Mains renewal Cost Adjustment Claim

PR24 Draft Determination Representations – August 24

Document reference	ANH_DD_010		
Title of cost adjustment claim	Mains Renewal		
Price control	Water Network+	Symmetrical?	No
Basis of claim	Our analysis of asset deterioration, coupled with the effects of climate change over the long term, indicates a need for a higher level of mains renewal to avoid worsening performance over time. The claim is calibrated to cover the costs of this increase only above the level delivered within base allowances.		

Gross value (£m five years)	£314.9 million
Implicit allowance (£m five years)	£116.8 million (based on 0.2 percent pa @ £292/m)
Net value of claim (£m five years)	£198.1 million (based on 0.34 percent pa @ £285/m)
How efficiency of costs is demonstrated	Ofwat's DD includes an efficient unit rate of mains renewal of £292/m. Our claim is for £285/m.
Materiality (as % of totex for price control)	£198 million is 4.8% of totex for Water Network+ (£4.063bn), therefore above the materiality threshold
How customers are protected	Ofwat's mains renewal PCD returns expenditure to customers in the event of non-delivery. By requesting this expenditure we are ensuring the resilience of our assets in the long term and balancing the demands on current and future generations.
Supporting document references	ANH01 Our plan 2025-2030 anh01-our-plan-2025-2030.pdf (anglianwater.co.uk) ANH26 Enhancement Strategy: Resilience to drought and flood ANH26-Enhancement-strategy-Resilience-to-drought-and-flood.pdf (anglianwater.co.uk) ANH38 Asset System Resilience Appraisal ANH38-Asset-systems-resilience-appraisal.pdf (anglianwater.co.uk) ANH68 The exceptional summer of 2022 ANH_DD_001 DD Representations – chapter on asset health

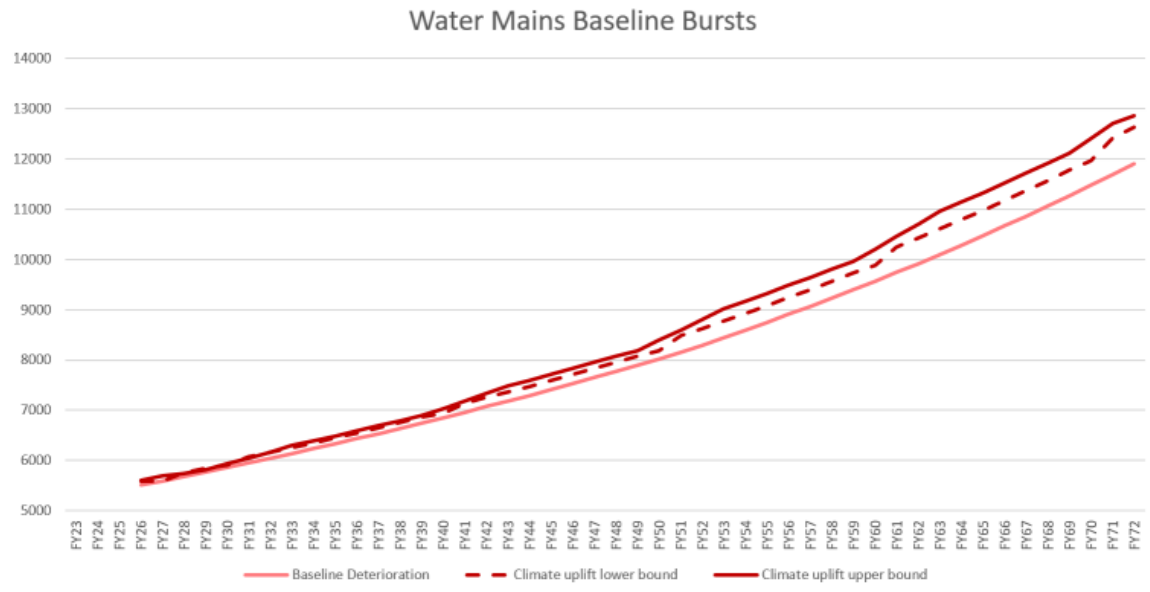
	ANH_DD_015 Asset Management Maturity update 2024

Introduction

We present below a new Cost Adjustment Claim to replace our Enhancement expenditure funding request for resilience submitted in our October Business Plan. This reallocation to base is consistent with Ofwat's preference for regulatory treatment of this type of expenditure (as noted in the Draft Determination by their reallocation of Northumbrian's similar claim to base). Our view is that the mechanism to allow the funding is less relevant than the necessity for additional investment to secure the long term resilience of our service to customers and the environment to deliver our company purpose. We have sought to construct our claim as far as possible in line with other precedents in the Draft Determination associated with the new mains renewal adjustment and preserve Ofwat's fundamental methodology, whilst proposing amendments to be included in the Final Determinations.

1. Initial points to note

In our October 2023 PR24 Business Plan Submission, we included an enhancement request for Climate Vulnerable Mains renewal, based on research indicating increasing risk of asset failure due to hotter drier summers as predicted in Ofwat's common reference scenario for Climate Change:



In the Draft Determination, Ofwat disallowed this request, stating that *"This shows a potential increase of around 200 bursts by 2050 based on the lower bound from baseline deterioration. This impact is small compared to the overall forecast burst level of 7000[sic[1]]. This scale of impact does not appear to justify the scale of investment requested. Given the uncertainty over climate change impacts, it also does not justify why this investment is required now, rather than when impacts are more certain. It is also likely that the increase in renewals required from base will offset some of this*

[1] Note the graph shows 8,000 bursts per year in 2050

deterioration and mitigate the climate change impacts, for example as we expect Anglian Water to replace AC and PVC mains as part of the baseline mains renewals."

Throughout this Cost Adjustment Claim (CAC) we aim to provide constructive feedback on the Draft Determination to allow Ofwat to make adjustments as part of the Final Determinations. We would welcome further dialogue on this technical and important issue in the coming months.

Ofwat's Long Term Delivery Strategy guidance for PR24 states that "The core pathway is consistent with best practice adaptation techniques and should include all activities that need to be undertaken to be ready for all plausible future scenarios", and requires us to assess the impacts of the adverse RCP8.5 common reference scenario for climate change. Our analysis here meets this requirement. However, we acknowledge that the scale of increase of around 200-300 bursts on average per year by 2050 is small relative to baseline deterioration. This prediction is intended to show an average annual uplift per year, with some years showing spikes well above this, and critically in particular the summer months having extremely high burst rates (such as the summer of 2022). In the forecast referenced above, Ofwat notes that baseline deterioration in the absence of any proactive renewal predicts an increase (from around 5,500 bursts per year in 2026[2], to around 8,000 bursts per year in 2050, rising to 12,000 by 2072). With the climate change uplift this increases further to nearly 13,000 bursts per year in 2072. This level of asset failure would be disastrous for our customers and the environment.

To illustrate this, as set out in the appendix to our business plan 'ANH68 The exceptional summer of 2022', we experienced our highest ever number of bursts at a total of over 6,800 bursts reported during that financial year, with burst levels during August double the normal average[3]. In the same year we missed performance targets for mains repairs, supply interruptions, and leakage, had the company incident room open for six weeks to manage constant risk of low storage points, experienced record levels of incoming calls from customers to report low pressure or other issues, and incurred tens of millions of pounds of reactive opex to repair assets. Importantly the new summer failure mode peak is predicted to coincide with peak demand from customers, including essential demand for firefighting. During the incident in one example of a major supply interruption at Haddenham in Cambridgeshire, the mains failure coincided with peak customer demand leading to rapid emptying of the potable storage point (water tower) and associated widespread interruption, that would have been more manageable off peak. In other events we experienced the network running at full capacity, with a burst creating widespread low pressure. Climate change forecasts from the UK government predict that summers like 2022 will become 'normal' by 2060.

In this Cost Adjustment Claim we respond to Ofwat's DD comments and instead of focusing solely on the worsening effects of climate change, we present evidence of why our renewal rate needs to increase to keep pace with deterioration *and* climate change. We simply cannot allow our assets to deteriorate to an extent that burst rates regularly exceed those experienced in 2022, so it is crucial that the level of mains renewal keeps pace with deterioration first, and then in addition to that the increasing impacts of failure driven by changing climate, to maintain resilience of the system. We believe that the evidence we set out explains why this investment is required now, as this is a long term issue that requires sustained investment from today otherwise we risk storing up problems and greater risk for customers which would not be deliverable as a more compressed 'catch up' programme starting in later AMPs.

[2] Aligned to our forecast provided in Business Plan Data Table OUT1.18

[3] ANH68 Figure 13 p19

In proposing this adjustment, we reflect on Ofwat's PR19 FD which recognised the need for adjustment based on a forward look assessment of maintenance needs. "We agree it is appropriate to focus on a forward looking risk based approach to maintenance planning. If that reveals a company has markedly different requirements that increase maintenance costs materially due to particular issues that clearly need to be addressed in one five year period, we would expect it to make a well evidence case through the cost adjustment claim process."[4]

2. Need for adjustment

As Ofwat noted in the PR24 Final Methodology and again in the Draft Determination, mains renewal rates in the industry are currently unsustainably low[5].

As explained in or business plan document ANH01 chapter 6, we have completed an analysis of the long term predictions of performance taking into account deterioration and maintenance levels. This analysis is set out in document ANH38 'Asset Systems Resilience Appraisal'.

Ofwat's Draft Determination presents a visualisation of condition grade changing over time from PR09 (2009) to PR24 (2024)[6]. We have used our deterioration models described in the Asset Systems Resilience Appraisal to produce forecasts of the same chart for PR49 (2049) to align with the Long Term Delivery Strategy (LTDS) planning period.

The first two columns use the data as submitted to Ofwat in table CW20 Water mains – asset condition for Anglian Water, and the equivalent data from PR09. The PR49 columns to the right represent forecast scenarios for 2050:

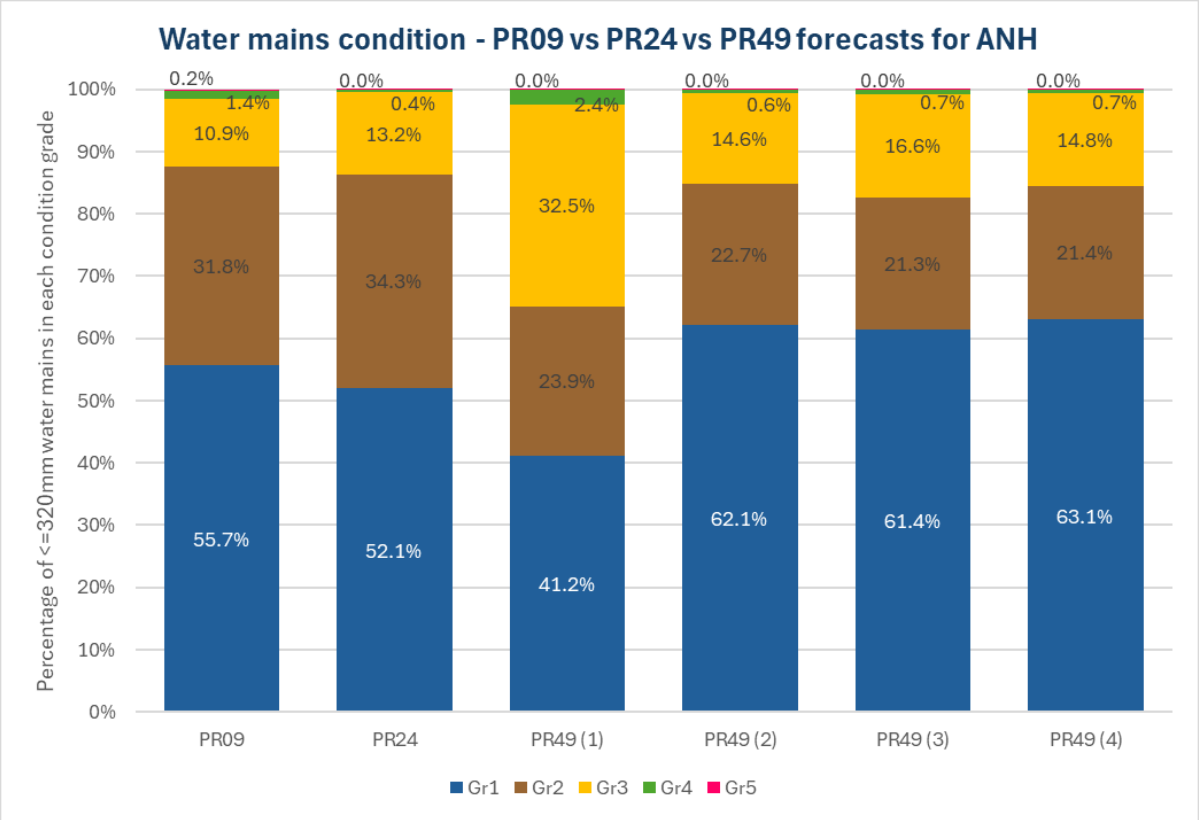
Scenario 1: using our AMP7 renewal rate per annum without climate change uplift (0.13% per annum)

Scenario 2: using our previous estimate of the sustainable level of replacement in the absence of climate change (0.89% per annum)

Scenario 3: as for scenario 2 but with our upper bound climate change uplift added

Scenario 4: as for scenario 3 but with renewal rate increased to a new rate to accommodate climate change (0.95% per annum)

[4] PR19 final determinations: Anglian Water - Cost efficiency additional information appendix, page 4
[5] Expenditure Allowances section 2.2.1
[6] Expenditure Allowances, Figure 4: water mains condition - PR09 versus PR24 at the sector level



As can be seen in the above forecast **scenario 1** if we continue to invest at our AMP7 level (c0.13% per annum) the condition of our mains (as measured via burst rate) will deteriorate significantly, with the % of grade 4 and 5 mains increasing to 2.4%. In this scenario we predict around 7,000 bursts per year by 2050[7]. Therefore this level of maintenance does not keep pace with deterioration – note this scenario does not include any climate uplift. This conclusion is similar to the outputs of Yorkshire Water's analysis in their cost adjustment claim 'CW02a Targeted Allowances for Asset Health – Infra'. In the DD, Yorkshire's cost adjustment claim was approved for the difference between the implicit allowance and their requested 0.66% per annum renewal rate for AMP8. We have built our claim to mirror this treatment and believe our evidence is equivalent to that presented in CW02a. We are open to sharing more details of our mains deterioration modelling work or providing demonstrations to the Ofwat team if required.

Importantly, in the DD feedback Ofwat said: *"It is also likely that the increase in renewals required from base will offset some of this deterioration"*. Although we set out in section 5 below that we believe the correct implicit allowance from base is 0.2% per annum, we have completed an additional modelling run in our predictive analytics system to test the burst rate based on asset deterioration only using Ofwat's DD proposed figure of 0.3% per annum from base (scenario 1a not shown on the graph above). Through this method we were able to quantify the proportion of deterioration offset by 0.3% as referenced in Ofwat's comment at around 800 bursts per year by 2050. In other words, this leads to a slight reduction compared to scenario 1, but still forecasts 6,200 bursts per year in 2050 vs the 5,500 we experience today. Adding the effect of climate change to this would lead to around 6,450 bursts per year, as explained above, with many of these bursts concentrated into July and August during peak customer demand.

[7] This is in line with the 'Residual £12m pa best value' line presented on the deterioration graphs in ANH38 chapter 1.1 Treated Water Mains

In **scenario 2** we test a higher level of mains renewal over the period to keep pace with deterioration. Given the limited period available in the DD window we tested 0.89% per annum, as this was the figure we provided to Ofwat in query OFW-OBQ-ANH-124. As we explained in that query response, this rate was derived using the National Infrastructure Commission's approach of remaining economic life. Remaining economic life is understood to be the length of the period after which it is not cost effective to continue using and repairing the existing asset, and replacement or structural renewal would be required. The results of this modelling show that:

- this is a rate of renewal that keeps pace with deterioration and in fact leads to improving performance of mains bursts over the period, with bursts in 2050 at around 4,100 per year
- but the percentage of grade 4/5 water mains increases slightly to around 0.6%.

The reason for the increase in condition grade 4/5 pipes is that the optimisation engine does not select pipes based on burst rate, but (as explained further below and in our DD Representations chapter on Asset Health) based on wider environmental and social value mitigated (i.e. best value rather than least cost).

Building on scenario 2, the additional research we completed for PR24 to investigate the effects of climate change on asset deterioration shows an uplift in the average bursts per year. In **scenario 3** we add the climate change uplift. As acknowledged above, this is a marginal worsening in 2050, with about 200 additional bursts per year on average, and with the percentage of grade 4/5 mains increasing to 0.7%. The effect of climate change increases beyond 2050, but this analysis is aligned to the LTDS planning period.

In **scenario 4** we tested a higher level of mains renewal to keep pace with both deterioration and climate change and find that 0.95% per annum is a rate of renewal that achieves this, keeping bursts in line with scenario 2, and decreasing the percentage of grade 4/5 water mains below 0.7% (NB figures in the chart above are rounded).

Conclusions from this scenario testing

The forecasts produced using our predictive analytics tool clearly show that both 0.13% and 0.3% per annum renewal rates are insufficient to address asset deterioration, let alone the compounding effects of climate change. It also shows that rates around 0.9% are able to keep pace with deterioration and climate change, as well as remaining economic life of assets. Depending on the priority measure of deterioration (total bursts vs % grade 4/5) it is likely that this rate would be sufficient to address either, using targeting of those pipe lengths that contribute most to that measure.

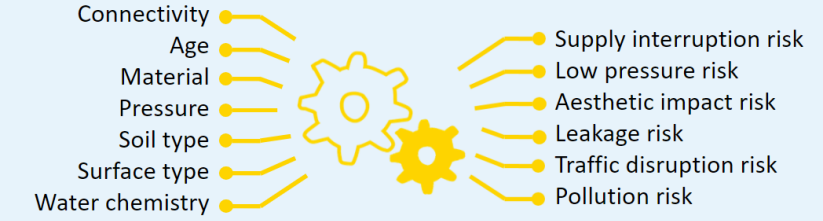
In this Cost Adjustment Claim although we signal a long term rate of 0.87% per annum for AMP9-12, we propose a partial increase towards this sustainable of 0.54% on average over AMP8. Therefore we consider our claim to be low regret, and note the opportunity to revise our long term view at PR29 after additional modelling can be completed, and the benefits of completed investment in 2025-2027 reviewed.

<u>Need for adjustment – unique circumstances</u>

Ofwat's Cost Adjustment Claim process requires evidence of how the company making the claim is different to other companies. Our region has some unique circumstances to note relating to mains renewal:

- As explained in our business plan (in particular in appendix ANH68), our water mains are laid in a higher proportion of class 6 shrinkable soils than any other company regulated by Ofwat – a key factor in failure risk when drying causes ground movement. Our analysis of drivers of deterioration in water mains has found soil type to be a statistically significant variable, and is therefore taken as an input to the prediction of future failure rates in our model
- Our average asset age is the fifth highest in the industry (third highest WASC) and above average at 63 years (vs 57.9 years average) – age is also an input to the calculation of deterioration and forecasting of future burst rates
- We have the highest proportion of asbestos cement (AC) pipe material of any water company regulated by Ofwat, approximately 2.5 times the typical proportion of AC pipes (18%) compared to the national average (7%). As noted by many sources including UKWIR and other water companies, this material type is expected to have a shorter asset life than other materials – again material type is an input to the modelled deterioration rate

Summary of data feeding mains renewal analysis for each pipe, and the outputs



We are prepared to share the technical report summarising the statistical relevance of these factors in predicting deterioration rates on request. These factors contribute to a higher level of baseline deterioration than would otherwise be the case, and consequently a need for higher maintenance levels in the future relative to the levels present in the period used in setting base allowances.

These issues are outside of management control since these pipes were laid using those materials prior to privatisation before modern equivalent pipe materials were available, and before climate science identified the summer failure mode.

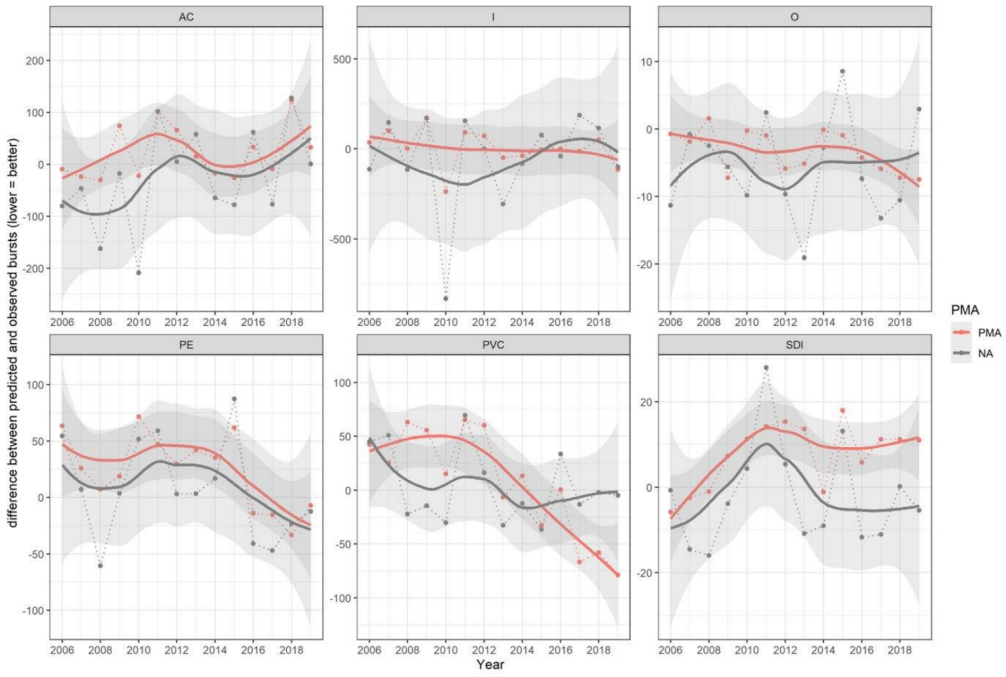
Despite these exogenous factors, we have maintained good asset health in the past 15 years. In the Draft Determination, Ofwat notes that the proportion of water mains in our region that are condition grade 4 and 5 (at 0.4%) is well below the industry average and has improved since 2009.

However, we note that the condition grade metric that Ofwat has selected in the DD is based on the backwards looking historic burst rate (actual bursts over the past 5 years). Below we have shown the PR24 guidance on mains condition grading in table CW20.2. Backwards looking measures are affected by short term incentives such as the ODI regime which have lead to operational burst reduction strategies. This means that whilst it may appear that condition has improved using this metric, the strategies that suppress burst rates are masking ongoing deterioration in structural condition (see below for more explanation). As a measure used to determine forwards looking maintenance allowances, we therefore believe that Ofwat's selected measure of asset condition is wrong. In the Ofgem Network Asset Risk Model (NARM) framework, the asset Health Index bands (similar to condition grade), are projected into the future using standardised deterioration models specific to the asset type. We have adopted the same format in our PR49 analysis above.

Table CW20.2 Mains Condition Grading

Condition grade	General meaning
1	Excellent Bursts average up to 125/1000km/annum over five years, (equivalent to 1600 metres or more between bursts over the five year period).
2	Good Bursts average greater than 125 up to 250 burst/1000 km/annum over five years, (equivalent to less than 1600 metres down to 800 metres between bursts over the five year period).
3	Adequate Bursts average greater than 250 up to 500 bursts/1000km/annum over five years (equivalent to less than 800 metres down to 400 metres between bursts over the five year period).
4	Poor Bursts average greater than 500 up to 1000/1000 km/annum over five years (equivalent to less than 400 metres down to 200 metres between bursts over the five year period).
5	Very Poor Bursts average greater than 1000/1000 km/annum over five years (equivalent to less than 200 metres between bursts over the five year period).

To further explain why deriving forwards-looking conclusions from backwards-looking data in this case is flawed, as we said in response to previous queries and in our business plan document ANH01 chapter 7.2.6, we note that the burst rate in our region has been effectively controlled via heavily investing in pressure management. We were early adopters of pressure management and are now working on enhanced approaches like smart networks to achieve further improvements. The image below was included as figure 9 in our Asset Systems Resilience Appraisal[8], and compares a smoothed average of observed bursts in pressure managed areas (PMAs, the red line) with non-pressure managed areas (NA, the black line) from 2006 to 2020 across 6 materials; AC, Iron (I), Other (O), Polyethylene (PE), PVC and Ductile Iron (SDI):



[8] Page 26 ANH38-Asset-systems-resilience-appraisal.pdf (anglianwater.co.uk)

The data shows that PVC and iron pipes in particular have improved with pressure management (red line decreasing), with AC mains also closing the gap.

Because of this, the chosen metric of condition grade above has appeared to improve over the last 15 years. A metric of structural condition, such as remaining wall thickness, degradation of gaskets in joints, or pipe cracking for instance, would not be expected to have improved over the same period.

In the DD Ofwat notes[9] that "*We have further analysed Anglian Water's asbestos cement mains to see if the company requires an uplift to replace these mains due to deterioration. These mains appear to be in a better condition than other mains in its network and so it is not clear that these mains would need near term replacement.*"

As shown above, pressure management is a significant reason for the reduction in the burst rate for AC mains since 2006. In 2018 we commissioned physical inspections of joints on our AC mains (noting joints are a major failure mode for this material). A specialist rubber consultant (ARTIS) carried out electron microscopy and analysis of eight failed water seals. The samples analysed were EDPM rubber polymer, of different formulations. The physical inspection report examined the joints and found degradation of the rubber gaskets to be a particular cause of increasing failure risk. They exhibited some degradation at the outer edges through oxidation. They also found a loss of polymer from the compound, possibly through chemical effect of contact with treated water, potentially linked to thermal expansion and contraction. Missing inner ribs indicate mechanical action with material possibly washed away. The seals tested were twisted with wear on one side, which could indicate the installation (around 1950) not being even. This supports the case that while pressure management prolongs the life of these assets, ultimately the deterioration observed continues over time through these sort of mechanisms.

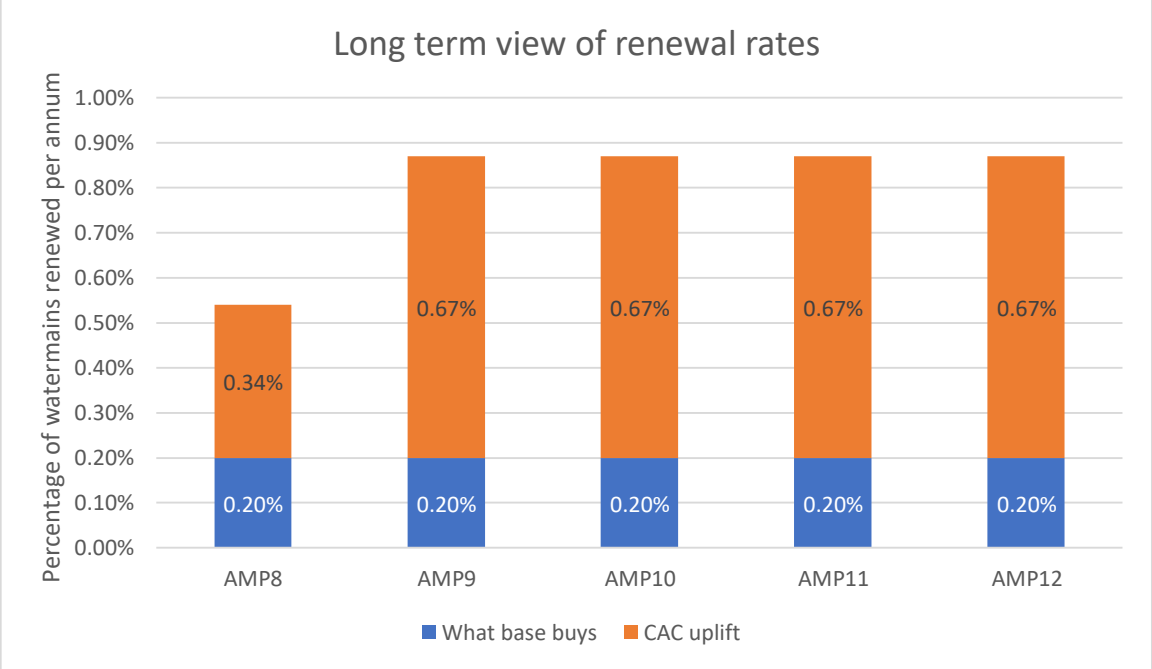
Operational strategies have limited additional effectiveness in the future as we approach full coverage of pressure management in all our DMAs. If asset health is allowed to deteriorate then eventually the effect of these strategies will be eroded.

Required increase in capital maintenance

As we noted in our business plan document ANH26 Enhancement strategy - Resilience to drought & flood, figure 42 on page 122, we staggered our request for mains renewal to aid deliverability. We proposed an increase in renewal rate of 0.34% per annum in AMP8, increasing to 0.67% for AMP9-12. Taken in combination with the implicit allowance within base, this is close to the renewal rate proposed in scenario 2, 3 & 4 above, rising from 0.54% per annum in AMP8 to 0.87% per annum in AMP9 onwards.

The graph below shows our proposed multi-AMP renewal plan which is calibrated to address deterioration and climate change over the long term:

[9] p8 PR24-draft-determinations-Total-expenditure-allowances-by-company

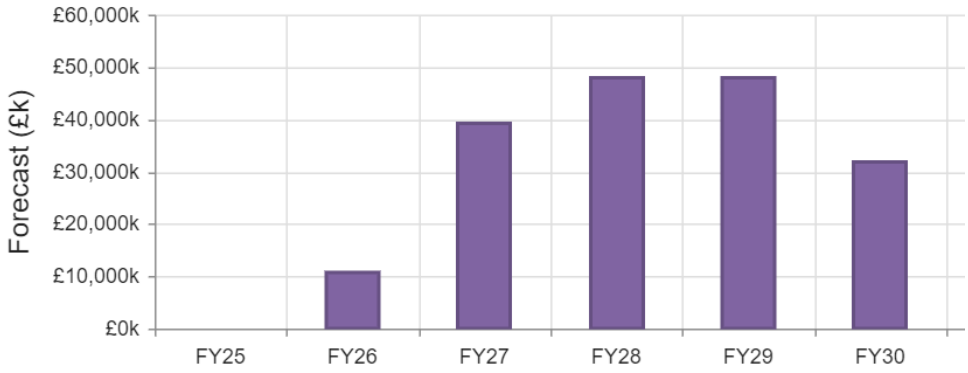


This Cost Adjustment Claim is to increase the level of capital maintenance within Anglian Water's allowance, to allow an increase in the mains renewal rate to 0.54% within base for AMP8 (2025-2030). We calculate the required increase in capital maintenance using our own cost models, which indicate a unit rate below Ofwat's efficient unit rate.

We include within our plan sufficient funding to complete the base level of renewal implied by Ofwat's econometric models for botex. We only request additional funding for replacement levels above this level of activity.

The details of the build up of the requested increase in cost are set out in detail in the document ANH26 chapter 8 as they are unchanged from the original October business plan submission.

In our updated data tables for the DD Representations, within AMP8 we have re-profiled our replacement rate to assist with deliverability within our supply chain[10], since mains renewal schemes take time to plan and design prior to delivery. Often this is due to complex traffic management, hydraulic design and other enabling constraints like archaeology and ecology.



[10] See further evidence on delivery profiles in the deliverability document PCD appendix in our DD Representation ANH_DD_016

3. Demonstrate cost efficiency

Within the Draft Determination document "PR24-DD-Mains-renewals-adjustments" Ofwat calculates its view of the median unit rate for mains renewal as £292.43/metre. In addition to the cost efficiency evidence submitted in our October Business plan document ANH26 chapter 8.4 for this programme, we note that our requested unit rate for this work at £285/m is below Ofwat's view of the efficient unit rate for mains renewal. In that chapter of our business plan we provide detailed evidence of benchmarking that was independently assured. As required by the table guidance[11] for CW18 (Water CACs), we quote the unit costs before the application of Frontier Shift and RPE.

4. Customer protection

We accept the need for a PCD for this activity and provide detailed comments on the specification of the PCD in a separate document, ANH_DD_016 Price control deliverables detailed commentary. We also comment on potential perverse incentives in the chapter on asset health in our main narrative ANH_DD_001. Lengths of mains are selected for renewal based not only on the burst rate but also on the wider societal and environmental impact of failures, for example traffic disruption, supply interruptions, leakage and pollution risk to watercourses using the risk factors that are shown in the model outputs. Customers are also protected from these wider impacts via ODI rates for these measures.

5. Implicit allowance

In the PR24 final methodology[12] Ofwat stated that companies had included 0.4% mains renewal in PR19 business plans. Since then, Ofwat has used a data request to reveal lower levels of activity than business plans suggested, and then derived a view of an implicit allowance in base spend of 0.3% per annum.

It is not appropriate to take the levels of activities in business plans, as these would have been proposed based on the level of expenditure in companies' business plans. The level of funding allowed in Final Determinations differed from these proposals, so it is appropriate to consider both what level of funding was allowed for efficient companies, and the actual level of activity undertaken by those who set the benchmark for that efficiency. We explore this point in more detail in our main Representations ANH_DD_001 chapter on asset health.

We welcome Ofwat's focus on this important issue, but we set out below why the calculation of this rate is incorrect and provide evidence that the more appropriate rate across the industry is 0.2% per annum.

We set out our view of two key tests that should be true of the implicit allowance when calculating a rate funded by base allowances. We believe that the rate is robust if:

1. The implicit allowance is based on activity levels consistent with botex modelled allowances
The DD method uses the averages over the panel period used in base modelling. While the coefficients of the base cost models are derived using the 12 years' panel data from 2012-2023, the cost efficiency of each company is computed by comparing companies' actual spend over the last five years only (2018-23 for DD), with what the models suggest they should have spent in that

[11] PR24 business plan table guidance part 3; Costs (wholesale) - water
[12] p75 PR24_final_methodology_main_document.pdf (ofwat.gov.uk)

period. Since this is the period used to set efficiency benchmarks, using the longer 2012-23 period to derive activity levels is inconsistent with the costs in the benchmark expenditure.

For this reason, the five-year period is therefore more accurate in deriving the implicit allowance of activity commensurate with the level of spend. This is the same method chosen by Yorkshire Water to calculate implicit allowances in their Cost Adjustment Claim para 6.2.8[13], although at the time Yorkshire Water did not have access to the data request that separates base renewal from enhancement. If the implicit allowance were to be calculated using the period from 2012-23, then the benchmark period in the econometric models should also be set to the same period.

There are a range of activity levels delivered by companies. There is a risk that cost efficient companies deliver lower levels of activity. Ofwat refutes this by comparing spend against allowance in the DD, but this does not adequately assess whether cost efficient companies are delivering a minimum level of mains renewal activity, only that their allowance has been spent on some activity. A better approach to understanding the funded level of activity implied by the base model benchmarks is to measure it directly.

Looking at this, the unweighted arithmetic mean of companies at or above the benchmark over 2018-23 is 0.21% per annum[14] (Upper Quartile companies SSC/PRT/ANH/AFW/SWB). We are aware that for Final Determinations Ofwat plan to incorporate an additional year of data from APR24, and have therefore recalculated the same approach for the period 2019-2024, giving a revised rate of 0.2% per annum (Upper Quartile companies SSC/PRT/ANH/AFW).

2. **The implicit allowance calculated in the abstract, when applied to the industry should broadly equate with aggregate reported renewal levels in km**

That is, the implicit allowance must have broad relevance and be explainable in terms of the activities undertaken at an industry level, even if individual companies vary considerably from the implicit allowance.

In general, but not in all cases, smaller companies tend to have higher rates of renewal. This might be explained by a number of structural factors, including smaller companies having smaller diameter mains on average, or may be a result of modelled allowances being more generous to smaller companies. The cause of this trend is less important than how to deal with its impact on the analysis. Here, the choice of how to calculate the average level of renewal matters. If all companies are given equal weight (a straight arithmetic mean as in the DD) this tends to overstate the implied level of overall mains renewal across the industry.

The DD method to calculate implicit allowance is to take the arithmetic mean of companies' replacement rates within base in the period 2011-23, giving 0.3% per annum. Using this figure applied to the length of water mains in service each year per company implies a replacement rate of 12,373km over the period 2012-23 (0.3% of column D in the mains renewals adjustments feeder model, tab Base_Enh_PR24Query, excluding financial years beyond 2023). However, the actual length of mains renewed within base allowances over the same period was only 9,951km (column F in Base_Enh_PR24Query, excluding financial years beyond 2023).

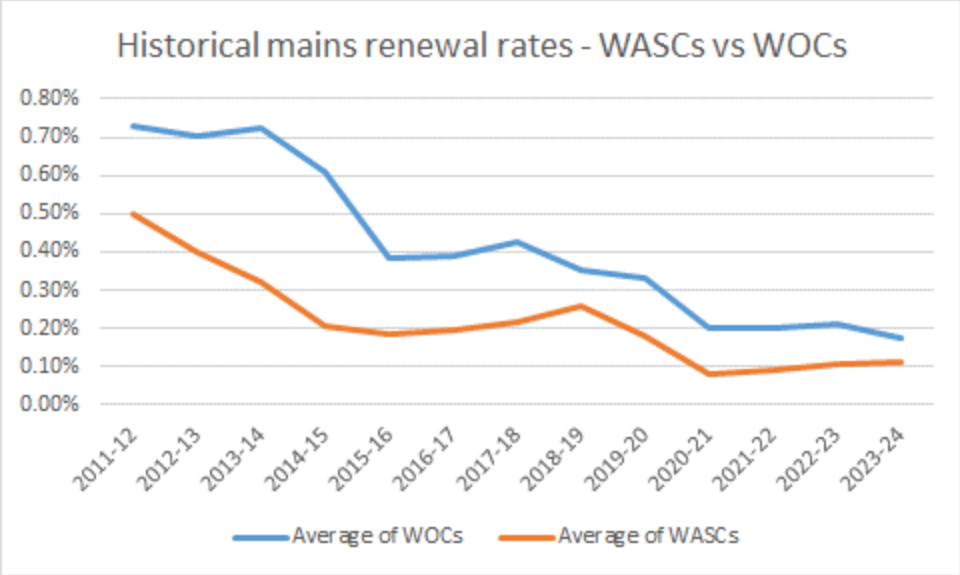
The reason for this significant over-estimate of 2,422km is that 0.3% is the unweighted arithmetic mean rather than being weighted based on mains length per company. So, if 0.3% is applied to the industry as a minimum, this represents a stretch on the industry to deliver 30% more than is

[13] yky46_cost-adjustment-claims_redacted.pdf (yorkshirewater.com)
[14] https://www.ofwat.gov.uk/wp-content/uploads/2024/07/PR24-DD-Mains-renewals-adjustments.xlsx

currently delivered from the same level of funding. It is important to note here that the implicit allowance should be a calculation of what has been funded, not an estimate of what could be achieved in the future through additional productivity gains.

By contrast, an industry weighted mean of the same period would be 0.24% (weighted using mains length in 2024). This accounts for the fact that, for example, whilst Portsmouth Water has an average rate of 0.52% per annum over the period, it has less than 1 percent of water mains. Using this weighted mean gives a total of 9,898km, leaving an immaterial difference of only 51km vs actual reported length.

Looking into this further however, we note a structural gap in renewal rates across the whole period between Water and Sewerage Companies (WASCs) and Water Only Companies (WOCs).



The industry level weighted mean over-predicts WASC lengths significantly (8,360km vs 7,384km) whereas under-predicts for WOCs (1,538km vs 2,567km). To remedy this, is it possible to produce weighted means for WASCs and WOCs separately, being respectively 0.21% per annum and 0.40% per annum. This effectively closes the gap between predicted and actual km (WASCs: 7,315km vs 7,384km, and WOCs: 2,564km vs 2,567km).

The same issue arises when considering a shorter timeframe consistent with cost modelling. Ofwat notes that the arithmetic mean of renewal rates for all companies over the period 2018-23 is 0.18% per annum (cell W22 tab Renewal rates). However, as above, this arithmetic mean is unweighted and skewed by small companies with short asset lengths. Applying the same logic as above, we see the weighted mean of all companies is 0.145% per annum, WASCs is 0.14% per annum, and for WOCs is 0.2% per annum. As before, using the separate weighted averages for WASCs and WOCs results in immaterial gaps between predicted and actual lengths in the period, satisfying test 1).

All the alternative methods explored suggest a significantly lower implicit allowance than 0.3%
We summarise below the various methods explored above. Our proposal is that taking an average of the upper-quartile companies provides the most consistency between assessing efficient costs and the level of activity implied within that allowance. When applied across the industry it implies a level of aggregate activity consistent with the observed levels of activity. It also provides a balance between the range of possible approaches we have assessed.

Summary of methods to derive the Implicit Allowance

Ref	Method	Period	Implicit allowance %pa
Ofwat DD	Unweighted mean	2011-2023	0.3
Ofwat DD v1	Weighted mean	2011-2023	0.24
Ofwat DD v1 WASConly	Weighted mean	2011-2023	0.21
Ofwat DD v1 WOConly	Weighted mean	2011-2023	0.4
YKY CAC	Unweighted mean	2018-2023	0.18
YKY CAC v1	Weighted mean	2018-2023	0.145
YKY CAC v1 WASConly	Weighted mean	2018-2023	0.14
YKY CAC v1 WOConly	Weighted mean	2018-2023	0.2
UQ companies only	Unweighted mean	2018-2023	0.21
UQ companies only v1	Unweighted mean	2019-2024	0.2

In conclusion we believe that the renewal rate from base that meets the two tests is 0.2% per annum, and request that Ofwat use this in re-calibrating the lengths required within our PR24 mains renewal PCD, in addition to the increase requested via this CAC.

6. Conclusion

This is an important issue for the future resilience of the sector and we have prepared this claim having read in detail all that Ofwat have published on the topic, aiming to address concerns raised. As noted above we welcome further discussion on the case and can provide further evidence on request.

Our claim is for an additional £198.1m within capital maintenance, to complete on average 0.34% per annum during 2025-2030, on top of the 0.2% per annum completed within existing base allowances. We believe that the long-term approach set out addresses both deterioration and climate change, and results in inter-generational fairness by ensuring asset health is stable in the long term for this asset class.

Appendix 1: Conformity with Ofwat's criteria for assessing CACs

Category	#	Issue	Response
Need For Adjustment: Unique Circumstances	1	Is there compelling evidence that the company has unique circumstances that warrant a separate cost adjustment?	There is compelling evidence that Anglian Water has a higher proportion of short asset life materials than any other company, as well as a higher proportion of mains laid in shrinkable soils, which are both statistically significant drivers of deterioration.
	2	Is there compelling evidence that the company faces higher efficient costs in the round compared to its peers (considering, where relevant, circumstances that drive higher costs for other companies that the company does not face)?	This is not a symmetrical claim. As with Yorkshire Water's CAC, we do not suggest that other companies do not also require an increase to sustainable levels of mains renewal. We do however set out why higher efficient costs are required than in the past.
	3	Is there compelling evidence of alternative options being considered, where relevant?	We set out how we have already deployed operational strategies such as pressure management and given the high penetration of this option across our region we now more to mains renewal.
Need For Adjustment: Management Control	1	Is the investment driven by factors outside of management control?	Yes – we have shown three important factors outside of management control that drive this requirement.
	2	Have steps been taken to control costs and have potential cost savings (eg spend to save) been accounted for?	We provide extensive benchmarking of unit rates for the cost of replacement.
Need For Adjustment: Materiality	1	Is there compelling evidence that the factor is a material driver of expenditure with a clear engineering / economic rationale?	In the Draft Determination, Ofwat state in relation to Yorkshire Water's claim "Yorkshire Water provides compelling evidence that the overall mains replacement rate proposed is sustainable and will result in stable bursts and asset health". We have provided evidence that is equivalent to Yorkshire Water's, therefore believe we have met this test.
	2	Is there compelling quantitative evidence of how the factor impacts the company's expenditure? Adjustment to allowances (including implicit allowance)	As above, given we have followed the precedent of deterioration analysis as per Yorkshire Water's claim, we believe the evidence to be compelling, and would be prepared to share more detail or demonstrations of the deterioration models and approach with the Ofwat team if required.
	3	Is there compelling evidence that the cost claim is not included in our modelled baseline (or, if the models are not known, would be unlikely to be included)? Is there compelling evidence that the	Ofwat in the DD acknowledge that there is a limit to the level of mains renewal in base, given historic levels of activity within the

		factor is not covered by one or more cost drivers included in the cost models?	modelled baseline. We present a different view to the implicit allowance of 0.3% used in the DD for what base buys.
	4	Is the claim material after deduction of an implicit allowance? Has the company considered a range of estimates for the implicit allowance?	Yes we calculate the claim as 4.8% of Water Network+ totex using the totex figure within our DD Representation data tables.
	5	Has the company accounted for cost savings and/or benefits from offsetting circumstances, where relevant?	Yes – we have included in our deterioration forecasts the effects of prior pressure management schemes (by reducing the operational pressure parameter fed into the deterioration forecast), and reflected faster operational responses to supply interruptions (by adjusting down the likelihood of a burst manifesting as an interruption of >3hrs).
	6	Is it clear the cost allowances would, in the round, be insufficient to accommodate the factor without a claim?	The scale of increase proposed is of a different order of magnitude and clearly could not be accommodated within base allowances given pressures of funding maintenance of other asset classes within the same price control.
	7	Has the company taken a long-term view of the allowance and balanced expenditure requirements between multiple regulatory periods? Has the company considered whether our long-term allowance provides sufficient funding?	The claim is set in the context of a five AMP strategy using long term projections of asset deterioration.
	8	If an alternative explanatory variable is used to calculate the cost adjustment, why is it superior to the explanatory variables in our cost models?	The current cost models do not include explanatory variables relating to asset renewal, relying on variables relating to existing asset characteristics like length and complexity.
Cost efficiency	1	Is there compelling evidence that the cost estimates are efficient (for example similar scheme outturn data, industry and/or external cost benchmarking, testing a range of cost models)?	We use Ofwat's own cost benchmark to compare unit rates, alongside others available in the industry.
	2	Does the company clearly explain how it arrived at the cost estimate? Can the analysis be replicated? Is there supporting evidence for any key statements or assumptions?	This is clearly explained in our business plan.
	3	Does the company provide third party assurance for the robustness of the cost estimates?	Third party assurance of cost estimates are provided in our business plan.
Need for investment	1	Is there compelling evidence that investment is required?	The deterioration modelling provides this evidence.
	2	Is the scale and timing of the investment fully justified?	The deterioration modelling provides this evidence.

	3	Does the need and/or proposed investment overlap with activities already funded at previous price reviews?	The request is only for renewal rates above the implicit allowance.
	4	Is there compelling evidence that customers support the need for investment (both scale and timing)?	We include customer evidence specific to asset health and mains renewal in our business plan.
Best option for customers	1	Did the company consider an appropriate range of options to meet the need?	We have considered both pressure management and mains renewal as have other companies with similar CACs.
	2	Has a cost–benefit analysis been undertaken to select proposed option? There should be compelling evidence that the proposed solution represents best value for customers, communities and the environment in the long term? Is third-party technical assurance of the analysis provided?	The mains renewal analysis uses cost benefit at the individual pipe length level, with each pipe assigned value measured in terms of environmental and social impacts. The analysis was subject to technical assurance by our third party assurance provider Jacobs as part of our business plan submission in 2023 (provided as appendix 2).
	3	Has the impact of the investment on performance commitments been quantified?	Yes – we have adjusted our mains renewal PCL accordingly for AMP8
	4	Have the uncertainties relating to costs and benefit delivery been explored and mitigated? Have flexible, lower risk and modular solutions been assessed – including where utilisation will be low?	We have responded to the company specific AMMA feedback we received in 2022 from Ofwat asking us to assess uncertainty in asset health trends, leading to the climate change analysis presented in our plan.
	5	Has the company secured appropriate third-party funding (proportionate to the third party benefits) to deliver the project?	Third party funding is only available when developers request diversion of mains and therefore this is not considered here.
	6	Has the company appropriately presented the scheme to be delivered as Direct Procurement for Customers (DPC) where applicable?	N/A. This work is not eligible for DPC.
	7	Where appropriate, have customer views informed the selection of the proposed solution, and have customers been provided sufficient information (including alternatives and its contribution to addressing the need) to have informed views	We include the outputs of specific customer consultation work completed in relation to mains renewal and asset health in our business plan submission.
Customer Protection	1	Are customers protected (via a price control deliverable or performance commitment) if the investment is cancelled, delayed or reduced in scope?	We propose the same approach to customer protection that Ofwat propose in the DD.
	2	Does the protection cover all the benefits proposed to be delivered and funded (eg primary and wider benefits)?	We propose the same approach to customer protection that Ofwat propose in the DD.

	3	Does the company provide an explanation for how third-party funding or delivery arrangements will work for relevant investments, including the mechanism for securing sufficient third-party funding?	N/A

Appendix 2: Jacobs technical assurance of Predictive Analytics

Anglian Water

PR24 - Other

Predictive Analytics

Scope:	**Originator:**	AY & PK
1: Inputs to the Predictive Analytics process such as asset, refurb/rehab cost and risk information. 2: Use of the infra deterioration and consequence and non infra risk models. 3: Setting up asset strategies to group assets for investment. 4: The use of performance and/or financial constraints in Predictive Analytics. 5: Analysis of the Predictive Analytics outputs, including the investigation of different options. 6: How the outputs of Predictive Analytics are translated into investment costs in C55.	**Completion date:**	Refer to Track Record audit ID 232.
	Reviewer:	
	Review date:	

Key to RAG assessments	No material concerns	Non-material observations(s) on supporting information	Minor concerns	Material concerns	Activity not complete	Not required
	Green	Blue	Amber	Red	Incomplete	N/A

Test	RAG	Comments	Recommendations
Briefly summarise headline findings. Please attach file with technical overview with further details.	Blue	Assurance report: Anglian Water PR24 C55 Predictive Analytics Feedback v1.pdf file uploaded.	n/a

Documentation and data sources seen

See attached file

Attachments

Please refer to Track Record for copies of any attachments:

20230727 Predictive Analytics.pptx

A2175: Anglian Water PR24 C55 Predictive Analytics Feedback v1.pdf

A2175: Audit Feedback 30.08.23.docx

Audit identification

Date of audit	7/28/2023
Auditees	SF & JB

This audit report has been generated from data held in Track Record. For more information including approval workflows and user notes, please refer to https://anglianwater.trackrec.com.

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