Appendix 2: Delivering outcomes for customers

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1. Introduction

At the IAP we opted out of the early certainty clause for the compliance risk index (CRI) and supply interruptions, while in our DD an intervention was made against our mains repairs performance commitment. In this appendix we set out a small number of changes to these three measures that we believe will help ensure they deliver improved customer outcomes in the short and long run.

Alongside these three substantive points we also respond to three technical issues that were set out in the DD. These relate to:

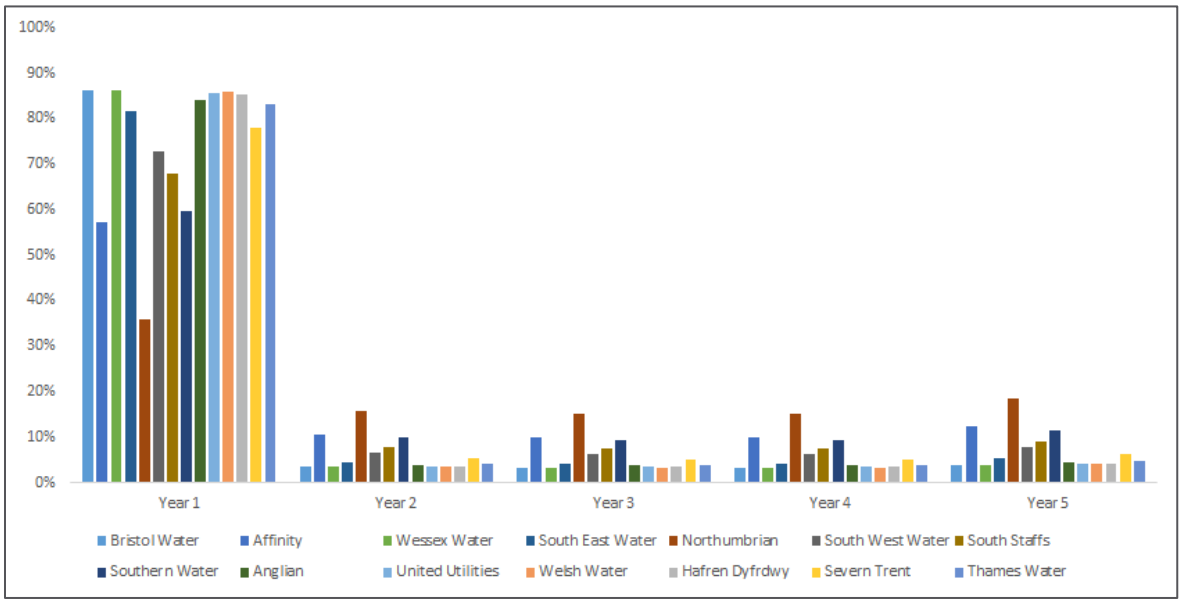
- Update on shadow reporting – in the DD outcomes appendix it is noted that companies need to provide updates on performance for measures where commitment levels were outlined using percentages to ensure that improvements in AMP7 are made against a robust baseline. In this appendix we provide an update on the convergence measures and the impact of continuing reporting improvements we've made since the submission of our plan. This relates to unplanned outage, sewer collapses, leakage and PCC and also applies to bespoke metrics supported by limited historical data – persistent low pressure, public sewer flooding and speed of response to leaks.
- Calculation of the closing position for SIM – since the submission of our business plan, Ofwat has published further information on the SIM replacement C-MeX. In the light of the fact that Ofwat has yet to publish a methodology for calculating SIM rewards and penalties, we've recalculated our potential SIM penalty by applying the C-MeX methodology.
- Clarifying performance commitment definitions – we have reviewed the performance commitment definitions set out in the DD to ensure that they are consistent with relevant reporting guidance, are clearly defined, easy to understand and act in the best interests of customers. We have identified four definitions where minor changes could be made to improve the PC and avoid ambiguity in the future.

2. Supply interruptions

We support the concept of the UQ ambition and the need for our sector to continuously push forward the standards of service that we deliver to our customers. However the use of the forecast UQ (3:00) raises significant concerns about deliverability given that the actual UQ has ranged between 06:18 and 07:24 in this AMP. In fact only one company has achieved less than 03:00 during that time. It therefore seems highly unlikely that this ambition – a 50% shift in UQ from 2019-20 company business plan forecasts – will be achieved by 2024/25.

Our concern with this measure is compounded by the fact that around 75% of the improvement needs to be made in the first year, and thereafter the PC is designed to deliver close to a 5% improvement (unlike the two other UQ common measures where improvement of one-third is required in the same period) as illustrated below. The level of sector-wide improvement required in year 1 (01:43) has not been achieved in this AMP (the best being 01:06).

Percentage improvement in performance required to achieve UQ target by company

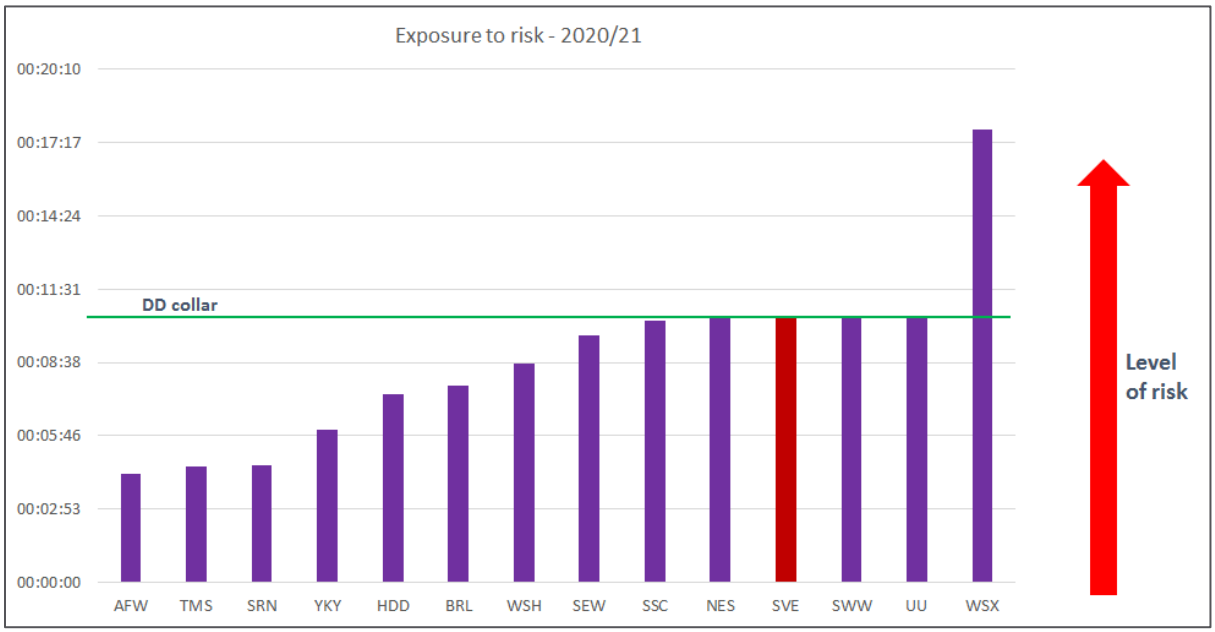


Overall the approach to the SI target could damage the reputation of the sector because the target and phasing have become too far detached from current performance to be realistically achievable.

If the target remained unchanged, then changing the current glidepath is essential. Applying a glidepath, from 2019/20 outturn to the 2024/25 UQ, would create a more realistic profile. Such an approach would also be consistent with PR19 totex cost assessment, whereby a historic UQ target is set along with an annual improvement (i.e. evenly-spread increments).

We also think that a more consistent penalty collar should be applied, given the significantly higher levels of risk (this would be consistent to CRI). In the DD, our penalty collar has been set above the collar put forward by a number of other companies, meaning they face significantly less risk. This position has been exacerbated by revisions to slow track plans whereby the majority of companies would now face significantly less risk than the three fast tracked companies (as defined by the difference between the target and the collar) – illustrated below.

Exposure to risk – 2020/21



Given the significant variations between companies' targets and collars, the collars should be standardised to ensure that companies have not put forward stretching ambition with a corresponding low risk of penalties. Assuming the target doesn't change for other companies, this would involve setting the collar at the UQ of the revised submissions – which is 12:30. If the targets do change then we believe the collar should be set to deliver a consistent level of risk (ie, the same difference between target and the collar).

The changes described above would allow incentives applied in a way that better facilitates the innovative effort required to achieve and sustain service improvements for customers in this price control period and going forward.

We discuss this solution and the underpinning need below.

2.1 Taking a constructive approach

We've looked at this challenge from the following perspective:

- we firmly believe that the challenge to companies at PR19 should be greater, and the incentives stronger, than PR14;
- the approach to using forecast UQ has worked well in that companies have 'bid up' and revealed more ambition – but we should not lose sight of the historical precedent and what is deliverable;
- the balance between ambition and deliverability is important to consider when incentives are being calibrated. We are long standing supporters of ODIs, but know that for incentives to work effectively, successes need to be recognised, and that seeking to drive performance only through the use of penalties can have undesirable short-termist effects; and
- we recognise that if glidepaths are not carefully applied they can weaken incentives and we've been cautious about using them in our plan. On balance, we think this is one area where they are warranted.

2.2 Why are we concerned about deliverability?

Deliverability has been an important and reoccurring theme during PR19. Throughout the IAPs, there were instances of Ofwat challenging the deliverability of companies' plans. Typically this was through the past performance assessments, but it was also on the grounds of whether certain combinations of commitments are possible.

We're concerned about deliverability for supply interruptions on the basis of:

- the variations in companies' forecasts of UQ in submitted plans;
- biases associated with company specific factors; and
- historical precedent.

Variations in initial company forecasts used to calculate UQ

At the time the business plans were submitted, companies included forecasts of UQ that varied considerably, ranging from 01:48 to 09:59. This means that 12 companies proposed a UQ worse than the 03:00 used in the draft determinations. At the same time, those who proposed stretching targets sought to offset some of the risk using deadbands (Yorkshire) or enhancement expenditure (Wessex).

There are two reasons why this is significant:

- there was no consistent view of what might be deliverable; and
- variations of this size have an important bearing on the target when a simple approach to calculating forecast UQ is used (as has been the case).

We also recognise that once the size of the likely UQ figure was known (following business plan publication), many companies (including ourselves) have made a sizeable shift in their target, with 12 companies now proposing a UQ of 03:00. We continue to believe that ambition is good for customers and it is a procedural success for the price review. At the same time, we need to keep in mind that the target hasn't become any more deliverable. As we set out below, historical data suggests there isn't a strong empirical basis for it, and when combined with the scope for penalties, it risks making companies unduly focused on the short-term avoidance of penalties (rather than on seeking out more innovative approaches that may deliver lasting step-change improvements).

Biases associated with company specific circumstances

The variations in initial forecasts also imply that there could be company-specific circumstances that impact performance. There is an emerging evidence base from company plans and IAP responses that suggest this is the case.

- A simple observation from performance over the last three years is that the consistent top performers are those that can easily re-route supplies (such as city-based companies) and that companies with significant rural populations are not able to apply the same solutions.

Company	2015/16	2016/17	2017/18
Bristol Water	00:16:53	00:12:34	01:15:59
Yorkshire Water	-	00:08:14	00:06:12
Sutton East Surrey	00:06:18	00:04:23	00:03:14

Portsmouth Water	00:03:30	00:04:09	00:04:17
Affinity	00:18:00	00:21:06	00:32:54
Wessex Water	00:14:18	00:13:19	00:12:34
South East Water	00:32:30	00:12:33	00:44:36
Northumbrian	-	00:02:10	00:05:19
South West Water	-	00:09:02	00:17:26
South Staffs	00:04:14	00:05:11	00:08:32
Southern Water	-	00:06:18	00:14:46
Anglian	00:08:12	00:11:43	00:07:24
United Utilities	00:17:04	00:13:57	00:13:21
Welsh Water	00:21:42	00:12:12	00:43:18
Hafren Dyfrdwy	00:06:47	00:18:09	00:08:31
Severn Trent	00:11:41	00:11:14	00:35:50
Thames Water	-	00:08:41	00:24:23
UQ	**00:06:40**	**00:06:18**	**00:07:24**

- The Hafren Dyfrdwy IAP response applied econometric modelling to show how different factors can influence company performance. It explained how the biggest challenges to achieving a 03:00 target are complex incidents. These incidents can impact all companies, but the ability to respond is significantly influenced by factors outside management control, such as population density, topography and accessibility. The best performing companies are those that can easily re-route supplies (e.g. city based) and weaker performers are those with large proportions of their populations in rural regions with very hilly topography with networks that have longer pipe lengths with fewer valves, less interconnectivity, higher water pressure and reduced accessibility to assets.

- Other companies too have contended that operating environments influence performance. For example, Dwr Cymru: *"in order for horizontal benchmarks to be fair, allowances should be made for significant differences in operating environments. The relative lack of network connectivity in our region combined with the sparsity of our population puts us at a significant disadvantage on CML performance; and there is no support from customers for significant further reductions in CML."*

This has important implications for supply interruptions:

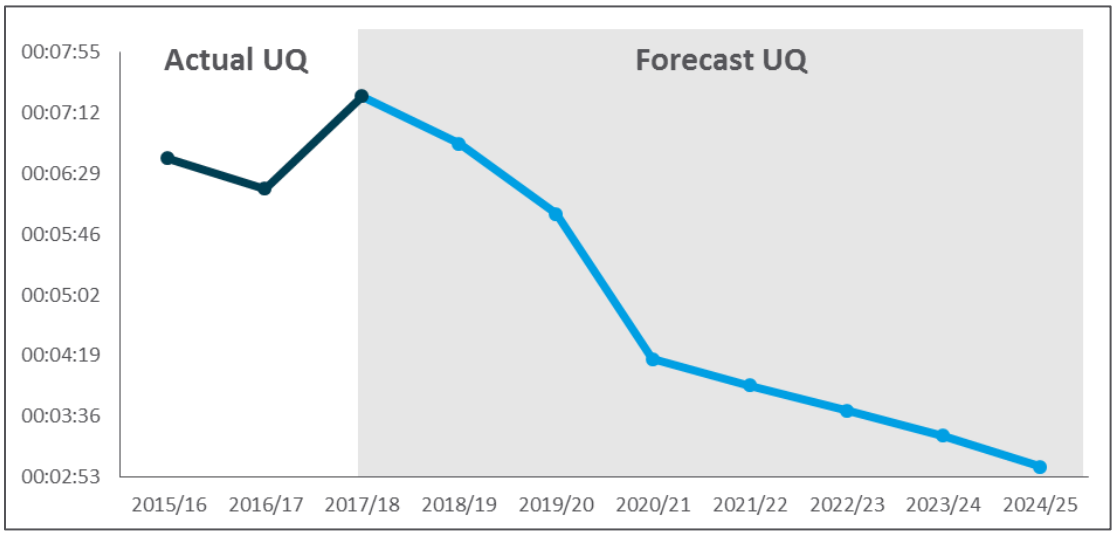
- there are exogenous factors that influence performance;
- these differences, and particularly the advantage that urban, water only companies have, could have introduced a further upward bias in the process to reach forecast UQ; and
- the outcome is that companies with significant rural regions are effectively being penalised.

The historical precedent

Finally, the extent of the deliverability challenge is also borne out by historical precedent.

The IAP/DD target strongly contrasts with the actual UQ this AMP, which has ranged between 06:18 and 07:24 minutes. Only one company has achieved below 03:00 mins and with the exception of Portsmouth and SES, companies have struggled to sustain improvements.

Figure: actual and forecast UQ



Without dampening the ambition shown by companies, this precedent should be an important consideration if we're to ensure there is a strong empirical basis for the sector's ambition and when assessing the overall deliverability of commitments.

In response to Query SVE-DD-OC-005 (which asked for longer term projections of supply interruptions) we raised similar concerns. We noted that the uncertainties about how companies had reached UQ forecasts highlighted above means that we should be very cautious in using business plan proposals to set our performance targets in the long term.

We proposed that the most robust method to estimate the UQ would be to use historic data. We also recognised that this approach could still overstate actual UQ given the change in the SI definition and in particular the removal of the incident cap. For this reason we included a potential range that we think the UQ might take:

- Upper limit – average AMP6 UQ; and
- Lower limit – forecast exponential UQ using historic data set.

This approach indicated the UQ could range from 5-6 minutes in AMP8 and between 03:36 to 06:47 by 2045 – although we recognise innovation could change this.

So while in the updated version of App1 that we have included with our response we have adopted the 03:00 UQ proposed for 2024/25, we have reverted to what we believe are more realistic assumptions about UQ performance for our longer term projections.

2.3 What does this mean for incentives?

Our principal concern at this stage of the price review is not with how the UQ target is set (although we note that the approach is arguably simplistic in the light of the above) but rather what the combination of the target and ODI design means for incentives and, in turn, deliverability.

Fostering innovative, forward-thinking approaches

The current approach of an extremely stretching commitment, with very little scope for outperformance risks being tantamount to creating a penalty only ODI – particularly given that 75% of the improvement needs to be made in year 1 in order to avoid penalties.

Regulatory experience in the water sector clearly points to the availability of genuine upside opportunities for companies as being important for the type of dynamic efficiency improvements that would be required to not just reach UQ, but sustain and then better it in future AMPs. By contrast, a penalty-only approach tends to encourage risk aversion and short-termism, and as such, smaller, more incremental changes. In our 2017 document *Charting a sustainable course: designing incentives to deliver for customers,* we cited a number of examples for this, including the Gray and Cave Reviews.

When such a shift in performance is required, incentives that tend to focus attention on the short-term avoidance of penalties can be counter-productive, and do little to foster the kind of innovative, forward-thinking approaches that are likely to be required to deliver substantial and sustainable improvements that will benefit our customers.

Variations in risk exposure between companies

Some companies have already sought to mitigate this risk through ODI design, and these differences in approach mean that the risk exposure that companies face varies considerably across the industry. For example, in 2024/5:

- Anglian Water has proposed a target of 05:34 and a penalty collar of £2.5m in each year;
- Yorkshire Water has proposed a target of 02:00, a deadband of 06:00 and a collar at 12:00; and
- Affinity Water has proposed a target of 03:00 and proposed a collar at 08:00.

If risk exposure is calculated as the difference between the target and collar, then it ranges between 04:17 for Affinity Water in year 1 (post IAP submission) to no limits on exposure for companies like Sutton and East Surrey and Portsmouth Water.

2.4 How could we strike a better balance between ambition and deliverability?

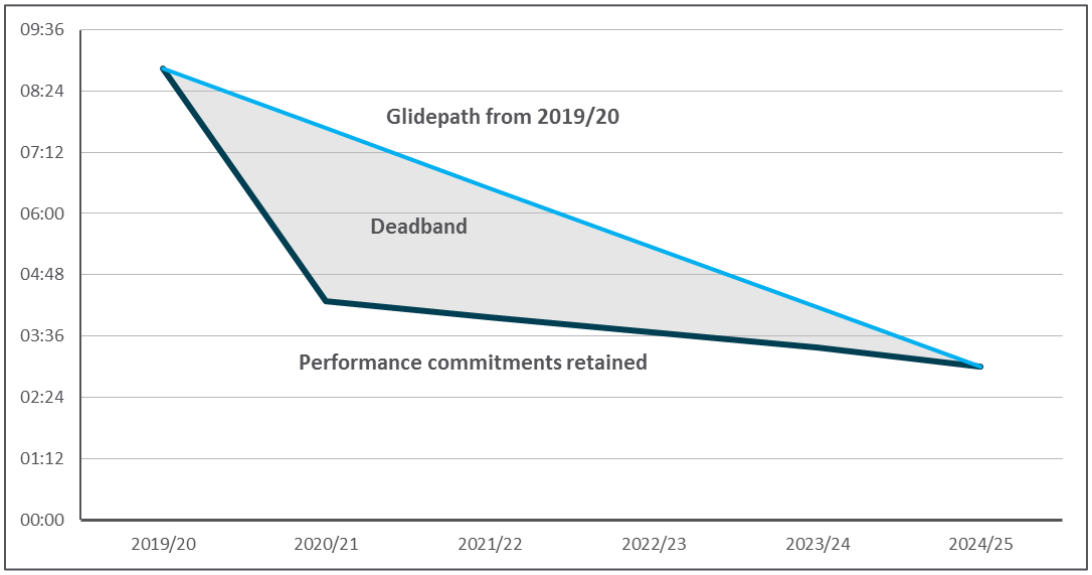
In the light of the above, we would encourage Ofwat to consider how the target has been set with reference to the most recent industry performance. Ofwat could also make a straightforward change to promote a more deliverable outcome with two changes to incentives to support deliverability:

- set a glidepath to the 2024/25 target by applying an industry deadband in years 1-4 of the next AMP; and
- standardise the application of the collar for this measure given the significantly higher levels of risk the industry faces on this measures (ie, it would be akin to CRI).

1. Apply a glidepath to the 2024/25 target

In the context of facing targets that are exceptionally challenging, for a service area where past performance has been much higher, has been variable, and is influenced by exogenous factors, we believe supply interruptions would now meet Ofwat's stringent criteria for setting a deadband – one which could be used to create a glidepath to forecast UQ in 2024/25.

A deadband/glidepath would retain ambition, but create better incentives for innovation



This approach has a number of advantages:

- it achieves Ofwat's aim of ensuring that incentives are both more stretching and stronger than at PR14 by setting a deadband/glidepath to get to *forecast* as opposed to *historic* UQ; and
- it ensures we would continue to be penalised if we did not deliver significant annual improvements.

Importantly, this approach would also offer consistency in principle with how Ofwat has set the totex allowance. This involved taking into account historic performance, and then applying an additional level of ambition by incorporating a consistent dynamic challenge (1.5% per year in the case of totex).

	Approach at PR14	Approach at PR19
Cost	Historic UQ	UQ plus 1.5% challenge
Service	Historic UQ AND glidepath	Forecast UQ with glidepath

2. Standardise the collar

We consider that creating a more standardised collar for ourselves (currently 14:40) and those of the industry would be appropriate for this measure (and reflect the approach applied on CRI). This is because of:

- the significantly higher levels of risk associated with this measures (as illustrated by past performance); and
- address the distortion from companies proposing very stretching targets but with collars to mitigate the downside risk

In the revised business plans of the slow track companies, it is apparent that the three fast track companies will face comparatively higher levels of risk (assuming the revised proposals are accepted), as illustrated earlier. These variations between targets and collars, could be standardised. This would ensure fairness across the sector and also ensure that companies are not proposing to show UQ ambition or better, and then seeking to mitigate that risk through the use of collars.

Assuming the target doesn't change for other companies, this would involve setting the collar at the UQ of the revised submissions – which is 12:30. If the targets do change then we believe the collar should be set to deliver a consistent level of risk (ie, the same difference between target and the collar).

These changes together create the additional benefit of allowing incentives to be applied in a way that better facilitates the innovative effort required to achieve and sustain service improvements for customers in this price control period and going forward.

3. CRI

The introduction of the Compliance Risk Index (CRI) is an important evolution in water quality regulation, moving from a compliance based approach to one based on the assessment of risk. For this reason we understand the concept of setting a target of zero to ensure that all companies strive to eliminate risk, and we have accepted the IAP result that CRI will be a penalty only incentive. However, our concerns about the immaturity and volatility of this measure make the positioning of the deadband and the calibration of the penalty even more important than most other measures and we do not accept the DD position.

We are concerned that the current position set out in our draft determination will have the unintended consequences of:

- unduly undermining customer confidence in what is the best drinking water quality in Europe; and
- distorting incentives with too strong a focus on penalties that does little to encourage continuous improvement in risk management, innovation and sustained change.

The proposed deadband of 1.5 is exceptionally narrow, not least if we consider that the industry average score in the last three years is 4.34 and upper quartile is 1.87 (implying that on average a 65% improvement will be needed to be delivered to avoid a penalty). While we understand the need to press the sector to continue to improve, we question the basis and the fairness of defining the deadband so close to zero given that:

- it appears inconsistent with the DWI's PR19 methodology response which states that companies should *aspire to continuous improvement and results of at least at a level that is equal to or below the national average* (ie, 4.34);
- industry standards are likely to tighten early on in the AMP, making the measure even more stretching;
- the potential risks are ever changing (e.g. new pesticides entering the market that could cause a CRI failure), which are not reflected in the current deadband;
- the deadband is too restrictive to enable emerging trends to be observed – it assumes all risks can be resolved within a year (the costs of which we have to absorb);
- it doesn't take account of the variable risk exposure across the industry – specifically factors such as system configuration (e.g. those with fewer, large works are at risk of one failure driving more volatility) and risks inherent in different regions (e.g. there are between 50 and 100 possible pesticides that can contribute to CRI depending on the region); and
- there are some factors which are beyond our immediate control and alone would account for the current deadband.

We therefore believe the deadband should be revised to align with the industry's average performance of 4.34. This would better take account of the nature of the measure, the degree of uncertainty and the public guidance from the DWI.

These issues are also exacerbated by the imposition of a penalty rate that risks being unduly strong, particularly when considered in the context that:

- a deterioration does not always reflect a deterioration in the quality of product that customers receive;
- existing sanctions exist in the form of the DWI's enforcement powers; and
- the penalty rate is based on a limited number of companies data, which is unsubstantiated and none of which appear to have been directly tested with customers.

Although this does not negate the need for a financial ODI, it does mean that this measure carries additional risk relative to other measures. We think that at a minimum the penalty rate should be updated to reflect the

additional data provided by companies in the revised business plans but ideally set so the outcome is consistent with the other UQ water measure – based on 55% variation to the mean. This would suggest an incentive rate of between £0.9m - £1.1m (instead of £1.26m).

We expand on these points below.

3.1 Calculating the deadband

Unlike its predecessor measure (mean zonal compliance), CRI uses a risk-based approach to measurement that is proportionate to the parameter of failure (the number of relevant parameters varies across companies), the cause of failure, the impact and the approach adopted by the company investigating the issue. It's a new and evolving measure and performance can be affected by companies' existing operating characteristics, for example, a higher risk score can be caused because of the size of the zone affected, or operating practices, for example, sampling frequencies or choice of chemicals. The fact that CRI is a new and risk-based measure, we think it is appropriate to take into account future changes to CRI reporting and challenges with historic data when setting the deadband.

Changes to CRI reporting post 2020

The measurement of CRI is unlikely to remain static over the course of the AMP. We not only expect reporting and guidance to evolve (for example, this was the case for similar metrics such as pollutions where improved guidance by the Environment Agency allowed for better consistency), but also changes are could be made to drinking water quality legislation.

Changes to the Drinking Water Directive are currently in consultation which could result in inclusion of new regulatory standards from 2021. The proposed revisions are likely to result in tighter standards for water quality parameters that could pose additional uncertainty to future CRI scores, such as the potential change in turbidity standard at water treatment works from 1NTU to 95%ile compliance with 0.3NTU. This could have a material impact at our larger sites where a single turbidity failure would incur a CRI score between 0.58 and 2.90. The deadband set at its current level of 1.5 leaves little scope to reflect that the measure is likely to change.

Limited and volatile historical data has been used to set the deadband

Given CRI was introduced by the DWI in 2017, there is currently only one year of company reported data, and two years of back cast data available for the deadband to be calculated for AMP7. The CRI data available shows the measure is volatile and can fluctuate significantly year on year due to:

- improvements in measurement changing the confidence with which data is reported more generally (as we have seen with the convergence measures for example, the confidence with which companies are able to report new measures should improve overtime);
- being able to prove the root cause of failures, particularly on property specific issues; and
- changes in performance.

Small water companies such as Hafren Dyfrdwy are exposed to greater levels of CRI score volatility, as the smaller number of assets and population served reduces the averaging component of the calculation (eg. The HD score moved from 2.8 in 2015/16 to 17.7 in 2016/17). This reflects the fact that if a single turbidity failure were to occur at Hafren Dyfrdwy's major works it would give a CRI score range of 2.89 to 14.47. This effect also applies to some samples taken from customers tap, if a taste or odour failure occurred at a customer's tap in a larger

zone and the company were not able to identify a cause within the customers' premises the CRI score range would be 0.64 to 3.22.

A deadband set at 1.5 implies much greater accuracy than this volatility and limited track record suggests.

The deadband is too restrictive to enable emerging trends to be observed

The change from MZC to CRI is intended to drive performance in a dynamic way. It is designed to drive positive behaviours to identify and respond to emerging risks, rather than waiting for legislative change to catch up and mandate compliance. There is an implicit expectation that companies will manage these risks, but the DWI has recognised that the time and cost required to reverse any trends will vary depending on the risk. The current deadband is too tight to allow any trends to be observed and it is likely that after one year of an emerging risk we will be in penalty. In some cases we will need longer to understand the problem before we can identify the most cost beneficial response to reverse the trend. Reacting too quickly could drive uneconomic investment decisions which is also not in customers best interests.

For example, if we see an increase in iron at customers' taps, there are a number of reasons that could be contributing to this. It could be a result of the type of coagulant we are using in the treatment process or it could be the manifestation of deteriorating iron pipes. The intervention we take will vary considerably depending on the root cause and even once the cause is understood if it were a result of deteriorating iron pipes then it could take several years and considerable cost to address. The narrow deadband imposes an unfair balance of risk.

Areas outside immediate company control

CRI scores can be affected by failures on assets not owned by water companies – taps, private supply pipes and even spillages on driveways. While we support the inclusion of these factors in the measure - given it drives companies to work more closely with house owners and customers on issues that can affect water quality compliance - it is nonetheless important that the incentive design recognises that these issues are not within our direct control.

In the last two years, an average of 1.5 points were caused by such factors:

Source	Average contribution	Detail
Customer tap hygiene	0.26	Bacteriological failures caused by poor tap hygiene at customers' properties can contribute to failure
Chrome taps	0.04	Chrome plated taps in customers' homes can contribute to Nickel failures
Internal property plumbing	0.10	Lead failures can be caused by internal plumbing
Other water companies	1.06	Taste and odour failures caused by imports from other companies which we are working to influence
Total	**1.46**	

3.2 Calculating the penalty rate

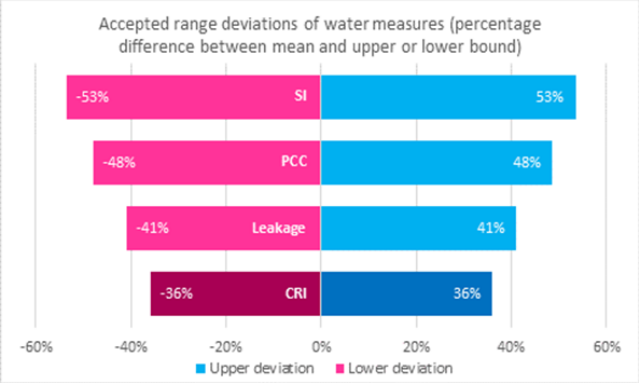
The narrowness of the deadband is exacerbated by the imposition of a penalty rate that risks being unduly strong, particularly when considered in the context that a deterioration does not always reflect a deterioration in the quality of product that customers receive.

CRI is designed to place greater focus on continuously identifying and improving risk. By definition this risk will not necessarily result in a failure to customers but its early identification will proactively drive the company to take suitable action and protect customers. For example, a change in turbidity leaving some larger works could contribute 0.6-2.85 points, driving companies to further investigate the source of turbidity and act upon it, while continuing to meet required parameters at customers' taps.

Despite this, when we examine other common water ODIs it is apparent that the incentive rate calculated is much higher than when Ofwat intervened for other measures where companies proposed reputational or low incentive rates.

For example, the supply interruptions incentive rate has been set 53% below the average, while CRI has been set at 36% below the average. So while the approach for the measures is consistent, the fact that a materially different outcome has been achieved raises some concerns. In particular:

- the high degree of accuracy doesn't seem consistent with the fact that this is a new and evolving measure;
- the narrow range implies a much more robust incentive rate relative to other measures, which seems unwarranted given it is based on a sub-set of companies' data, none of which seems to have been tested with customers, with some companies inferring it from other service areas and others basing it on costs;
- the unduly high rate doesn't take into account the additional cost that companies will have to absorb to address any emerging risks; and
- the DWI can also take enforcement action against any single event or failure.



This point can in part be addressed by taking into account the incentive rates in the revised plans for those companies that did either not submit a rate; or provided a rate that was not comparable in September (Anglian, Thames and South Staffordshire). This would result in an ODI rate of between £0.9m - £1.1m, rather than the current £1.26m/point (we explain further below).

3.3 Potential consequences

Getting the design of incentives for CRI is important for two reasons.

First, CRI incentives should encourage companies to:

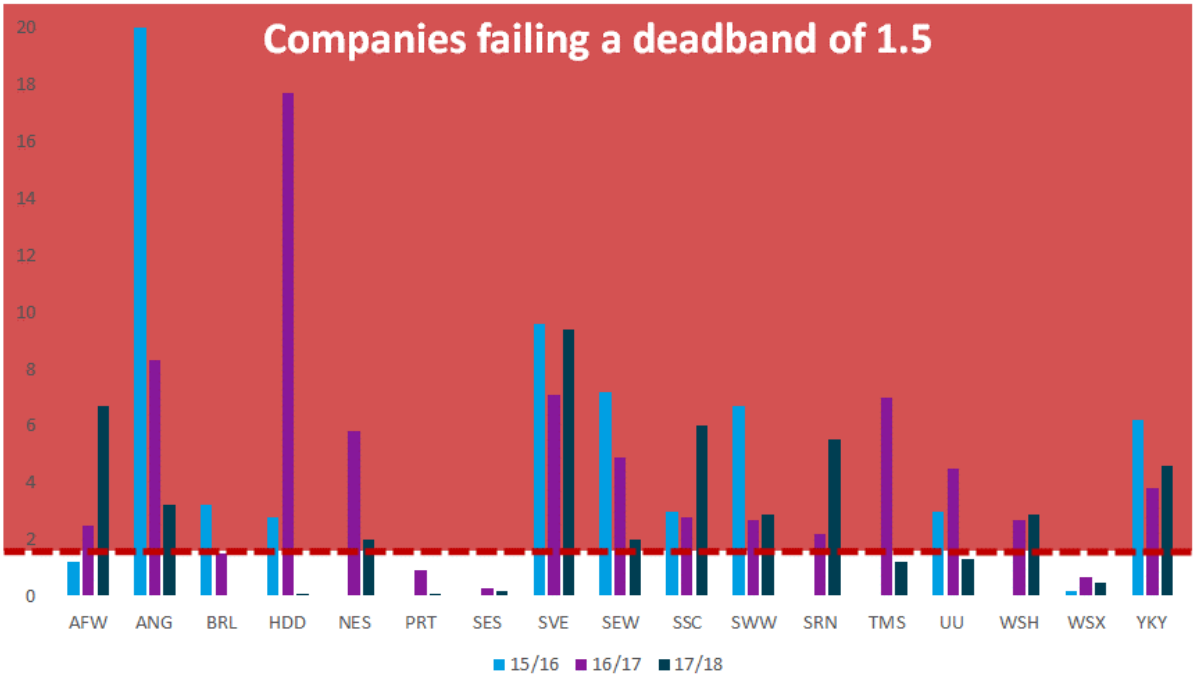
- Further invest in understanding and improving their management of risk. For example, we have a more proactive approach to operational sampling than other companies as we use it to determine the efficacy of our treatment processes. There are some determinands from our operational samples that we would be required to report under CRI (ecoli, crypto for instance) not just regulatory samples. Effectively setting such a low deadband could discourage this best practice approach to proactive sampling.

- Seek innovative approaches to change customer behaviours – which Ofwat has typically incentivised companies to do at price reviews using positive incentives.
- As well as offering strong sanctions for poor performance and non-compliance.

It is a difficult balance to strike but the current approach focuses too heavily on penalties.

Second, customers and stakeholders are used to the existing form of compliance reporting, however, CRI is a risk based measure and the difference between risk and failure is easily lost. The proposed deadband at 1.5 suggests that throughout AMP7 we will observe many, if not most companies "failing" (around 80% would have failed over the last three years). Not only does this contrast strongly with the 20% of companies that would have failed the deadband for mean zonal compliance when it was set at PR14, but also, and most importantly, it belies the fact that drinking water quality in England and Wales is the highest quality in Europe.

Figure: company performance under the proposed deadband of 1.5

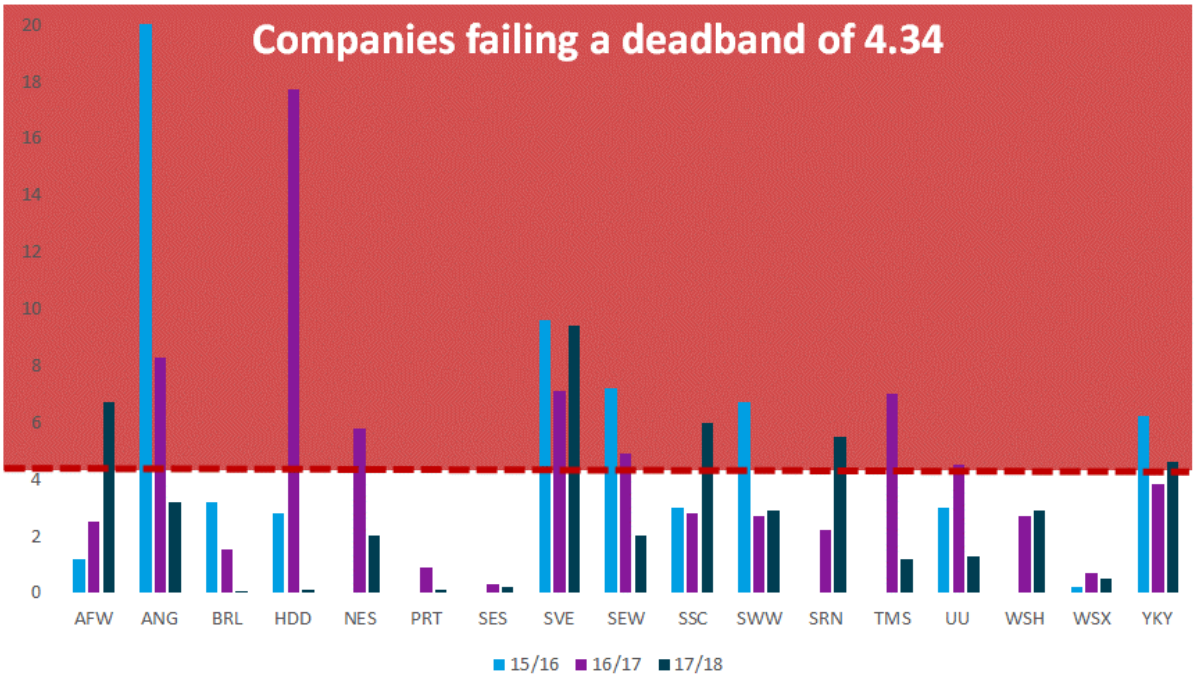


3.4 How could we get incentives to better support CRI delivery?

We believe we could drive a fairer balance of risk and better long term result for customers by modifying two elements of the incentive design.

First, there is a strong basis to broaden the deadband. A pragmatic approach would be to set a deadband at the sector 3 year average (4.34) as illustrated below. It would still set a very strong stretch ambition for companies but better reflect the absence of historic data, areas of performance outside companies' immediate control and the potential future tightening of standards.

Figure: company performance against a deadband of 4.34



Second, the penalty rate itself could better reflect that deteriorations in score reflect changes in risk as well as the quality of the product delivered to customers; and that sanctions against non-compliance already exist in the form of DWI enforcement powers.

In the IAP it was proposed that we should have an ODI rate of £1.26m/point. This is consistent with multiplying the lower bound of the accepted range – which was £0.373/point/household – and our number of households (water) for 2022/23 of 3,371,234.

Given the narrow range, this implies an absence of other valuation data. We think that at a minimum the penalty rate should be updated to reflect the additional data provided by companies in the revised business plans but ideally set consistent with the other UQ water measure – based on 53% of the mean. This would suggest an incentive rate of between £0.9m - £1.1m (instead of £1.26m). For the purposes of our plan, we have aligned the incentive with the mid-point of this range at £1.0m.

Overall we believe this combination of both the broadened deadband and adjusted rate would strike a better balance between encouraging innovation in changing customer behaviours, finding and driving down risk and rightly taking action against non-compliance.

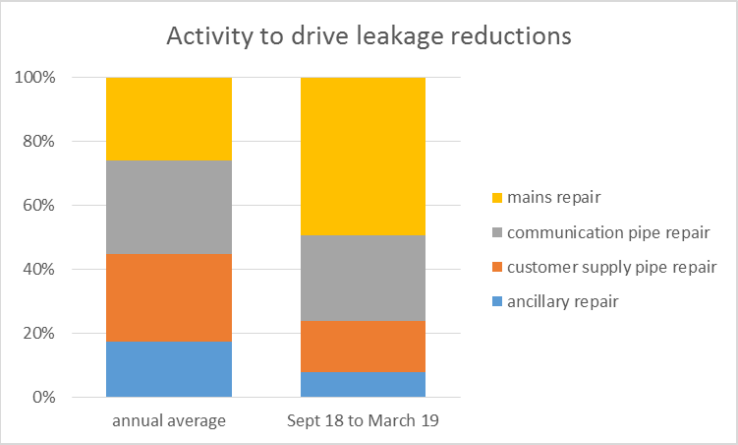
4. Mains repairs

The Draft Determination (DD) noted that we have provided insufficient evidence to justify an increase in the mains repair target beyond the current level of performance. In responding to this intervention we have identified three questions that we believe need to be addressed to ensure customers are protected and the right outcomes are delivered:

- Why do we believe there is a correlation between mains repairs and leakage?
- How does our position compare to that of other companies?
- How are customers protected by a change in the target?

Leakage and mains repair

Mains repairs is one of a number of tools available to help reduce leakage. The relationship is complex because there are many other variables that impact leakage, but both our data and industry wide data shows that an increase in mains repairs does drive a reduction in leakage. To date the increase in activity has largely been used to offset variations to keep pace with the natural deterioration rate.



Our data demonstrates that on average we carry out over 200 repairs to deliver a 1 Ml/d reduction in leakage and that a quarter of the leakage reduction is driven by mains repairs. The figure above also shows that during September 18 to March 19 (following the freeze/ thaw and prolonged hot summer), we increased the number of mains repairs to both address the increase breakout rate caused by the weather events and to drive further leakage reduction to ensure delivery of our leakage target. During this seven month period mains repairs represents 50% of the leakage reduction volume. To ensure that we can deliver the most cost beneficial solutions to reduce leakage, it is important that we are not restricted in the number of repairs we can undertake. The DD constrains our flexibility by setting a target with no headroom for additional repairs, which is compounded by the fact that our historical performance is better than upper quartile.

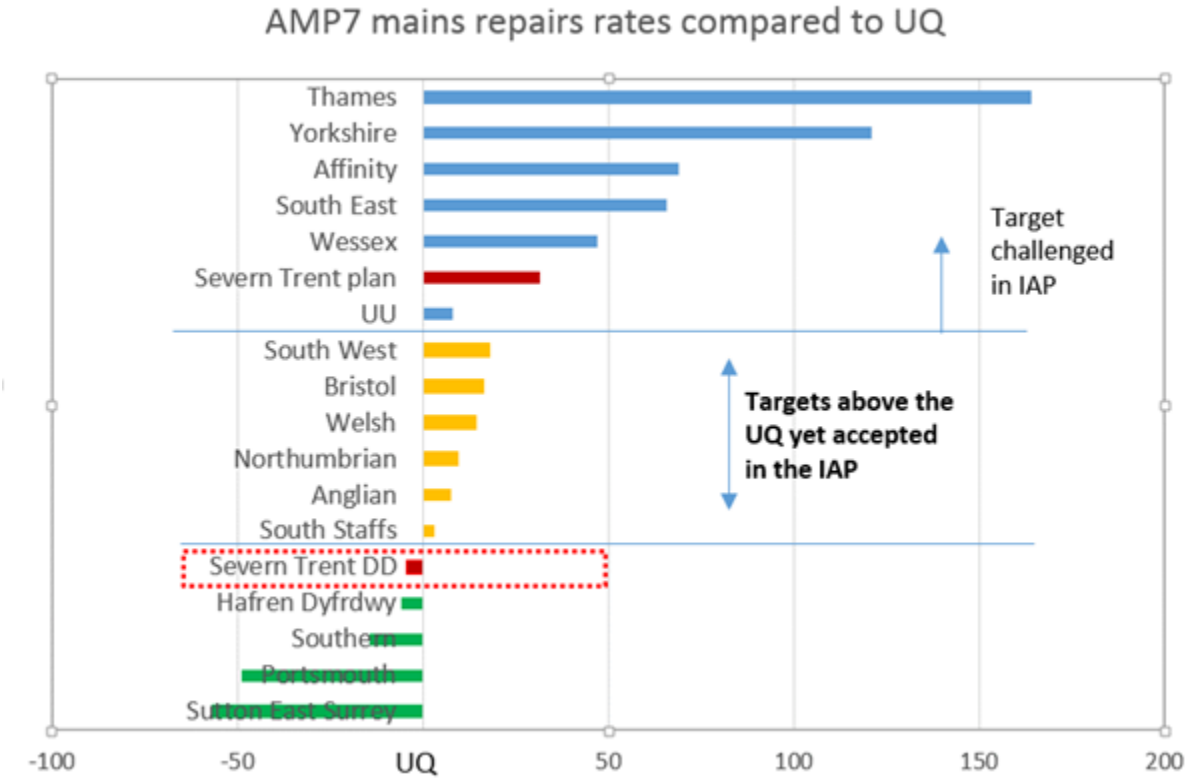
We are investing in a range of innovative solutions, such as the aqua pea and robotics which we expect will reduce the reliance on mains repairs, but these will take time to come to fruition. To deliver a 15% leakage reduction in the short term, mains repairs will need to increase. Assuming we apply the same historical mix of solutions this would equate to an increase of 327 repairs per year (equivalent to 119 repairs/ 1000km). The cost of which we will have to absorb within our programme.

We recognise that an increase in activity could raise concerns about deteriorating asset health. We are therefore committing to publish our split between proactive and reactive repairs to provide public assurance that we are not seeing a deterioration in the underlying asset health. We are also setting a long term target consistent with stable asset health, whereby we have an increase in the short term followed by performance reverting to our historical low levels as we embed our innovative solutions.

Our position relative to other companies

Our AMP6 performance is 4% better than upper quartile and 25% better than the sector average. The approach to forecasting efficient costs implicitly assumes all companies should be delivering the same level of asset health. It is therefore appropriate to consider comparative performance when setting targets for asset health measures.

We recognise that our September proposal would have resulted in our repairs increasing and being above the UQ and marginally higher than the sector average performance. However many other companies had targets accepted that are above the UQ and well above our DD position, as illustrated below. This means they have more headroom to manage annual variation and more flexibility to use mains repairs to drive leakage reduction.



To ensure the procedural benefits of fast track status are maintained going forward (so further stretch at PR24 is incentivised) we think it is important that we and other fast track companies are afforded an outcome that is no more onerous than others in the sector. This could be achieved in one of three ways:

- Set the fast track target based on South West Water's accepted target (135 / 1000km); or
- Set the sector target at the industry recent actuals (2015/16 – 2018) UQ so all companies have the same degree of flexibility in deriving the best mix of solutions to deliver leakage (116/1000km); or
- Set our target as the average of the accepted targets that are above UQ (i.e. the average of the amber companies above) (127/ 1000km).

Protecting customers

We recognise that setting a mains repair target above our current average level of performance (112/1000 km) raises the risk that we could earn rewards by simply changing our mix of leakage solutions. Rather than setting a target that restricts our ability to repair leaking mains we think this risk should be addressed by either:

- Introducing a reward deadband between our revised target (127 / 1000km) and current performance (112 / 1000km); or
- Establish the mains repairs as a penalty only incentive.

Both options would help deliver a better customer outcome by allowing us to use a range of inputs to reduce one of the most emotive issues for our customers - leakage.

4.1 Fair balance of risk

We have a basket of stretching performance commitments and an efficiency challenge that will require us to manage our network with more precision, efficiency and to improve its overall condition to deliver better service. We have a suite of possible interventions that we can make on our network to find the most cost effective programme to deliver these improvements. We have used our well established and highly regarded predictive models alongside our wider cost benefit tools to identify the optimum mix of solutions that drives performance in all of those outcomes.

The implication of setting the mains repairs target at the current level is that it limits the extent to which we can utilise proactive repairs from the suite of tools available for delivering the service improvements. This is not a fair balance of risk for two reasons:

- We fully embrace our responsibility to manage the impact of any external shocks to our system but increasing the number of mains repairs to recover from these events (such as extreme temperature variation) is one of the most effective solutions. This is because it is completely within our control to manage (unlike interventions on customer owned pipes) and it drives immediate improvements. This is why proactive mains repairs increased by 23% after the freeze/ thaw event in 2018 to recover leakage performance. We do recognise that it is not the only tool, but removing it from the toolkit does increase the risk of failure of our wider basket of performance commitments.
- If we decide that increasing proactive mains repairs is part of the optimum solutions (or under some circumstances, the only short term solution) for delivering our performance commitments then we will receive two penalties; firstly the ODI penalty for exceeding the mains repairs target and secondly through the lower totex sharing rate as a result of the additional investment we have made over and above the final determination assumptions to carry out the additional repairs.

4.2 Grounded in empirical data

We have analysed our historical data to answer the following key questions raised by Ofwat in their IAP and DD feedback:

- What is the relationship between mains repairs and leakage reduction; and
- What, if any, increase in mains repairs would be needed in AMP7 and over the long term?

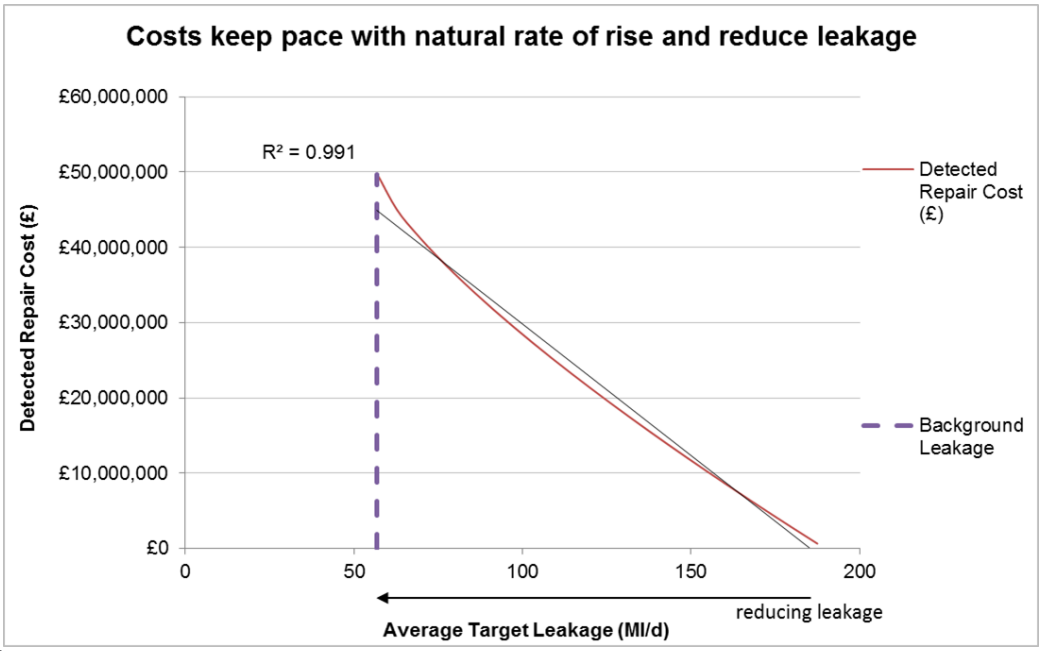
Mains repairs relationship to leakage reduction

It is important to recognise that managing mains leakage is only one aspect of our holistic leakage strategy which has three key components:

1. Activity to slow the rate of deterioration (by reducing the stresses on the network) such as:
   - pressure management and network calming
   - mains renewal programme to replace the weakest and therefore highest bursting mains
2. Mains activity, such as:
   - Increasing customer (and employee) awareness and ease of reporting leaks
   - Proactive leak detection/ mains repairs (find and fix activity)
   - Improved response to supply interruptions to reduce the volume lost during a burst event.
3. Non-mains activity that contributes to overall leakage, such as:
   - Customer side pipe repairs
   - Ancillary repairs

To date we have used proactive mains repairs to supplement customer reported leaks to keep pace with the natural rate of deterioration and then anything over and above that activity is used to drive a reduction in leakage. There are many variables affecting the relationship between total leakage and mains repairs and this relationship changes over time which makes it difficult to express a direct correlation between mains repairs and leakage at a total company level.

Therefore we have examined the relationship at a more granular level to better expose the correlation. The figure below shows a strong correlation (R^2=0.99) that leakage reduces as detected mains repair costs increase (costs is synonymous with activity) based on the activity carried out on our strategic grid. The relationship was derived using repair numbers, cost and benefit (volume saved) at each District Metered Area over a number of years. We use these relationships in our predictive models.



Using this relationship to predict AMP7 mains repairs

To set the target we have reviewed our historical data which shows that on average the optimum mix of interventions to drive 1 Ml/d leakage reduction resulted in 214 repairs, 27 of which are mains repairs that are included in the Ofwat mains bursts definition. We have also reviewed the mix of interventions made following a system shock (such as extreme weather changes) to see how the mix of interventions alters. This resulted in a 23% increase in mains repairs.

Figure: Leakage reduction is delivered through a mix of interventions

Repair type	Historical average	
	m3/d	Repairs
Ancillary repair	174	81.9
Customer supply pipe repair	274	51.0
Communication pipe repairs	292	54.2
Mains repairs	261	**26.9**
	1,000	214

This shows that in addition to the historical level of mains repairs needed to keep pace with the deterioration rate on the network we would need to do between 27 and 32 additional repairs for 1Ml/d leakage reduction.

Our leakage commitment in AMP7 is to reduce leakage by 61Ml/d, which would mean we have to make between 1637 and 1952 additional repairs over AMP7.

Our September business plan target assumed that we would deliver the entire leakage reduction (61Ml/d) through find and fix mains repairs. On average each repair reduces leakage by between 8 – 10 m^3/day, which for 61Ml/d reduction equates to 6995 repairs included in our plan.

We have reviewed this assumption and acknowledge that it is unlikely that we will deliver the leakage reduction solely through find and fix repairs. Based on the historical average mix of interventions shown in the figure above. 26% of the leakage reduction is achieved through mains repairs, which equates to an increase of 327 repairs per year (1637/5 years) which when normalised is 119 repairs/ 1000km.

<u>Evidence to forecast future relationship beyond AMP7</u>

As part of our business plan we have set out the long term targets for all performance commitments. These forecasts provide a clear and detailed understanding of where we need to drive performance and this is being used to focus our innovation efforts to meet these long term ambitions at an affordable cost.

In query SVE-DD-OC-001 Ofwat questioned why the long term repair rate was not forecast to return to the previous low levels once the level reduction had been delivered. We have used our predictive mains modelling tools to consider different interventions to meet the range of long term performance commitments. We continually improve the robustness of these models but they are limited by the range of interventions that the models can choose from (which in turn is limited by the data that we have on the costs and benefits associated each intervention). This means the relationship we have derived above doesn't take account of future innovation.

During AMP6 we have already been developing innovative solutions that will be introduced into our business as usual toolkit throughout AMP7. We aim to find solutions that drive multiple service improvements so the

following five examples have a varying impact on our mains repairs performance as some are more relevant to other performance commitments such as improving water pressure.

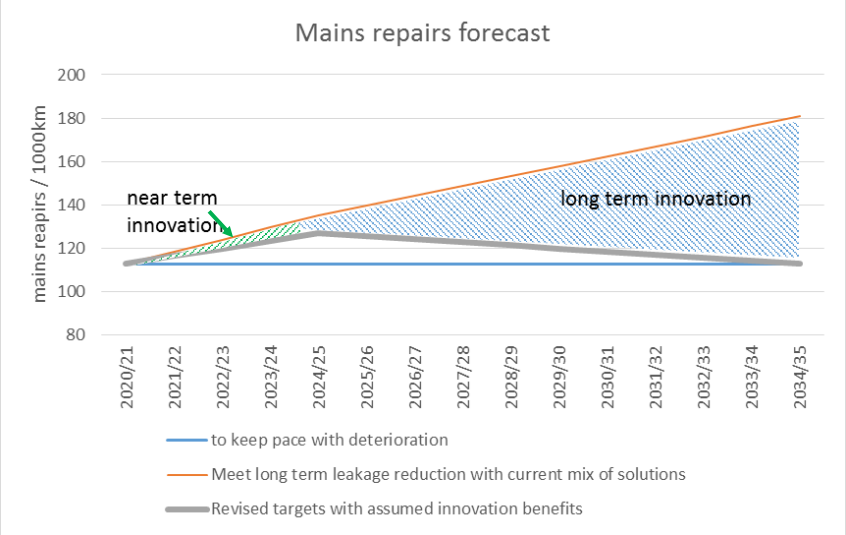
- Pressure transient control. Deploy technology to reduce pressure surges as pumps and valves on high pressure mains are operated. Primarily aimed at trunk mains where the consequences of failure are high. This will extend the asset life of the protected mains and over the long term is likely to reduce the number of repairs.
- Further advancement in PRV technology. Reducing losses at night by holding pressures at a set point, which will help calming the network. The primary aim is to reduce the water lost through small defects on mains and service pipes.
- Aqua pea. We are working with partners to develop a material which can be inserted into a service pipe which finds a point of leakage and blocks it.
- Boundary box repair clamp. This involves installing clamps to repair leaking manifolds on Boundary Boxes. If this is effective it might be a more cost effective way of driving leakage and therefore reduce the number of mains repairs.
- Installation of 35,000 pressure loggers. Additional constant monitoring of the network to provide early warning that an event (which could be a burst main) has occurred. The aim is to identify defects as they arise and minimise the impact on customers.

We also have several initiatives that we will be developing throughout AMP7 to help us achieve the longer term ambition of reducing leakage by 50%. Examples are set out below:

- Fibre Optics. Using fibre optics in water pipes to detect changes in condition and hence allow the early detection of emerging defects including leaks and mains bursts.
- Dynamically adaptive networks. Collaborative project with Bristol Water and Northumbrian Water to develop dynamic DMA configuration together with hydraulically based leakage detection. This is a PhD project at Imperial College.
- Network management. A project to understand how best to use the data we already have and then use data analytics to identify performance issues, including mains and service pipe bursts.
- Mains rehabilitation and repair. Progress trials with new techniques to rehab water mains and service pipes, including trials of a novel service pipe lining technique.
- World Water Innovation Fund, investigating a range of initiatives but specifically working with US-based WatchTower Robotics to create and trial a leak-finding robot.
- Robotic interventions. Funded by a £7million EPSRC award this project is led by a consortium of Universities including Leeds, Birmingham and Sheffield. Severn Trent are the supporting partner and are members of the steering group. The project will develop robotic inspection technology platform and explore how robots could be used to find defects including leaks and fix them.

The figure below sets out our long term forecast of mains repairs, which shows how we have included the optimum mix between mains repairs, other tools and included a forecast of the benefit we will drive through the near term and longer term innovations summarised below.

Figure: Long term forecast of mains repairs



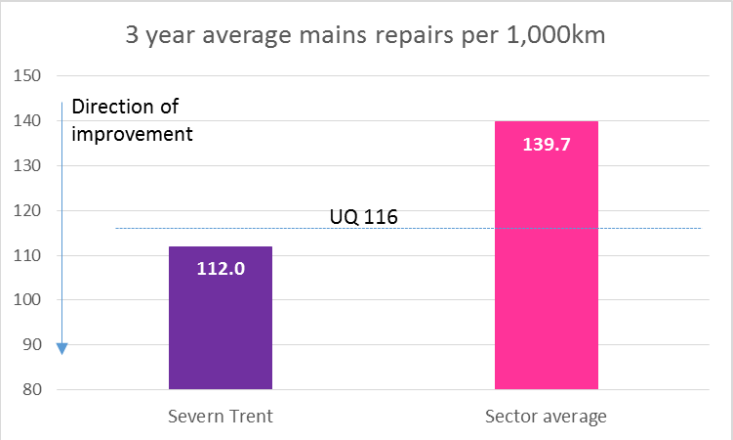
The orange (top) line represents the long term forecast of mains repairs based on the historical mix of interventions to deliver the long term leakage reduction. The AMP7 revised target (grey line – middle) is based on the historical mix of interventions during AMP7 and the 2025-2040 forecast is based on the assumption that it will take ten years to develop and embed the current early stage innovations, at which point the number of mains repairs will return to the base level needed to keep pace with the natural rate of deterioration on the network (bottom, blue line). It demonstrates the extent to which we are assuming innovation will drive alternative cost effective solutions to deliver the leakage reduction in future years. Factors such as mains renewal policies and supply pipe adoption will have a significant impact on the mix of solutions in the future and therefore this needs to be reviewed periodically.

4.3 Ensuring consistency

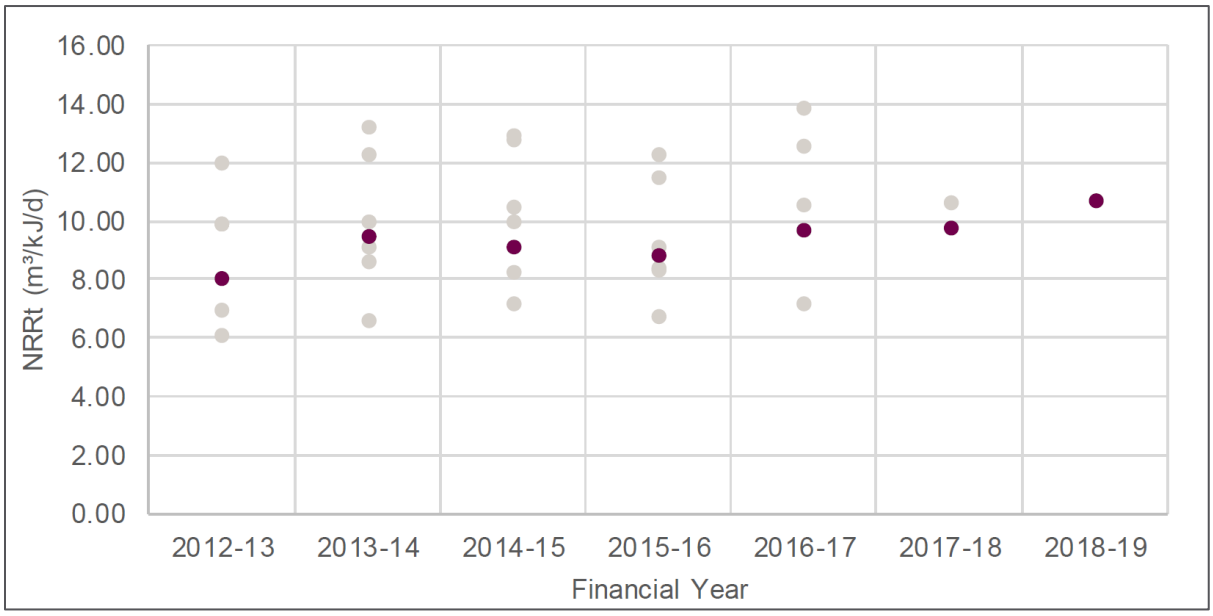
Consistency across companies

Mains repairs is a common measure, which means it has a common definition but company specific targets. However, it is a long standing measure and industry comparisons can be made with confidence. The figure below shows that our current average performance is better than industry upper quartile and significantly better than the sector average (note the data has been updated based on companies IAP resubmissions).

Figure: Industry comparison of current performance



The number of mains repairs carried out by each company will clearly vary depending on the level of leakage reduction each company is committed to deliver. To date targets have varied depending on the degree of water stress in each region. The natural rate of deterioration (also termed natural rate of rise or NRR) does vary depending on factors such as weather, but the trend over time is a reasonable indictor of underlying asset health and the figure below shows that ours is both broadly stable over time and towards the lower end of the range (although this information is not in the public domain for the last two years) which indicates a better than average asset health.



Given that Ofwat's expenditure assumptions implicitly assume all companies deliver the same level of asset health, we think that the targets should also be reviewed in relation to the relative performance. The figure presented at the start of this chapter shows that all companies who proposed an increase relative to their historical performance were challenged, but it also shows that there are five companies (shown in amber) who are maintaining stable performance at a level that is worse than upper quartile, but their target was accepted in the IAP. This illustrates a degree of inconsistency in the level of stretch across the industry and therefore the degree of flexibility that each company has to manage variation and drive leakage improvements.

4.4 Conclusion

We have updated our performance commitment targets as shown in the table below and updated in data table App1.

	2020/21	2021/22	2022/23	2023/24	2024/25	2025-30	2030-35	2035-40
Mains repairs / 1000 km	127	127	127	127	127	119.5	112	112

To ensure the procedural benefits of fast track status are maintained going forward (so further stretch at PR24 is incentivised) we think it is important that we and other fast track companies are afforded an outcome that is no more onerous than others in the sector. This could be achieved in one of three ways:

- Set the fast track target based on South West Water's accepted target (135 / 1000km); or
- Set the sector target at the industry recent actuals (2015/16 – 2018) UQ so all companies have the same degree of flexibility in deriving the best mix of solutions to deliver leakage (116/1000km); or
- Set our target as the average of the accepted targets that are above UQ (i.e. the average of the amber companies above) (127/ 1000km). This is the basis of our revised targets.

We recognise that setting a mains repair target above our current level of performance (112/1000 km) raises the risk that we could earn rewards by simply changing our mix of leakage solutions. Rather than setting a target that restricts our ability to repair leaking mains we think this risk should be addressed by either:

- Introducing a reward deadband between our revised target (127 / 1000km) and current performance (112 / 1000km); or
- Establish the mains repairs as a penalty only incentive

5. Shadow reporting on convergence measures

Consistent with the DD and PR19 methodology, we need to provide updated performance levels for those measures subject to shadow reporting.

In our submitted plan we expressed our performance commitment levels on metrics that were being refined based on new industry guidance and thus lacked a historic time series as percentages or stable with a view to translate the percentage changes into absolute levels once a robust reporting confidence grade was achieved. This applied to four measures – (i) unplanned outages; (ii) sewer collapses; (iii) leakage; and (iv) PCC.

This approach was consistent with the requirements of the PR19 methodology:

Companies should use the best information they have available to propose performance commitments based on a percentage change. For example, for leakage, a company might propose a performance commitment with a 15% reduction over time (by 2024-25), compared to the base level. Companies could translate the percentage changes into absolute levels (for example, in megalitres per day for leakage) once reporting under the new definition had settled down. PR19 Methodology, Appendix 2, Page 59.

In our Draft Determination Ofwat has understandably set numerical performance commitment levels for those PCs that were still defined as percentage improvements (sewer collapses and unplanned outages). The DD also notes that:

Performance commitment levels expressed as percentage reduction are to be re-applied to 2019-20 ***actual baseline*** *following final data being available to recalculate the performance commitment levels re-presented in megalitres per day (Ml/d).*

We support the approach being applied by Ofwat. It means companies will be incentivised to deliver real improvements rather than reporting changes. We also understand the need for numerical values to be stated in the Final Determination. To ensure the FD is based on the most up-to-date data we believe all companies should submit updated data for these four measures. This would effectively:

- Give Ofwat an opportunity to review the quantum and complexity of reporting changes and to assess if further shadow reporting is needed to ensure full compliance with the guidance.
- Ensure all companies are given the same timescales to develop robust reporting and there is no procedural disbenefit of being fast-tracked.
- Ensure that our performance in AMP7 is reflective of actual improvements and not changes to data reporting.

Currently, we have updated App1 with revised forecasts as outlined below based on shadow reporting 2018/19 for unplanned outages and sewer collapses.

Additionally we have also highlighted that for leakage and PCC, the numerical value as outlined in the Draft Determination will need to be updated based on 2019-20 actual baseline to ensure it is reflective of the consistency improvements and our proposed percentage improvements.

We propose, subject to Ofwat's approval, to update these numerical forecasts with half-year data for 2019/20 aligned with slow track/significant scrutiny company timelines.

We also believe there is a need for an approach which allows the performance commitment percentage reduction levels to be applied based on 2019-20 actual performance. This will ensure that the improvement reflects the most up to date and robust data available. We would be happy to work with Ofwat on this.

And similar to the consistency metrics there are 3 other bespoke measures – Persistent low pressure, Public sewer flooding and Speed of response to visible leaks – where we used percentages to outline our targets. This was based on the premise that these are new metrics and we currently do not have stable historic basis to set targets – thus we wanted to avoid gaining unduly/losing out based on a forecast position. We think it would be sensible for these metrics to be treated similar to the shadow metrics and be updated with half year data in 2019/20.

5.1 Unplanned outages

In our early 15 May APR19 submission on unplanned outages, we addressed the outstanding PR19 action SVE.OC.A21 and provided a revised 2018/19 forecast and re-submitted the 2019/20 – 2024/25 forecast data.

We are supportive of the emphasis Ofwat has placed on the sector improving reporting and data for this new measure. This importance is underscored by the significant variation in industry performance reported from 0.03%-17% (with Severn Trent being at the lower end of unplanned outages). This highlights uncertainty in industry reporting and need for further improvements.

Within our 15 May submission, we outlined the significant improvements we have made to our reporting processes which covered:

- a change of approach to groundwater data analysis to increase granularity, ensuring we report outages over 24h in line with the Ofwat guidance; and
- increased understanding of the measure ensuring we exclude any outages only in line with the guidance.

We also recognised the need to do further work, given the innovative nature of the measure. These improvements, which are outlined below, are likely to impact our 2019/20-2-24/25 forecast:

- expand reporting on surface works so asset failures that cause a partial loss of production output are captured; and
- improve accuracy of volume lost as a result of planned outages.

Given the need for improvements across the sector we think it is important that all companies provide an updated forecast for 2019/20 -2024/25 forecast via the slow track DD route.

Additional to the performance commitment levels, we believe there is a need for further consideration of our ODI collar to ensure it reflects a balanced exposure on risk.

In our business plan we originally proposed a reputational incentive for unplanned outages. In accepting fast track we accepted the financial ODI but opted out of the early certainty principle for this measure, having stated, "We are also opting out of the early certainty clause for this measure" (OCA22).

This decision was made to ensure that we did not incur any procedural disadvantage from fast track (ie, we could not see how Ofwat had assessed proposals from those companies that had put forward financial incentives).

We have since reviewed the IAP results for other companies and it is apparent that our position is materially worse than that of others. This is because we have had a very large penalty-only incentive applied without any corresponding collar. This position contrasts with that of other companies.

To prevent a procedural disadvantage and provide some protection for extreme events under a new measure with immature data we are proposing that a collar should be applied to our ODI. This collar would be set identically to that of the other fast track company South West Water (SWT).

In calculating our collar, we have based this on the ratio between SWT's target and collar, where the collar is 1.5 greater than the target. This position was confirmed in SWT's DD.

We have also made a comparison with other companies that proposed collars originally. This found that SWT's ratio is consistent with those for two Slow Track companies (BRL and WSX) and with two companies in Significant Scrutiny (AFW and SRN). In fact, as SWT's ratio is slightly larger than these comparators, this will provide for greater exposure (risk) than would exist using ratios derived from other companies' proposals.

Our revised forecast for commitment levels and proposed collar is as outlined in the table below:

Unplanned outages	2020/21	2021/22	2022/23	2023/24	2024/25
Ofwat DD	0.78	0.78	0.78	0.78	0.78
Revised forecast	4.00	4.00	4.00	4.00	4.00
Revised Collar	6.00	6.00	6.00	6.00	6.00

5.2 Sewer collapses per 1000km

In our September submission we pledged to maintain a "Stable" performance on sewer collapses recognising its importance as an asset health indicator. We are delivering stable performance on collapses ensuring that our performance is below the 1000 collapses reference level (c~10.64 collapses per 1000km) set by Ofwat in AMP5.

We recognise that within our Draft Determination, Ofwat has used the 2017/18 data (5.14 sewer collapses per 1000km) to set numerical values to define our "Stable" performance commitment levels for AMP7.

We believe this data needs updating given:

- Our 2017/18 data was based on the old definition as outlined in our App1 commentary. The equivalent consistency data as outlined in our 2017/18 shadow reporting was 9.6 sewer collapses/1000km. We used the old definition given we had low confidence in our consistency reporting.
- The need for further clarity was recognised by Ofwat and this is reflected in the recently (April 2019) published revised reporting guidelines on sewer collapses.

Given the recent changes to the guidance we need to ensure our AMP7 performance reporting and commitment levels are compliant with the recently published consistency guidelines. We are currently in the process of improving our reporting processes and our latest revised forecast for 2017/18 and thus forecast for 2019/20 – 2024/25 on sewer collapses is as outlined in the table below.

Collapse per 1000km	2020/21	2021/22	2022/23	2023/24	2024/25
Ofwat DD	5.14	5.14	5.14	5.14	5.14
Revised forecast based on April 2019 consistency guidelines	8.8	8.8	8.8	8.8	8.8

*uses sewer length of 92,223km to normalise 814 collapses

The changes whilst ensuring "stable" asset health performance are reflective of:

- the move from old sewer collapse reporting guidelines to consistency guidelines published on April 2018; and
- application of a more stretching and robust definition of collapses outlined by Ofwat in April 2019. We welcome the revised guidelines given its emphasis on customer service and thus inclusion of any repair that is needed to reinstate normal service to customers as opposed to basing a collapse on the extent of structural damage limited at >50% cross sectional area loss. Thus, by definition it reflects a significantly more stretching approach in the interest of better customer service.

The major differences between the old definition and revised April 2019 definition that we have taken account of in our revised forecast are highlighted below:

Area	AMP5 definition	Revised 2019 definition
Structural Damage	Only counted as collapse when pipe had >50% cross sectional area loss	Not limited by the magnitude (size) of collapse "any contact with the company (i.e. an impact on service has caused someone to contact the company) or any unplanned escape of wastewater and result in the need to replace or repair the pipe to reinstate normal service. The measure intentionally does not refer to the magnitude of the collapse"
***Damage caused by Roots**	Not included in the measure	Included in the measure where a pipe replacement has occurred "Root ingress is excluded unless it has resulted in a need for pipe replacement"
Restoration of flow to restore service to the customer	If <50% structural cross sectional loss then not counted	All repairs to reinstate normal service to customers should be included
Repair work competed on the sewer	Repair was not a criteria for inclusion	All repairs undertaken to restore normal service to customers are included
Third Party Damage	Included water utility damage	Excluded water utility damage
***Multiple collapse**	Definition based on time Multiple contacts at the same property within 5 days or if there are multiple contacts from the same road or postcode within a 3 day time period. Only the first contact will count.	Definition based on length (distance) "Multiple incidents on the same length of sewer (manhole to manhole/ valve to valve) will count as a single incident if all work is carried out as part of the same remedial job. This assumes that the locations are in close proximity. This would not be the case if separate locations were more than 25m apart."

*we have further improvements to undertake on capturing collapses linked with root damage and the revised definition of multiple collapse

Overall, a more stringent definition essentially will enable us to identify more risks on our assets, and ensure more targeted focus on asset health. Our target reflects at 19% improvement from the PR09 determination for stable collapses and is better than the industry average.

Given, we are continuing to undertake further work to improve our reporting, we will seek to update our forecasts with half-year data for 2019/20.

5.3 Leakage and PCC

Within the draft determination, we have noted the inclusion of leakage and PCC improvements as percentages alongside absolute numerical values.

We welcome the inclusion of performance commitment levels as percentages as it aligns with our September submission wherein as per the PR19 Methodology guidance, we outlined our leakage performance using percentage values in App1 (September 2018 submission). This was aimed at ensuring that we deliver the 15% leakage improvements as pledged in the plan whilst we continue to improve our reporting to align with consistency guidelines.

On the inclusion of the absolute numerical values we would like Ofwat to note that the data is subject to the reporting improvements we are undertaking. Thus we believe our 2019/20 baseline and forecasts for 2019/20 – 2024/25 will change to better reflect the improvements we are undertaking to align with consistency guidelines.

We are still undertaking improvements to our shadow reporting to ensure that we are fully compliant with the 76 recommendations within the leakage consistency guidelines. Some of the recommendations require significant system changes that we are the currently in the process of implementing but it also leads to the risk of limited historical data to ensure the reporting changes are valid.

Given, we are continuing to undertake further work to improve our reporting, we will seek to update our forecasts with half-year data for 2019/20.

5.4 In summary

In accordance with Ofwat guidelines which recognised the importance of transparency for performance commitments so that ODI payments relate to real performance changes, and not definitional, methodological or data changes, we have provided an updated numerical forecast based on reporting improvements we are undertaking, in response to Ofwat intervention on:

- Unplanned outages
- Sewer collapses

In addition we have also highlighted the need for revision of absolute numerical forecasts on leakage and PCC where commitments were expressed as percentage improvements aligned with Ofwat guidance

> *Performance commitment levels expressed as percentage reduction are to be re-applied to 2019-20* ***actual baseline*** *following final data being available to recalculate the performance commitment levels re-presented in megalitres per day (Ml/d).*

Given that a company's ODI payments should only apply to real improvements, we believe it is important that our 2019/20 baseline is as robust as possible. We also believe that companies should be incentivised to continue to make improvements in reporting. Thus we propose to update the absolute numerical forecasts, with half-year data for 2019/20, aligned with slow track/significant scrutiny company timelines.

We also believe there is a need for an approach which allows the performance commitment percentage reduction levels to be applied based on 2019-20 actual performance. This will ensure there is no bias based on

forecast performance and ensure companies deliver the percentage improvements as pledged in their business plan. We would be happy to work with Ofwat on this.

6. Calculation of the closing SIM ODI position for AMP6

One of the challenges when submitting business plans in September was that no detailed guidance was published on how companies should calculate the SIM incentive for AMP6. Accordingly, in our business plan we made a number of assumptions about how the mechanism would work, recognising this was highly uncertain.

Since submitting our plan, we note that further detailed information has been published regarding the SIM replacement – CMeX. These publications not only give additional clarity on how the experience of customers is going to be assessed and scored in AMP7, but also set out clearly how the incentive should be calculated.

In light of the fact that the SIM methodology has not been published in either the Initial Assessment of Business Plans of Draft Determination we have recalculated our SIM incentive for AMP6 using the C-MEX methodology. This provides an appropriate basis given that CMeX is the evolution of SIM, and is further evident by the fact that:

- CMeX performance is going to be used to measure reputational SIM performance for 2019/20; and
- the approach to incentive rates will be broadly similar between SIM and CMeX – in other words, there is no significant departure from the approach used for SIM.

In the following sections, we set out the methodology for CMeX and then use that as the basis for calculating the SIM incentive for AMP6.

6.1 C-MEX Methodology

The methodology for CMeX is based on an assessment of how far companies are from average performance. This assessment is based on how many standard deviations (SD) companies are above or below the mean. Overall companies can be placed in one of seven thresholds – 3 above the mean and 3 below the mean.

The following table summarises the published methodology for CMeX from Ofwat's CMeX policy decision document[1], reflecting relevant incentive rates and the performance levels at which they will apply.

Threshold	SD away from mean	Annual payment/penalty as % of retail revenue	Incentive type
1	Above 1SD	1.2%	Enhanced reward
2	+1 SD to +0.25 SD	SD score multiplied by 0.6%	Standard reward
3	Up to 0.25 SD above median	no payment/penalty	Reward deadband
4 (average)	Mean	no payment/penalty	Target no payment/penalty
5	Down to 0.25 SD below median	no payment/penalty	Penalty deadband
6	-0.25 SD to -1 SD	SD score multiplied by 1.2%	Standard penalty
7	Below -1 SD	2.4%	Enhanced penalty

[1] Ofwat, March 2019. *"PR19 Customer Measure of Experience (CMeX): Policy decisions for the CMeX shadow year 2019-2020."*

The policy decision document also contains a number of worked examples to help companies calculate the incentive rate. In these examples, higher levels of penalty and reward will apply in full as soon as the enhanced rate threshold is crossed.
For performance that qualifies for standard rates, the payment will be calculated on the basis of each company's standard deviation score multiplied by the 3% incentive for rewards, or the 6% incentive for penalties. On an equivalent annual basis, these incentives are worth 0.6% and 1.2% respectively. There is also to be a deadband area for performance that falls within +/-0.25 SDs from the mean.

Overall, we have used these examples and guidance to distil the CMeX methodology into six key steps:

- Step 1 – establish the overall performance for each company (an AMP6 average);
- Step 2 – calculate the industry mean;
- Step 3 – calculate the standard deviation;
- Step 4 – set the three positive and three negative thresholds (ranging from 0-0.25 standard deviations; 0.25-1 standard deviation; and above 1 standard deviation). For each threshold there is a defined incentive payment as detailed in the table above;
- Step 5 – based on the company score, place each company in the appropriate incentive range; and
- Step 6 – apply the incentive rate to the retail revenue.

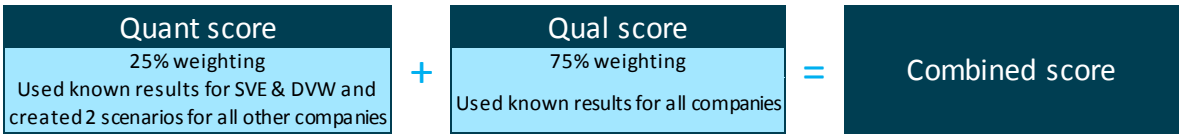
6.2 Calculating SIM in AMP6

Our method for calculating SIM incentive payments, for the four relevant years of AMP6, has followed the six key steps of CMeX methodology.

However before we could apply each of the CMeX steps, we needed to establish views for 2018/19 performance. This was necessary because complete performance data for the quantitative score is not yet available beyond the data we hold for SVT and HD. So, we've developed two scenarios to identify a plausible range of possible outcomes. These were:

- Scenario 1 – 2018/19 is based on the average of a company's quantitative scores over the first three years of the AMP; and
- Scenario 2 – 2018/19 is based on the best quantitative score for each company in the first three years of the AMP.

For the qualitative component, we've taken actual data from the industry data share, and then calculated the adjusted scores in line with Ofwat's methodology. To create the aggregate results, we combined the quantitative and qualitative scores using the specified weightings of 25% and 75% respectively. The building blocks in the diagram below summarise how we've established the performance scenarios for 2018/19.



Below we summarise the 6 steps to calculate the SIM incentive.

Step 1 – Establish the overall AMP6 performance for each company. Utilising the scores for each company, we calculated an AMP6 average, as set out in the following table.

	Actuals			Estimates for 2018/19		AMP average	
	2015/16	2016/17	2017/18	Scenario 1	Scenario 2	**Scenario 1**	**Scenario 2**
AFW	76.70	78.51	80.10	79.86	82.14	**78.79**	**79.36**
ANH	85.00	86.00	88.00	89.43	90.06	**87.11**	**87.26**
SBW	86.20	86.49	87.60	86.27	87.04	**86.64**	**86.83**
BRL	85.10	85.90	83.40	84.28	85.13	**84.67**	**84.88**
HD	83.42	85.98	86.50	78.76	78.76	**83.67**	**83.67**
WSH	83.00	82.86	84.60	86.56	88.37	**84.26**	**84.71**
NES	83.64	87.53	86.40	86.68	87.30	**86.06**	**86.22**
PRT	89.50	87.68	87.90	89.03	89.34	**88.53**	**88.61**
SVT	83.70	83.61	83.20	81.45	81.45	**82.99**	**82.99**
SEW	81.95	84.60	85.60	84.63	85.20	**84.20**	**84.34**
SRN	73.00	78.13	79.30	80.20	83.48	**77.66**	**78.48**
SSC	86.30	84.40	87.00	86.38	86.66	**86.02**	**86.09**
SWT	78.60	81.60	84.50	87.16	88.68	**82.97**	**83.34**
SES	80.80	79.60	78.70	80.96	82.03	**80.02**	**80.28**
TMS	76.74	77.26	78.40	78.19	80.38	**77.65**	**78.20**
UU	81.55	85.44	86.90	87.35	87.98	**85.31**	**85.47**
WSX	87.00	88.00	87.00	87.44	87.86	**87.36**	**87.46**
YKY	82.60	83.40	84.30	83.71	85.17	**83.50**	**83.87**

Step 2 – calculate the industry mean. We determined the companies' relative performance in relation to the mean value of the AMP-average scores which we calculated to be:

- 83.74 points in scenario 1; and
- 84.00 points in scenario 2.

Step 3 – calculate the standard deviation. We calculated the standard deviation for the range of AMP-average scores to be:

- 3.20 in scenario 1; and
- 3.04 points in scenario 2

Step 4 – set the three positive and three negative thresholds for deadbands, standard rates and enhanced rates. Using the relative distance of the scores from the mean, in standard deviation terms, we identified the thresholds for the applicable incentive rates on the basis of:

- 0-0.25 standard deviations = deadband
- 0.25-1 standard deviation = standard incentive
- above 1 standard deviation = enhanced incentive

	1	2	3	4	5	6	7
	Enhanced reward	Standard reward	Reward deadband	Target	Penalty deadband	Standard penalty	Enhanced penalty
Scenario 1	Above 86.94	86.94 to 84.54	84.54 to 83.74	83.74	83.74 to 82.94	82.94 to 80.55	Below 80.55
Scenario 2	Above 87.04	87.04 to 84.76	84.76 to 84.00	84.00	84.00 to 83.24	83.24 to 80.97	Below 80.97

Step 5 – based on the company score, place each company in the appropriate incentive range. This involves taking the AMP6 average scores from step 1 and placing them in one of the 7 thresholds identified above. This allows us to determine what final incentives should be applied. This is summarised in the table below.

	Scenario 1			Scenario 2		
	AMP6 score	**Applicable incentive**	Nature of incentive	AMP6 score	**Applicable incentive**	Nature of incentive
AFW	78.79	**-2.40%**	Enhanced penalty	79.36	**-2.40%**	Enhanced penalty
ANH	87.11	**1.20%**	Enhanced reward	87.26	**1.20%**	Enhanced reward
SBW	86.64	**0.54%**	Standard reward	86.83	**0.56%**	Standard reward
BRL	84.67	**0.17%**	Standard reward	84.88	**0.17%**	Standard reward
DVW	83.67	**0.00%**	Penalty deadband	83.67	**0.00%**	Penalty deadband
WSH	84.26	**0.00%**	Reward deadband	84.71	**0.00%**	Reward deadband
NES	86.06	**0.44%**	Standard reward	86.22	**0.44%**	Standard reward
PRT	88.53	**1.20%**	Enhanced reward	88.61	**1.20%**	Enhanced reward
SVT	82.99	**0.00%**	Penalty deadband	82.99	**-0.40%**	Standard penalty
SEW	84.20	**0.00%**	Reward deadband	84.34	**0.00%**	Reward deadband
SRN	77.66	**-2.40%**	Enhanced penalty	78.48	**-2.40%**	Enhanced penalty
SSC	86.02	**0.43%**	Standard reward	86.09	**0.41%**	Standard reward
SWT	82.97	**0.00%**	Standard penalty	83.34	**0.00%**	Penalty deadband
SES	80.02	**-2.40%**	Enhanced penalty	80.28	**-2.40%**	Enhanced penalty
TMS	77.65	**-2.40%**	Enhanced penalty	78.20	**-2.40%**	Enhanced penalty
UU	85.31	**0.29%**	Standard reward	85.47	**0.29%**	Standard reward
WSX	87.36	**1.20%**	Enhanced reward	87.46	**1.20%**	Enhanced reward
YKY	83.50	**0.00%**	Penalty deadband	83.87	**0.00%**	Penalty deadband

Notes – as set out in the above steps, the AMP6 scores are estimated results
The applicable incentive rates are shown as the annual incentive rate

Step 6 – apply the incentive rate to the retail revenue. Our applicable incentive could range from the penalty deadband through to a standard penalty depending on how other companies perform on quant in 2018/19. In financial terms, this would mean a financial incentive of between 0-£7.71m.

6.4 Conclusion

With the publication of the C-MEX methodology we are now in a much better position to calculate the SIM incentive for AMP6.

Although there remains some uncertainty about each company's performance on the quantitative measure in 2018/19, we can reliably assert that the incentive for Severn Trent should range between £0 and £7.71m.

7. Clarifying performance commitment definitions

We have reviewed the performance commitment definitions set out in the Draft Determination to ensure that they are consistent with relevant reporting guidance and the PR19 methodology, are clearly defined, easy to understand and act in the best interests of customers.

Through this review we have identified four definitions where minor changes could be made to improve the PC. Whilst these are not significant changes, it is important they are addressed within the Final Determination to avoid ambiguity in the future. These relate to:

- Abstraction Incentive Mechanism (AIM)
- Resilient supplies
- Protecting our schools from Lead
- Public Sewer Flooding

The following sections provide further detail on each of these performance commitment definitions.

7.1 Abstraction Incentive Mechanism (AIM)

We have identified three elements in the AIM definition in our Draft Determination that we believe should be modified to ensure alignment with our plan and the PR19 methodology. These are outlined in the table below along with the rationale for the change:

-DD Page No.	Ofwat -DD Outcomes PC appendix	Suggested amendments for Final Determination	Reason for change
102	The underperformance and outperformance payment incentive of ±£0.00120 only represents the incentive for Highgate AIM site and does not cover Dunhampton AIM site.	We have two AIM sites. Each site sits within a separate Water Resource Zone. Hence we have a bespoke incentive rate (identified in App3) which has been calculated based on the short run marginal cost of using alternative sources of supply within each particular Water Resource Zone. Therefore, for clarity incentive rates for both sites should be stated in the Final Determination. The incentive rate for Highgate is ±£1,204 per Ml (±£0.001204m).	The marginal cost has been calculated based on Ofwat's guidance which indicates the company should propose a bespoke incentive per Water Resource Zone: *"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." (PR19 Final Methodology Appendix 2, Ofwat 2017*).

		The incentive rate for Dunhampton is ±£136 per Ml (±£0.000136m).	
101	The performance commitment section states: "*The target for this performance commitment is to have 0 Ml/day abstracted from both sites whenever the trigger threshold is crossed*."	For clarity we believe this should read "*The target for this performance commitment is to abstract no more than our baseline daily average abstraction quantity of 2.05 Ml/d at Dunhampton and 5 Ml/d at Highgate whenever their trigger thresholds are crossed. The trigger threshold for Dunhampton is 61mAOD and 132mAOD for Highgate.*"	*For AIM sites the App1 target is relative to the baseline, as opposed to an absolute target* *The 0 Ml/d (relative) target stated in App1 is in accordance with the AIM calculation guidelines within PR19 Final Methodology Appendix 2.* This is important as the AIM is designed to incentivised reductions in abstractions relative to the baseline as opposed to halting them (which could have a detrimental impact on our ability to supply customers). This is the precise language used in the PR19 methodology. Clarity will also avoid customer misunderstanding as we are still able to abstract when AIM is 'on'
100	The benefit section states*: The benefit of this PC is that environmentally sensitive sites are preserved by avoiding abstraction water from them during lower levels of flow*"	For clarity we suggest: "*Benefits: The benefit of this PC is that environmentally sensitive sites are preserved by reducing water abstraction from them during lower levels of flow*" – text taken from *(PR19 Final Methodology Appendix 2, Ofwat 2017*).	*To ensure alignment with detailed definition and Ofwat's AIM methodology.* *"AIM intends to encourage water companies to reduce the environmental impact of abstracting water at environmentally-sensitive sites during defined periods of low surface water flows*." *(PR19 Final Methodology Appendix 2, Ofwat 2017*).

7.2 Increasing water supply capacity

In our "Increasing water supply capacity" PC there are two areas that would benefit from simplification with regards to the definition and parameters as outlined on Page 109, PR19 Draft Determination, Outcomes Performance Commitment appendix.

- Timing reference – the time details on when beneficial use of the increase water capacity will be available
- Scheme reference – the details (name) of the schemes outlined that will deliver the benefits

Timing reference

As per our submitted plan, the Draft Determination refers to delivery of schemes by 31st March 2025 and beneficial use available by 1st April 2025. Following further review, we believe that the multiple dates will be confusing for customers.

To enable clarity for customers between 31st March 2024/25 and 1st April 2025/26 – we propose to ensure beneficial use of 68.5 Ml/d will be available by 31st March 2024/25. This negates the need for a delivery milestone in 2023/24. The beneficial use will be calculated using our Water Resource Model.

Scheme reference

The detailed definition in the Draft Determination lists three new supply schemes that will be part of the metric:

- Bamford WTW to Grindleford pipeline capacity increase;
- Heathy Lea to North Nottinghamshire transfer solution; and
- Peckforton Group BHs asset and water treatment enhancements

These schemes deliver benefits to the Nottinghamshire and North Staffordshire water resource zones as identified within our Water Resource Management Plan and aligned with Appendix A8.

Akin to the naming convention we use on hydraulic sewer flooding schemes we believe it will be helpful if the schemes reference the area that is being benefitted as opposed to the site names within Severn Trent. This provides clarity on areas that will be benefitting through this work and helps reinforce the PR19 focus on outcomes rather than inputs. Additionally it also seeks to ensure security by not naming sensitive sites as we have sought to currently redact the scheme name for our website.

This does not change the basis for the target which is the overall volume of capacity that will be made available and is still set at 68.5 Ml/d.

Thus we would propose a change to:

- Nottinghamshire supply demand scheme 1
- Nottinghamshire supply demand scheme 2
- North Staffordshire supply demand scheme

7.3 Protecting schools from lead

We have identified one element in the Protecting Schools from Lead definition in our Draft Determination that we believe should be modified to ensure alignment with our plan. This is as outlined in the table below along with the rationale for the change:

-DD Page No.	Ofwat -DD Outcomes PC appendix	Suggested amendments for Final Determination	Reason for change
119	The DD sets out two descriptions The detailed definition currently reads – "The company will offer all necessary action to minimise the risk from lead including replacing the communication pipe, service pipe and plumbing where there is a risk from lead such as lead solder." In the additional details section this is clarified – "If the school or nursery chooses not to replace their service pipe/lead plumbing or lead solder, then as long as the company has offered appropriate advice and replaced the lead communication pipe (if present) then this can be counted as fulfilling its commitment."	For clarity we suggest a common approach wherein the detailed definition to ensure consistency with the additional details. This should be amended to state: "The company will offer all necessary action to minimise the risk from lead including replacing the communication pipe and raising the risk to school/nursery alongside bringing to notice information from public domain to schools on how the school/nursery could reduce its risk, on service pipes and plumbing."	As per our commitments we will seek to replace the communication pipe given it is a water company asset. We will provide assistance in the form of advice and guidance to schools/ nurseries on assets (service pipe and internal plumbing) which are outside our control. This ensures that we are compliant with wider competition law guidance covering assets we do not own. The amendment will also ensure that there is no ambiguity for schools/nurseries on the assistance we will provide with regards with service pipe and internal plumbing assets that are owned by schools.

7.4 Public sewer flooding

We have identified one element in the Public sewer flooding in our Draft Determination that we believe should be modified to ensure alignment with our plan. This is as outlined in the table below along with the rationale for the change:

-DD Page No.	Ofwat -DD Outcomes PC appendix	Suggested amendments for Final Determination	Reason for change
85	The additional details on measurement units section currently reads – " Each 5 metre stretch of highway or footpath that is flooded will be counted as a separate incident".	We understand the need for clarity on how multiple incidents are counted. For clarity we suggest use of the June return definition given it recognises different road layouts and forms the basis of our current reporting to CCWater – Highway flooding:	*Our submitted definition did not provide clarity on the basis for counting separate incidents. Hence we have suggested amendments, aligned with Ofwat's June return guidance which provided guidance taking account of road layouts and flow patterns and thus is a more representative as*

	· If a road floods in two places and the contour of the road is the only reason for two patches of water, then this should be counted as one highway area flooding; · If a road floods in two places and the flooding is sufficiently far apart to be deemed as coming from two different inadequacies in the network, then this should be counted as two highway area floodings; or · If a road floods at a cross roads or T junction, this should be counted as one highway area flooding.	*opposed to a 5 metre stretch parameter.*