Anglian Water

PR19 DRAFT DETERMINATION
LEAKAGE COST ADJUSTMENT CLAIM

August 2019

RESPONSIBLE BUSINESS OF THE YEAR 2017
BUSINESS IN THE COMMUNITY

THE QUEEN'S AWARDS FOR ENTERPRISE: SUSTAINABLE DEVELOPMENT 2015

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COST ADJUSTMENT CLAIM: MAINTAIN FRONTIER LEAKAGE PERFORMANCE

Name of claim	Maintain frontier leakage performance
Business plan table lines where the totex value of this claim is reported	Water Network Plus
Total value of claim for AMP7	£136.9m
Total opex of claim for AMP7	£104.5m
Total capex of claim for AMP7	£32.4m
Depreciation on capex in 2020-2025 (retail controls only)	N/A
Remaining capex required after AMP7 to complete construction	N/A
Do you consider that part of the claim should be covered by our cost baselines? If yes, please provide an estimate	No. Our assumption is that the cost baselines will allow for expenditure to maintain leakage at industry average levels. Our claim covers the additional expenditure that will be required to maintain leakage at the current frontier level.
Materiality of claim for AMP7 as percentage of business plan (5 year) totex for the relevant controls	6.1% of AMP7 Water Network Plus totex
Does the claim feature as a Direct Procurement for Customers (DPC) scheme?	No

This cost adjustment claim should be considered alongside the enhancement expenditure for leakage and the performance commitment and ODI. As a package, our plans are highly stretching and reflect both our current frontier performance and the ambition to drive down leakage to the levels set out in our WRMP. The DD position fails to recognise the higher costs of maintaining our current leakage performance, fails to reflect the costs of improving from this strong base to our PCL, and fails to incentivise the achievement of even lower levels of leakage beyond that. This is illustrated in the fact that were we to achieve the industry forecast upper quartile level of leakage for every year in AMP7, this would still lead to a net underperformance penalty of over £35m in AMP7. This cost adjustment claim covers the additional costs of maintaining leakage at our AMP6 outturn level, above the costs allowed in base modelling.

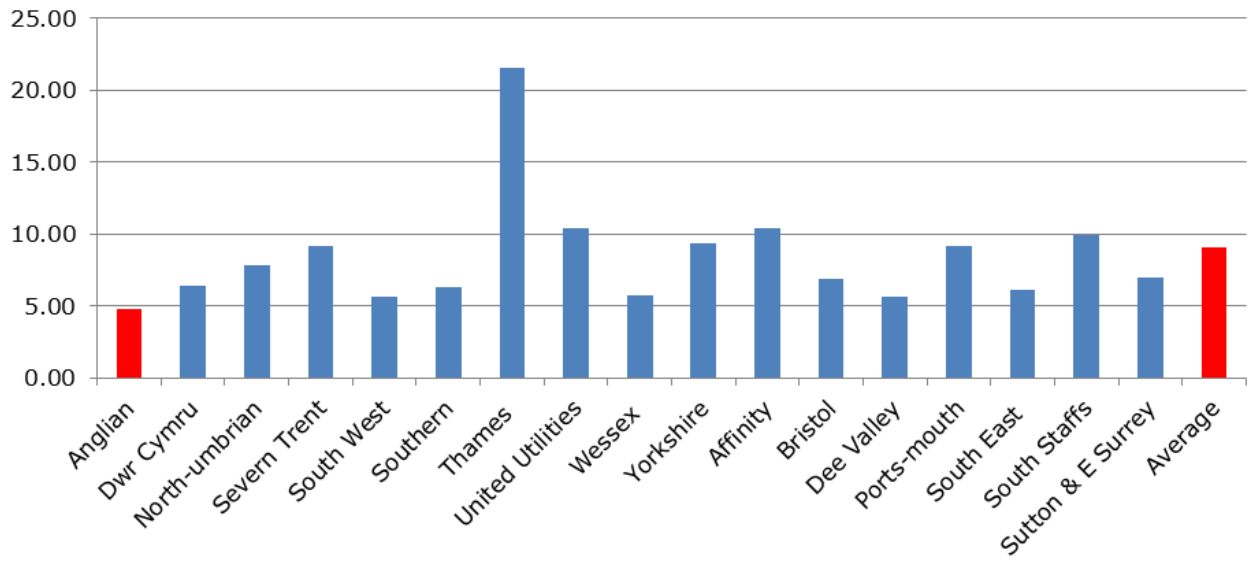
Since our IAP Response we have provided addition information in the cost adjustment claim:

- To update it with our revised 2019-20 forecast performance of 184Ml/d
- We have updated our cost adjustment claim model to include 2018-19 leakage performance and cost data as provided in response to query ANH-DD-CE-012.
- As a result of the above, we have changed the annual cost of maintaining leakage at our current level to £27.4m compared to £31.5m set out in the IAP.
- We have subsequently reflected this in the estimated leakage costs for the industry.

1.1 Need for Cost Adjustment

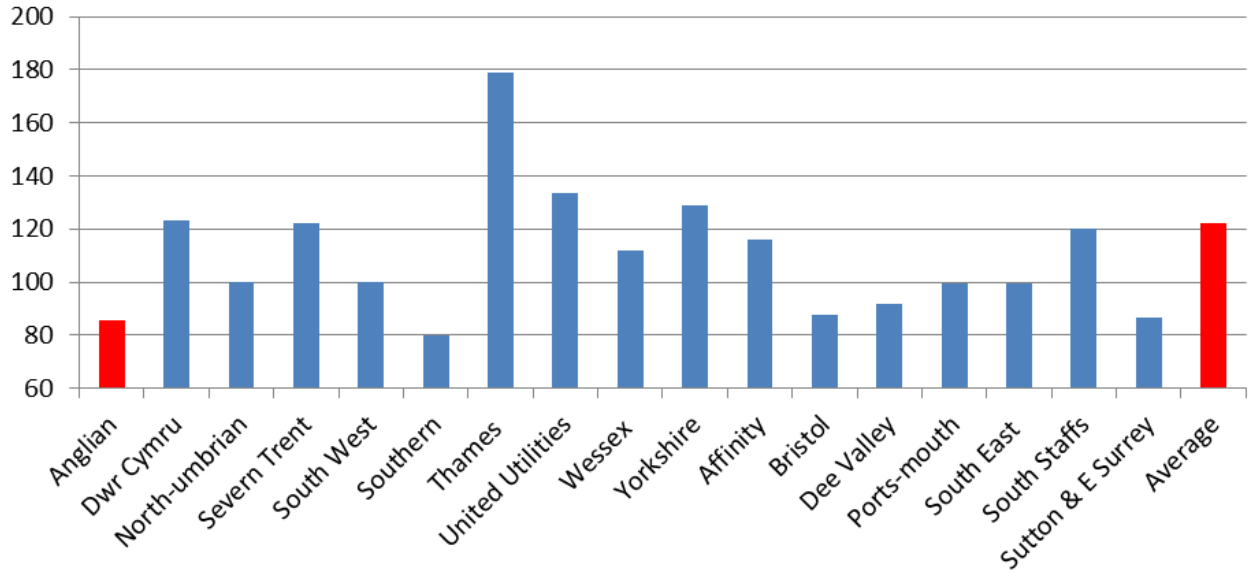
Our leakage level is at the frontier of the sector. In 2016-17 our leakage was around half that of the industry average in terms of l/km/day of water main and 70% when measured as leakage/property/day. This is shown in the figures below. Our relative position is even stronger on 2017-18 data, when more than half of the industry missed their leakage targets.

Figure 1 Leakage per kilometre per day



(source: Ofwat 2017 Information Request, Anglian Water analysis)

Figure 2 Leakage per property per day



(source: Ofwat 2017 Information Request, Anglian Water analysis)

As with most endeavours for improving performance, the better your level of performance, the more work (and cost) is required to sustain it and the more challenging any further improvements become. This is the principle of diminishing returns. Maintaining our level of leakage therefore

requires greater expenditure compared to maintaining, for instance, the industry average level of leakage. Unless the PR19 cost assessment models account for this, the costs needed to maintain our end of AMP6 level of leakage will be underestimated.

This claim relates to base expenditure only, as the cost is only to maintain leakage at 184 Ml/d, our expected outturn in 2019-20. This claim focuses on the additional costs which we can be expected to incur in maintaining a level of leakage which is not only below that of our peers but also below the sustainable economic level of leakage (SELL). By definition, maintaining leakage beyond (that is, below) SELL incurs additional costs. Details on the methodology used to arrive at the cost adjustment claim value are provided in the 'Robustness & Efficiency of Costs' section.

Our business plan includes proposals to continue to drive the leakage frontier, from 184 Ml/d in 2019-20 to 161 Ml/d in 2024-25. Additional expenditure will be required to achieve this. This expenditure will be treated as enhancement and is part of our enhancement plan. An enhancement case is included in our plan to describe and justify this, and this case was accepted by Ofwat in the DD.

Expenditure to maintain leakage at current levels is treated as base. Costs would be allowed by botex cost models if leakage levels were included as explanatory factors. However, we noted that leakage is not an explanatory factor in any of the relevant models reported in Ofwat's March consultation, including our own and Ofwat's eight Water Network Plus models.

We know that our customers, Ofwat and Government have a shared desire for us to continue to improve performance on leakage. For the reasons explained above, a cost adjustment will be required to do so. The base modelled allowance, this cost adjustment claim, our enhancement costs and ODI mechanism must reflect our unique position in operating well above industry average performance, above the industry upper quartile, and continuing to drive forward the leakage frontier to achieve the ambitions set out in our WRMP. At IAP, Ofwat accepted the need for this cost adjustment, though due to the incorrect application of log10 rather than natural log in its calculation of our adjustment, the majority of the costs were disallowed. Correcting for this error allowed this cost adjustment claim minus a 15% efficiency challenge. This 15% haircut did not recognise that we had already embedded an efficiency challenge through the cost adjustment claim by using SELL rather than average industry costs as the basis of calculating the extra costs of maintaining our current leakage performance. Ofwat applied the cost adjustment value from upper quartile rather than SELL or industry average, despite modelled base costs being based on historical industry average performance, rather than forecast upper quartile.

At DD, Ofwat reversed its earlier position and disallowed the cost adjustment claim in full. This was on the basis of the incorrect claim that modelled base costs cover forecast industry upper quartile performance, and that enhancement expenditure will cover expenditure to our performance commitment level. This assessment is flawed on two key points. Firstly, the inputs to modelled base costs reflect historical industry average performance. Whilst this includes some improvement in leakage over this historical period, it does not reflect improvement in the upper quartile; it reflects the improvement the average company performance. Therefore, there is no basis to conclude that forecast upper quartile is covered in base modelling, rather than industry average. Secondly, enhancement reflects the cost of improvement in the level of leakage and not the cost of maintaining performance above the industry average, i.e. if we were to maintain leakage at 184Ml/d during AMP7, there would be no need for enhancement expenditure, but a cost adjustment would be required to reflect the extra cost of performing significantly above industry average. This is why a different rate is used for our cost adjustment claim and our enhancement expenditure. It is therefore not appropriate to apply enhancement expenditure from the upper quartile, rather than from our current performance level to our PCL.

On the basis of these two key points, Ofwat is incorrect to reject this cost adjustment claim on the basis that modelled botex covers costs to upper quartile and enhancement expenditure supports expenditure beyond this. This cost adjustment claim should be applied to reflect the extra costs of maintaining leakage at our current performance level compared to the industry average, with our enhancement expenditure covering performance beyond current performance to our AMP7 PCL.

1.2 Management Control

Since the start of AMP5 in particular, reducing leakage has become a clear and united priority amongst government bodies and our customers. The catalyst for this was the severe winter of 2010-11 that caused a spike in our leakage up to 229.5 Ml/d. This made leakage a key priority.

Ofwat's PR19 Final Methodology tasks all companies to reduce leakage further by 2025. Other key stakeholders support this objective:

- National Infrastructure Commission (NIC): Preparing for a Drier Future. Recommends that government should ensure plans are in place to deliver additional supply and demand savings of at least 4,000 Ml/d in England and advocates a twin-track approach to achieve this, highlighting that leakage reduction is a key component to the demand management side of maintaining the supply and demand balance.
- Environment Agency: The State of the Environment: Water Resources. *"action must continue to reduce demand, increase supply and minimise wasting of water to prevent future shortages and limit environmental damage."*

In the face of strong stakeholder and customer opinion, avoiding leakage maintenance costs by allowing leakage to rise above our 2020 level (as would be the case under Ofwat's current cost assessment) is clearly not an option . It is the clear demand of our customers, Ofwat and Government that leakage should continue to fall, especially in water stressed regions such as our own.

1.3 Need for Investment

Maintaining leakage at 184 Ml/d mitigates our impact on the environment by minimising the amount of water we need to abstract from river and groundwater sources in order to supply the customers and businesses we serve. Leakage therefore directly relates to our customer outcome of achieving 'a Flourishing Environment'.

In addition, because our region is considered to be under serious water stress by the Environment Agency, it is important that we manage our supply and demand balance in our region as far as possible by focusing on demand management, as well as through developing new sources of supply.

A clear message from our customer engagement work (summarised in our Customer Research and Engagement Synthesis report) is that failure by a water company to control leakage from its own pipes can be a strong disincentive to customers adopting more water efficient behaviours. Avoiding this outcome is critical as we will require customers to use water efficiently to off-set the increase in demand that is expected as a result of the forecast population growth in our region.

The results from the 'Options Survey for the Water Resources Second Stage research' in our Customer Research & Engagement Synthesis report shows that our customers want us to continue focusing on leakage. Customers were introduced to a list of demand and supply side water resource options and asked to choose their top three options. Among household and non household customers, leakage reduction was the option most likely to be selected as one of the top options. When asked to explain their choices, both types of customers emphasised reasons around not wasting a precious resource and making the most of existing water resources. Although we are a top performer with regards to leakage, in our Customer Research & Engagement Synthesis report "leakage was considered by most respondents to be the worst aspect of the water service; only 13% felt it was the best and 41% felt it was the worst (n=301, combined sample)" (p58). This shows that our leading position relative to other companies does not negate the need for investment in this area.

In summary, investment to continue tackling leakage is needed because it is what our customers want. It is important with respect to maintaining trust and confidence, mitigating environmental damage from our abstractions and encouraging the adoption of crucial water saving behaviours amongst our customers.

In its PR19 Final Methodology document, Ofwat stated that companies should achieve forecast upper quartile performance in relation to both leakage per property per day and leakage per kilometre of main per day. As can be seen Tables 1 and 2 below, Anglian Water has been in the upper quartile of leakage per kilometre of main per day for 13 out of the last 16 years. It also moved into the upper quartile of WaSCs on the basis of per property per day in 2015-16.

Table 1 Upper quartile performance in terms of per kilometre per day (Source: Ofwat 2017 Information request, updated by 2018 APR; analysis by Anglian Water)

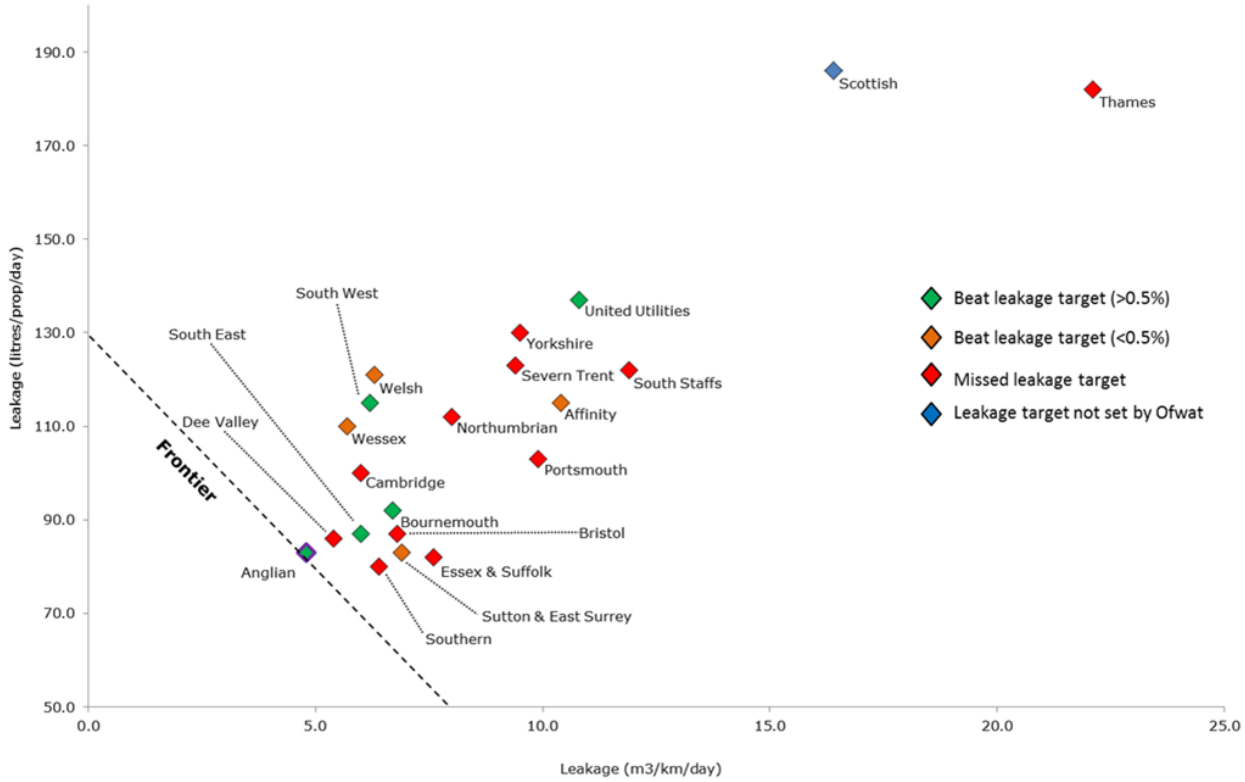
Year	UQ kl/km/day	ANH kl/km/day	ANH in UQ?
2003	5.45	5.23	Yes
2004	5.82	5.88	No
2005	5.78	5.82	No
2006	5.78	5.77	Yes
2007	5.52	5.46	Yes
2008	5.68	5.60	Yes
2009	5.65	5.62	Yes
2010	5.63	5.62	Yes
2011	5.91	6.10	No
2012	5.44	5.26	Yes
2013	5.32	4.98	Yes
2014	5.40	5.06	Yes
2015	5.35	5.04	Yes
2016	5.21	4.78	Yes
2017	5.27	4.82	Yes
2018	5.31	4.75	Yes

Table 2 Upper quartile performance in terms of per property per day (Source: Ofwat 2017 Information request, updated by 2018 APR; analysis by Anglian Water)

Year	UQ l/prop/day	ANH l/prop/day	ANH in UQ?
2003	99	100	No
2004	106	112	No
2005	104	110	No
2006	103	108	No
2007	95	100	No
2008	93	98	No
2009	95	99	No
2010	95	99	No
2011	98	107	No
2012	92	95	No
2013	88	90	No
2014	89	91	No
2015	88	90	No
2016	86	85	Yes
2017	87	86	Yes
2018	86	83	Yes

We are confident that the leakage reduction target we have set ourselves for AMP7 will continue to meet the upper quartile challenge.

Figure 3 Leakage frontier in 2018 (source: Anglian Water WRMP)



1.4 Best Option for Customers

It is clear that customers want us to tackle leakage. Our customer engagement process tells us that customers want us to conserve water and that they view leaks as an "emblematic issue". Examples of evidence for this from the Customer Research & Engagement Synthesis report v.12 are provided below:

"In the main online community trial, customers felt the company's commitment to reducing leakage should take pride of place in communications from Anglian Water, as it should be the company's priority." (p174).

"The Main Stage Willingness to Pay research suggests that customers think all of the attributes tested in the survey (relating to water, sewerage and wider services) are important. In relation to water services, tap water aesthetics (discolouration) and unplanned interruptions were the most important attributes for household customers (61% said these were very important), just marginally ahead of leakage (60%)…". (p46).

"In selecting a package of improvements relating to the water service, the Willingness to Pay (DCE) choice task indicates that household customers gave the greatest weight to leakage (26%)." (p114).

"In the Acceptability research, the element of the proposed plan concerning leaks was considered Acceptable by over 90% of all customer groups (with the exception of vulnerable customers). However, more respondents rated the leakage proposals as unacceptable (177 people) than any other individual element of the plan. The most commonly cited reasons for objection were that: more needs to be done to reduce leakage/waste (35%); some water leaks take too long to mend (19%); targets need to be lower (19%); 172 million litres a day is far too high (18%); and there should be zero tolerance on leakage (5%)." (p169).

In terms of affordability and willingness to pay, *"the PR14 Willingness to Pay Survey consistently identified positive and statistically significant willingness to pay for improved levels of service… if they were judged to offer 'value for money'."* (p43). To this end, *"in the Domestic Customer Survey, respondents were asked to choose three factors (from a given list of 11), which would most increase their assessment of the value for money offered by Anglian Water. Fixing leaks (61%) was the aspect most likely to increase customers' assessment of the value for money they receive from Anglian Water."* (p87). This shows that our customers are willing to pay more if it allows us to further tackle leakage.

In order to identify the best value demand management option for customers, we assessed the widest range of demand management options possible during the initial stages of our draft WRMP. The initial list of options therefore considered the following areas:

- Our current business practices and how we could improve them
- Current practices and plans of other UK water companies
- Practices in other sectors such as gas and electricity to encourage demand management and behaviour change
- Practices in other countries or localities that experience water stress
- Opportunities provided by technology and innovation, and,
- Latest academic research.

This list was then assessed using the screening criteria set out in WR27 Water Resources tools (UKWIR, 2012) to identify feasible option-types and a number of option-types were eliminated. For the remaining options, we went through a 'definition process' to develop the detail of each option, understand dependencies and exclusivities, and create options that are specific to Water Resource Zones (WRZs). Given the synergies between leakage reduction, smart metering and water efficiency activities, it was essential to consider the demand management options holistically during the development of strategic options. This approach is consistent with the approach to demand management in the Water Resources Long Term Planning Framework (WRLTPF).

All strategic demand management options were also assessed in the Strategic Environmental Assessment. This process yielded three potential strategic options, all of which underwent a cost-benefit analysis (CBA). This process identified the so-called 'Extended Plus' option as our preferred approach to demand management. A sensitivity analysis was also completed for this option and it was found to remain cost beneficial under all of the scenarios presented below.

- Increased costs of 10% capex and 5% opex
- Using the low estimate of the societal valuation results (our main CBA used the central estimate)
- Lower than expected water savings by 15% and 30%, and
- A combination of the higher cost and lower water savings scenarios (15%) while using the low estimate of societal valuation.

Thus, we are confident that the process detailed above has successfully identified the best value option for our customers. It is ambitious, yet achievable; best meets our customers' expectations and strikes the right balance between affordability and protecting the environment. The demand management identification process above has been subject to a detailed assurance process and has been approved by the AWS board (Draft WRMP Demand Management Strategy Technical Report).

1.5 Robustness & Efficiency of Costs

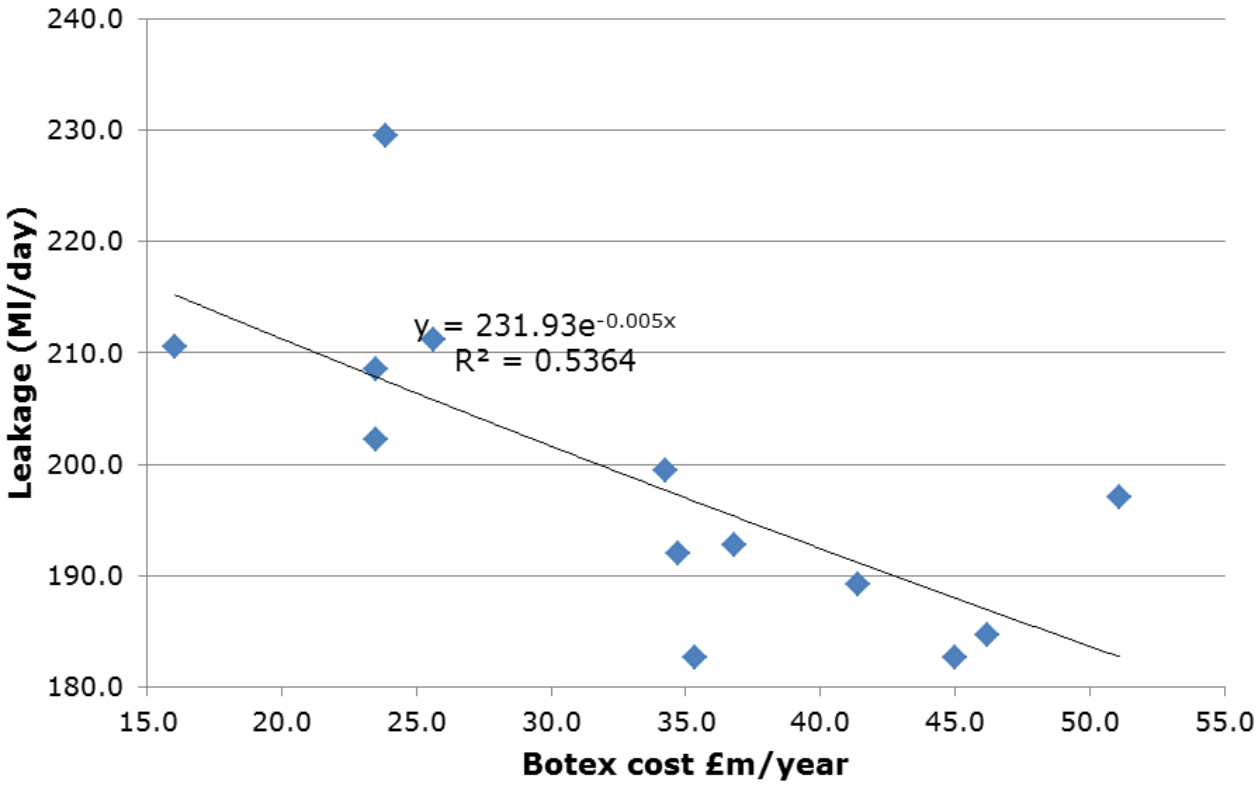
Our approach of encouraging collaboration and innovation in everything we do is clear from our Strategic Direction Statement. We believe this will allow us to maintain leakage at 184 Ml/d as cost effectively as possible. We are constantly trialing new leak-detection technologies such as thermal imaging drones, state-of-the-art noise loggers and smart meters to help us locate otherwise elusive leaks in a time- and cost-efficient way. This enables us to prioritise repairs and fix small leaks before they develop into bigger problems. This also helps to reduce carbon, cost and disruption to our customers by removing the requirement for manual surveys and allowing us to accurately pinpoint leaks before excavation. These efficiencies will help to keep the cost of maintaining leakage at 184 Ml/d as low as possible.

There is no established methodology with regards to how the additional cost of maintaining a lower than average level of leakage should be calculated. We have developed a methodology, based on Anglian Water historical data, to derive the relationship between leakage level and cost of maintaining leakage. This model was used by Ofwat to calculate our allowance for the IAP, though with an error in the use of log 10, instead of the natural log function. This methodology allows us to forecast the cost of maintaining leakage at 184Ml/d. The value of our claim is the difference between this cost and the cost of maintaining leakage at SELL.

It is important to note that the money spent on maintaining a particular level of leakage is viewed as being base capex and opex – that is to say, botex. By contrast, expenditure designed to drive down leakage to a lower level is viewed as enhancement capex and opex. The analysis which follows focuses only on the botex expenditure aimed at maintaining a particular level of leakage.

We have plotted our previous leakage levels in Ml/d against the expenditure (£m/year) to achieve this from the previous year. This is because the benefit of investment to control leakage made during any one year is not fully recognised until the following year. The data points used to establish this relationship range from 1997-98 to 2018-19, as provided to Ofwat in response to query ANH-DD-CE-012. A best fit curve was then added to extrapolate the trend so that the cost of achieving a leakage value of 184 Ml/d could be forecasted. As the figure below shows, as leakage falls the cost required per additional unit of leakage reduction increases. This is consistent with our expectations and the principle of diminishing returns. The high outlying point (from 2010-11) clearly is reducing the quality of the fit.

Figure 4 Anglian Water leakage vs botex cost (Source: Anglian Water; all costs are in 2017-18 price base)



Because the components of leakage control have evolved within the business over time, a level of interpretation and assumption has been necessary in order to combine cost data from different sources and achieve the leakage level to cost relationship back to 1997-98. The costs from 1997-98 to 2010-11 have been obtained from the old June Returns. In these reports, the cost of leakage is captured by summing:

- Capex (Table 35 commentary), and
- Opex (Reactive and planned maintenance included in opex - water distribution – infra).

Post 2010-11, the cost of leakage control has been computed on a broadly similar basis to the JR data. We are therefore confident that the data from these two sources can be combined to derive the relationship shown in the figure above.

Using the relationship described in the figure above, we can solve for x using the leakage level (y) as follows in the table below:

Table 3 Computing leakage cost from graph (source: Anglian Water analysis)

Y: Leakage Ml/d	X: Cost £m pa
SELL: 211	18.9
184	46.3
Difference	27.4

That is, the cost of maintaining leakage at 184 Ml/d is £27.4M pa greater compared to maintaining leakage at the SELL (equivalent to £136.92m across the whole of AMP7).

We note that the the relationship used in this cost adjustment claim is derived from our own historical costs. We acknowledge that performing at a level not seen in the industry before and the lack of availability of actual costs data from other companies limits our ability to externally benchmark the cost of this cost adjustment claim. We have therefore built in a cost efficiency factor to this claim. As described, our claim is evaluated as the difference between the cost of maintaining leakage at 184 Ml/d and the cost to maintain leakage at our SELL of 211 M/d. Our assumption is that the cost baselines derived from botex modelling will allow for expenditure to maintain leakage at industry average levels. These are much higher than our SELL. Our leakage level would be 233Ml/d at the forecast end-of-AMP7 industry median average level according to data used by Ofwat at Draft Determination. Correspondingly, the cost of maintaining leakage at industry average would be much lower. Because we have not operated at industry average leakage levels in recent years we have no reliable way of assessing the cost of doing so. A claim based on maintaining leakage at industry average would clearly be significantly higher. Therefore, by applying this cost adjustment claim to our SELL level rather than the industry average, we have embedded an additional cost efficiency challenge to our botex costs.

1.5.1 Conclusion

The approach we have taken is to derive a relationship between the level of leakage and the cost to maintain that level based on past performance. We have used that relationship to estimate the additional cost of maintaining our leakage at the target level for AMP7 (184Ml/d) compared to the cost of maintaining leakage at our SELL. This aligns with the model we shared with Ofwat in response to query ANH-DD-CE-012, and with the model that Ofwat used to calculate our costs adjustment claim at IAP (correcting for the log base error, and updated to include input cost and leakage figures for 2018-19).

1.5.2 Estimating costs for the industry

In its PR19 Methodology statement, Ofwat made it clear that, where possible, allowances for special factors should be applied symmetrically - that is, if one company required an uplift in its cost allowance to reflect a particular set of circumstances, those companies which did not face the same circumstances should see a countervailing reduction to balance the cost awarded.

If Ofwat was minded to take this approach, we think it would be possible for a symmetrical application of cost adjustments to reflect the cost of maintain leakage at differing levels. An approach to estimating the claims / costs associated with leakage maintenance for all companies is set out below. The basis of the approach is to compute a cost per Ml/d difference between actual and average leakage based on Anglian data (the only detailed data we have available to us) and

then apply it to all companies. We note that because we use our cost is based on a comparison with our more challenging SELL rather than industry average (for the reasons provided above), our cost in this table is lower than it would be if we were compared with industry average.

Table 4 set out this approach. It summarises the 2016-17 values for distribution input (DI) and total leakage in Ml/d for the industry. This yields an industry average percentage leakage figure of 21.7%. If we had operated at that level of leakage, then our leakage level would have been 1,099 x 21.7% = 238 Ml/d.

We can use the annual value of our claim as the basis for computing the claims (positive and negative) for other companies. This is set out in the following table. The average leakage for each company is the industry average leakage rate (21.7%) multiplied by its DI. The adjustment value for each company is a share of the annual cost we have assessed for AW of £29.6m pro rata to our gap to the industry average.

For example, for Northumbrian the value is 29.6m x 38.5 / 53.7 = £21.2m.

These values net to zero, achieving symmetrical application and zero net cost to customers.

Table 4 Industry costs and claims based on Anglian Water data (source: IR17, Anglian Water analysis)

2016-17 data	DI Ml/d	Average leakage Ml/d	Actual leakage Ml/d	Average actual leakage Ml/d	Cost £m
ANH	1,099.5	238.4	184.7	53.7	27.4
NES	1,108.6	240.4	201.9	38.5	19.6
NWT	1,730.6	375.3	439.2	-63.9	-32.6
SRN	532.3	115.4	88.1	27.3	13.9
SVT	1,848.1	400.8	431.6	-30.8	-15.7
SWT	427.9	92.8	84.4	8.4	4.3
TMS	2,641.4	572.8	677.2	-104.3	-53.2
WSH	804.0	174.4	175.4	-1.1	-0.5
WSX	337.0	73.1	68.4	4.7	2.4
YKY	1,261.3	273.5	295.2	-21.6	-11.0
AFW	901.9	195.6	173.0	22.6	11.5
BRL	272.8	59.2	46.4	12.7	6.5
SBW	141.5	30.7	19.1	11.6	5.9
DVW	66.1	14.3	11.3	3.0	1.5
PRT	170.1	36.9	30.4	6.5	3.3
SES	163.7	35.5	24.3	11.2	5.7
SEW	521.0	113.0	88.6	24.4	12.4
SSC	374.9	81.3	84.2	-2.9	-1.5
Total	**14,402.6**	**3,123.3**	**3,123.3**	**0.0**	**0.0**

We acknowledge that this approach uses gap to industry average leakage rather than gap to SELL which would be the appropriate approach given that our claim (and our £29.6m) depends on gap to SELL. We do not know companies' SELL values, though these could be substituted in the analysis to recalculate the figures.

1.6 Customer Protection

Our leakage performance commitment provides protection to our customers in the event that we do not deliver this level of performance. Penalty incentives will apply through the leakage performance commitment if our leakage falls below the level needed to achieve our performance commitment level at the end of the AMP (161 Ml/d measured as a three year average). This provides a very strong financial incentive and reflects the value that our customers place on reducing leakage.

Other powerful incentives exist to protect customers from the risk that leakage will increase. These include the reputational cost of missing our performance target in this critical area.

1.7 Affordability

The impact on bills and affordability of leakage reduction has been presented to stakeholders in our customer engagement programme and through our consultation on the draft WRMP. The CBA that has been completed and externally assured on our selected demand management option provides further assurance that our plans are affordable. Furthermore, there is evidence from our customer engagement that customers find their bills affordable and are willing to pay more for defined service improvements such as leakage reduction, especially if these improvements are considered to provide value for money. For customers who struggle to pay their bills, we offer a comprehensive payment support programme.

1.8 Board Assurance

Our third party assurance provider, Jacobs, has reviewed our special cost factor submissions. They concluded that we have compiled a robust claim for special costs which are unique to us as a company and are outside of management control.

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