jargon - where technical terms were included, explanatory text was provided.
 - **Fairness**
 - The survey was designed to provide a representative sample of customers across all areas served by Affinity Water (please see note below on vulnerability).

- **Respondent rights**
 - The survey explained to respondents the purpose of the survey and how the information would be used.
 - The questionnaire was kept to 15 minutes in length; the expected length of the survey was outlined in advance, so participants knew what was expected of them.
 - Survey filters and sample cells were used to help to reduce survey length / repetition for individual respondents, whilst also help to provide independent analysis on key areas (i.e. the sample was split into separate cells for the two bill profiles, therefore allowing for a monadic view on each profile).
 - Information collected in the survey was treated anonymously and confidentially.
 - **Presenting results**
 - This report presents the facts and results from the survey in a clear and neutral manner. Opinion and inference has been minimised for the purposes of the report.
- Σ The guidelines for consultation work state that all customer groups who will be affected by the decision are included in the sample. For pragmatic reasons of scheduling and efficiencies, the deliberate decision was made to use an online sample for the survey.
- An online survey may, by its nature, exclude certain cohorts of customers, specifically a proportion of those classified as living in vulnerable circumstances.
- Σ The definition of vulnerability is a complex and dynamic one, as it includes permanent, fluctuating and short-term vulnerabilities. This makes inclusion of all groups a challenge for any research.
- Σ However, the nature of the online approach inevitably means the exclusion of customers who do not have access to internet services.
- Σ Figures from 2016 indicate that 93% of UK population are currently online, so while the majority of customer profiles are included - the survey was designed to ensure representation from across social grades / income and captured disability at a high level - there are a percentage of customers who will have been omitted by the nature of the methodology.
- Σ Additional work using alternative methodologies (i.e. face to face interviewing) would be required to include the opinions of these groups.
- In addition, the survey was also provided in English only and therefore did not specifically cater for groups for whom English is not their first language.

However, customers would have been able to translate via their browser to overcome this.

- ∑ Finally, we should note that any survey will only ever generate estimates of the 'truth'; the latter of which would only be available if a complete census of customers was undertaken.
 - As a result, findings are subject to sampling tolerances and statistical confidence intervals, shown in the Appendices.
 - Any regions with a base size of under 100 have not been used for analysing the results of the survey, where they have been included for reference they have been greyed out.
 - Survey data has been weighted to match the profile of the population living in Affinity Water areas by age and WRZ, based on 2011 Census data.
 - Where percentages do not sum to 100, this is due to rounding of figures.

- ∑ Despite the above limitations which have been called out above, Verve and Affinity Water agreed that an online survey was the most suitable methodology to achieve a representative sample within the set timescale.

1.4 Survey Structure

- ∑ The survey was designed to capture customer's views on Affinity Water's 2020 - 25 Performance Commitment targets
 - The survey first introduced the 1,006 participants to the 11 different commitments offered by Affinity Water in relation to service reliability and sustainability (see section 3 for the full list)
 - To measure the perceived importance of each of the Performance Commitments, the survey used a trade-off (Max Diff) exercise. As consumers tend to rate everything as important when asked directly, this exercise is used to derive related importance so as to provide guidance on relative consumer priorities.
 - In the exercise consumers were shown all 11 commitments in 6 groups, with each set they were asked to choose the PC they considered to be most and least important.
 - By repeating this exercise across a number of screens, it is possible to derive a utility score / relative importance of each PC
 - This exercise was included to provide guidance on prioritisation from the customer perspective, but also help participants to become familiar with the

PCs and what is most important to them prior to exposure of penalty / rewards

- Following this, participants were introduced to the concept of payment incentives, with an explanation of how Affinity Water would receive rewards / penalties - based on failing to meet or exceeding its PC targets - and how this could potentially impact customer bills in the future.
- In this section:
 - Participants were first asked to rate how acceptable or unacceptable the concept of incentive payments are in general: i.e. Affinity Water could reduce customer bills if it failed to meet Performance Commitment targets and increase bills if it exceeded its Performance Commitment targets.
 - The sample was then split into five cells in order to rate the acceptability of different incentive payment values (increases and decreases) for each Performance Commitment
 - Σ The sample was split on a 'least fill' basis to ensure consistency of profile within each cell
 - Σ The order in which the Performance Commitments were shown was randomised for each participant
 - Σ Increases / decrease within each Performance Commitment were also shown in a random order (i.e. whether participants saw an increase or decrease first)
 - Σ The cells were designed to ensure a degree of consistency in the scale of the incentive amounts shown to each participant (i.e. individuals would tend to see incentives from either the upper, lower or mid-point thresholds)
 - The achieved sample for each cell is outlined at the end of this document
 - The cells saw the following incentive rewards and penalties across each Performance Commitment
 - The following supporting contextual information was also provided to participants:
 - Σ Please note that the average household water bill in 2020 / 2021 will be £185.70
 - Σ This includes clean water services only, it does not include waste water services
 - Σ The change to your bill would take effect from the following year e.g. a decrease from Affinity Water failing to meet its targets in 2020-21 would take effect in 2021-22

	Cell 1A		Cell 1B		Cell 1 C		Cell 2 A		Cell 2 B	
	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase
	[A]	[B]	[A]	[B]	[A]	[B]	[A]	[B]	[A]	[B]
Leaks	-£8.58	£3.60	-£8.58	£3.60	-£8.58	£3.60	-£1.53	£0.68	-£1.53	£0.68
Average water use per household	-£5.07	£2.92	-£1.55	£2.92	-£1.55	£2.92	-£1.03	£2.92	-£1.03	£2.92
Supply Int	-£13.20	£1.87	-£7.66	£1.87	-£7.66	£1.87	£-0.79	£1.87	£-0.79	£1.87
Unplanned Outage	-£3.74	N/A	-£3.74	N/A	-£3.74	N/A	-£1.99	N/A	-£1.99	N/A
Mains Bursts	-£4.18	N/A	-£4.18	N/A	-£4.18	N/A	-£2.06	N/A	-£2.06	N/A
Water Quality	-£4.24	N/A	-£1.82	N/A	-£3.03	N/A	-£0.12	N/A	-£1.21	N/A
Low Pressure	-£4.43	£1.83	-£2.76	£1.83	-£2.76	£1.83	-£1.10	£0.12	-£1.10	£0.12
Voids & Gaps	-£3.32	£1.81	-£3.32	£1.81	-£3.32	£1.81	-£1.12	£0.51	-£1.12	£0.51
River Rest	-£1.80	£1.23	-£1.80	£1.23	-£1.80	£1.23	-£0.90	£0.46	-£0.90	£0.46
Sustainability Reductions	-£2.27	£1.28	-£2.27	£1.28	-£2.27	£1.28	-£0.45	£0.44	-£0.45	£0.44
Abstraction Incentive Mechanism	N/A	£0.67	N/A	£0.50	N/A	£0.42	N/A	£0.34	N/A	£0.42

2. Executive Summary

- Σ 'Water Quality' emerged as by far the most important performance commitment across all demographics and water zones. 'Mains Bursts' and 'Leaks' were the second and third most important performance commitments.
- Σ 'Abstraction Incentive Mechanism' is the least important performance commitment for customers. 'Low Pressure', 'Voids & Gaps' and 'Average Water Use Per Household' are also limited factors of little importance to customers.

- Σ Overall, the concept of incentive payments split opinions: while over a third (39%) of customers felt that this proposition was fairly or very acceptable, nearly half (49%) felt that it was fairly or very unacceptable.
- Σ When looking at specific performance commitments, 'Leaks' and 'Average Water Use Per Household' are areas that customers feel least accepting of a price increase.
 - Although 'Leaks' is an important factor, customers feel this should be a standard service and many find it unacceptable to pay more for this commitment.
 - 'Average Water Use Per Household' was identified as a limited factor; customers found this commitment less important than others, therefore it's not surprising that increasing the price for 'Average Water Use Per Household' targets is also less accepted.
- Σ 'Sustainability Reduction', 'River Restoration', and 'Abstraction Incentive Mechanism' were the commitments which respondents were more likely to be prepared to pay an increase in their monthly water bill on the basis that Affinity Water exceeded their targets.
 - This suggests that addressing environmental concerns is something that customers will be willing to pay a little extra for.

3. Importance of Affinity Water Performance Commitments 2020-25

- Σ 11 'Performance Commitments' designed to challenge Affinity Water to achieve high levels of performance were tested with customers. Respondents were shown the following information describing each of the commitment areas and targets:

2

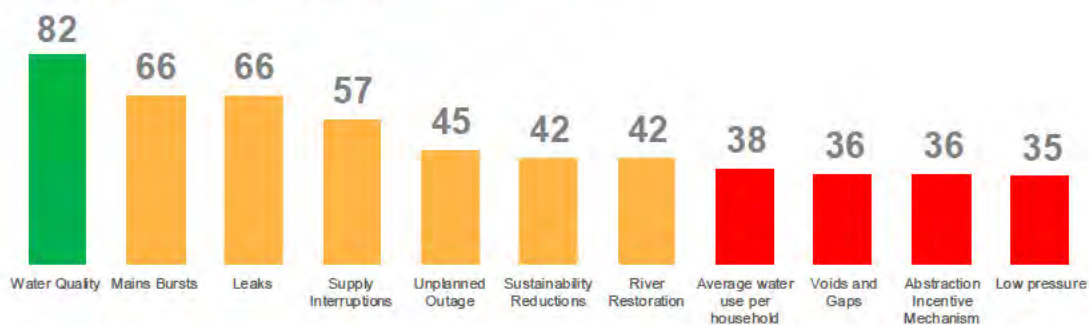
- **Leaks:** Reduce the amount of water lost from leaking pipes by 18.5% over the period 2020-2025.
- **Average water use per household:** Use a number of methods, such as metering and media campaigns, to raise awareness amongst customers of how much water they are using and encourage them to conserve water.
- **Supply Interruptions:** Aim for no customer to be subjected to an unplanned interruption to their water supply for longer than three hours.
- **Unplanned Outage:** Ensure that Affinity Water's water treatment assets continue to operate reliably
- **Mains bursts:** Maintain the condition of mains pipelines, identifying and repairing bursts when they occur in order to minimise disruption.
- **Water Quality:** Continue to supply high-quality water to customers and so continue to meet water quality compliance targets.
- **Low Pressure:** Reduce the number of properties on the 'low pressure register': Properties are put on the register if they are at risk of experiencing pressures below the minimum standard.

- **VOIDS & GAPS:** Reduce the number of properties wrongly classified as empty on the billing system, or not recorded as existing at all; resolving them will reduce bills for other customers.
- **RIVER RESTORATION:** Invest money to significantly improve the quality of local rivers, delivering benefits to wildlife and people who visit the rivers.
- **SUSTAINABILITY REDUCTIONS:** Reduce reliance on taking water from environmentally-sensitive sites in favour of sites that have a lower impact on the environment.
- **ABSTRACTION INCENTIVE MECHANISM:** In a period of dry weather, avoid taking water from environmentally-sensitive sites, and instead take water from alternative sources.

3

- We wanted to understand the relative importance of each performance commitment among customers, therefore a Max Diff analysis was conducted. In the exercise consumers were shown all 11 commitments in 6 groups, with each set they were asked to choose the feature they considered to be most and least important. This analysis shows the commitments that are seen to be most important relative to one another. The results provide a scores out of 100, over 70 indicated most important, around 50 is fairly attractive and those below 40 are not important
- Water Quality emerges as the most important performance commitment. Abstraction Incentive Mechanism is the least important performance commitment for customers. Low Pressure, Voids & Gaps and Average Water Use Per Household are also limited factors of little importance to customers.

Figure 1: Features ranked by importance - Max Diff



~70: Consider over & above ~41-70: Strong ~40 and lower: Limited

Base: 1006/1006 adults aged 16+ from across the Affinity Water customer areas, March 2019

- Water Quality emerges as the most important performance commitment across all demographics and water zones.
- There are some significant differences identified when looking at age.

- o Younger customers aged 16-34 tend to place more importance on a wider number of performance commitments including; average water use, low pressure, voids and gaps, river restoration, sustainability reductions and abstraction incentive mechanism.
- o Older customers aged 55+ are significantly more concerned about mains bursts and leaks.

Figure 2: Features ranked by importance - Max Diff

	Leaks	Average water usage	Supply interruptions	Unplanned outage	Mains bursts	Water Quality	Low pressure	Voids and gaps	River restoration	Sustainability reductions	Abstraction Incentive Mechanism
Total	66	38	57	45	66	82	35	36	42	42	36
Male	68	38	58	46	67	81	36	34	41	41	35
Female	63	39	55	44	65	83	34	37	44	44	36
Aged 16-34	57	45	55	45	58	78	37	40	46	47	39
Aged 35-54	62	40	58	46	63	81	37	37	43	43	36
Aged 55+	70	36	56	45	69	83	34	34	41	41	35
ABC1	66	39	57	45	66	82	35	36	42	42	35
C2DE	64	38	56	44	65	83	36	37	42	42	35
Benefits	62	39	56	45	65	83	36	38	42	42	36
No benefits	66	38	57	45	66	82	35	35	42	43	36
Have meter	66	38	56	45	66	82	35	36	43	43	36
No meter	65	38	57	45	66	83	36	36	41	41	35
Main bill payer	64	39	58	46	65	82	36	36	42	42	35
Joint Bill payer	68	38	54	43	68	81	34	35	43	44	36
Misbourne	67	38	57	46	66	80	35	36	43	43	35
Colne	65	37	61	48	67	82	36	35	39	40	34

Lee	66	37	56	43	66	82	33	35	44	45	37
Pinn	63	40	56	46	64	83	36	37	43	42	35
Stort	65	41	57	45	65	83	36	34	40	42	36
Wey	65	38	55	44	66	83	37	36	42	42	36
Dour	68	38	50	43	67	82	32	34	47	46	37
Brett	73	37	55	41	68	82	34	39	41	41	34

Base: 1,006 adults aged 16+ from across the Affinity Water customer areas, March 2019. Male (n=522), Female (n=484), Age 16-34 (n=137), Age 35-54 (n=315), Age 55+ (n=554), ABC1 (n= 696), C2DE (n=310), Benefits (= 189), No Benefits (n=798), Meter (n=596), No meter (n=385), Main bill payer (n=702), Joint bill payer (n=304), Misborune (n= 136), Colne (n=158), Lee (n=167), Pinn (n=182), Stort (n=105), Wey (n=152), Dour (n=66), Brett (n=40)

4.1 Overall acceptability of bill reductions/ increases based on performance commitments

- Σ Next, customers were asked to consider all 11 Performance Commitment areas as a collective and to rate the level of acceptability regarding incentives (penalties and rewards) as a general concept.
- Σ Following the description of Performance Commitments and incentives, participants were asked the following question:
 - *“In general to what extent do you think it is acceptable or unacceptable that, if Affinity Water fails to meet its targets it could reduce your bills each year BUT if Affinity Water were to exceed its targets it could result in an increase to your bill each year”.*
- Σ Overall, the concept of incentive payments split opinions: while over a third (39%) of customers felt that this proposition was fairly or very acceptable, nearly half (49%) felt that it was fairly or very unacceptable.

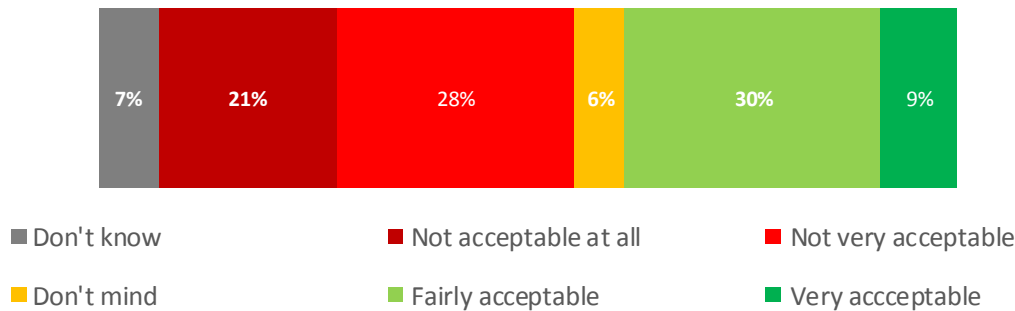


Figure 3: Stated acceptability of overall Performance Commitment bill reductions/ increases

Base: 1,006 adults aged 16+ from across the Affinity Water customer areas, March 2019

- Σ Younger age groups are significantly more accepting of reductions and increases to their bill based on overall performance commitments compared to those aged 55+.
 - 46% of those aged 16-34 and 47% of those aged 35-54 agree that the increases/ reductions are fairly or very acceptable compared to only 32% of those aged 55+.
- Σ Those living in Lee are also significantly more accepting of reductions and increases to their bill based on overall performance commitments compared to the total, however those living in Misbourne are significantly less accepting.
 - 50% of those living in Lee agree that the increases/ reductions are fairly or very acceptable compared to 39% total.
 - 57% of those living in Misbourne feel that the increases/ reductions are not very acceptable or not acceptable at all compared to 49% total

Figure 4: Stated acceptability of overall Performance Commitment bill reductions/ increases

	Very acceptable	Fairly acceptable	Not very acceptable	Not acceptable at all	Don't mind	Don't know	Acceptable (NET)	Unacceptable (NET)
<i>Total</i>	9%	30%	28%	21%	6%	7%	39%	49%
<i>Male</i>	10%	28%	28%	25%	6%	5%	38%	52%
<i>Female</i>	8%	32%	28%	17%	6%	9%	40%	45%
<i>Aged 16-34</i>	9%	36%	28%	17%	6%	4%	46%	45%
<i>Aged 35-54</i>	12%	35%	20%	20%	5%	9%	47%	39%
<i>Aged 55+</i>	7%	25%	32%	23%	7%	6%	32%	55%
<i>ABC1</i>	9%	28%	28%	22%	6%	6%	38%	50%
<i>C2DE</i>	8%	32%	27%	18%	6%	8%	40%	46%
<i>Benefits</i>	12%	30%	22%	18%	6%	12%	42%	40%
<i>No Benefits</i>	8%	30%	29%	22%	6%	5%	38%	51%

<i>Have meter</i>	10%	30%	28%	22%	6%	4%	41%	50%
<i>No meter</i>	8%	28%	28%	19%	7%	10%	36%	48%
<i>Main bill payer</i>	10%	29%	27%	21%	6%	7%	39%	48%
<i>Joint bill payer</i>	7%	31%	29%	20%	7%	6%	38%	50%
<i>Misbourne</i>	7%	24%	29%	27%	5%	8%	30%	57%
<i>Colne</i>	8%	26%	32%	22%	6%	5%	34%	54%
<i>Lee</i>	13%	37%	22%	17%	5%	7%	50%	38%
<i>Pinn</i>	7%	30%	25%	22%	7%	9%	37%	47%
<i>Stort</i>	9%	36%	30%	17%	3%	6%	45%	47%
<i>Wey</i>	9%	28%	28%	20%	9%	5%	38%	49%
<i>Dour</i>	14%	23%	24%	26%	8%	6%	36%	50%
<i>Brett</i>	5%	30%	43%	15%	3%	5%	35%	57%

Base: 1,006 adults aged 16+ from across the Affinity Water customer areas, March 2019. Male (n=522), Female (n=484), Age 16-34 (n=137), Age 35-54 (n=315), Age 55+ (n=554), ABC1 (n= 696), C2DE (n=310), Benefits (= 189), No Benefits (n=798), Meter (n=596), No meter (n=385), Main bill payer (n=702), Joint bill payer (n=304), Misbourne (n= 136), Colne (n=158), Lee (n=167), Pinn (n=182), Stort (n=105), Wey (n=152), Dour (n=66), Brett (n=40)

4.2 Individual pricing acceptability of bill reductions/ increases based on performance commitments

- Σ Customers were then asked how acceptable or unacceptable a specified reduction value and a specified increase value was each of the 11 performance commitments (see above for explanation)

- Σ It appears that commitments related to protecting the environment are those that customers are most willing to pay extra for provided that Affinity Water exceeds its targets. Sustainability Reduction’, ‘River Restoration’ and ‘Abstraction Incentive Mechanism’ were the only performance commitments that had stronger acceptability scores than unacceptability scores for an increase on the customer bill.
 - The ‘Sustainability Reduction’ Performance Commitment appears to be the area that customers were most willing to pay for an increase on their bills
 - 47% believed that £1.28 was a fairly or very acceptable increase for exceeding targets whereas only 28% thought it was not very acceptable or not acceptable at all.
 - Similarly 50% found an increase of £0.44 acceptable were Affinity Water to exceed this target compared to only 34% finding the increase unacceptable.
 - ‘River restoration’ was also a commitment that customers were willing to pay extra for
 - 50% are prepared to pay £1.23 extra and only 38% feel the increase is unacceptable
 - 52% are prepared to £0.46 extra and only 35% think the increase is unacceptable

- 'Abstraction Incentive Mechanism' was also a commitment that customers were willing to pay extra for
 - 57% found £0.67 an acceptable increase and only 28% thought it was an unacceptable increase
 - 53% rated £0.50 as an acceptable increase and only 31% thought it was an unacceptable increase
- Overall the 'Leaks' and the 'Average Water Use Per Household' performance commitments appear to be the commitments customers are least willing to pay more for
 - 52% found an increase of £3.60 for the 'Leaks' performance commitment unacceptable
 - 57% found an increase of £2.92 for the 'Average Water Use Per Household' performance commitment unacceptable
- 'Supply Interruptions', 'Low Pressure' and 'Voids & Gaps' are performance commitments which divide customers; some feel it's acceptable to pay more for and some feel it's unacceptable.
- Most customers appreciate the reduction in 'Water Quality', 'Mains Burst' and 'Unplanned Outage' for unmet targets but there doesn't tend to be much significant difference between the specific reduction value offered.
 - When thinking about the 'Unplanned Outages' performance commitment 59% were happy with a £3.74 reduction but 57% of customers were also happy with a £1.99 reduction.
 - When thinking about the 'Mains Burst' performance commitment 62% were happy with a £4.18 reduction but 58% of customers were also happy with a £2.06 reduction.
 - When thinking about the 'Water Quality' performance commitment 49% were happy with a £1.82 reduction but 48% of customers were also happy with a 12p reduction.

Commitment One – Leaks

When looking at the 'leaks' commitment, nearly half (48%) are willing to pay 68p more if Affinity Water exceeds their targets. This drops 11 percentage point to around a third (37%) when the price is increased to £3.60.

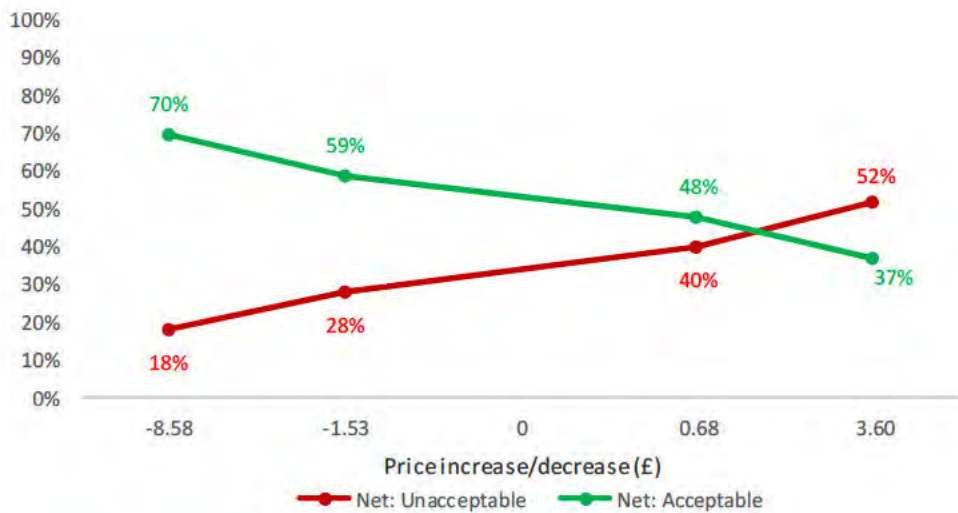


Figure 4: Acceptability of price increases/decreases – Leaks

Base: 501-505 /1006 adults aged 16+ from across the Affinity Water customer areas, March 2019

Commitment two – Average water usage per household

When looking at the ‘Average water use per household’ commitment, just under a third (30%) are willing to pay £2.92 more if Affinity Water exceeds their targets. When looking at the cost of reductions there is no significant difference between a reduction of £1.03 and a reduction of £1.55

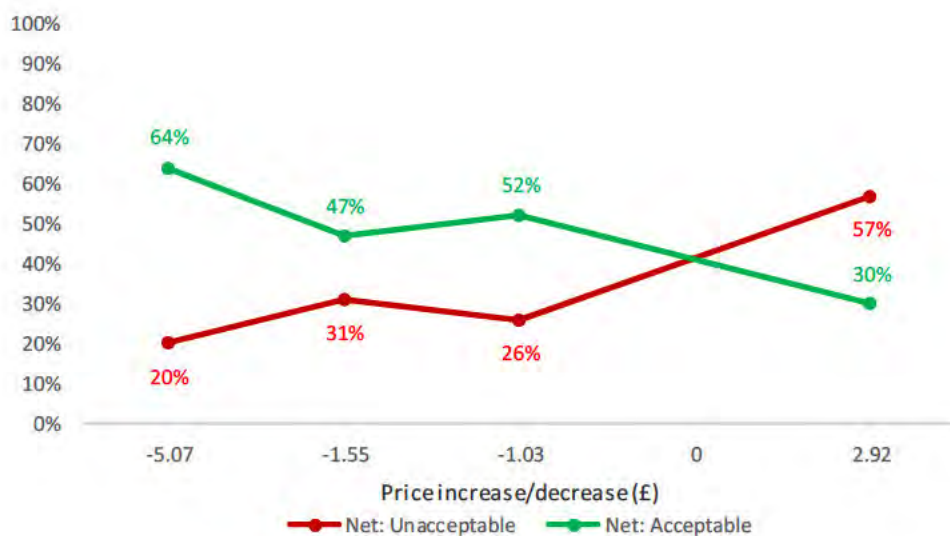


Figure 5: Acceptability of price increases/decreases – Average water use per household

Base: 168-337-1,006 /1006 adults aged 16+ from across the Affinity Water customer areas, March 2019

Commitment three – Supply Interruptions

When looking at ‘supply interruptions’ 48% found an increase of £1.87 unacceptable with 40% finding it acceptable. The parity of these figures suggests that customers would not unanimously be against a future price increase were no customer to be subject to an unplanned interruption for more than three hours.

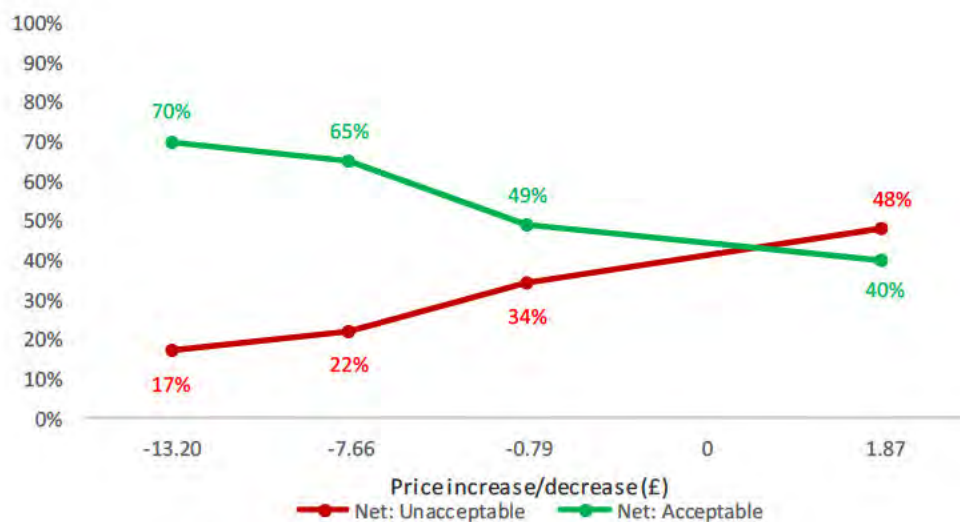


Figure 6: Acceptability of price increases/decreases – Supply interruptions

Base: 501 - 168 - 337 - 1,006 /1006 adults aged 16+ from across the Affinity Water customer areas, March 2019

Commitment four – Unplanned outages

When looking at the ‘unplanned outage’ commitment, there is not much differentiation in acceptability between a decrease of £3.74 and £1.99. This suggests that any decrease would be welcome but the amount reduced differentiates little.

Figure 7: Acceptability of price increases/decreases – Unplanned outage



Base: 505 /1006 adults aged 16+ from across the Affinity Water customer areas, March 2019

Commitment five – Mains bursts

When looking at the ‘mains bursts’ commitment, there is not much differentiation in acceptability between a decrease of £4.18 and £2.06

**Figure 8:
Acceptability of price
increases/decreases – Mains
Bursts**

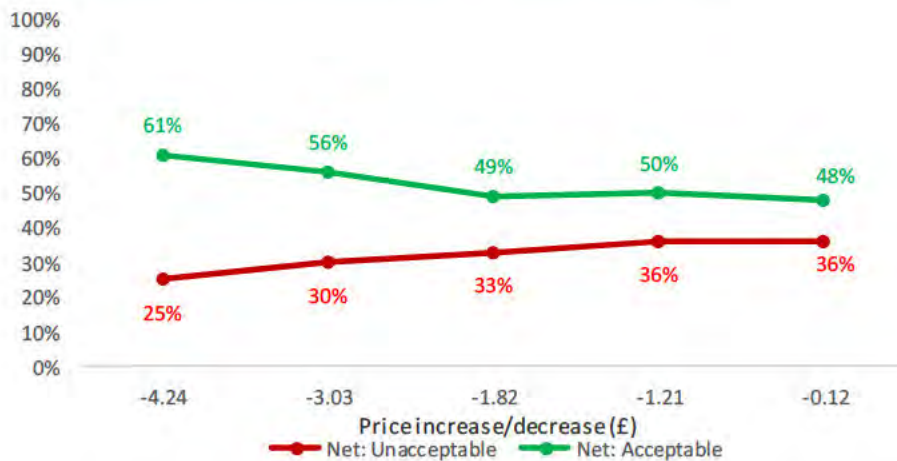


Base: 501 - 505 /1006 adults aged 16+ from across the Affinity Water customer areas, March 2019

Commitment six – Water Quality

When looking at the ‘water quality’ commitment, there is no significant difference in acceptability between a reduction of £3.03 and a reduction of 12p. Only when the reduction reaches the highest value of £4.24 do nearly two third of customers feel satisfied. This suggests that reaching the target of water quality is of high importance to customers.

Figure 9: Acceptability of price increases/decreases – Water Quality



Base: 249 – 252 – 169 - 168 /1006 adults aged 16+ from across the Affinity Water customer areas, March 2019

Commitment seven – Low pressure

When looking at the ‘low pressure’ commitment, customers tend to be nearly as satisfied with a reduction in their bill of £1.10 as they are a reduction of £4.43.

More customers find an increase of 12p more acceptable than unacceptable if this low pressure target was to be met.

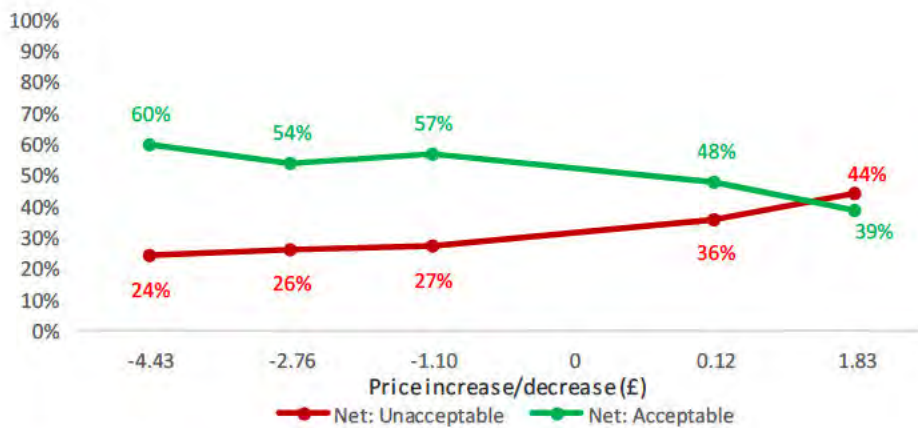


Figure 10: Acceptability of price increases/decreases – Low Pressure

Base: 501 – 337 – 168 /1006 adults aged 16+ from across the Affinity Water customer areas, March 2019

Commitment eight: Voids and Gaps

When looking at the ‘Void and Gaps’ commitment, customers feel that any kind of increase is more unacceptable than acceptable. Although an increase of £1.81 is more or less equally unacceptable than an increase of £0.51.

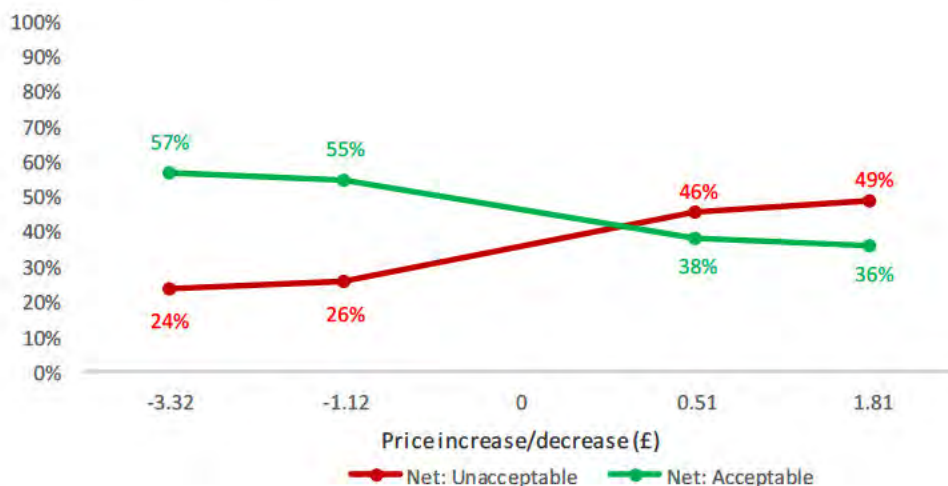


Figure 11: Acceptability of price increases/decreases – Voids and Gaps

Base: 501 - 505 /1006 adults aged 16+ from across the Affinity Water customer areas, March 2019

Commitment nine – River Restoration

When looking at the ‘River Restoration’ commitment, customers feel that any kind of increase to their bill for exceeding targets is more acceptable than unacceptable. This shows that ‘River Restoration’ is important to customers as they would be prepared to pay a slight increase in their bill were this commitment to be met.

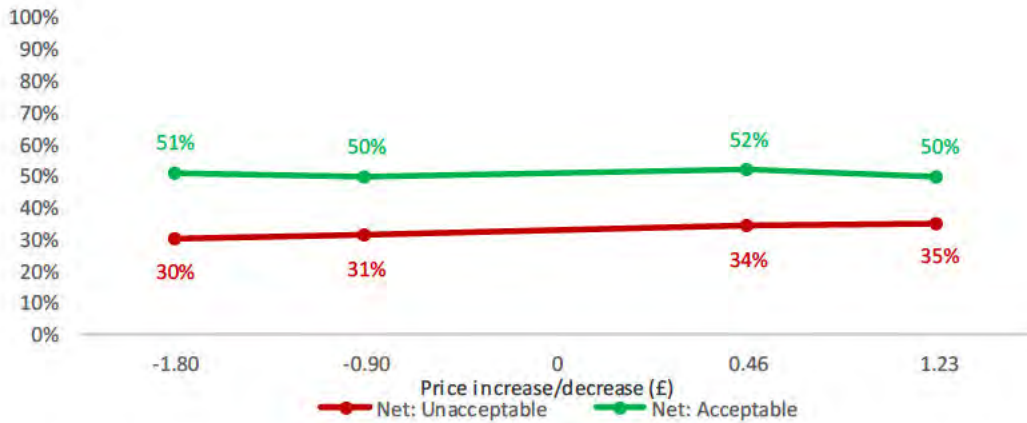


Figure 12: Acceptability of price increases/decreases – River Restoration

Base: 501 - 505 /1006 adults aged 16+ from across the Affinity Water customer areas, March 2019

Commitment ten: Sustainability Reductions

When looking at Sustainability Reductions most customers were willing to accept a price increase were Affinity Water to exceed their targets on this measure. 50% of customers would accept a price increase of £0.44, with 47% willing to accept an increase of £1.28.

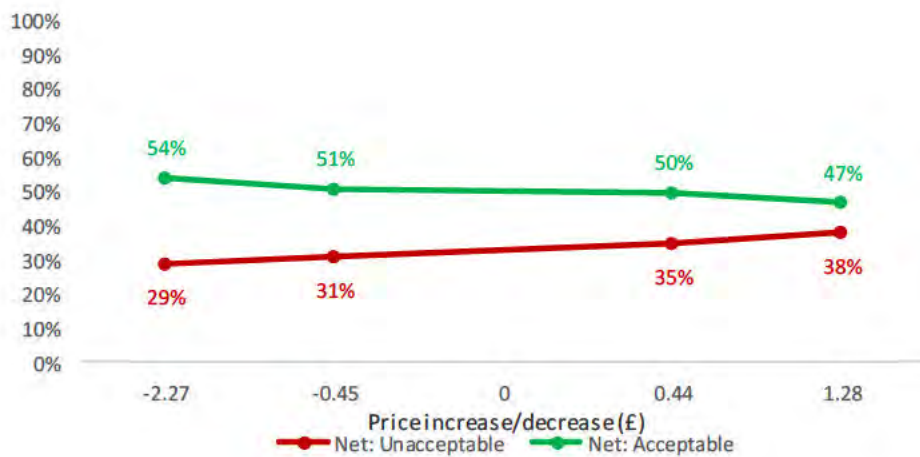


Figure 13: Acceptability of price increases/decreases – Sustainability Reductions

Base: 501 - 505 /1006 adults aged 16+ from across the Affinity Water customer areas, March 2019

Commitment 11: Abstraction Incentive Mechanism

When looking at the 'Abstraction Incentive Mechanism' commitment, customers feel that any kind of increase to their bill for exceeding targets is more acceptable than unacceptable.

Figure 14: Acceptability of price increases/decreases – Abstraction Incentive Mechanism



Base: 249 – 420 - 169/1006 adults aged 16+ from across the Affinity Water customer areas, March 2019

Appendix

Data Sample profile

		Completes N=1,006	% Breakdown
Community Zone (WRZ) WATER ZONE	Misbourne	136	14%
	Colne	158	16%
	Lee	167	17%
	Pinn	182	18%
	Stort	105	10%
	Wey	152	15%
	Dour	66	7%
	Brett	40	4%

Gender [Q1]	Male	522	52%
	Female	484	48%

Age [SAGE]	16-24	29	2%
	25-34	108	7%
	35-54	315	27%
	55+	554	55%

Socio-economic group [Q5]	ABC1	696	69%
	C2DE	310	31%

Appendix OC.A44.1

Action ref AFW.OC.A44

Letter dated 23 April 2018 to Jon Ashley, setting out Affinity Water's AIM plans post April 2018, including the reasoning behind the groupings

Jonathan Ashley
Director of customer engagement and outcomes
Ofwat,
City Centre Tower,
7 Hill Street,
Birmingham,
B5 4UA



Affinity Water Limited,
Tamblin Way,
Hatfield,
Herts,
AL10 9EZ

23 April 2018

Dear Jon,

Affinity Water operating plans for AIM for the future

We would like to take this opportunity to expand on our slides from Tuesday 17 April 2018 and update you as to our experience gained through operating according to the Abstraction Incentive Mechanism (AIM) to date. We would also like to set out our plans regarding the operation of AIM from April 2018 onwards. Both of these are outlined in Appendix 1.

If you have any queries, please do not hesitate to contact me, either by email  or by phone .

Yours sincerely,

Daniel Yarker



Asset Scientist - Water Resources

Asset Strategy

Appendix 1- Affinity Water operating plans for AIM for the future

We have been a leading force within the industry with regards to AIM, since its inception in April 2016. A total of 23 groundwater sources were identified as sensitive and were included within our final PR14 submission to Ofwat (Table 1 in Appendix). These were a combination of: planned sustainability reduction sites, sites where there is a pre-existing operating agreement (e.g. augmentation scheme) and sites which were under National Environment Programme (NEP) investigation. Abstraction licences which have been altered under the Restoring Sustainable Abstractions scheme as of 1 April 2018 are highlighted grey in Table 1, below. Table 1 Affinity Water AIM Sources, as of 1 April 2016

	Source	Licence Number	Avg. Ann. Licence	Max Daily Licence	2015 Deployable Output (DO)		AIM Baseline	Combined AIM baseline
NEP sensitive	Netherwild	28/39/28/336		40.91	28.00	30.00	18.51	37.16
	Bricket Wood	28/39/28/336		27.28	14.00	15.00	18.65	
	Chesham	28/39/28/104	5.22	7.09	5.22	6.00	4.08	4.08
Operating Sustainability	Oughton Head	28/39/28/339	4.55	6.55	4.10	5.22	4.43	5.03
	Offley Bottom	06/33/13/09	1.14	1.14	0.00	0.00	0.60	
	Slip End	06/33/14/36	5.46	6.82	0.00	0.00	3.62	3.62
	Well Head	06/33/13/10	2.27	2.27	1.15	1.15	0.84	0.84
	Primrose	9/40/4/497/G	3.00	4.00	3.00	3.00	2.50	6.50
	Buckland Mill	14/033	4.00	4.00	4.00	4.00	4.00	
	Denge Gravels	9/40/5/71/G	9.04	15.00	4.65	9.04	6.00	6.00
AIM Sustainability	Bow Bridge	28/39/28/130	6.82	11.37	5.82	5.82	0.00	0.00
	Whitehall	29/38/03/42	22.73	30.46	15.00	28.00	19.00	19.00
	Fulling Mill	29/38/02/46	9.09	9.09	5.60	9.09	5.34	5.34
	Marlowes	28/39/28/335		20.47	4.74	4.74	4.42	20.14
	Piccotts End	28/39/28/335			15.72	15.72	15.72	
	Hughenden	28/39/25/47	2.28	2.27	1.60	1.75	1.46	1.46
	Amersham	28/39/28/334	7	18.18	7.00	12.00	7.51	10.38
Chalfont St Giles	28/39/28/334	4	4.55	4.00	4.50	2.87		
AIM Potential	Digswell	29/38/02/46	11.37	11.37	7.88	7.88	7.53	7.53
	Holywell	28/39/28/337		9.09	8.20	9.09	10.29	17.72
	Mud Lane	28/39/28/337		11.37	10.03	11.37	7.43	
	Periwinkle Lane	28/39/28/401	4.99	5	4.19	4.19	3.36	9.94
	Runleywood (Chalk)	29/38/01/09	9.55	9.55	6.30	6.30	6.58	

Since April 2016, we have had two full years of operating AIM, including the prolonged groundwater drought of 2017 which we are currently experiencing. We have implemented sustainability reductions in six river catchments as of 1 April 2018. Additionally, through our extensive monitoring programme, our conceptual understanding of the hydrogeology of the catchments in which we operate AIM has advanced. All in all, we feel that we have a much stronger understanding of AIM than we did in April 2016. This allows us to operate AIM in a way that maximises the benefit to the environment, whilst maintaining an effective and resilient water supply to our customers.

Many of our catchments have more than one source which is assessed for AIM. In such cases, we have grouped the sources for the purposes of assessing AIM. The groupings have been used as the baseline was calculated based on the performance of AIM sources under historic droughts, and this does not necessarily reflect the current operational regime. An example is the Bricket Wood and Netherwild sources. These are now both baseload sources of the Clay Lane group licence and usually abstract at a higher rate than the AIM baseline. In the event of an operational outage at either of the sources, there is a need for the flexibility to increase abstraction at the other, to compensate the lost output. Without the grouping, we would not be able to recoup the lost volume if an outage occurred during a low flow period.

The groupings are also important when calculating the normalised AIM score. The relative size of different abstractions means that if output from one source was increased in response to an outage at a baseload source during a low flow period, without the grouping, the normalised AIM score of the two sources would not balance and the AIM assessment would be inaccurate. Where sources are grouped, the same trigger point is used. This is usually the downstream gauge of both sources in the grouping, such that the benefit of their combined operation can be realised.

We are also proposing to alter the method of assessment for our Slip End Source. Currently, the AIM trigger of 2.55 Ml/d is used to assess AIM. This forms the upper limit of a table of step reductions in the abstraction licence. These reductions are proportional to flow at Ashwell gauging station. It is considered to be inappropriate to claim a benefit from AIM using 2.55 Ml/d as a trigger, as when flow drops below this point, the step reductions limit abstraction, eventually below the AIM baseline. Instead, it is proposed that the AIM trigger should vary, depending on flow at Ashwell gauging station and the abstraction rate specified in the licence. To allow for headroom, we usually abstract slightly less than we are entitled to under most of our abstraction licences. With this in mind, we suggest that the AIM baseline should be 95 % of the licensed abstraction at Slip End at any time (see Table 2), so that a benefit can be claimed for any abstraction lower than usual operation.

Table 2 Proposed moving AIM baseline at Slip End

Flow at Ashwell Gauging Station at National Grid Reference TL 267 401 in litres per second	Maximum Daily Abstraction rate in Ml/d	Proposed AIM trigger (95 % of Licensed volume)
Flows above 29.46	Up to 6.82	
Between 28.95 and 29.46	5.46	5.18
Between 28.41 and 28.94	5.00	4.75
Between 27.90 and 28.40	4.55	4.32
Between 27.36 and 27.89	4.09	3.89
Between 26.83 and 27.35	3.64	3.46
Between 26.32 and 26.82	3.18	3.02
Between 25.78 and 26.31	2.73	2.59
Between 25.27 and 25.77	2.27	2.16
Between 24.74 and 25.26	1.82	1.73
Between 24.20 and 24.73	1.36	1.30
Between 23.69 and 24.19	0.91	0.86
Between 23.15 and 23.68	0.46	0.43

Less than 23.15	0.00	0.00
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We are currently undergoing discussions with the Environment Agency with regard to our proposed AMP 7 sustainability reductions at Periwinkle Lane and Runleywood Chalk. We are investigating the impact of these abstractions and our current understanding is that reductions here, either for AIM or in the form of sustainability reductions, are unlikely to benefit flows in the upper Lea. As such, from April 2018 we intend to report our total AIM scores, both inclusively and exclusively of these sources.

As shown by our substantial sustainability reductions programme, we remain committed to reducing the impact of our abstractions on the environment. Where a sustainability reduction has reduced deployable output (DO) to 0 MI/d, we intend to remove the respective abstraction from AIM, as the impact of the abstraction has been fully mitigated. Where a sustainability reduction has reduced DO but not to 0 MI/d, there remains the potential for a residual impact of the abstraction on the environment. We therefore propose that these sources remain in AIM, with an updated AIM baseline to the new average annual licensed abstraction rate. In this case, when AIM is triggered, the peak abstraction would be capped at the new average licence to encourage a lower output from those sources.

Our proposed AIM sources and baselines, post April 2018, are shown in Table 3. It represents a slight change to the draft note which we submitted to the Environment Agency in January 2018. The main differences are:

- The inclusion and sub-totalling of the Runleywood Chalk and Periwinkle Lane sources.
- Inclusion of sources which have had a sustainability reduction which has not reduced DO to 0 MI/d, including both Chalfont St Giles and Amersham.



Table 3 Proposed AIM sources and AIM baselines, post April 2018

Source	Licence Number	Avg. Ann. Licence	Max Daily Licence	2015 DO Avg	2015 DO Peak	AIM Baseline	Combined AIM baseline	Comments
Netherwild	28/39/28/336		40.91	28.00	30.00	18.51	37.16	
Bricket Wood	28/39/28/336		27.28	14.00	15.00	18.65		
Chesham	28/39/28/104	5.22	7.09	5.22	6	4.08	4.08	
Oughton Head	28/39/28/339	4.55	6.55	4.10	5.22	4.43	5.03	
Offley Bottom	06/33/13/09	1.14	1.14	0	0	0.60		
Slip End	06/33/14/36	5.46	6.82	0	0	3.36	95 % of licensed rate	Change in AIM baseline and assessment method, see Table 3
Well Head	06/33/13/10	2.27	2.27	1.15	1.15	0.84	0.84	
Primrose	9/40/4/497/G	3.00	4.00	3.00	3.00	2.50	6.50	
Buckland Mill	14/033/R01	4.00	4.00	4.00	4.00	4.00		
Denge Gravels	9/40/5/71/G	9.04	15.00	4.65	9.04	6.00	6.00	
Whitehall	29/38/03/42	2.00	10.00	2.00	10.00	2.00	2.00	New AIM baseline is 2 MI/d (post sustainability reduction annual average licence)
Digswell	29/38/02/46	11.37	11.37	7.88	7.88	7.53	7.53	
Marlowes	28/39/28/335	8.34	8.34	8.34	8.34	8.34	14.06	New AIM baseline is 14.06 MI/d (sum of post sustainability reduction rates at Piccotts End and Marlowes)
Piccotts End	28/39/28/335	5.72	10.72	5.72	10.72	5.72		
Amersham	28/39/28/334	4.00	9.00	4.00	9.00	4.00	6.87	New AIM baseline is 6.87 MI/d (sum of post sustainability reduction rate at Amersham and current AIM baseline for Chalfont St Giles)
Chalfont St.Giles	28/39/28/334	4.00	4.55	4.00	4.50	2.87		
Holywell	28/39/28/337		9.09	8.20	9.09	10.29	17.72	

Mud Lane	28/39/28/337		11.37	10.03	11.37	7.43		
Periwinkle Lane	28/39/28/401	4.99	5.00	4.19	4.19	3.36	9.94	Sub-total AIM score and report inclusively and exclusively of total AIM score
Runleywood (Chalk)	29/38/01/09	9.55	9.55	6.30	6.30	6.58		

Affinity Water Limited | Registered Office Tamblin Way, Hatfield, Hertfordshire, AL10 9EZ | [w www.affinitywater.co.uk](http://www.affinitywater.co.uk) | [t 01707 268111](tel:01707268111) | [f 01707 277333](tel:01707277333)

Registered in England No 2546950

Appendix OC.A44.2

Action ref AFW.OC.A44

Emailed recognition of letter dated 23 April 2018 from Jon Ashley

Hi Dan,

That is brilliant, thank you.

Best regards,

Jon

[REDACTED]
[REDACTED]

From: Yarker, Daniel [REDACTED]
Sent: 15 May 2018 09:05
To: Jon Ashley [REDACTED]
Subject: RE: Letter on the AIM of 23 April

Hi Jon

Thanks for your email.

Please see the attached PDF version of the letter.

Best regards,

Dan

Daniel Yarker
Senior Asset Scientist
Hydrogeology Team

Affinity Water Limited
Tamblin Way, Hatfield, Hertfordshire AL10 9EZ
Mobile: [REDACTED]
Telephone: [REDACTED]
Email: [REDACTED]

affinitywater.co.uk || facebook.com/affinitywater || twitter.com/affinitywater ||
linkedin.com/company/affinity-water

Keep track of the tap and help us save water this summer: if we all save a little, we'll all save a lot! For tips on saving water and to order your FREE water saving devices, visit www.affinitywater.co.uk/savewater

Spotted a leak? Let us know! Call the Leakspotters hotline **0800 376 5325**; email leakspotter.central@affinitywater.co.uk; or report a leak at www.affinitywater.co.uk/leakspotters

From: Jon Ashley [REDACTED]
Sent: 14 May 2018 16:48
To: Yarker, Daniel [REDACTED]
Subject: Letter on the AIM of 23 April

Hi Daniel,

Thank you for your letter to me about Affinity Water's operating plans for the AIM dated 23 April. Please could you send me an electronic version of your letter, if you have one, so that I can more easily share it with my Ofwat colleagues and save it on our systems.

Best regards,

Jon

Jonathan Ashley
Director of customer engagement and outcomes
Ofwat
Tel: [REDACTED]
Mobile: [REDACTED]

Ofwat, Centre City Tower, 7 Hill Street, Birmingham, B5 4UA
Ofwat, 4th Floor, 21 Bloomsbury Street, London, WC1B 3HF

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Appendix OC.A44.3

Action ref AFW.OC.A44

OFWAT query on the AIM- email from Jon Ashley

Hi Ilias,

I'll give you call at 1pm. Thank you for the quick response.

Best regards,

Jon

[REDACTED]
[REDACTED]

From: Karapanos, Ilias [REDACTED]
Sent: 15 August 2017 11:43
To: Jon Ashley
Cc: Charlesworth, Tim
Subject: RE: Query AFW-3C-001 on the AIM

Dear Jon,

I am available for a chat today from 1pm onwards – you can call me on 01707 679203.

Kind regards,

Ilias

Dr Ilias Karapanos, PhD, FGS, CGeol
Asset Specialist – Water Resources
Asset Strategy

Affinity Water Ltd
Tamblin Way, Hatfield, Hertfordshire AL10 9EZ
Mobile: [REDACTED]
Telephone: [REDACTED]

affinitywater.co.uk || facebook.com/affinitywater || twitter.com/affinitywater ||
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From: Jon Ashley [REDACTED]
Sent: 15 August 2017 11:30
To: Karapanos, Ilias
Cc: Charlesworth, Tim
Subject: Query AFW-3C-001 on the AIM

Dear Ilias,

I would like to have a quick chat with you to clarify your response to our Query AFW-3C-001 on the AIM. It's purely just to help me understand the response. I am on annual leave next week so hopefully we can have a quick call this week.

Best regards,

Jon

Jonathan Ashley
Associate Director
Ofwat
Tel: [REDACTED]
Mobile: [REDACTED]

Ofwat, Centre City Tower, 7 Hill Street, Birmingham, B5 4UA

Ofwat, 4th Floor, 21 Bloomsbury Street, London, WC1B 3HF

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Appendix OC.A44.4

Action ref AFW.OC.A44

Telephone call with Jon Ashley (Ofwat) regarding his query on reporting AIM sites in groups

On the 15th August 2017 at 1pm, Ilias Karapanos (IK) of the Asset Strategy department at Affinity Water had a telephone conversation with Jon Ashley (JA) from Ofwat, who enquired about the reasons for reporting AIM performance in groups rather than individual sources on some occasions. IK explained that the reason for this is that the AIM baseline was calculated based on the performance of the AIM sources under historic droughts and does not necessarily reflect the current operational regime. Netherwild and Bricketwood were mentioned as an example, since both of these are now baseload sources in the Clay lane group licence, hence their abstraction is normally higher than the AIM baseline. In the event of operational outages in any of the 2 sources we would need the flexibility to allow one of the 2 sources to pump higher to compensate for the loss of the other, so if this was to occur in a low flow period we would not be able to do so, based on the AIM targets. This is especially the case when the AIM normalised score is calculated where different abstraction rates can change the impact the Normalised AIM score has, based on the size of the abstraction and the duration of the low flow period. In other words, the 2 sources' Normalised AIM score would not cancel one another and the AIM reporting would not be accurate. As such, for sources that are located in the same catchment and the AIM trigger is the same (i.e. downstream gauge) the AIM score will be compared to the combined AIM baseline to give a combined score for the said sources. This ensures maximum operational flexibility of our sources is maintained to cover outages and also allows the environmental benefits to be realised in the catchment as measured by the AIM trigger locations (typically the downstream gauges).

JA was happy with the further explanation and the examples provided and thanked IK for the call.

Appendix OC.A44.5

Action ref AFW.OC.A44

Slides from OFWAT and water companies at workshop to discuss the future of AIM, on 17 April 2018



Abstraction Incentive Mechanism (AIM) Workshop

Jon Ashley, Chair

Ofwat, Centre City Tower, 7 Hill Street, Birmingham B5 4UA
17 April 2018

Time	Item	Presenter
10.00-10.30	Arrival, tea and coffee	All
Section 1 - Companies' experience with the AIM so far this price control period		
10.30-10.40	An introduction and the existing AIM guidelines	Jon Ashley, Ofwat
10.40-10.50	Affinity Water's experience of the AIM	Ilias Karapanos, Affinity Water
10.50-11.00	Thames Water's experience of the AIM	Chris Lambert, Thames Water
11.00-11.10	United Utilities' experience of the AIM	Janet Bromley, United Utilities
11.10-11.35	Discussion	All
11.35-11.45	Break	All
Section 2 - the AIM in the PR19 final methodology and a discussion of any issues this raises		
11.45-12.00	The PR19 final methodology on the AIM	Simon Harrow, Ofwat
12.00-12.40	Table discussion on implementing the PR19 final methodology on AIM	All
12.40-12.55	Plenary feedback from table discussions	All
12.55-13.00	Concluding remarks	Jon Ashley, Ofwat
13.00-13.30	Lunch	All

An introduction and the existing
AIM

guidelines

Jon Ashley

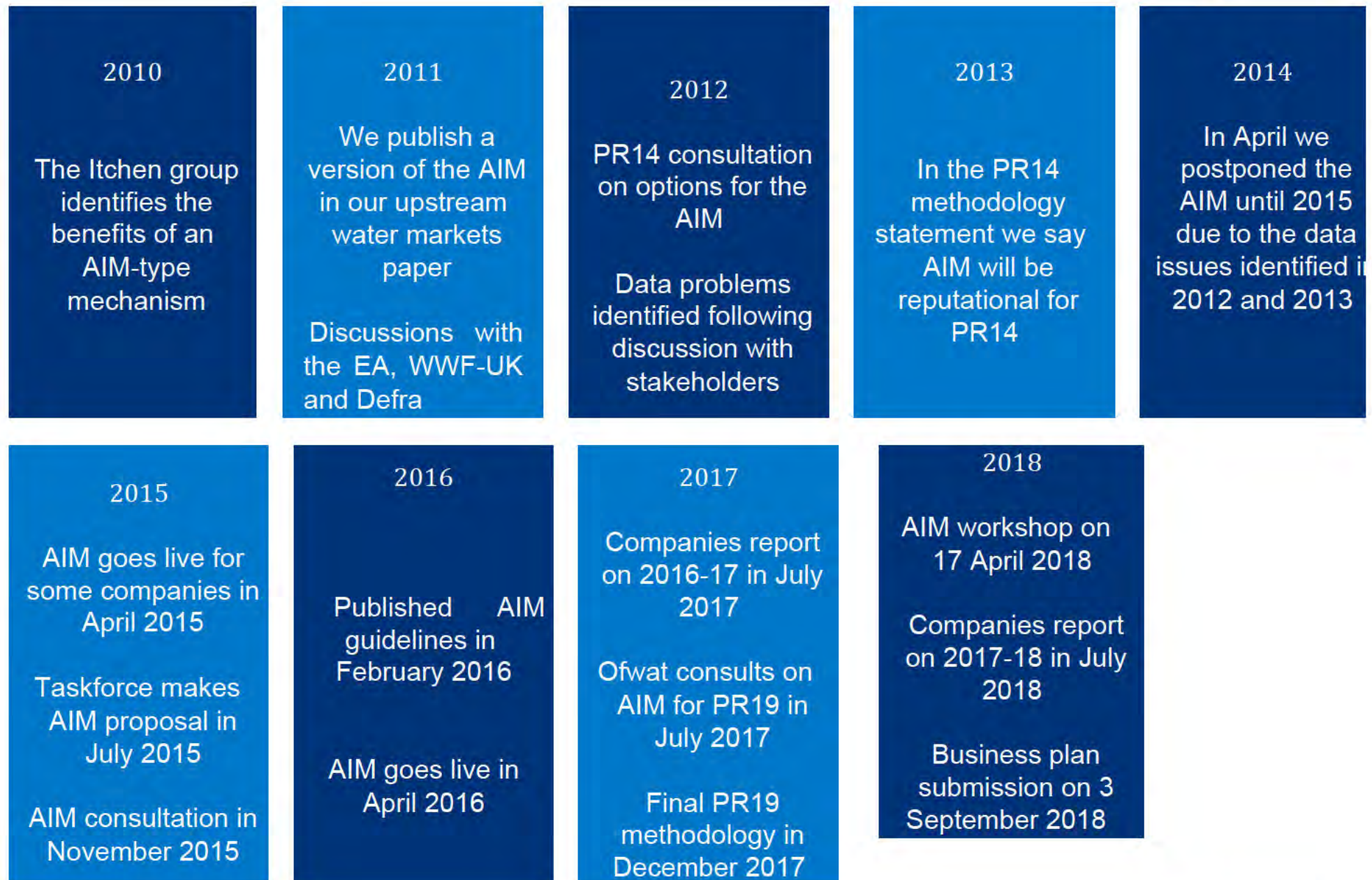
The objective of the AIM is:

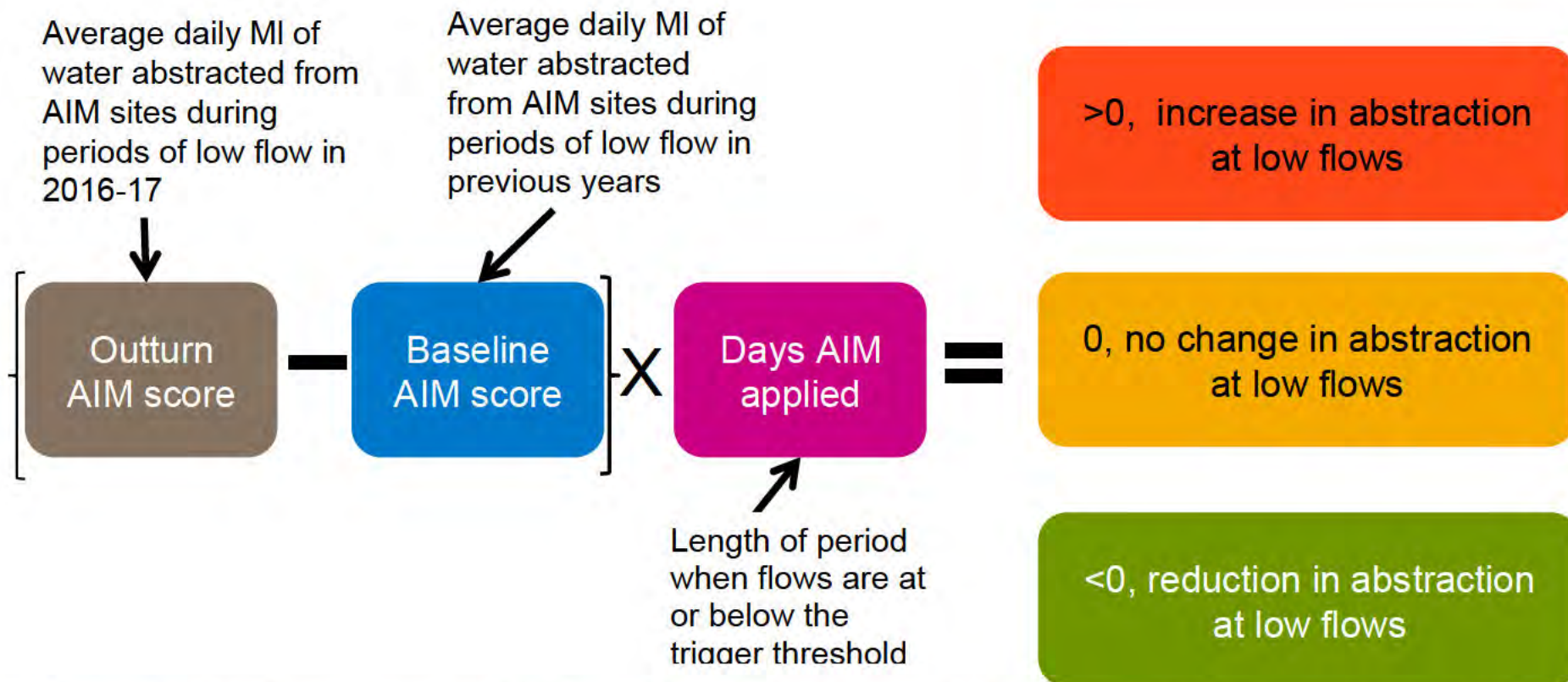
to encourage water companies to reduce the environmental impact of abstracting water at environmentally-sensitive sites during defined periods of low surface water flows.

This will help improve the resilience of water supplies and ensure that it is provided in a more sustainable way.

The AIM supports the formal abstraction licence process where reductions in licence quantities might be necessary for a range of environmental drivers identified through the Environment Agency's Water Industry National Environment Programme (WINEP) and Natural Resources Wales' National Environment Programme (NEP) processes.

AIM can help identify temporary and voluntary solutions that benefit the environment while more permanent solutions, including licence changes, are investigated and implemented.

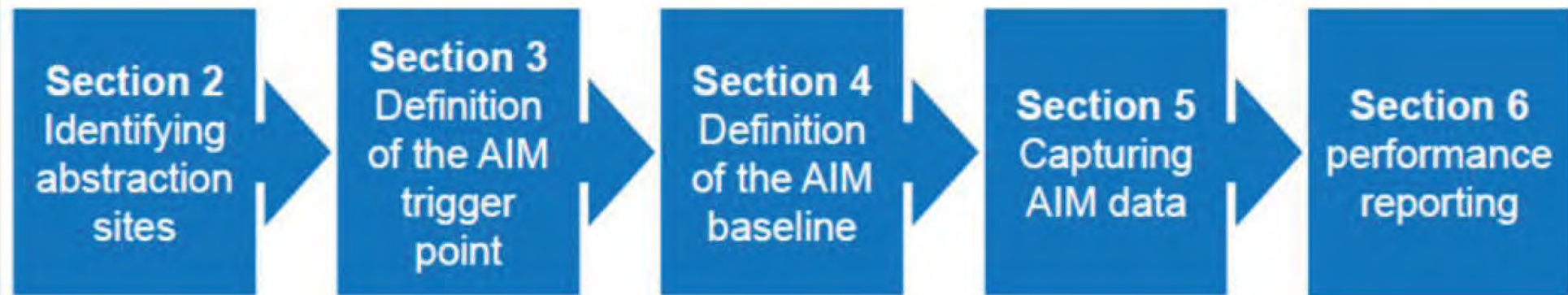




Companies have a reputational and/or financial incentive to improve relative to their baseline performance.

The AIM performance can be normalised by dividing the AIM performance above by (baseline average daily abstraction * length of period when river flows are at or below the trigger threshold)

Main features of the AIM guidelines (February 2016)



Key themes:

Local and bespoke design

River flow or groundwater level triggers

Assurance of design of AIM

Public reporting

No financial incentives required before PR19

Water and sewerage companies	Number of sites
Anglian	2
Northumbrian	1
Southern	0
Severn Trent	0
South West	0
Thames	5
United Utilities	4
Welsh	0
Wessex	1
Yorkshire	0

Water only companies	Number of sites
Affinity	23
Bournemouth	0
Bristol	0
Dee Valley	0
Portsmouth	1
SES Water	0
South East	2
South Staffs	3
Total	42

Red 0s indicate a company we expected to have AIM sites in 2016-17

Affinity Water's experience of the AIM
Ilias Karapanos, Affinity Water

Abstraction Incentive Mechanism (AIM) - Affinity Water experience

17 April 2018

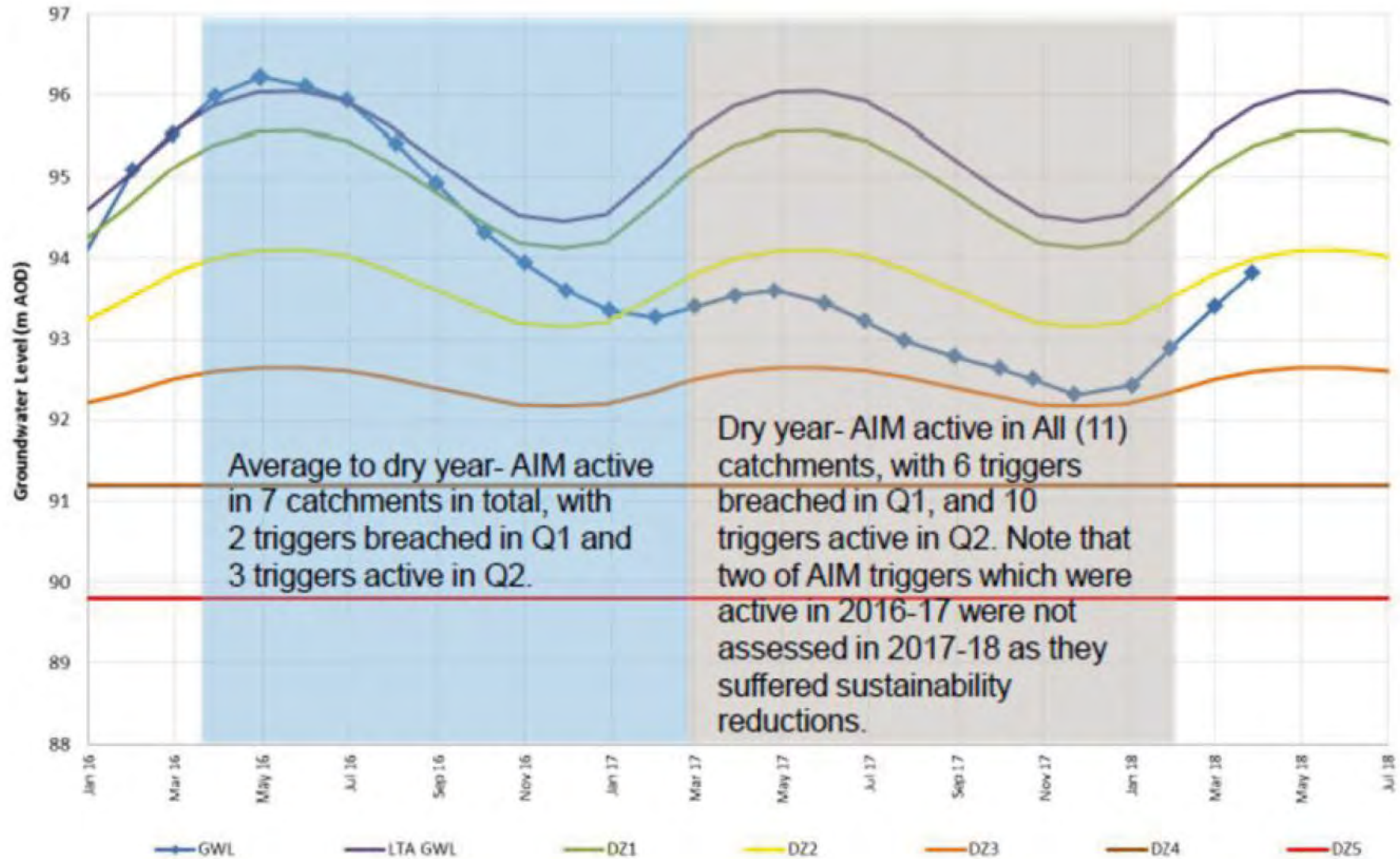
Dan Yarker- Asset Scientist

Dr Ilias Karapanos- Asset Specialist

Contents

- Our experience with AIM to date
- Complexities and solutions to operating AIM
- Next steps

AIM since 2016



➤ Our AIM sources in April 2016

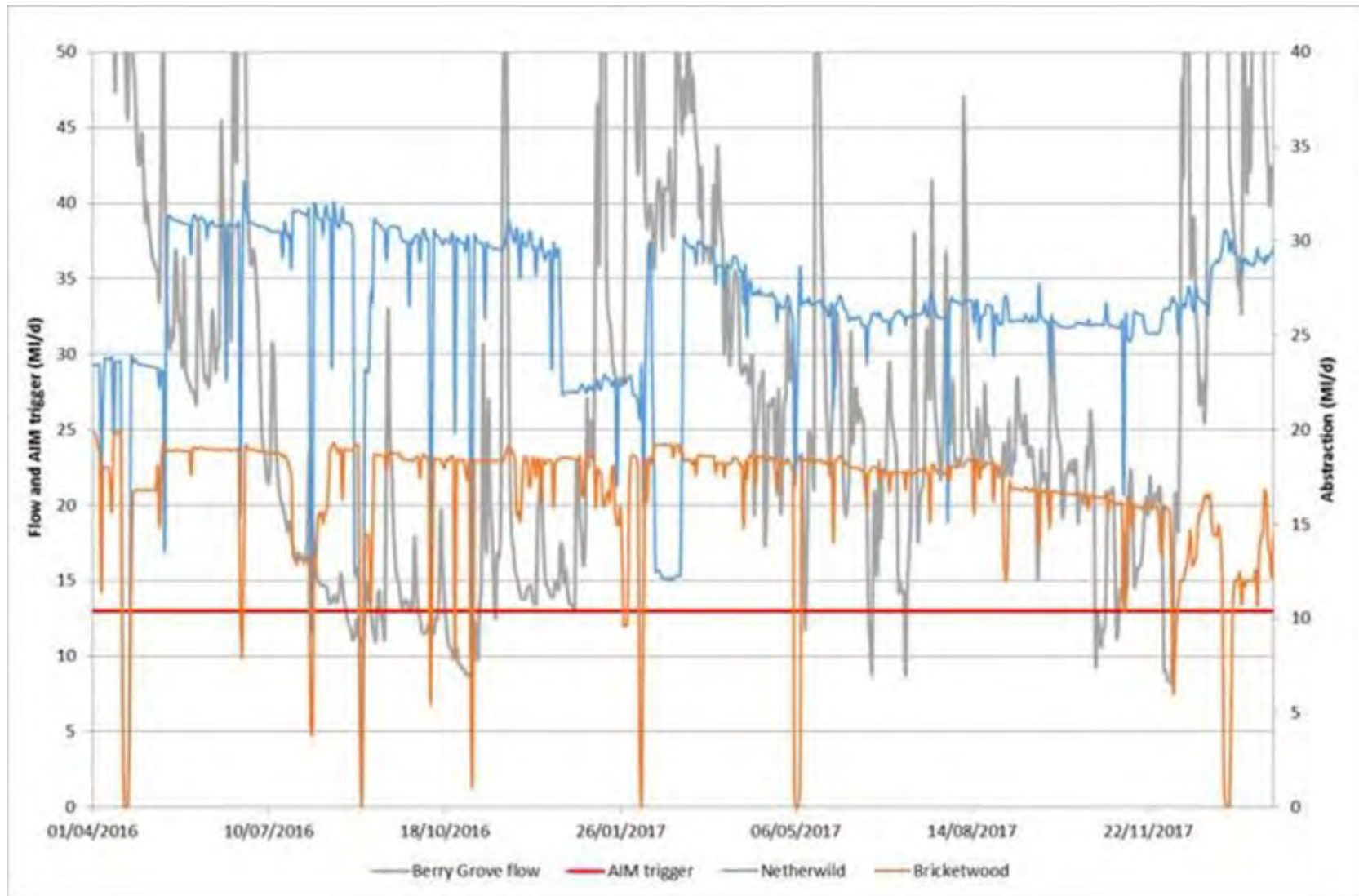
	Source	Licence Number	Avg. Ann. Licence	Max Daily Licence	2015 Deployable Output (DO)		AIM Baseline	Combined AIM baseline
NEP further sites	Netherwild	28/39/28/336		40.91	28.00	30.00	18.51	37.16
	Bricket Wood	28/39/28/336		27.28	14.00	15.00	18.65	
	Chesham	28/39/28/104	5.22	7.09	5.22	6.00	4.08	4.08
AMP5 sustainability operating agreements	Dughton Head	28/39/28/339	4.55	6.55	4.10	5.22	4.43	5.03
	Offley Bottom	06/33/13/09	1.14	1.14	0.00	0.00	0.60	
	Slip End	06/33/14/36	5.46	6.82	0.00	0.00	3.62	3.62
	Well Head	06/33/13/10	2.27	2.27	1.15	1.15	0.84	0.84
	Primrose	9/40/4/497/G	3.00	4.00	3.00	3.00	2.50	6.50
	Buckland Mill	14/033	4.00	4.00	4.00	4.00	4.00	
	Denge Gravels	9/40/5/71/G	9.04	15.00	4.65	9.04	6.00	6.00
AMP6 Sustainability reduction sites	Bow Bridge	28/39/28/130	6.82	11.37	5.82	5.82	0.00	0.00
	Whitehall	29/38/03/42	22.73	30.46	15.00	28.00	19.00	19.00
	Fulling Mill	29/38/02/46	9.09	9.09	5.60	9.09	5.34	5.34
	Marlowes	28/39/28/335		20.47	4.74	4.74	4.42	20.14
	Piccotts End	28/39/28/335			15.72	15.72	15.72	
	Hughenden	28/39/25/47	2.28	2.27	1.60	1.75	1.46	1.46
	Amersham	28/39/28/334	7	18.18	7.00	12.00	7.51	10.38
Chalfont St.Giles	28/39/28/334	4	4.55	4.00	4.50	2.87		
AMP7 potential Sustainability reduction sites	Digswell	29/38/02/46	11.37	11.37	7.88	7.88	7.53	7.53
	Holywell	28/39/28/337		9.09	8.20	9.09	10.29	17.72
	Mud Lane	28/39/28/337		11.37	10.03	11.37	7.43	
	Periwinkle Lane	28/39/28/401	4.99	5	4.19	4.19	3.36	9.94
	Runleywood (Chalk)	29/38/01/09	9.55	9.55	6.30	6.30	6.58	

Reasoning behind groupings

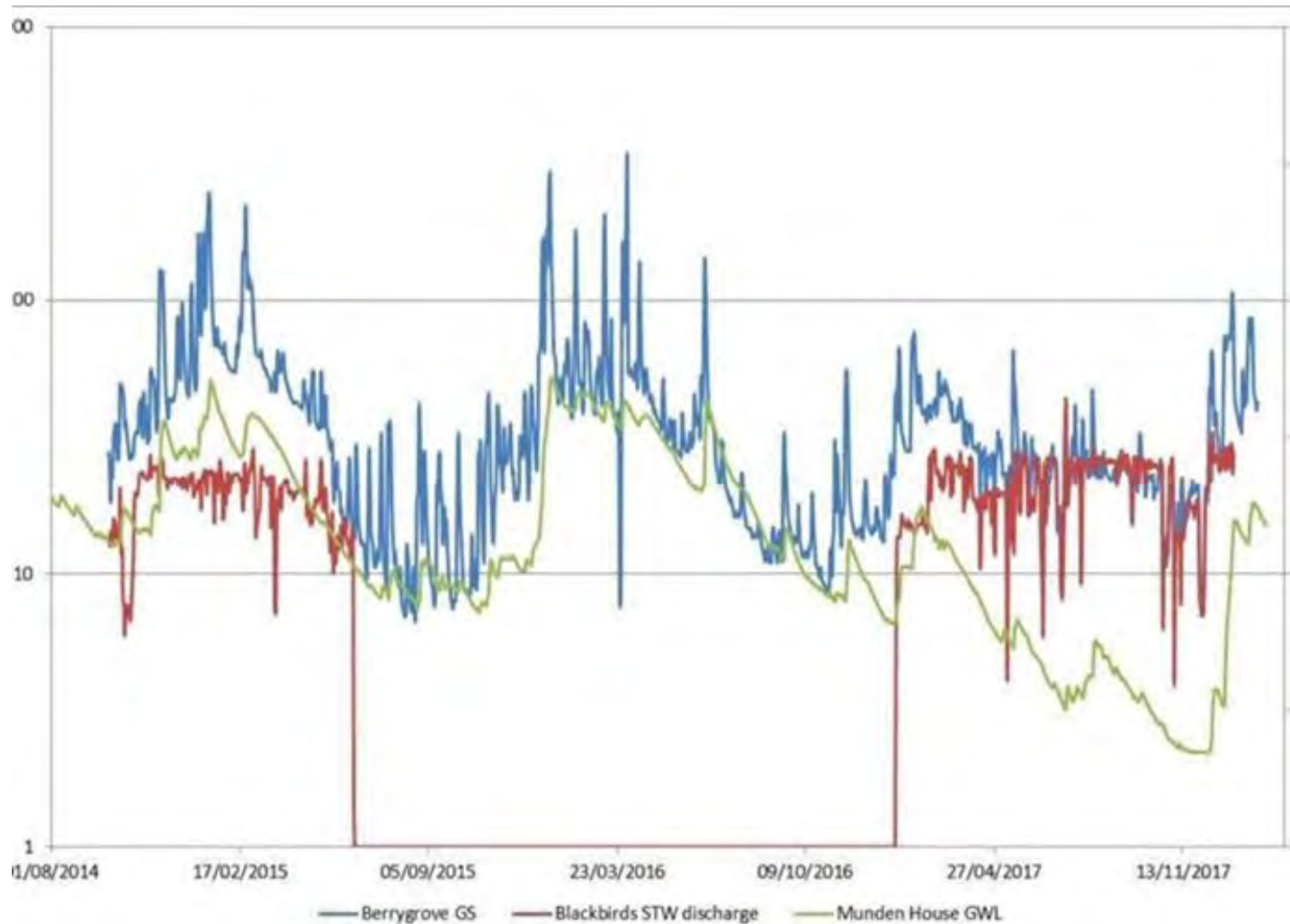
- Many of our catchments have more than one source which is assessed for AIM- in these cases, we have grouped the sources for the purposes of the assessment
- The grouped sources use the same trigger point, which is downstream of both abstractions
- When the AIM baseline was calculated, the operational regime may have been different to what it is now- the grouping allows flexibility in source operation, and allows the recouping of volume that is lost through outages during low flow periods
- The grouping is also important when assessing the normalised AIM score- if output at one source was increased to compensate decreased use of the other, without the groupings, the two sources would not balance and the AIM assessment would be inaccurate



Example of grouping- Bricket Wood and Netherwild



Berrygrove Gauging Station vs Blackbirds STW & local Chalk groundwater level



➤ Sustainability Reduction sources

- A number of our AIM sources have undergone sustainability reductions as of 1 April 2018
- Where this has reduced DO to zero, the potential impact of the abstraction has been mitigated
- Where this has not reduced DO to zero, there remains the risk of a residual abstraction impact ○ Hence, we are proposing to keep the source in AIM, but with a new AIM baseline of the annual average licence. The AIM trigger for the respective gauging station will remain the same. This would cap the peak capability of the source ○
Whitehall example

Whitehall AIM Operation- Example

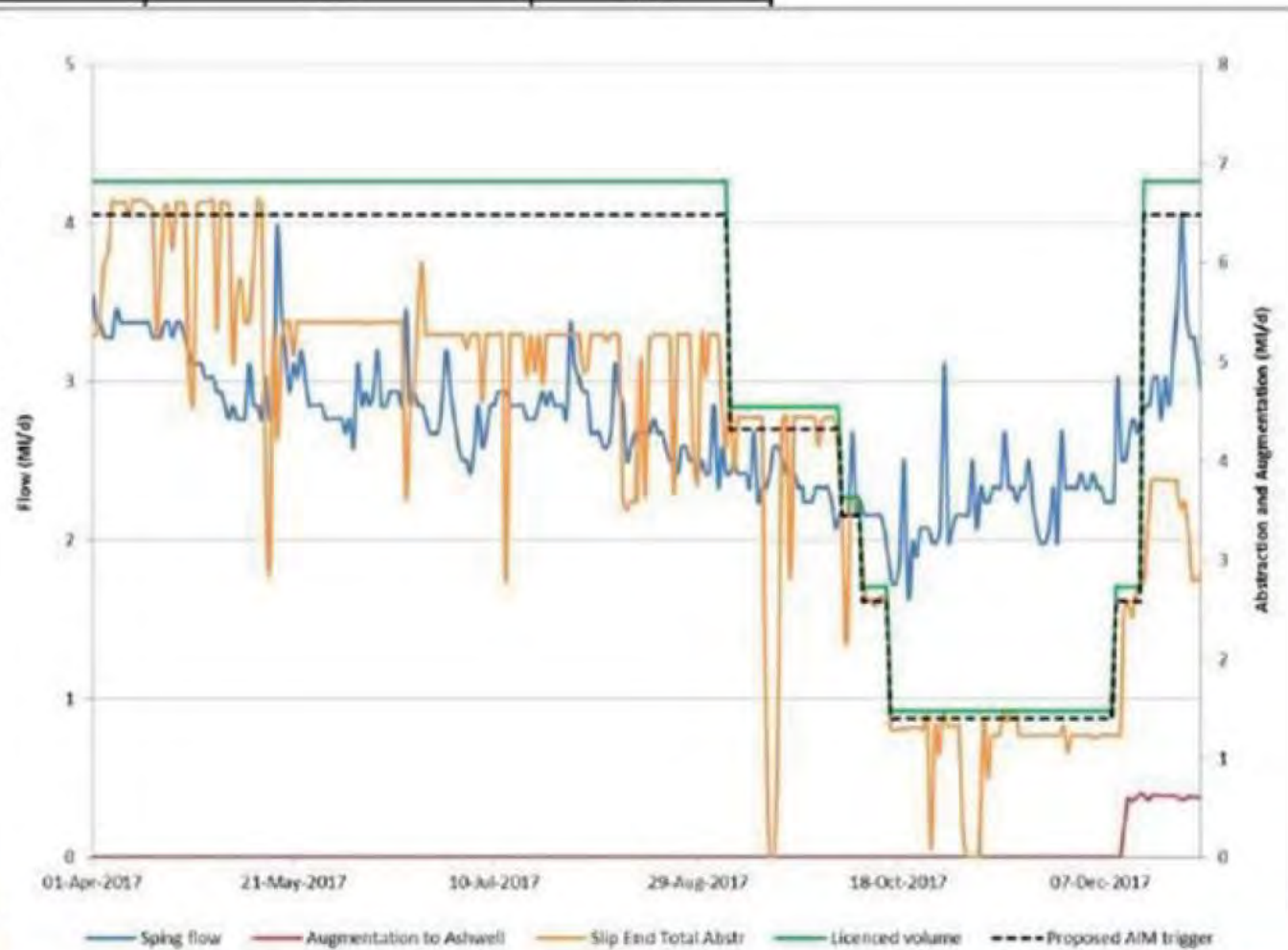
PR14 DO (MI/d)		Pre SR AIM baseline (MI/d)	PR19 DO (MI/d)	Proposed New AIM baseline (MI/d)	Potential loss of output when AIM in effect (MI/d)
Average	18.18	19.00	2.00	2.00	0
Peak	28.00	19.00	10.00	2.00	8.00

Slip End

- We are proposing to alter the method of assessment for our Slip End source - currently, the trigger of 2.55 MI/d at Ashwell gauging station is used to assess AIM
- This forms the upper limit of a table of step reductions in the abstraction licence. These are proportional to flow at the gauging station
- It is considered inappropriate to claim an AIM benefit using 2.55 MI/d as a trigger, as when flow drops below this point, the licence conditions limit output
- It is proposed that the AIM trigger should vary depending on the river flow, with the AIM trigger being 95 % of the respective licensed volume

Slip End

Flow at Ashwell Gauging Station at National Grid Reference TL 267 401 in litres per second	Maximum Daily Abstraction rate in MI/d	Proposed AIM trigger (95 % of licensed volume)
Flows above 29.46	Up to 6.82	6.48
Between 28.95 and 29.46	5.46	5.18
Between 28.41 and 28.94	5.00	4.75
Between 27.90 and 28.40	4.55	4.32
Between 27.36 and 27.89		
Between 26.83 and 27.35		
Between 26.32 and 26.82		
Between 25.78 and 26.31		
Between 25.27 and 25.77		
Between 24.74 and 25.26		
Between 24.20 and 24.73		
Between 23.69 and 24.19		
Between 23.15 and 23.68		
Less than 23.15		



➤ Our proposed AIM sites post April 2018

Source	Licence Number	Avg. Ann. Licence	Max Daily Licence	2015 DO Avg	2015 DO Peak	AIM Baseline	Combined AIM baseline	Comments
Netherwild	28/39/28/336		40.91	28.00	30.00	18.51	37.16	
Bricket Wood	28/39/28/336		27.28	14.00	15.00	18.65		
Chesham	28/39/28/104	5.22	7.09	5.22	6	4.08	4.08	
Oughton Head	28/39/28/339	4.55	6.55	4.10	5.22	4.43	5.03	
Offley Bottom	06/33/13/09	1.14	1.14	0	0	0.60		
Slip End	06/33/14/36	5.46	6.82	0	0	3.36	95 % of licensed rate	Change in AIM baseline and assessment method
Well Head	06/33/13/10	2.27	2.27	1.15	1.15	0.84	0.84	
Primrose	9/40/4/497/G	3.00	4.00	3.00	3.00	2.50	6.50	
Buckland Mill	14/033/R01	4.00	4.00	4.00	4.00	4.00		
Denge Gravels	9/40/5/71/G	9.04	15.00	4.65	9.04	6.00	6.00	
Whitehall	29/38/03/42	2.00	10.00	2.00	10.00	2.00	2.00	New AIM baseline is 2 Ml/d (post sustainability reduction annual average licence)
Digswell	29/38/02/46	11.37	11.37	7.88	7.88	7.53	7.53	
Marlowes	28/39/28/335	8.34	8.34	8.34	8.34	8.34	14.06	New AIM baseline is 14.06 Ml/d (sum of post sustainability reduction rates at Piccotts End and Marlowes)
Piccotts End	28/39/28/335	5.72	10.72	5.72	10.72	5.72		
Amersham	28/39/28/334	4.00	9.00	4.00	9.00	4.00	6.87	New AIM baseline is 6.87 Ml/d (sum of post sustainability reduction rate at Amersham and current AIM baseline for Chalfont St Giles)
Chalfont St Giles	28/39/28/334	4.00	4.55	4.00	4.50	2.87		
Holywell	28/39/28/337		9.09	8.20	9.09	10.29	17.72	
Mud Lane	28/39/28/337		11.37	10.03	11.37	7.43		
Periwinkle Lane	28/39/28/401	4.99	5.00	4.19	4.19	3.36	9.94	
Runleywood (Chalk)	29/38/01/09	9.55	9.55	6.30	6.30	6.58		

Thank you for Listening – Any Questions?



Thames Water's experience of the AIM
Chris Lambert, Thames Water



Abstraction Incentive Mechanism (AIM)

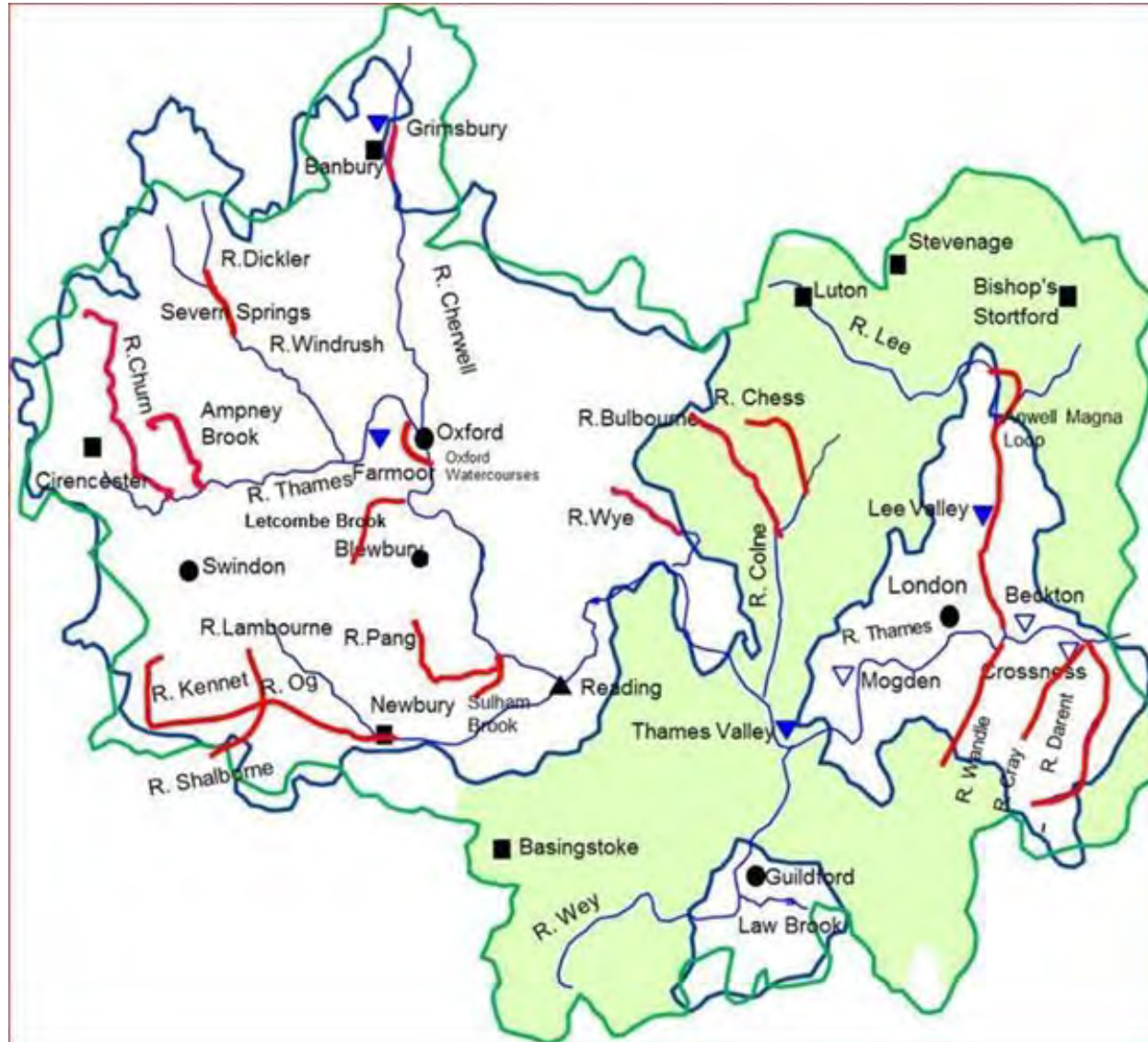
Thames Water's experience

Overview of Abstraction Incentive Mechanism

- **AIM sites proposed following an open and transparent consultation process with local EA, CCG and local stakeholders**
- **Reputational AIM implemented from April 2016. AIM should not impact security of supply or deployable output**
- **No capital investment – implemented at sites where it is not cost beneficial to make licence reductions**
- **Conditions when AIM applies defined individually for each AIM source, with reduction from source when flow has fallen below trigger level**



Low flow rivers in the Thames catchment



Requirements for each AIM site

- **Baseline – average daily abstraction that would have taken place from a source if AIM had not been in place during periods of low flows (below trigger)**
- **Trigger points – the critical value determining when a reduction in abstraction should take place**
- **The impact of the incentive will be measured as the deviation in actual use relative to baseline usage**

Selection of AIM sites by Thames Water



Ofwat's list of potential abstraction sites impacting Water Framework Directive Band 1, 2, 3 sites	33
Remove sites listed with no environmental impact or an existing reduction is already in place	-4
Unacceptable environmental impact of using alternative site	-10
Site closed or will be closing shortly	-3
No available alternative existing site	-11
Residual sites selected for AIM	5



Thames Water AIM sites

AIM Sources



Details of AIM sites

AIM Sites	Justification
Pangbourne, Kennet Valley WRZ	Investigation demonstrates impacts of Pangbourne abstraction on the Sulham Brook, but it is not cost beneficial to reduce abstraction. Existing flow constraint at Pangbourne restricts abstraction from boreholes but the AIM trigger will introduce this at an earlier stage in flow recession
Axford, SWOX WRZ	High profile with stakeholder interest. Abstraction will be reduced to a maximum of 6 MI/d during low flows from 01/04/2017. Scope to reduce this abstraction earlier than the current trigger
Pann Mill, SWA WRZ	Investigation shows that abstraction at Pann Mill has an impact on the River Wye. A sustainability reduction is proposed for Pann Mill to reduce the licence to 9.6 MI/d. Reducing the licence further on a permanent basis is not cost beneficial. There is flexibility within the network to support further reduction, subject to demand and water pressure.
North Orpington, London WRZ	It is not cost beneficial to reduce this licence. When all other sources in the area are fully operational there is flexibility within the network to reduce abstraction during low flows. Known stakeholder interest.
New Gauge, London WRZ	Reducing abstraction at New Gauge during low flow periods will benefit the environment.

AIM Sites Baseline, Trigger Values and Reductions

W7 - Abstraction incentive mechanism - surface and ground water abstractions under the AIM threshold

Line description		Trigger (MI/d)	Baseline (MI/d)	Target abstraction (MI/d)
A	AIM sites			
1	RIVER LEE AT NEW GAUGE PUMPING STATION POINT B	60	89.6	80
2	PANGBOURNE	1.02	31.6	26.6
3	AXFORD PUMPING STATION	166	7.85	6
4	PANN MILL PUMPING STATION	5.6	11.4	7
5	NORTH ORPINGTON PS	11.4	7.16	6

AIM Performance 2017/18

AIM Sites	Performance
Pangbourne, Kennet Valley WRZ	Trigger active for 96 days Average abstraction when AIM in place was 26.3 MI/d AIM benefit 510 MI
Axford, SWOX WRZ	Trigger active for 235 days Average abstraction when AIM in place was 7.16 MI/d AIM benefit 162 MI
Pann Mill, SWA WRZ	Trigger active for 105 days Average abstraction when AIM in place was 10.5 MI/d AIM benefit 94 MI
North Orpington, London WRZ	Trigger active for 11 days Average abstraction when AIM in place was 3.2 MI/d AIM benefit 43 MI
New Gauge, London WRZ	Trigger active for 46 days Average abstraction when AIM in place was 71 MI/d AIM benefit 857 MI

Thank you



United Utilities' experience of the AIM
Janet Bromley, United Utilities

v1

15/03/2018

The background of the slide is a scenic landscape photograph. It shows a large, calm lake in the middle ground, surrounded by lush green hills and forests. In the foreground, there are tall, dry grasses and some green foliage. The sky is overcast with grey clouds.

Janet Bromley, Hydrology Manager
UNITED UTILITIES
Our experience of AIM
17 April 2018

AMP6 AIM

- AIM incentivises us to reduce our abstraction at sensitive locations at times of low flow. When the river flow trigger is met, we seek to swap abstraction to other sites.
- We worked with Colin Fenn (working for Ofwat and WWF) to model a trial AIM in 2012, supporting the development of Ofwat's proposals.
- We were one of five water companies to adopt AIM before Ofwat introduced it as reputational measure for all companies in 2016.
- AIM is commensurate with our long-term strategy to ensure all our abstractions are sustainable.
- In AMP6 we have four AIM sites:
 - Ennerdale (West Cumbria);
 - Aughtertree Spring (West Cumbria);
 - Old Water (Carlisle); and
 - River Calder at Barnacre (Lancashire).
- Two sites, Aughtertree Spring and Old Water, were on Ofwat's AIM list (issued 16 October 2013). Following discussions with the EA, we decided to add the other two sites.
- We cannot completely offset abstraction at Ennerdale as alternative sources are limited.



AMP6 AIM

- For AMP6 we used the 2007-13 period as our baseline and set AIM river flow triggers based on the Q95 of the long term flow dataset for the associated gauging station (except for at Ennerdale).
- For each AIM site, we determined the length of downstream river improved. Our annual abstraction volume at times when AIM is triggered is compared to the average annual abstraction for the baseline period (2007-2013) to calculate the length of river improved e.g. if we halve our AIM abstraction, then we benefit half the river length. If we avoid abstraction completely, we benefit the whole river length.
- In 2015/16 and 2016/17 we did not hit the AIM river flow triggers at any of our four AIM sites. In 2017/18 we hit it at Ennerdale for 9 days.
- For AMP6 we combined AIM performance with delivery of the National Environment Programme (NEP) into an ODI (km river improved) with financial penalties/rewards.
- Each scheme on our NEP also has an associated river length improved, and together with the AIM river length improved, forms our ODI. The penalty rate is £111k per km and the reward rate is £28k per km. We have penalty/reward caps that vary for each year in AMP6. To date, we have earned a reward in each year of AMP6 primarily through early delivery of NEP schemes.
- We also report following Ofwat's AIM approach (February 2016 guidance) in our annual WRMP update.

Plans for AMP7

- As we developed our AIM prior to Ofwat's guidance (February 2016) we have gone back to first principles to develop AIM for AMP7.
- We've dropped Aughtree Springs as an AIM site due to the small impact the abstraction has on river flows at the gauging site (the abstracted catchment is just 1.6% of the gauging station catchment area; the gauging station is 21.962 km downstream).
- In AMP6 we're implementing a new prescribed flow at the River Calder to resolve the low flow issues; so this ceases to be in AIM.
- We have reviewed all sources of information to identify possible new AIM sites (the WINEP, sustainable catchments work etc.).
- For AMP7 we are proposing to have two AIM sites: Ennerdale and Old Water. Both are existing AMP6 AIM sites.
- We have used the 2011-2017 period as our AIM baseline (for AMP6 we used 2007-2013). This has resulted in a lower AIM baseline abstraction rate at Ennerdale, reducing from 26 MI/d in AMP6 to 24.8 MI/d in AMP7, meaning AIM will be more stretching in AMP7 as it will be harder for us to reduce abstraction even further during AIM periods.
- We have used updated river flow gauging records to recalculate the AIM flow trigger for Old Water (the Q95). This has increased slightly from 8.8 MI/d in AMP6 to 9.1 MI/d in AMP7. This is due to a longer data set with higher rivers flows in more recent years (partly due to managing our abstraction under AIM). The increase in the AIM flow trigger for Old Water means it will be more stretching for us in AMP7 as we will hit the it more often. The AIM flow trigger for Ennerdale remains the same.
- AIM aligns with our West Cumbria water resources strategy (the Thirlmere pipeline scheme) which will allow abstraction from Ennerdale to cease in 2022. So this site will fall out of AIM site once the abstraction licence is revoked.
- Our AMP7 AIM methodology has been reviewed and endorsed by both the EA and our existing Ofwat auditor. We have also engaged our CCG customer group on several occasions as we have developed our AMP7 AIM proposals.

Plans for AMP7

- For AMP7 we're having separate ODIs for AIM and the WINEP.
- For AIM we are aligning to the Ofwat guidance.
- We are developing financial penalties/rewards for AIM.
- We expect the reward and penalty rates to be symmetrical with no caps, collars or deadbands.
- We are likely to use the downstream river length that benefits, together with a valuation per km, to derive reward/penalty rates for each AIM site.
- We are targeting a zero AIM performance at each AIM site for each year of AMP7. To achieve zero AIM performance will be challenging as at Old Water the AIM river flow trigger has increased and at Ennerdale the baseline AIM abstraction rate has reduced.
- We have no capital spend associated with AIM in AMP7; there will be small additional operational costs associated with using more expensive pumped sources of water to offset abstraction at the AIM sites.

Discussion

Break

AIM methodology for PR19
Simon Harrow

Objectives:

- Strengthening the Abstraction Incentive Mechanism (AIM) for PR19
- Making it easier for companies to identify sites
- Ensuring that sites proposed would provide environmental benefits through the AIM
- Moving from reputational to financial incentives
- Maintaining alignment of incentives with customer and stakeholder views
- Retaining company ownership of performance commitments

Consultation responses

- Some respondents expressed concern that the AIM could duplicate the environmental regulatory process that addresses over-abstraction through licence changes or other mitigation approaches.
- Other respondents agreed with our approach. They recognised the environmental benefits that AIM can encourage, including delivering solutions more quickly or achieving outcomes that go beyond current regulatory obligations.

AIM for PR19 (1)

All companies are expected to adopt AIM at PR19.

Companies should **engage** with customers/stakeholders to design an appropriate version of AIM for them that fits within our AIM guidelines.

Companies should **continue with current AIM sites at PR19**, unless they justify why not. Similarly, they should provide reasons if they make any changes to how AIM applies to their existing AIM sites.

For PR19 **companies are expected to use WINEP or NEP lists** as the starting point for AIM site identification and selection.

WINEP/NEP drivers will be useful to check those sites where **abstraction** and low flows are the cause of **environmental harm**.

Companies should identify suitable sites **in liaison with the EA or NRW** and provide evidence of their engagement.

The process for the abstraction incentive mechanism (AIM)



* WINEP – Water industry national environment programme, NEP – National environment programme

Companies:

- must ensure that abstraction sites have **no impact on security of supply** or they should have some **other means of reducing abstraction** from the AIM site;
- must ensure that **no sites are included in the AIM where replacement water will be taken from the same source**, thus having the same environmental impact;
- can **apply their own additional checks** when identifying AIM sites, but should **engage with local environmental stakeholders when doing so**, and must provide a good justification for any further check that reduces the number of AIM sites.

If, following the application of well-justified checks, a company does not have any suitable sites for AIM, it should:

- **consider sites not identified in the WINEP lists** for inclusion in the AIM, e.g. companies could consider sites where there is evidence that current abstraction rates are causing harm and that reductions in abstraction at low flows will provide environmental benefit; and
- **engage with their local stakeholders** on their views on abstraction sites which might benefit from the application of the AIM.

PR19 AIM process

As with PR14 once a site has been identified the data requirements follow a similar structure, which is why the PR19 methodology is based on the 2016 AIM guidelines

Definition of the AIM trigger point

- The AIM will apply, subject to a hydrological trigger, when a reduction in abstraction from the abstraction site is likely to be environmentally beneficial. Typically this will be a river flow condition (e.g. Q95 flow), but it might be a groundwater level, drought trigger or other appropriate measure.
- Triggers for the period when the AIM applies should be determined locally for each site, depending on the environmental needs. This should include appropriate consultation with EA/NRW, CCG and other stakeholders

Definition of the AIM baseline

- Set the baseline historical period, for example, the previous five years.
- Calculate the periods during the historical period when the water body impacted by the AIM abstraction site had a flow at or below the trigger point, and then the volume of water the company abstracted from the AIM site during the days when the water body flow was at or below the trigger point and the AIM applied. The volume (in MI) is divided by the time period when the AIM applied (in days) to calculate the baseline in MI/d.

Capturing AIM data

- Data captured to support AIM should include whether the level / flow of the surface water body impacted by abstraction from the AIM site is above, below or at the trigger point for that site, and the volume of abstraction during these periods.

AIM performance reporting

- AIM performance is calculated as the difference in abstraction (below the AIM trigger) between baseline and reporting period. This is normalised by dividing by the baseline abstraction, and multiplied by 100 to generate a percentage abstraction reduction (under AIM trigger conditions)

The AIM will have financial incentives attached to it at PR19 to give companies greater incentive to reduce their abstraction at environmentally-sensitive sites at low flows.

Based on AIM taskforce findings, we are proposing three options that companies could use to set their AIM outperformance and underperformance payments – these are presented in order of preference; however, it is for companies to propose their AIM incentives following engagement with local stakeholders.

Preference	Approach	Description
First	The environmental value of abstraction reduction, relative to baseline abstraction.	The incentive would be calculated based on an assessment of the value of the environmental gains (including any biodiversity or natural capital gains) delivered by the revised abstraction policy.
Second	Customer willingness to pay for abstraction reduction, relative to baseline abstraction.	The incentive would be calculated based on customers' willingness to pay for the environmental improvement delivered by the AIM.
Third	Short-run marginal cost to use an alternative source (or a multiple of this cost).	The incentive would be calculated by the difference in operating cost between the AIM source and the cost of alternative sources. These costs will generally reflect marginal operating costs, but may include other cost differences. A multiple of the difference in operating costs (e.g. 1.2) could be used to provide an incentive beyond cost recovery. Alternatively, a multiplier of less than 1 could be used to only part-fund the additional financial cost of reducing abstraction at the AIM site.

Table discussions on implementing the
PR19 final methodology on AIM

- 1) How can AIM site selection best complement the other abstraction regulatory processes?
- 2) What is the best way to engage stakeholders on AIM site selection, AIM baselines and AIM trigger points?
- 3) What are the best approaches to setting financial incentives for AIM sites?

Concluding remarks
Jon Ashley, Ofwat

Appendix OC.A44.6

Action ref AFW.OC.A44

Ofwat workshop on the Abstraction Incentive Mechanism (AIM)

Ofwat workshop on the Abstraction Incentive Mechanism (AIM)

17 April 2018

Ofwat's Birmingham office

10.30 – 13.00

Attendees

Chris Lambert	Thames Water	Janet Bromley	United Utilities
Ilias Karapanos	Affinity Water	Matthew Pitts	Bristol Water
Daniel Yarker	Affinity Water	Lee Dance	South East Water
Marcus Adams	South West Water	Miranda Foster	Yorkshire Water
Daniel Clark	South Staffs Water	Nigel Hepworth	Southern Water
Julie Morton	Wessex Water	Marcus O'Kane	Severn Trent Water
Claire Lorenc	Northumbrian Water	Hannah Freeman	Wildfowl & Wetlands Trust
Alison Murphy	SES Water	Catherine Moncrieff	WWF
Nick Walters	Anglian Water	Owen Turpin	Environment Agency

Ofwat attendees

Jon Ashley	Ofwat	Nathan Warren	Ofwat
Simon Harrow	Ofwat	David Watson	Ofwat

Purpose of the workshop

The Abstraction Incentive Mechanism (AIM) workshop had two main objectives:



1. to share companies' experiences with the AIM so far this price control period; and
2. to discuss the PR19 final methodology on the AIM to understand any issues it raises.

AIM workshop – 17 April 2018

Session 1 – Companies' experience with the AIM so far this price control period

Jon Ashley (Ofwat) presented the history of the AIM and reminded attendees of the main elements of Ofwat's 2016 AIM guidelines.

Chris Lambert (Thames Water), Janet Bromley (United Utilities) and Daniel Yarker and Ilias Karapanos (Affinity Water) presented their companies' experiences with the AIM during this price control period. Some of the main points were:

- Companies are implementing a large number of other abstraction measures, which reduces the number of sites suitable for the AIM.
- 2015-16 and 2016-17 were relatively wet and few AIM sites reached their trigger points.
- The length of time AIM sites are triggered for varies considerably between sites reflecting the local nature of the abstraction issues. This makes it difficult to compare AIM performance between companies.
- AIM sites with only reputational incentives are still causing companies' operational teams to change their abstraction behaviour.
- AIM sites are most appropriate where long-term capital solutions are not cost beneficial. Such sites could continue to benefit from the AIM over the long term.
- There remain issues with the timeliness and completeness of flow data to inform the AIM.
- It can make sense to group AIM sites where they impact on the same flow gauge.

Session 2 – The AIM in the PR19 final methodology and a discussion of any issues this raises

Simon Harrow (Ofwat) presented the PR19 final methodology on the AIM.



In the subsequent table discussions about the PR19 methodology attendees made the following main points:

- The WINEP (in England) and NEP (in Wales) abstraction sites do not produce many, or any, suitable AIM sites for a number of companies. Some attendees raised the need for companies to engage with their stakeholders about other potential abstraction sites for inclusion in the AIM.
- Environmental investigations are continuing and could reveal more sites suitable for the AIM where a capital solution is not cost beneficial. The AIM could be a potential solution following a WINEP / NEP investigation.

AIM workshop – 17 April 2018

-
- In the future climate change could increase the number of abstraction sites where the AIM could be beneficial.
 - Companies trading their surplus water in future price control periods could create a need for AIM to apply to certain abstraction sites, where currently there is no need.
 - Gauging data remains a constraint on potential AIM sites and there are potential negative environmental impacts of putting new gauging stations into rivers.
 - Some attendees considered that operating cost data was easier to obtain to calculate the AIM financial incentives and might be more meaningful for operating teams.
 - Some attendees said that they could use environmental valuation data from the EA's NWEBS (National Water Environment Benefit Survey) to calculate the AIM financial incentives, even though it used average data across all sites and all times in a catchment.

Conclusions

Jon Ashley concluded the session by thanking the attendees for their contributions and particularly the four presenters from Thames Water, United Utilities and Affinity Water.

Following reflection on the issues discussed at the workshop, Ofwat can confirm it is not proposing to make any changes to its current policy on the AIM as set out in the [PR19 final methodology](#), [Appendix 2 to the final methodology](#) and [the 2016 AIM guidelines](#).

Appendix OC.A44.7

Action ref AFW.OC.A44

Annual AIM performance for the period 2017-2018



Abstraction Incentive Mechanism – Methodology and Abstraction in 2017-2018

Affinity Water

August 2018



Abstraction Incentive Mechanism- Methodology and Abstraction in 2017-18



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1.7 Asset Management document control sheet

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Abstraction Incentive Mechanism- Methodology and Abstraction in 2017-18



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Executive Summary

The Abstraction Incentive Mechanism (AIM) has been proposed by Ofwat with the objective to encourage water companies to reduce the environmental impact of abstracting water at environmentally sensitive sites during low flow periods (i.e. droughts). The purpose of this document is to set out the methodology and assumptions used to calculate the AIM triggers and baseline abstraction values. Actual abstraction data from the AIM sources for the financial year



2017-18 are shown in this report, in order to track performance and validate the AIM triggers selected.

A total of 23 groundwater sources have been identified as sensitive by Affinity Water, some of which will have sustainability reductions implemented in AMP6 and AMP7. The remaining ten sources have an operating agreement, other licence condition or are currently under National Environment Programme investigation. The AIM taskforce guidelines as proposed by Ofwat were followed to calculate the triggers and abstraction baseline figures. The AIM triggers selected were based on the Environment Agency's Restoring Sustainable Abstraction assessments, NEP investigations or other Environmental Impact Assessment work. Where current investigations were in place, the preferred trigger points on river flows were adopted, based on Environmental Flow Indicators in consultation with the Environment Agency. In the absence of these, Q95 flows were adopted as best indication of low flow conditions for the AIM triggers. Baseline abstraction values were calculated based on the 20-year period of 1st April 1995 - 31st March 2015 as this period is considered representative enough to include a number of droughts with and without demand restrictions.

The 23 sites selected under AIM were submitted to Ofwat in September 2015. Since then a number of sources have had sustainability reductions implemented. It was initially proposed to assess these sources for AIM until the timing of the reduction however there may be merit in continuing to operate AIM, where the deployable output has not been reduced to 0 MI/d, to mitigate any residual abstraction impact. Also, for sources that have augmentation schemes, the volume into supply will only be calculated under AIM, not the river support volume, since the latter is benefiting the environment.

Following the Ofwat guidance, two equations were used to calculate the AIM performance and the normalised AIM performance. For the 19 AIM sources at which the trigger was breached during 2017-18, the combined AIM performance was -3096.95 MI and the normalised AIM performance was -2.56. The negative figures signify an improved performance as average abstraction was lower than the baseline at the global scale. This suggests that the company met and exceeded the AIM baseline figures for the financial year 2017-18 which is mainly linked to the overall low demand and planned outages at some of the AIM sites.

Following the annual review of the AIM triggers and baseline abstractions, it appears that they are robust and representative of the catchment status. The validity of the triggers and baseline abstraction is constantly monitored and the next AIM performance review will take place in June 2018 for Q1 of 2018-19.

1 Purpose

The Abstraction Incentive Mechanism (AIM) has the objective of encouraging water companies to reduce the environmental impact of abstracting water at environmentally sensitive sites in low flow periods (i.e. droughts). The purpose of this document is to set out the methodology and assumptions used to calculate the AIM triggers and baseline abstraction values. Furthermore, actual abstraction data from the AIM sources for the financial year 2017-18 are shown in this report, in order to track performance and validate the AIM triggers selected. Affinity Water have put forward a total of 23 groundwater sources to be included in AIM, which have been deemed as potentially environmentally sensitive by previous studies. AIM has come in force in



reputational form since the 1st April 2016. Four sources have been subject to sustainability reductions since 2016 and these abstractions have been omitted from the assessment, leaving a total of 19 sources that have been assessed for AIM in this report.

2 Methodology

A total of 23 sites put forward by Affinity Water have been assessed as potentially having an impact on a surface water body hence included in the AIM list. Four sources have been subject to sustainability reductions before the start of the 2017-18 assessment period. A further three abstraction changes were implemented on 1 April 2018. Sustainability reductions may be considered at six additional sources in AMP7. The remaining ten sources have either an operating agreement in place (i.e. augmentation scheme) or other licence condition or are currently under National Environment Programme (NEP) investigation.

In order to calculate the trigger and abstraction baseline, the AIM Taskforce guidelines have been followed. Based on these, the AIM trigger is set based on a specific environmental trigger identified through the Environment Agency's (EA) Restoring Sustainable Abstraction (RSA) assessments, NEP investigations or other Environmental Impact Assessment (EIA) work. In cases where our sources are situated in catchments under previous or currently ongoing NEP investigations, we have adopted the preferred trigger points on river flows (Environmental Flow Indicators) as set out by the EA. For sites that have not been under investigation or this is currently underway with no triggers yet agreed, the Q95 flows have been adopted as the best indicator of low flow conditions below which AIM should operate. In the majority of cases, the potential impact on the surface water body is the river, so the trigger is set in the downstream gauging station that is considered to be representative of the groundwater catchment. There are exceptions to this, where a groundwater level trigger has been used instead, due to better representation of the aquifer baseline conditions or the absence of a gauging station.

The length of the record for each gauging station or groundwater level monitoring point is defined by the data availability and data quality in order to better calculate the AIM trigger. Where the Q95 or Q70 values have been used, these were adopted from the Centre of Ecology and Hydrology as published in their website¹ in July 2016.

Once the AIM triggers were identified, the baseline abstraction values were calculated based on the average abstraction during the historic period when river flows or groundwater levels were at or below the trigger. The duration of the abstraction record was chosen as the period between the 1st April 1995 and the 31st March 2015. This 20-year period was chosen as the most representative of current and future abstraction patterns, as the distribution network constantly evolves and pressure on sources may fluctuate accordingly. Also, if this were to extend further back, the uncertainty on data quality would increase as flow meters were not always available, with abstraction being calculated based on pump hours. Following the AIM guidance stating that "the past needs to be representative of the future", the period from 1995 – 2015 is thought to best represent the future. Furthermore, this 20 year period includes a number of low flow periods (1997, 2003, 2005, 2006 and 2012) with some of them having demand restrictions and others being unrestricted. As such, this record is considered as being long enough to incorporate different types of droughts and also smooth out abstraction values that may be very low due to site outages. In cases where outliers were found that are deemed as not representative of the future use of the sources, these were highlighted and addressed appropriately as explained in the next sections.



3 Triggers and Abstraction Baseline

Table 1 below presents the sources that were submitted to Ofwat in September 2015 for inclusion in the AIM list.

1.7.1 Table 1. Sources Operated Under AIM from 1st April 2016

	Source	Group	Licence Number	Avg. Ann. Licence	Max Daily Licence	2015 DO		A M P6 SR	A M P7 SR	En vir on me nt al Benefit
fur Netherwilde P	Netherwild	Clay Lane	28/39/28/336		40.91	28.00	30.00	No	No	Yes
	Bricket Wood	Clay Lane	28/39/28/336		27.28	14.00	15.00	No	No	Yes
	Chesham	Individual	28/39/28/104	5.22	7.09	5.22	6.00	No	No	Yes
A M P5 operating independently	Oughton Head	Individual	28/39/28/339	4.55	6.55	4.10	5.22	No	No	Yes
	Slip End	Individual	06/33/14/36	5.46	6.82	0.00	0.00	No	No	Yes
	Well Head	Individual	06/33/13/10	2.27	2.27	1.15	1.15	No	No	Yes
	Offley Bottom	Individual	06/33/13/09	1.14	1.14	0.00	0.00	No	No	Yes
	Primrose	Individual	9/40/4/497/G	3.00	4.00	3.00	3.00	No	No	Yes
	Buckland Mill	Individual	14/033	4.00	4.00	4.00	4.00	No	No	Yes
	Denge Gravels	Denge	9/40/5/71/G	9.04	15.00	4.65	9.04	No	No	Yes
A M P6 Sudston bilbit	Bow Bridge	Kensworth	28/39/28/130	6.82	11.37	5.82	5.82	Yes	N/A	Yes
	Amersham	Missenden	28/39/28/334	7	18.18	7.00	12.00	Yes	N/A	Yes
	Whitehall	Whitehall	29/38/03/42	22.73	30.46	15.00	28.00	Yes	N/A	Yes
	Fulling Mill	Digswell	29/38/02/46	9.09	9.09	5.60	9.09	Yes	N/A	Yes
	Marlowes	Gaddesden	28/39/28/335		20.47	4.74	4.74	Yes	N/A	Yes
	Piccotts End	Gaddesden	28/39/28/335			15.72	15.72	Yes	N/A	Yes
	Hughenden	Individual	28/39/25/47	2.28	2.27	1.60	1.75	Yes	N/A	Yes
Sustainability Action M P7	Digswell	Digswell	29/38/02/46	11.37	11.37	7.88	7.88	No	Yes	Yes
	Chalfont St.Giles	Missenden	28/39/28/334	4	4.55	4.00	4.50	No	Yes	Yes
	Holywell	St. Albans	28/39/28/337		9.09	8.20	9.09	No	Yes	Yes
	Mud Lane	St. Albans	28/39/28/337		11.37	10.03	11.37	No	Yes	Yes
	Periwinkle Lane	Individual	28/39/28/401	4.99	5	4.19	4.19	No	Yes	Yes
	Runleywood (Chalk)	Individual	29/38/01/09	9.55	9.55	6.30	6.30	No	Yes	Yes

Some of these sources have individual licences whilst others are part of a group licence. The licence and deployable output (DO) values reflect the situation in September 2015 as since then, sustainability reductions have already been implemented (Bow Bridge reduced to zero as of 1st April 2016, Fulling Mill and Hughenden reduced to zero as of 1st April 2017 and Whitehall



reduced to an annual average of 2 MI/d), hence the licence and DO values have been adjusted accordingly. Where DO has been reduced to 0 MI/d, it is proposed that AIM no longer applies to these sources as the impact of abstraction has been mitigated. Where DO has not been reduced to 0 MI/d, there remains the potential for a residual abstraction influence and so there may be benefit in continuing to assess AIM against a lower AIM baseline. For this assessment period, Whitehall has not been assessed for AIM as it was the original intention to exclude sources which had suffered a sustainability reduction.

Some of the sources assessed for AIM are located in the same catchment, and have been grouped in, Table 3 and Table 4. The groupings have been used as the baseline was calculated based on the performance of AIM sources under historic droughts, and this does not necessarily reflect the current operational regime. An example is the Bricketwood and Netherwild sources. These now both form baseload sources of the Clay Lane group and usually abstract at a higher rate than the AIM baseline. In the event of an operational outage at either of the sources, there is a need for the flexibility to increase abstraction at the other, to compensate the lost output. Without the grouping, we would not be able to recoup the lost volume if an outage occurred during a low flow period.

This is also important when calculating the normalised AIM score. The relative size of different abstractions means that if output from one source was increased in response to an outage at a baseload source during a low flow period, without the grouping, the normalised AIM score of the two sources would not balance and the AIM assessment would be inaccurate. Where sources are grouped, the same trigger point is used. This is downstream of both sources in the grouping, such that the benefit of their combined operation can be realised.

Based on the methodology explained in section 2, the calculated or adopted AIM triggers are presented in Table 2.

Abstraction Incentive Mechanism- Methodology and Abstraction in 2017-18



1.7.2 Table 2. AIM Triggers for Affinity Water Groundwater Sources

Source	Trigger Location	Monitoring Record	Q95 or bespoke trigger (MI/d)	Comments
Bricketwood	R. Colne at Berrygrove GS	April 1995 – March 2015	13.00	Bespoke trigger based on minimum flows derived from AMP5 Options Appraisal Work
Netherwild				
Well Head	R. Hiz at Hitchin GS	August 1980 – to date	0.26	Trigger based on Q95 adopted from CEH ¹
Oughton Head				
Offley Bottom				
Digswell	R. Mimram at Panshanger GS	December 1952 – to date	18.66	Trigger based on Q95 adopted from CEH ¹
Fulling Mill				AIM not applicable due to SRs in April 2017
Bow Bridge	R. Ver at Colney Street GS	April 1995 – March 2015	7.44	AIM not applicable due to SRs in April 2016
Holywell				Trigger based on Q95 adopted from CEH ¹
Mud Lane				
Marlowes	R. Gade at Croxley Green GS	October 1970 – to date	32.00	Trigger based on Hunton Bridge Licence condition for flows at Croxley Green
Piccotts End				
Amersham	R. Misbourne at Denham Lodge GS	July 1984 – to date	5.53	Trigger based on Q95 adopted from CEH ¹
Chalfont St Giles				
Whitehall	R. Beane at Hartham Park GS	August 1979 – to date	15.47	AIM not applicable due to SRs in April 2017
Chesham	R. Chess at Rickmansworth GS	July 1974 – to date	15.38	Trigger based on Q95 adopted from CEH ¹
Hughenden	Hughenden Stream at High Wycombe GS	July 1997 – to date	1.90	Trigger based on Q70 from flow duration curve between 1997 to 2015
Periwinkle Lane	R. Lee at Luton Hoo/East Hyde GS	October 1959 – to date	7.34	Trigger based on Q70 adopted from CEH ¹
Runleywood Chalk				
Slip End	R. Rhee at Ashwell GS	November 1965 – to date	2.55	Trigger based on Operating Agreement for Ashwell BH Augmentation
Primrose	R. Dour at Crabble Mill GS	August 1966 – to date	18.06	Trigger based on minimum flows at Crabble Mill as per



Buckland Mill				Buckland Mill Licence condition
Denge Gravels	Denge Tubewell 19	October 2000 – March 2015	1.78mAOD	Bespoke trigger based on minimum levels for the nearby wetlands (at 1.35mAOD in TW33)

The abstraction baseline values have been calculated as the average historic abstraction, based on the period April 1995 to March 2015 when the AIM trigger would have been reached as set out in Table 2. The results are shown in Table 3 below and have been adopted by Affinity Water as the AIM baseline daily abstraction values.

Netherwild and Bricketwood sources will operate under AIM at a combined daily abstraction of 37.16 MI/d. The 5 MI/d deficit from the current target will be met by the introduction of Tolpits Lane and/or the slight increase of Eastbury.

The Hitchin sources (Well Head, Oughton Head and Offley Bottom) currently have augmentation schemes in place, based on level trigger points at Charlton Mill Pond (for Well Head) and Oughton Springs (for both Oughton Head and Offley Bottom). It is proposed that AIM will only apply to the abstracted water for public water supply and not for augmentation, as augmentation is in place to mitigate the abstraction impacts. The EA also operates an augmentation scheme from Bath Springs borehole to the River Hiz downstream of Charlton Mill Pond and upstream of their gauging station. Despite the low augmentation volumes, if this is considered to skew the gauge readings when in operation, then a groundwater level trigger could apply based on the EA observation borehole at Lilley Bottom. The equivalent trigger for flows at Q95 (0.26 MI/d) at Hitchin Gauging station, would be set at 92.4 mAOD based on the relationship between the groundwater level hydrograph and the river gauge as shown in Figure 1.

The Mimram source (Digswell) will operate under AIM at the baseline abstraction of 7.53 MI/d, based on the Q95 trigger flow at Panshanger Gauging Station. Fulling Mill previously formed part of this grouping however following the 2017 sustainability reduction, it will not be included in the AIM assessment.

The Ver sources (Holywell and Mud Lane) will operate under AIM at the combined output of 17.72 MI/d. Since Mud Lane is considered operationally as an additional borehole for Holywell and due to their close proximity, it is proposed that the combined AIM baseline will apply instead of the individual baseline values, in order to allow operational flexibility during low flow periods. As discussed earlier, it is proposed that AIM will not apply for Bow Bridge since the source has had its licence revoked due to sustainability reductions as of the 1st April 2016.

The Gade sources (Marlowes and Piccotts End) will operate under AIM at the combined output of 20.14 MI/d. It is suggested that for these two sources the combined AIM baseline is used so that there is operational flexibility between the two sources to operate at or below the 20.14 MI/d aggregate volume during low flows. It may be beneficial to continue to operate AIM in the Gade catchment after the April 2018 sustainability reductions at Marlowes and Piccotts End to help mitigate any residual abstraction impact. The baseline abstraction for Marlowes (4.42 MI/d) was calculated by applying the AIM methodology but taking into account only abstraction values >1 MI/d due to operational outages during historic low flow periods. This also discounts the very low abstraction values due to flowmeter errors. Conversely, the AIM methodology suggested a higher value (17.3 MI/d) for Piccotts End, but this was capped at the drought DO of 15.72 MI/d so that the aggregate volume from this and Marlowes is lower than the licensed volume of 20.47 MI/d by 0.33 MI/d.

The Misbourne sources (Amersham and Chalfont St Giles) will operate under AIM at the combined baseline abstraction of 10.38 MI/d. Sustainability Reductions will be imposed on Amersham on the 1st April 2018 with potentially further reductions in the future at either



Amersham or Chalfont St Giles. These will not reduce DO to 0 MI/d and so there may be merit in continuing to operate AIM following the reductions.

1.7.3 Table 3. AIM Baseline Abstraction versus Triggers

Source	Catchment	Combined AIM baseline (MI/d)	AIM baseline (MI/d)	Average Deployable Output (MI/d)	Operational Site Target (MI/d)
Bricketwood	Colne	37.16	18.65	14.00	15.00
Netherwild			18.51	28.00	27.00
Well Head	Hiz	5.03	0.84	1.15	1.70
Oughton Head			4.43	4.10	4.55
Offley Bottom			0.60	0.00	1.00
Digswell	Mimram	7.53	7.53	7.88	8.00
Fulling Mill	Mimram	Not assessed due to April 2017 sustainability reduction			
Bow Bridge	Ver	Not assessed due to April 2016 sustainability reduction			
Holywell	Ver	17.72	10.29	8.20	8.00
Mud Lane			7.43	10.03	10.00
Marlowes	Gade	20.14	4.42	4.74	4.70
Piccotts End			15.72	15.72	15.00
Amersham	Misbourne	10.38	7.51	7.00	7.00
Chalfont St Giles			2.87	4.00	4.00
Whitehall	Beane	Not assessed due to April 2017 sustainability reduction			
Chesham	Chess	4.08	4.08	5.22	5.22
Hughenden	Hughenden	Not assessed due to April 2017 sustainability reduction			
Periwinkle Lane	Upper Lee	9.94	3.36	4.19	4.50
Runleywood Chalk			6.58	6.30	6.30

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Slip End	Rhee	3.62	3.62	0.00	4.50
Primrose	Dour	6.50	2.50	3.00	2.50
Buckland Mill			4.00	4.00	3.50
Denge Gravels	Denge	6.00	6.00	4.65	5.00

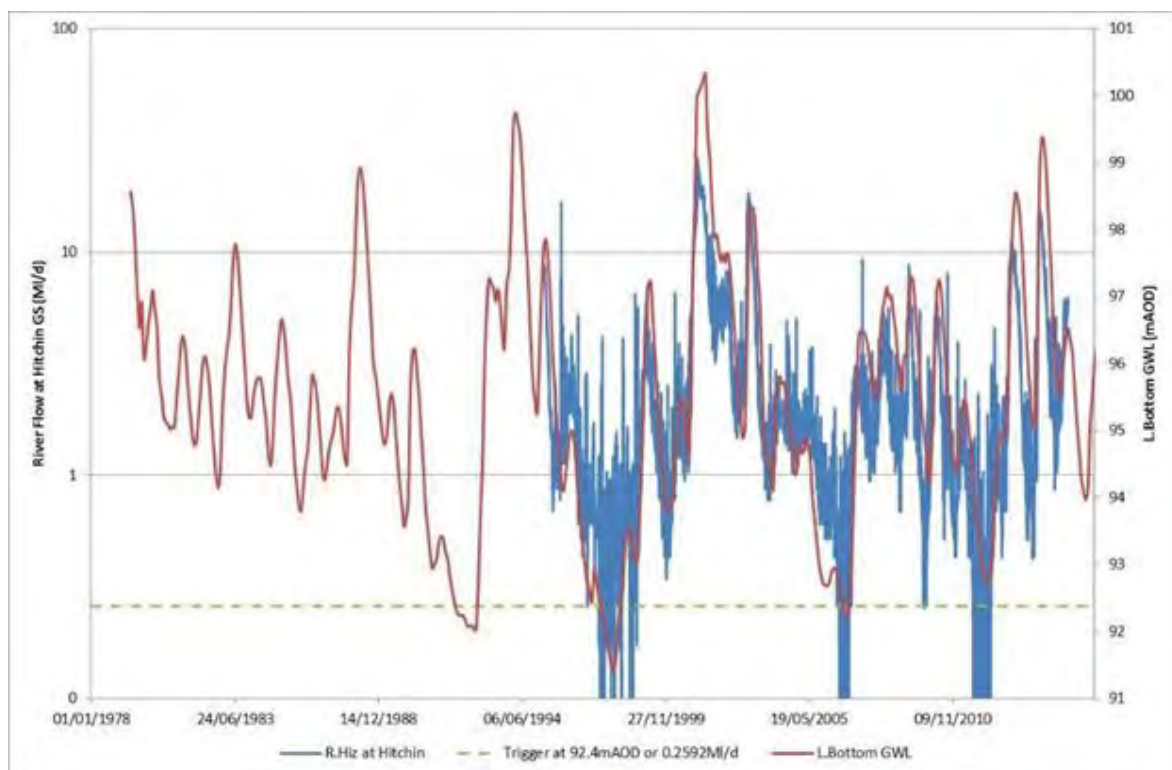


Figure 1: Relationship between River Flows at Hitchin Gauging Station and Groundwater Levels at Lilley Bottom Observation Borehole

The Whitehall source in the Beane catchment had sustainability reductions imposed on the 1st April 2017. The source was not assessed for AIM in 2017-18 but there may be environmental benefits to re-introduce the operation of AIM for this source next year. The considerable difference between peak and average licensed conditions would serve to severely constrain peak use and limit abstraction during low flow events.

Chesham source will operate under AIM at the abstraction baseline of 4.08 MI/d as calculated by the AIM methodology for flow in the Chess reaching Q95 values at the Rickmansworth gauge. It needs to be noted though that if the Chartridge source is out of supply due to high nitrates, the AIM will not apply for Chesham as they are both in the same catchment area. In this case, the river would theoretically benefit from Chartridge being out of supply (DO of 1.78 MI/d).

Hughenden source has had a sustainability reduction imposed on the 1st April 2017 (full closure). As such, going forward, AIM will cease to apply.

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The Upper Lee sources (Runleywood Chalk and Periwinkle Lane) are being considered for sustainability reductions in AMP7. It is proposed that the AIM baseline will be 9.94MI/d as the combined abstraction from the two sources until the reductions are implemented. If the reductions are no longer required based on the monitoring results, the sources could be removed from the AIM list.

Slip End source has an augmentation scheme in place linked to flow in the River Rhee at Ashwell gauge. It is proposed that AIM will operate at the volume for water into supply and not the augmentation volume as explained earlier for the Hitchin sources. The AIM baseline abstraction as calculated by the methodology is 3.62 MI/d.

Buckland Mill source has a licence condition that allows augmentation to the River Dour. However, since both this and Primrose are located in the same part of the catchment, it is proposed that when the trigger is reached at Crabble Mill gauge, that both sources will operate under AIM at the combined abstraction of 6.50 MI/d. This was adopted based on the anticipated increased demand in this zone due to housing developments. This volume is still lower than the combined DO for the two sources by 0.5 MI/d. It needs to be noted, that as mentioned above for sources that have river support schemes, the AIM baseline will apply to the volume of water into supply and not the augmentation volume. This will apply to Buckland Mill only as there is no augmentation capability from Primrose.

Denge source will operate at the AIM baseline of 6 MI/d as per the new average licence implemented on the 1st April 2015. This is a voluntary licence reduction by 3 MI/d at average (previous licence at 9 MI/d average), so the AIM baseline is adjusted to reflect the new operational pattern.

It should be noted that the triggers and the AIM abstraction baseline values are subject to consultation and may need to be reviewed following this procedure. At present, they are thought to be robust based on the current knowledge of the catchments and the historic and future use of the sources under low flow conditions. Periodic reviews of the AIM sites will take place in order to validate both the triggers and the abstraction values. The review for the financial year of 2017-18 for the AIM sites is discussed in the next section.



4 Abstraction in 2017-2018 versus AIM Baseline

A periodic review of the AIM triggers and baseline abstraction is undertaken on a quarterly and annual basis in order to validate the selected values. Table 4 below shows the actual abstraction figures for the period 2017-18 (1 April to 31 March) against the AIM baseline values.

Table 4. AIM baseline Abstraction versus Actual Abstraction in 2017-18 Note that sustainability reduction sources have been removed.

Source	Catchment	Combined AIM baseline (MI/d)	AIM baseline (MI/d)	Actual Abstraction (2017-18) (MI/d)		AIM Performance (MI)	Normalised AIM Performance	Number of days flow below the trigger
Bricketwood	Colne	37.16	18.65	16.03	42.72	+88.35	+0.13	19
Netherwild			18.51	26.69				
Well Head	Hiz	0.84	0.84	1.32 (excluding augmentation)		+4.03	+0.37	13
Oughton Head		5.03	4.43	0.84	1.02	-55.77	-0.85	
Offley Bottom			0.60	0.18				
Digswell	Mimram	7.53	7.53	7.94		+23.10	+0.05	66
Holywell	Ver	17.72	10.29	9.20	17.68	+13.13	+0.01	101
Mud Lane			7.43	8.48				
Marlowes	Gade	20.14	4.42	5.88	19.72	-102.86	-0.07	74
Piccotts End			15.72	13.86				
Amersham	Misbourne	10.38	7.51	5.47	9.20	-172.90	-0.18	95
Chalfont St Giles			2.87	3.73				
Chesham	Chess	4.08	4.08	2.78		-154.86	-0.43	89
Periwinkle Lane	Upper Lee	9.94	3.36	3.52	3.52	-1919.12	-0.65	298
Runleywood Cha k			6.58	0.00				
Slip End	Rhee	3.62	3.62	3.86 (excluding augmentation)		-121.98	-0.31	107
Primrose	Dour	6.50	2.50	1.79	4.47	-568.16	-0.41	212
Buckland Mill			4.00	2.67 (excluding augmentation)				
Denge Gravels	Denge	6.00	6.00	5.00		-79.91	-0.22	61
TOTALS						-3046.95	-2.56	



It should be noted that from July 2016 onwards, the background groundwater levels have been below the Long Term Average (LTA) (Figure 2). Groundwater level crossed Drought Zone 1 in August 2016 and dipped below Drought Zone 2 by the end of December 2016, where it remains. The winter recharge of 2016-17 was low, although the summer of 2017 experienced above average rainfall; this subdued the rate of recession. Chalk groundwater levels started to rise in December 2017, the result of high rainfall and snowmelt. The current groundwater level situation was the result of lower than average winter rainfall (2016-17) and higher than average temperature, which combined to cause a recharge deficit. Even with above average rainfall from May to September 2017, groundwater levels continued to decrease. The result was that AIM was active in all of the catchments in which it operates, at some point in 2017-18. Groundwater levels in Q4 of 2017-18 have started to move towards the drought zone 2 curve. This, in combination with surface water runoff, has led to fewer triggers being active compared with earlier in the year.

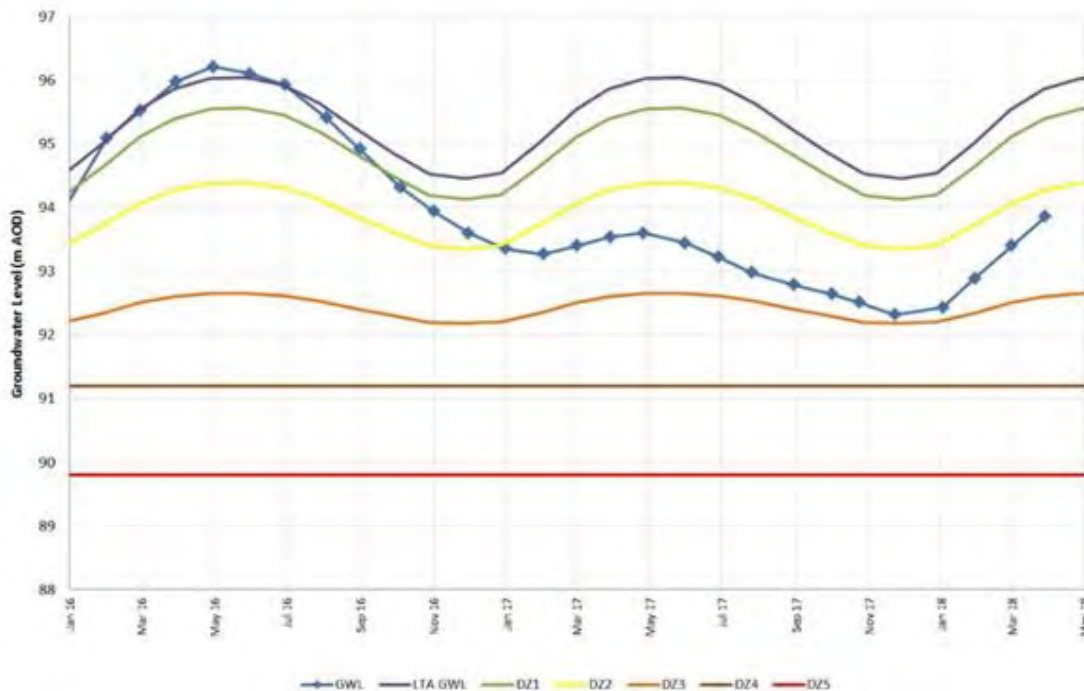


Figure 2: Background Groundwater Level Fluctuations Measured at the EA Observation Borehole at Lilley Bottom

All rivers experienced a gradual decline in baseflow in line with regional groundwater levels. The peak of the surface water drought generally coincided with that of the groundwater event. The exception to this was the Colne. Here, flows are artificially supported by the treated effluent discharge from Blackbirds Sewage Treatment Works (STW). The low-point in the hydrograph of the Rhee occurred in October 2017. This was followed by step recoveries in the flow regime, which may be linked to changes in abstraction at our Slip End source and the commencement of augmentation in December 2017.

Table 4 states the number of days in 2017-18 that each AIM trigger was active. This can be used to assess how sensitive each trigger is to drought. It can be seen that the Lea trigger was active for the longest period (298 days), followed by the Dour trigger (212 days), Rhee trigger (107 days) and Ver trigger (101). The Colne (19 days) and Hiz (13 days) were least impacted.



As previously mentioned, flows in the Colne are artificially maintained by STW discharge and the trigger being breached was coincident with outage. The resilience of the Hiz to drought may be evidence that the augmentation schemes are effective at mitigating low flows. Crabble Mill gauging station is upstream of the discharge from Buckland Mill and so the mitigating effect of the augmentation scheme cannot be assessed.

Some of the sites (Bricketwood and Netherwild, Holywell and Mud Lane, Digswell and Well Head) assessed for AIM had higher abstraction than the AIM baseline during low flow periods in 2017-18. For the Mud Lane/Holywell pairing (0.13 MI/d), Digswell abstraction (0.35 MI/d) and Well Head source (0.3 MI/d), the difference was very small. The discrepancy between the AIM baseline and average abstraction for Bricketwood/Netherwild was larger (4.65 MI/d) however flow in the Colne was maintained by the discharge from Blackbirds STW and the normalised AIM score only resulted in a small penalty. Flow in the Colne was below the trigger for 19 days in 2017-18 (out of 365) and the combined average abstraction from Bricketwood and Netherwild during the 19 days was 41.82 MI/d.

As specified in the AIM guidelines document from Ofwat, the AIM performance is measured based on the difference between the actual and the baseline abstraction, multiplied by the number of days when flows were at or below the trigger threshold (see equation below).

AIM performance in MI = (average daily abstraction during period when flows are at or below the trigger threshold - baseline average daily abstraction during period when flows are at or below the trigger threshold) * length of period when flows are at or below the trigger threshold.

In order to allow for comparison of the AIM performance between abstraction sites, either within the company or between water companies, the performance on the AIM is normalised by the baseline average daily abstraction and the length of time for which flows were at or below the trigger threshold. This is because the guidelines suggest that a performance of -1MI is better if the AIM baseline is smaller or if the period for which flows are at or below the trigger threshold is shorter. The equation for the Normalised AIM performance is given below as proposed by Ofwat.

Normalised AIM performance = AIM performance / (baseline average daily abstraction * length of period when river flows are at or below the trigger threshold)

As such, when applying the two equations above to measure the AIM performance and the normalised AIM performance for Bricketwood and Netherwild for 2017-18, the AIM performance is +88.35 MI and the normalised performance is +0.13. The positive figures signify a reduced performance as average abstraction was higher than the baseline, over the 19 day that AIM was in effect. As explained above, the flow pattern seen at Berrygrove gauge is linked to the discharge from Blackbirds STW. This discharge is known to be critical for maintaining flows in the Colne, especially in the section between Munden Estate and Berrygrove gauge. As such at times of reduced STW outage, the river suffers from low flows due to the leaky nature of the river bed and the underlying drift deposits. Blackbirds experienced ongoing operational issues towards the end of Q4 of 2016-2017. These have now been resolved and Blackbirds discharged for the majority of 2017-2018, helping to sustain river flow. Instances of flow falling below the trigger at Berrygrove coincide with outages at Blackbirds.

Periwinkle Lane and Runleywood Chalk sources are situated in the Upper Lee catchment. The AIM trigger was active for most of 2017-18, 298 days in total. Using the same equations as above, the AIM performance was -1919.12 MI and the normalised AIM performance was -0.65, since the combined abstraction at both sites was significantly lower than the AIM baseline when the trigger was on at the East Hyde gauge. This is mainly attributed to the outage at Runleywood Chalk due to water quality issues.



Flow triggers in the Rivers Mimram (Digswell source), Ver (Holywell and Mud Lane sources), Gade (Piccotts End and Marlowes sources) and Misbourne (Amersham and Chalfont St Giles sources) were reached intermittently, at times when the rivers were not responding to runoff from summer rainfall events. For the Gade and Misbourne sources, abstraction when AIM was in effect was below the AIM baseline, at -102.86 MI and -172.90 MI respectively. This gives a normalised AIM score of -0.07 for Marlowes and Piccotts End and -0.18 for Amersham and Chalfont St Giles. For the Ver and Mimram sources, abstraction when AIM was in effect was above the AIM baseline, at +13.13 MI and +23.10 MI respectively. This gives a normalised AIM score of +0.01 for Holywell and Mud Lane and +0.05 for Digswell.

The Rivers Chess, Dour and Rhee were not as responsive to the summer rainfall as some of the other rivers assessed for AIM, and have experienced a gradual decline in flows. Subsequently, the River Rhee breached the AIM trigger in mid-August and the Chess in mid-September. When flow was below the AIM trigger on the Chess, abstraction from Chesham was below the AIM baseline, giving an AIM performance score of -154.86 MI and a normalised AIM score of -0.43. When AIM was enforced, abstraction from Slip End was below the AIM baseline, partly in response to step reductions in abstraction to comply with the abstraction licence conditions. This gave a score of -121.98 MI, and a normalised AIM score of -0.31. Water abstracted for the purposes of augmentation was not included in the assessment.

Flow in Dour, as measured at Crabble Mill, was below the AIM trigger for much of 2017-18. Abstraction over this period from Buckland Mill and Primrose was below the AIM baseline, at -568.16 MI, giving a normalised score of -0.41.

The Denge groundwater levels, as measured in tubewell 19, were maintained by the above average rainfall which we received over the summer. They dipped below the AIM trigger between early October and early December 2017. Abstraction from the Denge aquifer was below the AIM baseline at -79.91 MI, giving a normalised AIM score of -0.22.

In summary, for the 19 AIM sources that the trigger was reached during 2017-18, the combined AIM performance was -3096.95 MI and the normalised AIM performance was -2.56. This suggests that the company met and exceeded the AIM baseline figures for this year.

Following the quarterly review of the AIM triggers and baseline abstractions, it appears that they are robust and representative of the catchment status. The validity of the triggers and baseline abstraction is constantly monitored and the next AIM performance review will take place in June 2018 for Q1 of 2018-19.

References

¹: <http://nrfa.ceh.ac.uk/data/search>

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