November 2020

Reference of the PR19 final determinations: Costs and outcomes – response to provisional findings responses

Ofwat

Reference of the PR19 final determinations: Costs and Outcomes – response to provisional findings responses

Contents

1. Introduction

1.1 In this document, we set out our response to provisional findings responses from each of the four Disputing Companies (Anglian Water, Bristol Water, Northumbrian Water and Yorkshire Water) on issues relating to cost allowances and outcomes for customers (performance commitment and outcome delivery incentives). As before, we submit an accompanying document covering risk and return issues.[1]

1.2 As requested by CMA, we have limited our submission to comments on new evidence and arguments presented by the companies and third parties in their responses to the provisional findings. As mentioned in our introduction document we ask the CMA to approach these submissions on the basis that, where we do not respond to arguments or evidence submitted by a disputing company, that does not indicate our acceptance of their arguments representations but rather that the CMA already has our answer and that the answer still stands.

1.3 In each of chapter 2. Costs and chapter 3. Outcomes, and for clarity, we present our responses to cross-cutting issues and company-specific issues in tabular form.

1.4 We then provide six appendices on issues that relate to individual company and/or cross-cutting issues where our comments are more accessible in a non-tabular form. These appendices are:

- Appendix A1: Anglian Water - Elsham direct procurement for customers scheme
- Appendix A2: Yorkshire Water - Internal sewer flooding
- Appendix A3: Leakage
- Appendix A4: Anglian Water - Cost adjustment claim regarding pumping costs
- Appendix A5: Anglian Water cost modelling issues
- Appendix A6: Base models update with 2019-20 data

[1] Ofwat, 'Reference of the PR19 final determinations: Risk and return – response to provisional findings responses', November 2020.

2. Costs

2.1 This chapter provides our response to new issues raised relating to costs. In particular:

- Table 2.1 Cross-cutting issue – frontier shift, wage adjustment index, and energy RPE/true-up.
- Table 2.2 Anglian Water – large sewage treatment works cost claim, strategic interconnectors programme, Elsham DPC scheme, smart metering cost claim, metering enhancement costs, leakage base and enhancement costs, metaldehyde, and meeting lead standards.
- Table 2.3 Bristol Water – leakage.
- Table 2.4 Northumbrian Water – sewer flooding, phosphorus removal, and leakage.
- Table 2.5 Yorkshire Water – Phosphorus removal and WINEP upper quartile calculation.

2.2 In additions, we provide six appendices:

- Appendix A1: Anglian Water: Elsham Direct Procurement for Customers scheme
- Appendix A2: Yorkshire Water: internal sewer flooding
- Appendix A3: Leakage
- Appendix A4: Anglian Water cost adjustment claim regarding pumping costs
- Appendix A5: Anglian Water cost modelling issues
- Appendix A6: Base models update with 2019-20 data

Table 2.1: Our response to new cross-cutting cost issues

Topic area	Section reference	Company response	Ofwat response
Application of frontier shift	Anglian Water – response to provisional findings, p. 24 Northumbrian Water – response to provisional findings, p. 12 Bristol Water – response to provisional findings, p. 6 and p. 46	Anglian Water, Bristol Water and Northumbrian Water state that if 2019-20 cost data is used then frontier shift should only be applied from 2020-21.	The CMA has applied frontier shift across all base and enhancement costs. Enhancement and unmodelled costs are based on company forecasts from September 2018 business plans and so do not reflect 2019-20 data. There is therefore no reason to apply a reduced frontier shift to these figures. In relation to modelled base costs, if the CMA models are updated to include 2019-20 data, modelled costs will then be based on data from 2011-2020. While this implies that frontier shift should be applied from 2020-21 onwards, this would be a material softening of the efficiency challenge as it would only reflect frontier shift efficiency improvements from a year later. If the CMA were to incorporate 2019-20 data then it should revisit the overall scale of the efficiency challenge for the remaining years of the price control. Alternatively continuing to apply from 2019-20 would have benefits in terms of simplicity as all companies would have the same adjustment and the same adjustment would apply to all costs. It would also be consistent with the challenge placed on other companies that accepted their final determination.
Application of frontier shift to enhancement costs	Anglian Water: Oxera report, pp. 1-6 Yorkshire Water: Oxera report, p. 4 Northumbrian Water – response to provisional findings, p. 14	Anglian Water and Yorkshire Water state that the CMA should not apply frontier shift to forward looking enhancement costs as this would be double counting the frontier shift challenge. Northumbrian Water states that its business plan included *a* 'frontier shift assumption of … 1% for enhancements.'	In its provisional findings the CMA advises that frontier shift has only been applied 'to the extent there is not strong evidence that an equivalent frontier shift of 1% has not already been included in firm's own projections'. In the company responses to the CMA's provisional findings, no new evidence is provided to demonstrate they have applied a net frontier shift to their enhancement costs (i.e. a frontier shift challenge without an equal or offsetting Real Price Effect allowance). As outlined in our previous submission, there remains evidence that companies have included excessive Real Price Effect allowances in their enhancement cost estimates, which we advise the CMA to remove prior to setting their final determinations.[2] Further, analysis presented by disputing companies shows that at least Yorkshire Water has

[2] Ofwat, 'Cross cutting issues – response to companies' 27 May submissions to the CMA', June 2020, pp. 9-11.

Topic area	Section reference	Company response	Ofwat response
			not applied frontier shift to their enhancement costs, with Table 4 in Northumbrian Water's response to the CMA's provisional findings notes Yorkshire Water has 'Not applied [frontier shift] to unmodelled costs or enhancements.'[3] Overall, we agree with the CMA's application of frontier shift to enhancement costs and agree there is no evidence provided to show that companies have included a net frontier shift challenge in their estimates.
Frontier Shift applied by other companies	Northumbrian Water – response to provisional findings, p. 14	Northumbrian Water states that company business plan frontier shift assumptions are effectively less than 1% as companies applied the frontier shift to a smaller range of costs than the CMA has done. Northumbrian Water also states that the CMA's frontier shift is more challenging than the companies' frontier shift as it has been applied to '*the CMA's lower estimates of efficient costs*'.	We do not consider that Northumbrian Water's calculations are appropiate. While companies have applied frontier shift to different categories of costs, frontier shift has been calculated based on all costs in other sectors. Frontier shift should therefore apply to all in costs in water unless there is a good reason not to.
Frontier shift – impact of Covid-19	Northumbrian Water – response to provisional findings, pp. 15-17	Northumbrian Water asks the CMA to adjust downwards the frontier shift assumption to take into account of the impact of Covid-19.	We agree with the CMA that as uncertainty around Covid-19 will likely remain at the time of their redetermination, that no adjustments for Covid-19 should be made within the framework of the CMA's redetermination. This is particularly important given Covid-19 affects all companies, not just those appealing.[4] We note that labour productivity in the water sector in terms of output per hour has increased since the start of the pandemic and that costs are expected to decrease as well as increase.[5]

[3] Northumbrian Water, 'Response to provisional findings', Table 4, p. 14.
[4] Competition and Markets Authority, 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations Provisional findings', September 2020, paragraph 25, p.13.
[5] Europe Economics, 'Response to new points on frontier shift and real price effects', November 2020, pp. 3-4.

Topic area	Section reference	Company response	Ofwat response
Frontier shift – comparator sectors	Oxera – responding to the CMA's provisional findings on costs, pp. 20–21[6]	Oxera (on behalf of Yorkshire Water) claims that 'Professional, scientific, technical, administrative and support service activities' is less relevant as a comparator for wholesale activities.	'*Professional, scientific, technical, administrative and support service activities*' meet the criteria used to identify relevant wholesale comparators: first, it is a competitive sector; and second, it captures a range of activities which share similarities with the nature of tasks undertaken by the wholesale water sector. There is also regulatory precedent for using the sector as a comparator for the water sector.[7]
Frontier shift – embodied technological change	Oxera – responding to the CMA's provisional findings on costs, pp. 22–23	Oxera (on behalf of Yorkshire Water) argues that an adjustment for embodied technical change requires an offsetting quality adjustment to outputs and that the impact of embodied technical change is both negative and insignificant.	Embodied technological change reflects the quality improvements 'embodied' in the inputs used by the sector, which are not commonly accounted for in total factor productivity analysis which focuses on measuring disembodied technological change. As set out by Europe Economics, it is conceptually incorrect to offset an adjustment for embodied technical shift by stripping out the quality adjustments that have been made to outputs, since efficiency improvements can take the form of either more output or higher quality output. Oxera's argument is based on a report by Economics Insight which produced results that are not credible due to a flaw in their methodology. In particular, Economic Insights' econometric equations appear to be mis-specified and use data that was already adjusted for embodied technical change (leaving no residual effect in its data for it to identify).[8]
Frontier shift – embodied technological change	Energy Networks Association – response to the provisional findings, p. 29 and associated Oxera report	The Energy Network Association (ENA) claims that an uplift for embodied technical change implicitly assumes that the water sector invests more than other sectors in innovation, and can thus outperform productivity growth in relevant benchmark sectors.	As set out by Europe Economics total factor productivity estimates in any sector need to be uplifted for embodied technical change to give an estimate of total technical change. Hence, the uplift for embodied technical shift does not assume that the water sector can outperform comparator sectors or that it invests more than other sectors in innovation.[9]

[6] Note points made by Oxera on behalf of Yorkshire Water) are also made by the response of the Energy Networks Association and the related Oxera report on frontier shift, we have not repeated all of the cross references here.
[7] Europe Economics, 'Response to new points on frontier shift and real price effects', November 2020, p. 5.
[8] Europe Economics, 'Response to new points on frontier shift and real price effects', November 2020, pp. 6–8.
[9] Europe Economics, 'Response to new points on frontier shift and real price effects', November 2020, p. 9.

Topic area	Section reference	Company response	Ofwat response
Frontier shift - scale	Anglian Water – response to the provisional findings, p. 23	Anglian Water referred to the frontier shift set by the Utility Regulator in Northern Ireland at PC 21 to argue that the frontier shift figure set by the CMA is very challenging.	The Utility Regulator's draft frontier shift decision for Northern Ireland Water is not a useful precedent as it uses an inappropriate comparator sector and fails to consider embodied technical change. We note that Ofgem has much higher frontier shift estimates of 1.2-1.4% per year in its RIIO2 draft determinations, even without an uplift for embodied technological change.
Frontier shift - application of value added measures	Oxera – responding to the CMA's provisional findings on costs, p. 23 Energy Networks Association – response to provisional findings, p. 29 and associated Oxera frontier shift report	Oxera stated that frontier shift calculated through value added measures should only be applied to certain elements of costs, i.e. excluding intermediate inputs.	As set out by Europe Economics value added measures continue to show materially higher estimates of frontier shift, even after allowing for the exclusion of relevant items.[10]
Use of ASHE index to adjust wages.	Northumbrian Water – response to provisional findings, pp. 22-26, paragraphs 88-104 and annex 1	Northumbrian Water argues that the Average Weekly Earnings (AWE) electricity, gas and water supply index should be used for the wage true-up mechanism in place of the Annual Survey of Hours and Earnings (ASHE) manufacturing index proposed by Ofwat.	The index proposed by Northumbrian Water is not suitable for use in the true-up mechanism, as it includes furloughed workers, is affected by changes in hours worked, is subject to higher sampling variability and is not independent of water companies' own pay awards.[11]

[10] Europe Economics, 'Additional evidence on some points related to frontier shift', October 2020, pp. 21-25.
[11] Europe Economics, 'Response to new points on frontier shift and real price effects', November 2020, pp. 13-14.

Topic area	Section reference	Company response	Ofwat response
Ex-post true up for energy	Northumbrian Water – response to provisional findings, pp. 20-21, paragraphs 81-87	Northumbrian Water states that the CMA should reconsider "the case for an energy RPE with an end of period reconciliation mechanism to ensure that both companies and customers are protected from windfall gains/losses resulting from changes in energy prices that are outside of their control.	We agree with the CMA's provisional findings in that energy costs are partially under management control,[12] and we understand that a number of companies have already taken advantage of low prices in April to hedge. Introducing an ex-post true up will reduce company incentives to minimise costs.[13] In addition as energy costs are already included in CPIH, then any true-up will tend to over correct for any changes in energy prices.[14] It would also increase complexity.
Energy RPE – wedge to CPIH	Northumbrian Water – response to provisional findings, p. 21, paragraphs 84-86	Northumbrian Water states that Cornwall Insight's forecasts show "consistent price increases in excess of CPIH inflation (c.2%) and support the inclusion of an RPE adjustment to allow efficient cost recovery.	We note that these forecasts do not appear consistent with the wholesale energy forward curve evidence we provided to the CMA which shows little change over future years and do not appear to take account of the significant price reductions set out in the RIIO2 draft determinations.[15,16]
Cost and service relationship for water	Bristol Water – response to provisional findings, p. 67, paragraph 14	'We consider from this updated evidence that it is clear that the industry cost to deliver ODI targets (reflected in the base cost modelling) has increased as service has improved, specifically for the water service and there is no clear ODI outperformance that has offset this. As Ofwat have toughened ODI targets	As we set out in our previous submission, the inclusion of 2019-20 data does not change the overall position on the cost service relationship with some companies performing well on cost efficiency and outcomes and others less well.[17] Just looking at data from the water service, as suggested by Bristol Water, does not change this conclusion. In addition as we set out in our response to RFI19, cost performance in 2019-20 is affected by some companies bringing forward investment from 2020-25. This may particularly affect the water service.

[12] CMA, 'Provisional findings', September 2020, p. 200, paragraph 4.437.
[13] Ofwat, 'Costs and outcomes - response to CMA's provisional findings', October 2020, p 20.
[14] Energy costs make up 5.2% of CPIH, Europe Economics, 'Frontier shift and real price effects – final assessment', December 2019, p. 37.
[15] Cornwall Insight, 'Forecast of GB electricity costs: 2020-21 to 2024-25', October 2020, p. 6.
[16] Europe Economics, 'Response to new points on frontier shift and real price effects', November 2020, pp. 11-12.
[17] Ofwat, 'Costs and outcomes - response to CMA's provisional findings', appendix 5, pp. 121-124.

Topic area	Section reference	Company response	Ofwat response
		and cost challenges, this situation could well worsen in AMP7.'	

Table 2.2: Our response to new cost issues raised by Anglian Water

Topic area	Section reference	Company response	Ofwat response
Anglian Water, Base cost – a large wastewater treatment works cost claim.	Anglian Water – response to the provisional findings, Chapter C, pp. 18–19, paragraphs 98–105	Anglian raises a new cost adjustment claim arguing that a more granular consideration of large sewage treatment works would reveal economies of scale that other companies are capitalising on more than it can. It requests an adjustment of £53 million.	At PR14, we made little use of an economies of scale cost driver in sewage treatment models – only one of the two econometric models that assessed treatment costs included a variable to control for sewage treatment works size (ie for economies of scale). The model included the proportion of load treated in small works (ie bands 1-3). At PR19, after working with the sector to develop our data tables and a consultation with the sector on econometric modelling, we evolved our approach to include an economies of scale variable in every econometric model that assesses sewage treatment costs. Moreover, we make use of two alternative variables to control for economies of scale: a) the proportion of load treated at small works (ie bands 1-3) and b) the proportion of load treated at large works (ie band 6).[18] Both of these variables benefit companies with relatively small works, such as Wessex Water, South West Water and Anglian Water. We are aware of Anglian Water's concern to close the gap between our view and their requested costs. But given the evolution of our models to accommodate for more economies of scale at PR19, we don't believe this cost claim is an appropriate way to achieve such goal. We do not think there is convincing evidence behind the claim, nor do we consider that Anglian Water is taking a balanced approach, as we have set out that we expect companies to do.[19] **Anglian Water's situation is not unique**: The table below shows the percent of load treated across bands 6-10 using Anglian Water's proposed classification (where band 6 includes the smallest sewage treatment works and band 10 the largest) and the number of works in each band. The table shows that Anglian Water is not unique. There are other companies without load treated in band 10 (in fact, there are only five sites across three companies in band 10), and two other companies

[18] The inclusion of load treated at bands 6 was motivated by feedback from companies to our March 2018 consultation on the econometric models.
[19] Ofwat, 'Delivering Water 2020: Our final methodology for the 2019 price review', December 2017, p. 150.

<table>
<tr><th>Topic area</th><th>Section reference</th><th>Company response</th><th>Ofwat response</th></tr>
<tr><td></td><td></td><td></td><td>without any load treated in both bands 9 and 10. On the same token, there are also companies with a higher proportion of load treated at band 6 than Anglian Water's proportion, and those companies have less access to economies of scale at higher size bands. Anglian Water's situation is not unique.
We note also that Anglian Water puts a large weight on the evidence of lower unit cost in bands 9 and 10, and the fact that they do not have treatment works in these bands. However, there are very few sites to obtain reliable statistics in these bands. A closer look at unit costs reveals that for three of the seven companies that have load treated at band 9, the unit cost is higher than their unit cost at band 8.
<table>
<tr><th>Company</th><th>% of load treated in band 6</th><th>% of load treated in band 7</th><th>% of load treated in band 8</th><th>% of load treated in band 9</th><th>% of load treated in band 10</th></tr>
<tr><td>Anglian Water</td><td>40%</td><td>40%</td><td>20%</td><td>0%</td><td>0%</td></tr>
<tr><td>Northumbrian Water</td><td>37%</td><td>9%</td><td>17%</td><td>38%</td><td>0%</td></tr>
<tr><td>United Utilities</td><td>38%</td><td>17%</td><td>23%</td><td>8%</td><td>14%</td></tr>
<tr><td>Southern Water</td><td>45%</td><td>20%</td><td>35%</td><td>0%</td><td>0%</td></tr>
<tr><td>Severn Trent Water</td><td>33%</td><td>11%</td><td>20%</td><td>15%</td><td>21%</td></tr>
<tr><td>South West Water</td><td>72%</td><td>28%</td><td>0%</td><td>0%</td><td>0%</td></tr>
<tr><td>Thames Water</td><td>13%</td><td>11%</td><td>10%</td><td>15%</td><td>51%</td></tr>
<tr><td>Dŵr Cymru</td><td>31%</td><td>28%</td><td>10%</td><td>31%</td><td>0%</td></tr>
<tr><td>Wessex Water</td><td>53%</td><td>14%</td><td>0%</td><td>33%</td><td>0%</td></tr>
<tr><td>Yorkshire Water</td><td>31%</td><td>15%</td><td>27%</td><td>27%</td><td>0%</td></tr>
<tr><td>Number of sites in the industry</td><td>295</td><td>54</td><td>28</td><td>11</td><td>5</td></tr>
</table></td></tr>
<tr><td>Anglian Water, Strategic</td><td>Anglian Water – response to the provisional findings, pp. 32–33 and 70–74,</td><td>The company's response directs the CMA to change the performance commitment for the Strategic Interconnectors programme. The company reveals it considers it might</td><td>Anglian Water is proposing that the performance commitment in this area is changed to one based on net supply benefit and not the capacity of the scheme as set out in its statement of case. The company considers there are opportunities to optimise its solution through the design process (paragraph 360).</td></tr>
</table>

Topic area	Section reference	Company response	Ofwat response
Interconnectors Programme	paragraphs 179-183 and 357-375	be able to find a better solution for costumers and the environment.	Considering the prominence of the arguments put forward by the company in its statement of case, it is unclear why it is now seeking not to be bound by its proposed engineering works. Throughout this process we have raised concerns regarding the company's over-estimated growth forecasts that underpin its supply-demand balance and its justification of the pipeline capacities set out in its proposals. We are deeply concerned that, under the guise of 'innovative solutions', Anglian Water will not deliver the proposed capacities, which customers are being asked to fund. Again the company's plan is lacking credible evidence setting out the scenario in which a significant change in the volume of pass-through flow would occur. Based on this lack of conviction in its own plan and its own view that there are clear opportunities for out-performance, we recommend that the CMA changes it decision in the provisional findings and does not make any additional allowance for the strategic interconnector scheme. We set out our response to its proposed performance commitment in the following section in table 3.2.
Anglian Water, Smart metering base cost adjustment claim	Anglian Water - response to the provisional findings, pp. 37-41 and paragraphs 210-236	Anglian Water accepts that should an allowance be made for the early replacement of meters in AMP7 there would be a risk of over-recovery of costs in AMP8. The company claims that not allowing the £42m of early replacement costs leaves them underfunded in AMP7 with the risk of not being able to recover the amount over future AMPs due to variations in cost sharing rates and regulatory approach. The company proposes a multi-period reconciliation	We have set out previously our support for the CMA's provisional findings in this area. We will confine our comments to the new objections raised by the company. Notwithstanding that the company has a track record of under-spending its allowance, and even more so of its requested costs, the value of the investment is approximately 1% of our wholesale base allowance. We consider that a complex multi-period reconciliation mechanism (spanning across 15 years) proposed by the company would add unnecessary regulatory burden. Considering the value of the cost adjustment claim we anticipate the company does not need to fund this investment outside of its totex allowance. As with capital maintenance, it is the role of management to prioritise investing in competing management strategies to meet their objectives within our regulatory framework. The company argues that the asymmetric cost sharing arrangement would not allow it to recover the funds over multiple periods. As we explained in our response to the

Topic area	Section reference	Company response	Ofwat response
		mechanism, which it argues would avoid this. Anglian Water argues that the PCL is inconsistent with the number of smart meters that the PF's totex allows Anglian to deliver in AMP7 due to the rejection of the cost adjustment claim and therefore it puts forward a new proposal to reduce the PC targets.	provisional findings, it is not the asymmetry of cost sharing rate that is an issue, but that the cost sharing rate can vary from period to period. That has always been the case, both for water companies and for energy companies, for the purpose of providing important incentives on business plan efficiency. Anglian cannot require certainty in respect to the cost sharing rate. If it submits an efficient and well justified business plan in the future, its cost sharing rate can be such that it recovers the same amount as the current investment, or even a higher amount. The company has never, and continues not to, clearly quantify the benefits it will receive to offset investments in smart metering. These include reducing direct costs such as meter reading, customer service, reducing per capita consumption and improved leak detection and benefits in meeting associated performance commitments now and into the future. We do not agree that Anglian Water is being funded to deliver less meters over the course of the AMP. For this reason we do not agree with the company that there should be a consequential relaxation of the performance commitment levels.
Anglian Water, metering enhancement costs	Anglian Water – response to the provisional findings, pp. 40–41 and paragraphs 225–235	Anglian Water clarifies its position in that it considers that higher meter penetration rates drive higher cost only at the highest levels of meter penetration. The company also restates an additional £1.9 million is required to reflect the installation costs at new properties.	Anglian Water does not provide any evidence for its claim regarding higher metering penetration rates, nor does it demonstrate how an uplift of £3.1 million has been derived. Anglian Water states that over the period between AMP5 to the present the number of less expensive installations has proportionately reduced, and the number of more expensive ones increased. It was the company's choice to follow this approach. Other companies may have considered it imprudent to avoid the more costly installations during the early part of their meter implementation programmes as, in general, our allowances are based on industry unit costs averaged across companies and installation types. Therefore we can see no reason for the CMA to change the position it reached in its provisional findings. We do not understand the reference made by Anglian Water to additional allowances made by Ofwat outside of modelled costs for other areas of enhancement (paragraph 229), Our allowance to Dŵr Cymru relating to frequently spilling CSOs did include a component not included in the derivation our benchmarking model. This was because the cost drivers could not be reliably determined at the time of our

Topic area	Section reference	Company response	Ofwat response
			final determination. We made this allowance as there was strong support from Natural Resources Wales and as it will be subject to the same efficiency challenge (using the output of our benchmarking model) through a reconciliation process. If this is the allowance Anglian Water is referring to, we do not see the relevance. Anglian Water provides no new information to support its request for £1.9 million additional allowance for smart meter installation at new properties.
Anglian Water, leakage, base and enhancement costs	Anglian Water - response to the provisional findings, pp. 47-56. Report on water supply challenge (Prof. Hall). Report on environmental factors (Dr Farewell). Report on cost adjustment claim (Oxera)[20]	Anglian Water has provided three new reports alongside its response document. The company has focused upon the supply demand balance challenge it faces, environmental factors in its region and consideration of the implicit allowance for leakage contained within the base modelled allowance. The company considers a base cost adjustment of £132 million is appropriate (representing a £106 million increase on the provisional findings). However, it also suggests that following the method used by the CMA in its provisional findings an allowance of £44 million would be reached. It also considers its enhancement request of £76.7 million should be allowed in full.	Anglian Water has submitted a large volume of additional evidence. We agree there is a supply-demand challenge in the region, as there are in many other regions – this does not remove the requirement for the company to demonstrate that the funding requested is efficient. We note the company has identified factors that influence the leakage challenge it faces in its region. However, we recognise that these are a subset of the multiple factors that influence the leakage challenge faced by an individual company and are likely to influence the challenge for a number of companies in the South East of England. We have previously responded that it is appropriate to set a high evidential bar and consider symmetrical adjustments when considering the need for any company specific adjustments.[21] We disagree with the company's arguments that it needs a significantly larger base adjustment than the provisional findings provides – the company does not demonstrate the efficiency of its proposals and substantially underestimates the implicit allowance already allowed in base funding. Based on the evidence submitted we consider that the CMA should allow a maximum base allowance adjustment of £32.5 million and a maximum enhancement allowance of £56.5 million. We set out our detailed reasoning and our calculations in Appendix A3.

[20] Anglian Water, PF013 'The urgent challenges to water supply in the South and East of England', Professor Jim Hall and Dr Helen Gavin, October 2020; Anglian Water, PF014, 'Impact of environmental factors on leakage in the Anglian Water region', Dr Timothy Farewell, October 2020; and Anglian Water, PF015, 'Quantifying a company-specific leakage base cost adjustment for Anglian Water', Oxera, October 2020.
[21] Ofwat, 'Response to RFI020 (Q8-Q10)', November 2020, question 8, pp. 3-4 and Ofwat, 'Response to RFI020 (Q11)', November 2020, p. 3.

Topic area	Section reference	Company response	Ofwat response
Anglian Water, Metaldehyde	Anglian Water – response to the provisional findings, pp. 41–43 and paragraphs 236–246	Anglian Water has acknowledged Defra's decision to reintroduce a ban on metaldehyde and presents a new request for costs of £13.4 million to mitigate the impact of the pesticide until the ban is in place and the substance no longer persists in the environment Regarding customer protections, Anglian Water states that 'on the basis that there is no longer uncertainty regarding the required expenditure and the total value is less material than previously, it is proposed that the normal cost sharing arrangements apply to this cost allowance.'	As we have set out in our response to the provisional findings, we do not consider that Anglian Water would require much funding, if at all, to deal with metaldehyde risk before the ban is fully in place on 31 March 2022. In its response to the provisional findings, Anglian Water argues that despite the reintroduction of the ban, it would have to invest £13.4 million in additional water treatment and a limited amount of product substitution subsidies at three interconnectors. As with previous submissions, Anglian Water does not provide even the basic evidence required to assess its planned expenditure. The only evidence to support the need for this investment and of any optioneering undertaken is limited to two paragraphs (242–243). The company does not provide any information on the range of options considered, details of the proposed works nor a breakdown of cost that can be used to determine if they are efficient. It is not clear why the mitigation for the ELY9 interconnector requires both treatment and product substitution. It is not clear what treatment is required over that existing currently of the raw water abstracted from Grafham Water to justify the material capital cost estimate of £9 million. It is also not clear whether the company has considered mitigations that would enable a delay in commissioning a specific transfer scheme until the pesticide is no longer prevalent and thus these costs avoided. If the CMA is minded to make an allowance, we recommended it applies a strong efficiency and optioneering challenge to Anglian Water's proposals in the light of such poor evidence. As noted in our response to the provisional findings, if the CMA makes a material metaldehyde cost allowance for Anglian Water, we consider that there should be associated customer protections (for example, in the form of a new performance commitment and ODI).
Anglian Water, Meeting lead standards	Anglian Water – response to the provisional findings,	Anglian Water considers it inappropriate to use a unit cost of £2,000 per pipe replacement in its deep dive for supply pipes, and claims this unit cost has been applied	Anglian Water's claim that it is inappropriate to use a £2,000 unit cost in the deep dive is new. The unit cost of £2,000 per pipe replacement is based on a joint research by the Consumer Council for Water and water companies, which evidences

Topic area	Section reference	Company response	Ofwat response
	pp. 43-44, paragraphs 247-252	inconsistently to set an allowance for Hafren Dyfrdwy. It requests the CMA makes an allowance for its supply pipes replacement setting a unit cost based on the evidence it presented on its longer pipes.	costs of £1,000 per customer owned supply pipe and £1,000 per company owned communication pipe.[22] We do not consider it would be appropriate to apply a different unit cost for Anglian Water's supply pipes, given the lack of any convincing evidence of the company's longer supply pipes compared to other companies (as the CMA noted in its provisional decision).[23] We note that Hafren Dyfrdwy's lead strategy includes a variety of interventions at schools and domestic properties, and the costs are not limited to pipe replacement but also to associated measures and research costs which invalidate a simple unit cost comparison.
Anglian Water, PAYG rates and new cost claims	Anglian Water - response to the provisional findings, p. 96 and paragraphs 478-480	Anglian Water suggests amendments to the opex/capex split for the provisional findings	We consider that there is no need for the CMA to amend Anglian Water's PAYG rates as the company suggests. The introduction of the DRSA and the CMA's proposed true up mechanism for growth, largely removes the difference in challenge between base and growth related costs. Furthermore the change in reasons that Anglian Water suggests for the gap between Anglian Water's and the CMA's totex allowance further reduces the reliance the CMA should place on the specific PAYG rates that Anglian Water has proposed.

[22] Hafren Dyfrdwy, 'Appendix 4, Enhancement business cases and cost adjustment claims', September 2018, p. 94.
[23] Competition and Markets Authority, 'Provisional findings report', September 2020, pp. 293-294, paragraph 5.121.

Table 2.3: Our response to new cost issues raised by Bristol Water

Topic area	Section reference	Company response	Ofwat response
Leakage	Bristol Water – response to the provisional findings, pp. 39–43	Bristol Water proposes a number of revisions to the calculations used in the CMA's provisional findings, and seeks to remove an efficiency challenge.	Our position remains that we do not consider a base adjustment is necessary for Bristol Water. The company does not provide sufficient evidence to support the build-up of its costs for leakage activities and we consider the CMA should apply an efficiency challenge to any leakage allowances it makes. If the CMA decides to apply its provisional findings decision methodology we consider the maximum base adjustment should be £2.8 million and the company's enhancement allowance should be £4.3 million. We set out our detailed reasoning and our calculations in Appendix A3.

Table 2.4: Our response to new cost issues raised by Northumbrian Water

Topic area	Section reference	Company response	Ofwat response
Sewer flooding	Northumbrian Water – response to provisional findings, Part B - Section 4 – Enhancement costs, pp. 35-44	Northumbrian Water asks the CMA to reconsider funding the sewer flooding resilience investment (which it has reduced by £7 million), providing some new arguments, including on our approach to setting sewer flooding allowances. Northumbrian Water explains how before 2015 the DG5 register of sewer flooding was used to derive a unit cost allowance per property over each control period (where every company received a different performance target and cost allowance). It compares this with the PR19 common comparative performance level and cost allowances via base models which it claims will not fund the enhancement programme. The company also states that the DG5 approach for sewer flooding is similar to the SELL approach for leakage, for which the CMA has provisionally granted extra funding to some companies, and asks that	We consider that Northumbrian Water does not provide substantive new evidence to support a cost adjustment in respect of its proactive sewer flooding programme. We fully support the CMA's provisional decision which considered that the company is funded to deliver the programme and no special adjustment is required. We explained in our response to RFI11A[24] why we consider that the company can accommodate the investment within its totex allowance, and that, in addition, it can recover significant ODI rewards to fund the full programme at a rate customers are willing to pay for. We consider that with our totex allowance and the ODI rewards the company has a strong incentive (and an obligation to its customers) to make the investment. We have always invetivised companies to improve their service to customers in this area, given the importance of this outcome to customers, and we will continue to do so in the future. The DG5 register was a list of properties that had flooded as a result of hydraulic incapacity. In earlier price reviews we drove investment by funding companies to reduce the number of properties on the register or face a claw back of funding. To reduce the number of properties on the register, companies could mix a proactive strategy of preventing more properties being added to the register and a reactive strategy of addressing issues at properties that are on the register (ie companies that had flooded previously). Solutions tended to be large, high value capital schemes to increase capacity in the sewerage network, rather than addressing other causes of flooding such as blockages, collapses or equipment failures. Since customers were not experiencing a commensurate reduction in internal sewer flooding incidents while the focus was solely on hydraulic incapacity, we have moved to a totex and outcomes approach in the last two price reviews. Our approach since PR14 has been to drive sewer flooding performance improvements for the customer by requiring companies to reduce the flooding risk to properties. Companies are incentivised to

[24] Ofwat, 'Response to RFI 11a Q1 - Northumbrian Water – sewer flooding enhancement', September 2020, p.5.

Topic area	Section reference	Company response	Ofwat response
		the CMA's approach to sewer flooding is consistent with its approach to leakage.	consider all causes of flooding and have the flexibility to make the most efficient investment including alternatives to capacity enhancement / 'end of pipe' capex solutions. In respect of the comparison to leakage, as we have evidenced previously,[25] [26] our base model allowances already reflect the service improvement we require the sector to deliver in this area. Even if the CMA was to consider an approach similar to leakage, there would be no grounds to award additional sewer flooding funding. (Also relevant to Northumbrian Water's proposal are the points we make in Appendix A2 below discussing Yorkshire Water's internal sewer flooding case). We have previously demonstrated that Northumbrian Water is unlikely to face significantly different future climate challenges to other water companies to justify an adjustment to the modelled allowance on that basis.[27] [28] The company itself accepted that climate change and the need to reduce flooding risk is not unique to the north east.[29] [30] According to data presented in its response to the provisional findings, rainfall in the north east varied significantly over the period from 2000 to 2019 with no apparent increasing trend.[31] Northumbrian Water has reduced its requested expenditure for this scheme from £86 million to £79 million to acknowledge a likely overlap between its base and enhancement sewer flooding programmes.[32] While we recognise the company's attempt to avoid the risk of customers paying twice, we are concerned as to why this was not identified earlier in the price review or redetermination process.

[25] Ofwat, 'Reference of the PR19 final determinations: Response to Northumbrian Water's statement of case', May 2020, p.53, paragraph 3.102.
[26] Ofwat, 'Reference of the PR19 final determinations: Cross-cutting issues', March 2020, p.21, paragraph 3.55.
[27] Ofwat, 'Reference of the PR19 final determinations: Response to Northumbrian Water's statement of case', May 2020, p.56, paragraph 3.119.
[28] Ofwat, 'Reference of the PR19 final determinations: Response to Northumbrian Water's 27 May submission to the CMA', June 2020, pp.9-10, paragraph 2.15.
[29] Northumbrian Water, 'PR19 CMA Redetermination', May 2020, p. 31, paragraph 126.
[30] Northumbrian Water, 'SOC444, NWL – PR19 BSG – Reduce flooding risk to properties Business Board paper', 24 June 2019, p. 4, paragraph 8.3.
[31] Northumbrian Water, 'Response to provisional findings', October 2020, p. 40 paragraph 174, figure 8.
[32] NWL, 'PR19 CMA Redetermination post-hearing submission 17.8.20', pp.4-6, paragraphs 10-19.

Topic area	Section reference	Company response	Ofwat response
Phosphorus removal	Northumbrian Water – response to provisional findings, Part B – Section 4 – Enhancement costs, pp. 44-46	Northumbrian Water proposes that the CMA gives more weighting to Models 4 & 5 than to Models 1 & 2. This would result in an increase in the triangulated allowance of £1.3m.	We do not agree that the equal weighting accorded to the four models by the CMA should be adjusted in the way proposed by Northumbrian Water. The same criticism that the company makes of model 1, namely that it takes no account of treatment complexity, may be levelled at model 5. By including the number of enhanced sites as well as the total population served, model 1 controls for economies of scale – an important driver of cost. Model 5, on the other hand, does not capture economies of scale. Model 1 is no more simplistic than the other models and no less robust statistically. Likewise, Northumbrian Water criticises model 2, arguing that its cost driver captures only just over half of the sites with a phosphorus consent compared to model 4, whose cost driver captures a larger proportion of enhanced sites. This consideration is irrelevant. The relevant question is which level of consent, 0.5 mg/l as in model 2, or 1 mg/l as in model 4, is a more relevant cost driver - which level of consent captures a steeper step change in costs? Each model includes different relevant cost drivers and it is not clear to us why the percentage of a company's enhanced sites captured by a model should determine the relative importance accorded to the variable(s) included in the model or have a bearing on the weighting applied to its results. Indeed, by that measure, model 1 should have an increased, rather than a diminished, weighting as it captures 100% of Northumbrian Water's enhanced sites.
Data error - Spill frequency	Northumbrian Water – response to provisional findings, Part B – Section 4 – Enhancement costs, p.47	Northumbrian Water identified an error in its data provided in its business plan and used in the spill frequency feeder model, and asks the CMA to correct it.	Despite Northumbrian Water suggesting that this is a new issue, we have responded to this general issue in Q17 of RFI014. In our RFI response, we did not comment fully on Northumbrian Water. We do so now as in its new evidence the company requests the CMA to correct for its error. We note that in our final determination our modelled allowance in this area determined an allowance £4 million higher than the totex requested by the company. We are dependent on companies providing correct information for us to use in setting appropriate allowances. Companies are not incentivised to reveal information that may go against them and this raises the risk of bias in a process which only seeks to adjust for those errors identified by a company. Northumbrian Water had three opportunities to submit correct data to us, but only in the appeals process did it realise that it had provided us with significantly low values for the cost drivers of

Topic area	Section reference	Company response	Ofwat response
			storage volume and number of sites. Significant corrections to data was a systematic issue for Northumbrian at PR19 (for example the number of booster pumping stations was substantially revised when it became aware of the use of this variable in our base econometric models). This gives us little confidence in their data, and a concern that corrections to the data are reported only where the company stands to benefit.
Leakage	Northumbrian Water, Response to provisional findings, Part B – Section 6 – Leakage Totex, pp. 52–55	Northumbrian Water confirms a new request for £15.57 million of leakage enhancement expenditure	We do not consider Northumbrian Water's request for leakage enhancement expenditure is credible or supported by convincing argument or evidence. The company's submission appears to be an opportunistic approach to maximise its totex allowance. Prior to this point the company has never requested such funding, maintaining a position that it required no additional funding for leakage beyond its base allowance. Our view is that if the CMA considers it has made an efficient allocation of base expenditure then Northumbrian Water should be able to deliver its leakage reduction performance at no extra cost in accordance with the company's business plan proposals which were discussed with its customers and also confirmed in its subsequent hearing with the CMA.[33] However, if the CMA does decide to award some level of enhancement funding to Northumbrian Water following this opportunistic request, it should be no more than £6 million, not the £16 million requested. We set out our detailed reasoning and our calculations in Appendix A3.

[33] Competition and Markets Authority, 'Northumbrian Water hearing', August 2020, p. 62, lines 7–11.

Table 2.5: Our response to new cost issues raised by Yorkshire Water

Topic area	Section reference	Company response	Ofwat response
WINEP, Phosphorus (P) removal	Yorkshire Water – response to provisional findings, pp. 45–47 paragraphs 5.2.1 – 5.2.14, and Annex 2, pp. 2–8, Section 1.1	Yorkshire Water requests incremental adjustments to the CMA's phosphorus removal modelling approach. Specifically i) fully accounting for the impact of the Urban Waste Water Treatment Directive (UWWTD) in the industry and not just United Utilities, and ii) avoiding biasing the outcome for Yorkshire Water by diluting the impact of UWWTD and first-time imposition of consents through triangulation. Yorkshire Water argues that the CMA's approach to modelling does not fully account for the UWWTD's impact on its P removal costs by only excluding six United Utilities Water schemes from the analysis. It points to evidence of more cost effective 'catchment schemes' in other companies the like of which are not open to Yorkshire Water to implement and which should therefore also be excluded for benchmarking to be fair.	We are not persuaded that the UWWTD drives higher P removal costs than other legislative drivers. While the UWWTD precludes anything other than 'end-of-pipe' treatment, this constraint is very much an academic one. In practice, the evidence from PR19 strongly suggests that companies almost always implement 'end-of-pipe' treatment solutions irrespective of the legislative driver. Yorkshire Water itself suggests that this may at least in part be due to onerous 'qualifying criteria imposed by the Environmental (sic) Agency to deliver catchment solutions.' The catchment-based approaches in business plans that Yorkshire Water points to in support of its arguments (including United Utilities' Irwell catchment schemes) by and large rely on on-site end-of-pipe treatment or are not relevant to WINEP obligations concerning phosphorus removal in 2020-25. Below we provide comments on each in turn: • **United Utilities:** As we said in our response to the CMA's PFs, we consider that three of the four schemes subject to "group measures" should be reinstated in the modelling dataset on account of their being costed on the basis of on-site treatment to meet specific future consent limits. Even the fourth member of the group, Davyhulme STW has been costed on the basis of an on-site requirement to reduce phosphorus discharges by 100kg/day. We accept that owing to the relatively undemanding nature of this requirement there remains a case for the Davyhulme scheme to be excluded from the dataset. • **Severn Trent Water:** The 'catchment approach' adopted by Severn Trent in the Erewash catchment involves closing two of the eight STWs, transferring flows for treatment at two nearby STWs and relocating the discharge point of a third STW to avoid the need for additional treatment altogether. Though the driver is the WFD, none of these measures would be precluded by a UWWTD driver. Thus, they are measures that are open to Yorkshire Water to consider at its sites. Indeed, as has been noted elsewhere, Yorkshire Water has proposed site closures and transfers of flows at three of its STWs where there is a P removal requirement. A further point is that Yorkshire Water (through a report by Oxera) has been selective when quoting from Severn Trent's business plan. Severn Trent also says with regard to the

Topic area	Section reference	Company response	Ofwat response
			Erewash study, 'We undertook a catchment study on the Erewash River (see Annex 2A) and this helped us quantify the benefits associated with the wider environment but **did not bring any new natural solution options to the challenge we are facing** there. Indeed the specific advice from the external experts is that **natural solutions to the wastewater challenges we are facing under WFD are likely to be quite rare** given that they will be predicated on, contributory causes, local geographic conditions, willing partners and the inherent risk the solutions will bring when compared to more traditional solutions.' [34] • **Dŵr Cymru-Welsh Water:** Dŵr Cymru merely commits in its business plan to 'look to understand a catchment wide scheme' for four of the 25 sites in its P removal programme; there is no indication that the submitted costs are based on anything other than on-site treatment. Indeed, in response to a query we raised with the company Dwr Cymu responded: 'Investment included in our AMP7 programme for the 25 P removal schemes was predominantly based on the provision of traditional chemical removal solutions. For four sites, costs were looked at for providing P removal at individual sites and a catchment rationalisation option. We also consider (sic) a pump away option for a further two sites that were included in the plan.' As in the case of Severn Trent there is nothing in the UWWTD that would prevent Yorkshire Water from considering catchment rationalisation (whereby a site is closed and flows are transferred to another for treatment) or pump away options. • **Southern Water:** Of the companies cited by Yorkshire Water's consultants (Oxera), only Southern Water has clearly based a proportion of its cost estimate for phosphorus removal on the implementation of catchment measures which would not meet UWWTD requirements. Of the 81 WINEP phosphorus removal schemes, only four schemes (Ockley West, Staplefield, Blackstone and Sedlescombe) have been costed on the basis of catchment measures alone and a further two (Barcombe New and Bethersden) have been costed on the basis of a combination of catchment measures and on-site treatment. Only the four purely catchment based schemes would not be compliant with the UWWTD. These four schemes serve a

[34] Severn Trent Water, 'PR19 business plan Appendix A8', September 2018, p. 153.

Topic area	Section reference	Company response	Ofwat response
			population equivalent of just 7,800 (ie <1.3% of the total p.e. benefitting from Southern Water's P removal programme) avoid the need for some on-site treatment. A secondary point is that Oxera's claim that Southern Water's estimates show that 'catchment solutions cost about 49% less than end-of-pipe solutions in total, resulting in savings of about £23m' should be treated with considerable caution. Firstly, the analysis compares catchment solution costs with end-of-pipe solution costs, not with the most cost effective solution that would be 'UWWTD-compliant'. This may be something other than 'end-of-pipe', such as flow transfers or discharge relocation as adopted/considered by Dŵr Cymru and Severn Trent. Where Southern Water has presented cost estimates for 'pumpaway' solutions these are considerably lower cost than end-of-pipe solutions. Secondly, the analysis is based on cost information which is presented in Appendix 3 of TA.12.WW06 Wastewater Environmental Programme Business Case, September 2018 and which therefore must be regarded as superseded by the more recent estimates which underpin Southern Water's materially reduced requested totex for its P removal programme submitted on 1 April 2019. Lastly, to a large degree the comparison is academic as factors other than totex influence the choice of solution. It is clear that Southern Water's business plan includes for non-catchment based solutions at Ashington, Lingfield and High Halden even though a catchment solution appeared cheaper at these locations. This suggests that catchment solutions may not always be practicable or permitted by the Environment Agency - a point Yorkshire Water itself makes. Cost comparisons should therefore be limited to those locations where both end-of-pipe and catchment solutions are possible ie Ockley West, Staplefield, Blackstone, Sedlescombe, Barcombe and Bethersden. • **South West Water:** While we recognise that South West Water's 'Upstream thinking' initiative aims to use catchment management solutions we understand this primarily concerns the protection of raw water sources to reduce the treatment costs associated with drinking water production. Indeed, the company's statement that it will 'employ catchment management for over 80% of the catchments within which we operate' is made in the context of improving raw water quality and restoring landscapes. The case study in South West Water's 'Environment Plan to 2050' referred to by Oxera relates to the company working with a local farmer to

Topic area	Section reference	Company response	Ofwat response
			reduce the quantity of phosphate running off his land and entering Drift Reservoir. We acknowledge the company's stated commitment to apply the same 'principles to target nutrient reductions and benefit our wastewater service and their associated environmental outcomes' but have established through enquiries with the company that this is a reference to the potential for reducing *future* needs for end-of-pipe removal at sewage treatment works in catchments where phosphorus reduction is targeted. South West Water has confirmed to us that the costs associated with all 28 WINEP schemes included within its phosphorus removal programme are based on on-site treatment solutions (using cost models for dosing and tertiary solids removal solutions). If it is accepted that the legislative driver in practice has very little bearing on the type of solution and therefore costs, then there is no need to either amend the dataset used in the modelling by filtering out schemes where catchment solutions are employed or amend the CMA's econometric models in the way suggested by Oxera. Also, Yorkshire Water's argument about diluting the impact of the UWWTD on costs by giving equal weight to each of the models evaporates. We also see little merit in basing Yorkshire Water's totex allowance on the results of a single model (Model 5) (with or without the exclusion of the United Utilities schemes) as this would take no account of economy of scale or the constraints on the treatment technology imposed by the tightness of the proposed consent.
WINEP, Upper quartile	Yorkshire Water – response to provisional findings, Annex 2, Section 1.2	Yorkshire Water asks the CMA to recalculate the WINEP UQ benchmark taking into account its amended P-removal models which would result in a lower challenge.	For the reasons given above we consider that no company's costs are significantly influenced by the use of catchment schemes. Accordingly it would be inappropriate to exclude United Utilities or any other company from the dataset used to calculate the upper quartile on these grounds.
Internal Sewer Flooding	Yorkshire Water – response to provisional findings, section 6.8,	Yorkshire Water considers that the same principles that guided the CMA's decision to award enhancement funding for leakage should also apply to internal sewer flooding. It requests that the CMA	We provide our assessment of Yorkshire Water's new engineering evidence and its request for £79 million in enhancement costs in Appendix A2 below.

Topic area	Section reference	Company response	Ofwat response
	paragraphs 6.8.1–6.8.17, pp 63–67 Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding Annex 04 Economic Insight, Funding and incentives for internal sewer flooding	accounts for company specific features (prevalence of cellars) that impact the achievability of performance levels set and asks that £79 million of enhancement funding is allowed.	

3. Outcomes

3.1 This chapter provides our response to new issues raised relating to performance commitments and outcome delivery incentives (ODIs). We provide tables below to address the following issues:

- Table 3.1: Cross-cutting issue – leakage ODIs;
- Table 3.2: Anglian Water – 'upper quartile' performance commitments, water quality contacts performance commitment and strategic interconnector performance commitment; and
- Table 3.3: Yorkshire Water – internal sewer flooding.

Table 3.1: Our response to new cross-cutting outcomes issues

Topic area	Section reference	Company response	Ofwat response
Leakage ODIs	Anglian Water - response to provisional findings, Chapter F, paragraphs 321-337 Bristol Water - response to provisional findings, Section B, paragraphs 183-201; Section C paragraphs 223-229 Northumbrian Water - response to provisional findings, Chapter 6, paragraphs 228-255 Yorkshire Water - response to provisional findings, Chapter 6, paragraphs 6.7.1-6.7.13	**Anglian Water**: the company puts forward a number of new changes to the ODI structure and rates for the leakage PC. It proposes that its Tier 1 underperformance ODI rate should only allow for claw-back of enhancement funding. It also proposes a revised standard outperformance ODI rate which is substantially higher than the equivalent rate in the PR19 final determination. We also note that Anglian Water is seeking an uplift to its base and enhancement allowances for leakage reduction. **Bristol Water**: the company supports the CMA's proposal to increase the Tier 1 underperformance ODI rate such that this incorporates underperformance penalties. We also note that Bristol Water is seeking an uplift to its base and enhancement allowances for leakage reduction. **Northumbrian Water**: the company is seeking enhancement funding for delivering leakage reduction. Northumbrian Water proposes that if it fails to deliver the committed reductions, it will return the	Companies have provided differing views on the ODI incentives that should apply to leakage reduction. **Our response to Anglian Water's proposals** We disagree with Anglian Water's proposed outperformance ODI rate, which we consider to be unacceptably high for several reasons. Its proposed rate of £0.94m per Ml/d is over four times larger than the £0.219m per Ml/d standard outperformance rate set in its PR19 final determination, which the CMA has retained in the provisional redetermination. The £0.219m per Ml/d outperformance rate was guided by the company's own research, and was unchanged from the company's 2018 business plan. Anglian Water's proposed rate is also materially larger than the £0.782m per Ml/d enhanced outperformance ODI rate set at PR19 final determination. Moreover, it would apply to the full range of outperformance up to the enhanced outperformance cap, whereas our enhanced rate only applied to a smaller enhanced outperformance range. Anglian Water's proposed rate is also at least two times larger than the per-unit incentives applicable to underperformance (for both tier 1 and tier 2 rates). This means that customers would pay much more for leakage reduction than the compensation they would get from leakage increases. **Our response to Bristol Water's proposals and Northumbrian Water's proposals** Bristol Water and Northumbrian Water are seeking additional enhancement funding for leakage reduction. Should the CMA decide to increase these companies' leakage enhancement allowances, it should reflect these revised allowances in the calculation of their Tier 1 underperformance ODI rates. **Our response to Yorkshire Water's proposals** We disagree with Yorkshire Water's position that the Tier 1 and Tier 2 underperformance ODI rates applicable to leakage are too high.

Topic area	Section reference	Company response	Ofwat response
		enhancement costs to customers via a claw-back ODI mechanism, as used for other companies. It appears that this would apply in addition to the company's existing leakage ODI rates. **Yorkshire Water**: the company disagrees with the CMA's proposed approach to setting Tier 1 underperformance ODI rates, advocating that these rates should only incorporate funding claw-back without any underperformance penalties. Yorkshire Water also challenges the Tier 2 rate on its leakage ODI, arguing this is not supported by its customer research. We additionally note that Yorkshire Water is seeking an uplift to its enhancement allowances for leakage reduction.	This is because the company is not a leading performer on leakage. In our PR19 final determination, we allowed leakage enhancement funding only for those companies that planned to exceed the forecast upper quartile performance levels for leakage. Whilst we set two-tier underperformance ODI rates for all of these companies, the Tier 1 rates were limited to enhancement funding clawback only for those companies whose 2019-20 three-year average performance forecasts exceeded the industry upper quartile for the same three-year period **and** where we increased the performance commitment levels (PCLs) beyond those proposed by the companies.[35] We followed this approach in recognition that these companies are strong performers and that we were applying additional stretch to their PCLs. If these conditions were not met, then companies receiving leakage enhancement funding were set Tier 1 ODI rates which reflected enhancement funding clawback **plus** a penalty rate to reflect customers' foregone incremental benefits from underperformance. We applied this policy in setting a two-tier ODI rate for SES Water. Companies that are not among the industry's leading performers, like Yorkshire Water, were not granted enhancement funding (and two-tier standard ODI rates) in the first place, and their standard underperformance ODI rates reflect customers' foregone incremental benefits from underperformance.[36] We note that among the disputing companies, Northumbrian Water is not a leading performer either, and its response appears to accept that the Tier 1 rate should reflect both funding clawback plus compensation for underdelivery. We see no good reason why Yorkshire Water should be treated differently from Northumbrian Water and our PR19 final determination. For this reason, we consider it would be inappropriate to remove this foregone benefit component from the Tier 1 rate as Yorkshire Water proposes.

[35] Ofwat, 'PR19 final determinations: Delivering outcomes for customers policy appendix', December 2019, pp. 115-116.
[36] For the purposes of clarity, we note that we allowed enhanced ODI rates for Yorkshire Water's leakage ODI at final determination. This is separate from the concept of a two-tier standard underperformance ODI rate. We set Yorkshire Water a single standard underperformance ODI rate at final determination, because the company was not awarded leakage enhancement funding and therefore a two-tier standard ODI was not needed.

Topic area	Section reference	Company response	Ofwat response
			We note that Yorkshire Water also challenges the Tier 2 underperformance ODI rate provisionally determined by the CMA, which is unchanged from our PR19 final determination. We have already set out our reasoning for retaining the existing Tier 2 rate in previous submissions to the CMA, and therefore we do not comment on this here.[37]

[37] See Ofwat, 'Reference of the PR19 final determinations: Response to Yorkshire Water's statement of case', May 2020, pp. 22-24 and Ofwat, 'Reference of the PR19 final determinations: Final submission to the CMA', August 2020, pp. 28-29.

Table 3.2: Our response to new outcomes issues raised by Anglian Water

Topic area	Section reference	Company response	Ofwat response
'Upper Quartile' PCs	Anglian Water – response to provisional findings, Chapter G, Paragraphs 347-350	Anglian Water makes a new proposal that the CMA increases the reward caps for pollution incidents, and introduces a glidepath on the penalty collars, to make the upside and downside incentives "more symmetrical" and to keep the penalty risk constant over the AMP. The company also asks for an (unspecified) increase in the reward caps for water supply interruptions and internal sewer flooding.	The company has provided no evidence to support its new requests on pollution incidents caps and collars. The company provides charts that show that its reward caps for water supply interruptions and internal sewer flooding are tighter than for some other companies. However, it does not provide any new evidence for why the caps that we set are not appropriate for the company or what should be alternative caps for these PCs. The caps were generally set with reference to the company's own P90 estimates which tended to be more pessimistic than most other companies' P90 estimates of performance on these measures, and, where appropriate, in line with the customer evidence put forward by the company on the maximum incentives that its customers consider appropriate. On pollution incidents we widened the P90 estimates slightly to take account of Anglian Water's customers' expectations. Therefore, the company's new proposals would not be in line with its own P90 estimates or its customer evidence. On the pollution incidents collar we considered that, where the collars proposed by the company suggested a tight range of underperformance (as in the case of Anglian water), it would not give sufficient incentive to adequately prepare for high impact low probability events. In this case we set the collar based on a multiple of the service level for each year of the period rather than as a constant maximum financial risk. The company has not provided any evidence to reconsider this. Our detailed reasoning as to why we set the caps and collars for Anglian Water at their FD levels are provided in our Outcomes Final Decisions document for the company.[38] Nevertheless, we acknowledge that companies' estimates of P90s may not be reliable. Moreover if, despite the evidence we presented, the CMA remains concerned about the degree of skew, we consider it is preferable to make adjustments to the ODI

[38] Ofwat, 'PR19 final determinations: Anglian Water – Delivering outcomes for customers final decisions', December 2019. For the pollution incidents caps and collars see p. 51, for the water supply interruptions caps see p. 5, and for the internal sewer flooding caps see pp. 29-30.

Topic area	Section reference	Company response	Ofwat response
			framework, such as adjusting caps and collars, than to "aim up" on the WACC. This may override the preferences expressed in customer research but customers may find it preferable to the alternative of increasing bills through an uplift to the WACC.
Water quality contacts PC	Anglian Water – response to provisional findings, Chapter G: Paragraphs 351-356	Anglian Water proposes new less-stretching performance commitment levels that it claims more closely align the required improvements with comparable companies.	The PR19 customer contacts PC measures the number of contacts to the water company about the appearance, taste and odour of the water. The dataset provided by the company alongside its PF response to support its proposal uses the DWI measure of "acceptability" which is not strictly comparable to either the PR19 common definition[39] or the data provided to us by companies in their business plans and subsequent data submissions. For example, the DWI measure includes contacts where a customer claims to have an illness[40] as a result of poor water quality, whereas the PR19 common definition does not (ie the DWI measure includes more contacts). The difference in numbers of contacts under the two definitions will vary from company to company and year to year. We also note that the new dataset provided by the company has different values in most years to the equivalent dataset provided to us by the company in its business plan submission.[41] It is therefore not straightforward to use this new dataset to calculate the PC levels as Anglian Water proposes. Anglian Water has made significant improvements in this area (around 25% over the 2014/15-2018/19 period) resulting in the company being an upper quartile performer. These improvements have continued in 2019-20. The Final Determination requires the company to make a 28% improvement over the five year period from 2020-25 to 0.77 contacts per 1,000 population.[42] Anglian Water

[39] Ofwat, Outcomes definitions - PR19 DWI letter - Customer contacts about water quality (taste and odour).
[40] Illness is defined as 'consumer reports symptoms of ill health in their household or workplace or some other location such as a school and attributes these symptoms to the water'. See DWI letter link above for full definition,
[41] Anglian Water, 'PR19 business plan submission', September 2018, Table APP1, 'Water Quality Contacts' performance commitment years 2010/11 – 2017/18.
[42] Ofwat, 'PR19 final determinations: Anglian Water – Outcomes performance commitment appendix', December 2019, p83 performance commitment level 2020/21 to 2024/25.

Topic area	Section reference	Company response	Ofwat response
			originally proposed in its business plan a flat performance commitment level of 1.17[43] with no further improvement over the AMP. It then revised this in its response to our Draft Determinations so that contacts reduced by 7.4% over the five year period to 1.00 by 2024-25.[44] The company is now proposing to reduce contacts by 17.5% over the five year period to 0.90 by 2024-25. Many other companies committed in their business plans to significantly improve their performance on this measure during the next AMP. Under any of its proposals, Anglian Water would no longer be an upper quartile performer on this measure when compared to other companies' forecasts of performance and the PCLs that other companies have accepted. The upper quartile level is 0.67.[45] The PCLs we set for the company at FD encourage it to make the improvements that will maintain its position as a relatively high performer in the face of significant forecast improvements by the rest of the sector (funded through their base totex allowances), and we do not consider that the company's alternative proposal based on the trendline of improvements by "comparable" companies (undefined) is an appropriate benchmark in this case.
Strategic Interconnector PC	Anglian Water – response to provisional findings, Chapter G: Paragraphs 357-375, and Appendix 17	Anglian Water proposes further details and some new changes in the specification and other parameters of the PC and puts forward the results of new customer research in support of its proposition.	We have set out our response to the CMA's provisional findings on the form of this PC and the associated ODI previously[46], and broadly agree with the CMA's provisional determination in this area. The basic specification of the PC put forward by the company in its PF response is the same as that provisionally rejected by the CMA. We have assessed the new customer research document provided as we did any other piece of customer research put forward by a company during the PR19 process. Our comments are below.

[43] Anglian Water, 'PR19 business plan submission', September 2018, Table APP1, 'Water Quality Contacts' performance commitment years 2020/21 – 2024/25.
[44] Anglian Water, 'PR19 business plan submission', August 2019, Table APP1 ,'Water Quality Contacts' performance commitment years 2020/21 – 2024/25.
[45] Ofwat, 'PR19 final determinations: Delivering outcomes for customers policy appendix', p. 56, Table 3.3, Customer Contacts performance commitment.
[46] Ofwat, 'Reference of the PR19 final determinations: Costs and Outcomes - response to CMA provisional findings', pp. 44-46.

Topic area	Section reference	Company response	Ofwat response
		The changes to the PC levels in Table 21 of the response, as compared to the equivalent table in its RFI015 Q5 response, reduce the aggregate PC target proposed by the company from 117.3 Ml/d "net supply benefit" to 114.3 Ml/d.	This is the type of research that is hard for people to be involved with in a meaningful way.[47] For example, the stimulus materials present complex issues in a relatively inaccessible manner for a general audience. Option 1 presented to the group is potentially framed in a leading way (as it describes potential negative corporate behaviours that would be motivated by the ODI, rather than what is right for customers). Anglian Water also seem to have presented an almost opposing argument to customers as that presented to us (which the research participants would not be aware of) i.e. Anglian Water is telling us it needs to build bigger pipes as this presents 'best value', yet the company has told customers that the larger capacity might not be needed and the deficit could be met in different/more cost effective ways (and this is reflected in some of the comments provided by participants). On the other hand, the online community is typically better informed than most participants in customer research because of their ongoing engagement with the company (although we are not told if this particular set of participants had been involved in previous PC/ODI research), and the qualitative responses provided seem to show that these participants did understand the issue as presented to them. We also note that the company has not provided full details of the research design. For example, we are not told if all respondents were blind to the votes of other respondents. We are not told whether the company consulted its CCG during the process of developing this particular bit of interaction with the online community and, if so, what were their views and how they were taken into account in the final design. We are also not told if the online community used included Hartlepool customers. We would consider that a sample size of 144 is satisfactory in the circumstances, but note that we have no information about the representativeness of participants. That being said, it seems clear that a majority of this sample of Anglian Water customers 'showed a preference for an outcome based approach, rather than an output based approach focusing on interconnectors.' However, as the CMA agrees in its provisional findings, the current PC **is** also based on outcomes – and so the company seems wrong to characterise it as based on outputs.

[47] See 'Engaging water customers for better consumer and business outcomes', blue Marble Research for CCW, pp. 4–5

Topic area	Section reference	Company response	Ofwat response
			In paragraphs 362 and 368 of its response to the provisional findings, the company points to the need for the PC to be sensitive to potential future changes from the Environment Agency (eg abstraction licensing, WRMP requirements), and the evolution of requirements and solutions going forward, as reasons for building flexibility into the PC definition and levels at this stage. We are concerned that actually the company is revealing that it already plans to make significant changes. We note that there is already an existing process for changing PR19 performance commitments (for example, for changes in legislation, changes in third party materials contributing to PC definitions, or for other changes in customers interests).[48] Anglian Water is free to bring forward proposed changes or improvements in this PC in line with that procedure. We agree with Anglian Water that the final ODI incentive rates for this PC cannot be set until the scope of the programme and associated cost allowances are determined by the CMA. We have set out in Appendix A1 our response to the consequential changes that would be required to the SIP PC if some activities (and cost allowances) are taken out of the Elsham DPC scheme and put into the Strategic Interconnector Programme (SIP).

[48] Ofwat, 'PR19 final determinations: Anglian Water – Outcomes performance commitment appendix', December 2019, Annex 2.

Table 3.3: Our response to new outcomes issues raised by Yorkshire Water

Topic area	Section reference	Company response	Ofwat response
Internal sewer flooding	Yorkshire – response to provisional findings, section 6.8, paragraphs 6.8.1-6.8.18 pp 63-67. Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding Annex 04 Economic Insight, Funding and incentives for internal sewer flooding	The company considers that the same principles that the CMA has, in its view, correctly applied in relation to leakage should be applied to internal sewer flooding and that additional enhancement funding (£79m) should be allocated. The company states that poor access in cellared properties limits swift response and proactive cleansing without significant enabling works which significantly increases the level of investment required. The company proposes that if the additional enhancement funding is granted, the CMA should implement a two-tier ODI for internal sewer flooding.	We provide our assessment of Yorkshire Water's new engineering evidence and its request for £79 million in enhancement costs in Appendix A2 below.

A1 Anglian Water – Elsham direct procurement for customers scheme

A1.1 In our response to the CMA's provisional findings we supported the CMA's decision that the issue of uncertainty around **funding for the Elsham scheme need not be dealt with as part of the redetermination**.[49] Anglian Water disputes this decision and this appendix sets out our response to this new position.

A1.2 In its response to the provisional findings:

- Anglian Water asks the CMA to amend its totex allowance and associated performance commitments to reflect the de-scoped components being delivered in-house rather than rely on our direct procurement for customers interim determination (DPC IDoK) process.[50]
- The company cites timetabling constraints as the reason for this requirement. It states that the timetabling constraints are due to, in particular, the process for agreement of a Network Rail Basic Asset Protection Agreement as the pipeline crosses railways.
- It considers that due to these delays it will not meet its environmental obligations during AMP7, ensure security of water supply and meet the level of drought resilience prescribed in the WRMP19 guidelines.
- In support of this position Anglian Water submits as new evidence a DPC Letter and note from October 2020 and a presentation slide pack given at a meeting held with Ofwat on 28 September 2020.
- In summary the company requests their totex allowance be increased by £89 million for the scheme costs. The company accepts there should be £4 million reduction in its allowance to reflect the removal of the design cost for the de-scoped components from the costs awarded in our FD for running the DPC process.
- The company considers that the de-scoped components should be included within the Strategic Interconnector performance commitment. It also proposes amending the incentive rates for the performance commitment designed to incentivise full consideration of the DPC process.

[49] Ofwat, 'Reference of the PR19 final determinations: Costs and Outcomes – response to CMA provisional findings', table 2.2, p.55.
[50] An interim determination is a process whereby price controls can be reset within a five year price control if certain events occur which significantly affect, either positively or negatively, revenues or costs.

A1.3 **Based on the evidence provided by the company we are concerned that descoping of the Elsham DPC is not in the interests of customers.** Our DPC process will establish the merits of this outcome without being the cause of any delay.

A1.4 We have a clear process, which has been widely consulted upon, for managing the direct procurement for customers.[51] This process aligns with best practice[52] and requires water companies and Ofwat to engage throughout and agree the scheme's progression through a number of control points.

A1.5 **If we so determine that direct procurement for customers is not appropriate for the project (or part thereof), based on our assessment at the various control points, we have the mechanisms to allow the project, or part thereof, to revert to in-house delivery.** We expect the development of the project itself to continue in parallel and therefore the decision on the procurement route should not delay the overall programme.

A1.6 We proposed a set of licence changes to reflect the new direct procurement for customers delivery route. Included in this is a specific interim determination process to address the uncertainties related to managing changes in the delivery route for the scheme. It includes any potential change in scope and addresses concerns as to the operation of the materiality threshold. We have worked with Anglian Water to ensure that all concerns have been mitigated through the development process for the licence change.

A1.7 Our concerns with Anglian Water circumventing the existing process through this redetermination are two-fold:

Firstly, that by accepting the de-scoped project, its customers potentially dis-benefit substantially from increased costs of in-house delivery. From the latest estimates by Anglian Water, the customer benefits foregone could be between £7.5 million and £9.6 million on a NPV basis over the life of the contract. By delivering in-house, benefits may accrue to shareholders, rather than delivering the lower cost solution for customers.

[51] This process is outlined at Appendix 5 (Direct Briefing Note on the Procurement Process for 2020-2025) within our Consultation on the proposed amendments to licence conditions for Direct Procurement for Customers including an uncertainty mechanism published in July 2020.
[52] Best practice includes the HM treasury Green Book and the new International Infrastructure Business Case Guidance published by the Infrastructure and Projects Authority.

Secondly, that any re-determination by the CMA will undermine the DPC framework and potentially lead to other major projects raising similar issues, eg the Network Rail's Basic Asset Protection Agreement (BAPA) process, to avoid delivering via a DPC route e.g. insufficient time or risk associated with delivery, even though timings have been in the company's complete control throughout.

A1.8 We seek the support of the CMA for the Elsham scheme to continue to follow the process that has been developed for DPC projects, which is widely supported as being potentially beneficial to customers by others including the National Infrastructure Commission.[53]

Detailed points on the Elsham Project Delivery

A1.9 The only issues that Anglian Water raised on why the CMA should de-scope are based on the delivery timetable. **A timetable that has been, and still is, fully within its management control.**

A1.10 **Project Control** - Anglian Water has been in control of the delivery of this project since its proposal to include it as direct procurement for customers scheme in May 2019. Its concerns about the delivery timetable and de-scoping have arisen after the final determination and only came to light in August 2020, from the documents (Anglian Water PF10a) that have been supplied on the project timetable. It is noticeable that these effectively start in September 2020. A full 16 months after it proposed the scheme for DPC, during which time it could have developed a programme which was achievable. **Notwithstanding, we believe that, whilst it will be challenging to deliver the project within the remaining time after this delay, it is feasible to do so. We also believe the decisions around programming sit with the Anglian Water management team to manage appropriately.**

A1.11 **Project Critical Items** - There are a number of critical activities in the project timetable and one of those as mentioned by Anglian Water is the interface with the BAPA process. We have reviewed the company's approach, obtained external legal advice on the BAPA process and identified a number of alternative approaches that could be taken to minimise the impact. These have been

[53] National Infrastructure Commission, 'Anticipate, React, Recover. Technical Annex: Case studies and good practice for resilience', July 2020, p.27.

communicated to Anglian Water[54] but these do not appear to have been considered, and have not been incorporated within the plan supplied in support of its response (Anglian Water PF10a). Our suggested alternative approaches and amendments could reduce the timeline to meet the estimated delivery of March 2025. We are also of the view that there are other more practical arrangements that could be put in place to mitigate this risk. However, it is for Anglian Water to manage the project, deliver in a way that offers the best value for customers and manage the risks associated with the project.

A1.12 We consider that all the elements of the Elsham project should continue to be evaluated through the direct procurement for customers' route. However, if the CMA is minded to re-determine that the DPC should be de-scoped then we would recommend that any cost allowances should ensure that the estimated loss of benefits for customers from this proposed change fall entirely on the company. **This is justified as the risk of non-delivery of the project is entirely due to management inaction.**

A1.13 This estimated loss should include:

- A cost efficiency challenge to the capital delivery of these elements. The level of any adjustment should as a minimum be reflective of inefficiency identified elsewhere in the company's business plan. During our DPC process we requested information from Anglian Water for a cost breakdown and details of cost drivers but this was not provided.
- The loss of estimated benefits through not delivering the project via DPC between £7.5-£9.6 million NPV as provided by Anglian Water to us on 10th September 2020.

A1.14 In addition to the cost allowance, the following amendments would need to be made to existing performance commitments and ODI rates:

- The scope/definition of both of the DPC PCs (ANH_47 and ANH_48) would need to be changed to reflect the reduced DPC activities. Note that the company only refers to ANH_48 in its provisional findings response.
- It is logical that the outperformance ODI rate (effectively a one-off success payment) in ANH_48 would be reduced in line with whatever totex is allowed

[54] The document 'Indicative timelines with revised phasing for Elsham procurement- Sep2020.pdf' is provided to the CMA alongside this submission.

by the CMA for the revised activity in the price control period (as is proposed by the company). Notwithstanding our recommendation above, If the CMA were to allow the amount set out in the company's provisional findings response then the payment/ rate proposed by the company is correct, ie £0.5 million.

- It would also be a corollary of the above to reduce the underperformance rate and collar in ANH_47 in line with the reduced totex allowance (although the company hasn't raised this in its provisional findings response). If the CMA were to allow the amount suggested by the company then the rate would be -0.25 (units: £m/control point) and the collar would be £0.5 million (ie the same as the cap in ANH_48, given the two stages covered by the PC).
- The scope/definition of the SIP PC (and hence delivery requirements) would need to be correspondingly changed to reflect the set of new activities reallocated to SIP.
- The associated ODI rate in the SIP PC would be increased to reflect the increase in the aggregate totex allowed for all the activities that would then be covered by the PC. This is the principle proposed by Anglian Water. The exact ODI rate would depend on the totex allowed by the CMA and the cost-sharing rate, so the calculation and resulting number in the company's PF response is only illustrative. We note that in our response to the Provisional Findings[55] we suggested a revised ODI rate for the SIP PC – this did not reflect any adjustments for DPC activities moving into the scope of the programme.

[55] Ofwat, 'Reference of the PR19 final determinations: Costs and Outcomes – response to CMA provisional findings.', p.45-46 and footnote 62.

A2 Yorkshire Water – internal sewer flooding

Introduction

A2.1 Yorkshire Water continues to maintain that it has an atypically high number of cellared properties in its region. Throughout both PR19 and the CMA appeals processes the company has used this argument to request either additional funding or a change to its internal sewer flooding performance commitment level.

A2.2 Yorkshire Water's response to the CMA's provisional findings reverts to a request for additional funding, and this time additional enhancement funding, as opposed to the cost adjustment claim for additional base expenditure that the company included in its September 2018 business plan. It now considers there is logic from the CMA's provisional findings on leakage that applies to sewer flooding, i.e. additional enhancement costs to meet performance improvements.

A2.3 In its most recent response, Yorkshire Water includes new reports and analyses which attempt to demonstrate that company-specific factors necessitate additional enhancement allowances in order for it to meet its final determination performance commitment levels.[56] The new reports reiterate arguments the company has previously submitted concerning the apparent prevalence of cellars in its region but the new data do not provide compelling evidence to address the concerns we flagged in our earlier submissions.[57] Therefore, we consider there is no rationale for the CMA to change its provisional findings in this area.

A2.4 We consider that the CMA's provisional findings on cost allowances with respect to leakage are not related to the issues the company raises with respect to internal sewer flooding as the company states in its response to the provisional

[56] Yorkshire Water, 'Response to provisional findings', Annex 04 Economic Insight, Funding and incentives for internal sewer flooding; Yorkshire Water, Response to the CMA's provisional findings, Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding.

[57] Ofwat, Final determination models, 11 – cost adjustment claims feeder models; Reference of the PR19 final determinations: Explanation of our final determination for Yorkshire Water, paragraphs 2.39-2.45, pp 24-26, box 1; Reference of the PR19 final determinations: Response to Yorkshire Water's 27 May submission to the CMA, paragraphs 4.37-4.50, pp 30-33; Reference of the PR19 final determinations: Response to Yorkshire Water's statement of case, paragraphs 4.24-4.49, pp 81-88.

findings. The arguments the company makes in relation to internal sewer flooding relate principally to its view that company specific circumstances should be reflected in cost allowances. We address these below.

A2.5 We have structured our assessment into four key sections. Firstly, we provide a summary of our assessment, we then address in more detail the new engineering data. Thirdly we consider the new information provided in relation to cost allowances. Finally, we address the points the company has made in relation to the performance commitment incentive structure for internal sewer flooding.

Summary of our assessment

- Any assessment of Yorkshire Water's request for additional funding should be considered in the light of its current performance.
- Yorkshire Water is a poor performer at a sector level on its wastewater network measures as indicated by 2019-20 performance data. We consider there may be a potential link between the company's poor sector performance on these measures and the effectiveness of its asset and operational practices.
- Yorkshire Water's new reports claim limited sewer access makes resolving network problems more difficult but they do not make it clear how the £79 million requested is built up from solutions to address access issues. The company provides access survey data from which it makes misleading conclusions to justify £79 million in additional expenditure.
- We now consider the new information as a cost adjustment claim for additional funding for reducing sewer flooding, which is incorporated in the scope of the base models.
- Firstly, after taking into account the implicit allowance, the residual claim is insufficiently material to require an adjustment.
- The need for adjustment is not proven: the evidence on the prevalence of cellars is inconclusive, and information on recently transferred assets ignored another implicit cost allowance for the company within base models.
- The best option for customers is not proven; there is no detail of options the company considered for different housing stock, nor why its options are the best of any range of possible options.
- The robustness and efficiency of costs is not proven. An "efficient unit cost" is calculated from a subset of the company's enhancement proposals and is benchmarked against a company shown to be inefficient.

- We consider no additional cost allowance should be made, which means there is no requirement for a two-tier structure to the internal sewer flooding ODI. In addition, Yorkshire Water's proposed ODI structure is not appropriate for a company with lagging performance. Our leakage Tier 1 rates for companies that were not leading performers include an element of penalty for underperformance in the Tier 1 rate. We consider this principle should be retained where any additional enhancement allowance is made.

A2.6 We provide more detail of our assessment below.

Assessment of new engineering data: 2019-20 performance

A2.7 When reviewing the new evidence provided by the company we suggest that the CMA considers the purported impact of cellars alongside the poor performance of the company relative to the sector in order to robustly assess the company's new and previous arguments. This is important because customers should not be asked to pay simply for the company to catch up with its peers. We note that the company itself states the need to 'catch-up' 'Given the particularly adverse effect that such incidents can have on its customers, YWS agrees with the need for stretching targets in this area and recognises that its customers want YWS to catch up to the industry UQ.'[58]

A2.8 New 2019-20 outturn data not available for our May and June submissions suggest that Yorkshire Water may well have a wider issue in its sewer network beyond the apparent impact of cellars.[59] The data indicate that the company performs poorly at a sector level across a range of wastewater infrastructure service measures, not only internal sewer flooding where the impact of cellars might be expected to be more pronounced.

A2.9 The new data show the company:[60]

- has the worst internal sewer flooding performance in the sector;
- has the second worst external sewer flooding performance in the sector;
- has the second worst sewer collapses performance in the sector; and

[58] Yorkshire Water, 'Response to provisional findings', section 6.8, paragraph 6.8.1, p.63.
[59] Update to Q2 RFI007 Performance Commitment data
[60] Thames Water and Hafren Dyfrdwy do not have external sewer flooding as a performance commitment in the 2020-25 period. Hafren Dyfrdwy is not included in the following; collapses and pollution.

- has the joint third worst performance on pollution incidents in the sector.

A2.10 We have previously highlighted the company's low levels of investment in its wastewater infrastructure assets as well as evidence from the company's own business plan where it states that it has had very low sewer renewal rates.[61]

A2.11 We consider there is a potential link between the company's poor performance on internal sewer flooding (and other wastewater metrics) relative to the sector and the effectiveness of its asset and operational practices. The integrated nature of the wastewater network system means that management practices can manifest across a range of service measures. For example, poor resource deployment, risk identification, operational practices or investment decision making are likely to impact multiple performance commitments. This is something the company asserted itself in its September 2018 business plan where it stated 'We consider the waste water network as an integrated system. The combined effect of our activities on network-related causes of sewage escapes will also have a positive impact on pollution incidents and on internal and external sewer flooding' and 'Our wastewater network is an integrated system, and we are working hard to identify solutions that can help reduce the service failures across the performance commitments relating to network escapes.'[62]

Assessment of new engineering data: Yorkshire Water's reports

A2.12 We consider that, in its previous and new submissions, the company provides no compelling evidence that a reduction in the hypothecated number of cellared properties in its region would be sufficient to significantly improve its performance on internal sewer flooding. The adjustments the company makes to its outturn performance to account for cellars are based on significant inferences and assumptions from limited data (1998 MORI and 2001 Census

[61] Ofwat, 'Reference of the PR19 final determinations: Response to Yorkshire Water's statement of case', May 2020, paragraphs 4.21-4.23, pp 79-80; Yorkshire Water, 'Exhibit 66-157, 33_Sewer Collapses_19c.pdf', Yorkshire Water business plan, September 2018, p.3; Yorkshire Water, Exhibit 001, YWS PR19 Business Plan, September 2018, chapter 15, p.162.

[62] Yorkshire Water, 'Exhibit 66 - 155, 31_Internal Sewer Flooding_19c.pdf', Yorkshire Water, September 2018 business plan submissions, appendix 19c, internal sewer flooding, pp 2-5; Yorkshire Water, 'Exhibit 66-157, 33_Sewer Collapses_19c.pdf', Yorkshire, p.1.

data) and the company compounds this by making only one-sided adjustments to its own performance and not to that of other companies.

A2.13 The new evidence presented by the company draws parallels between internal sewer flooding at properties that have a cellar and external sewer flooding at properties that do not have a cellar.[63] The company states "Cellared properties are more likely to flood due to being below ground level and more akin to external flooding for properties with no cellar. If Yorkshire Water had a lower proportion of cellars, then it is reasonable to assume that the external flooding may have increased." We consider this is a paradoxical argument to make because Yorkshire Water also has some of the worst external sewer flooding performance in the sector.

A2.14 The company does have stretching levels of improvement to deliver, but we consider, as demonstrated above, that this is potentially a function of management practices in previous periods where customers have not received the service they paid for. We note that the company considered 66% improvement from 2017-18 to 2019-20 achievable in its original business plan.[64]

A2.15 Cost adjustment claims to base or enhancement cost allowances, necessarily, have a high evidential bar so the company must demonstrate that company-specific circumstances alone, outside of management control, are driving performance/investment and not poor management practices. Customers must not pay again for a service they should already have received. The company's poor performance has also been highlighted by the Consumer Council for Water in their response to the CMA's provisional findings.[65]

The new submission focuses on the company's ability to access properties but does not provide compelling evidence that this is a significant driver of increased costs

[63] Yorkshire Water, 'Response to provisional findings', Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding, p. 10.
[64] Yorkshire Water, 'Exhibit 66 - 155, 31_Internal Sewer Flooding_19c.pdf', Yorkshire Water, September 2018 business plan submissions, appendix 19c, internal sewer flooding, p. 1.
[65] The Consumer Council for Water, 'CCW's response to the Competition and Markets Authority's Provisional Determinations for Anglian Water, Bristol Water, Northumbrian Water and Yorkshire Water', paragraph 9.12, pp 16-17.

A2.16 In its response to the provisional findings the company presents new survey data in an attempt to highlight the problems it faces gaining access to customer properties. The new report also reiterates arguments the company has submitted several times previously.[66] We would like to draw the CMA's attention to our key concerns with the new survey data.

A2.17 The company has not produced up to date, accurate records of the number of cellars in its region. The new analysis provided by the company, used to derive cost estimates, continues to rely on limited MORI and Census data that is almost 20 years old without any robust validation or analysis concerning its representativeness. We are extremely concerned that the company does not appear to have accurate estimates of the number of properties with cellars in its region despite the fact that these types of properties pre-date the privatisation of the sector and, according to the company, are the key driver of its poor internal sewer flooding performance.

A2.18 The company states that the limited access demonstrated by the new survey information 'limits swift response, proactive cleansing and the use of monitoring without significant enabling works. This also highlights the challenge to repair and rehabilitate the network around these properties to address the cause. Therefore, to reach Yorkshire Water's performance commitments, enabling works will be required across a large number of cellared properties.'[67] It is unclear what these 'enabling works' are, if they represent the best option for customers, if there is any evidence of their effectiveness and how the total cost has been derived.

A2.19 The engineering report provided in the company's response to the provisional findings provides new data summarising the outcome of 9,620 attempted surveys of properties it identified as being at high risk of internal sewer flooding; the report states that access surveys could only be completed at 6,824 properties.[68] We consider some aspects of the survey data used to justify

[66] Yorkshire Water, 'Response to provisional findings', Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding, pp. 7-10.
[67] Yorkshire Water, 'Response to provisional findings', 27 October 2020, Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding, p.10.
[68] Yorkshire Water, 'Response to provisional findings', 27 October 2020, Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding, p.9.

increased investment requirements based on limited access are misleading. For example:

- The company states that 'Nearly all the properties that could be surveyed confirmed the presence of a cellar.'[69] Based on the information provided by the company, we calculated that cellars were present in 80% of the properties where access surveys could be completed.[70] This indicates the company has overstated the conclusions.
- Similarly, the company states that 'Only 12% of the properties had good access to the sewer network to enable ideal sites for monitoring / response and if desired a proactive operational approach.'[71] Classifying access as 'not ideal' is not the same as concluding access to install monitoring that enables a proactive operational approach is not possible.
- Moreover, in earlier submissions the company stated it was fitting sensors to gullies,[72] which would indicate monitoring and proactive intervention was possible in properties with gullies. The data therefore suggests monitoring could be installed at 69% of properties surveyed enabling a proactive operational approach. So, again, the company is overstating its conclusions from this new survey data.[73]
- Furthermore, the company was unable to confirm the presence of a cellar in 41% of the properties it attempted to survey.[74] A related concern is the fact that it appears, in 17% of cases, despite being able to complete an access survey, the company was unable to confirm if a cellar was present or not present.[75]

[69] Yorkshire Water, 'Response to provisional findings', 27 October 2020, Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding, p.9.
[70] 80% calculated from total properties where access surveys could be completed (6,824) and properties with a confirmed cellar (5,426).
[71] Yorkshire Water, 'Response to provisional findings', 27 October 2020, Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding, p.9. Note, the calculated percentage provided by the company is based on the number of property surveys attempted (9,620).
[72] Yorkshire Water, 'Exhibit 070 – 161019 Ofwat meeting YKY', p. 16.
[73] 69% calculated from, total properties where access surveys could be completed (6824), number identified as having 'easy access' (1187), and, number identified as having 'gully access only' (3537), Yorkshire Water, 'Response to provisional findings', 27 October 2020, Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding, p. 9.
[74] Yorkshire Water, 'Response to provisional findings', 27 October 2020, Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding, p.9. Note, the calculated percentage provided by the company is based on the number of property surveys attempted (9,620).
[75] 17% calculated from total properties where access surveys could be completed (6824), properties with confirmed cellar (5426) and properties with no cellar confirmed (216).Yorkshire Water, 'Response to the

Our assessment of Yorkshire Water's £79 million cost adjustment claim

A2.20 We have assessed Yorkshire Water's sewer flooding cost adjustment claim made in its response to the provisional findings and we consider it fails to demonstrate the need for a cost adjustment. The company claims £79 million due to the prevalence of cellars in its region impacting the costs of reducing sewer flooding risk.

A2.21 In its September 2018 business plan, Yorkshire Water submitted a cost adjustment claim for £106 million due to the impact of having a high number of cellared properties, based on the 1998 MORI survey. We rejected this claim on the basis of insufficient evidence that the company had a higher number of cellared properties than the national average. Yorkshire Water withdrew the claim in later submissions to us.

A2.22 Our base allowance for Yorkshire Water at final determination, and the CMA's base allowance in the provisional findings, already includes an allowance to "reduce sewer flooding risk for properties" as well as the operational and capital maintenance costs associated with blockages, collapses and sewer refurbishment. We therefore consider Yorkshire Water's new claim for an additional £79 as a cost adjustment claim to our base modelled allowances, and we assess the key aspects of it as such below.

A2.23 We set out our process for assessing cost adjustment claims in our price review methodology.[76] To qualify for an adjustment, the value of a claim first has to pass a materiality threshold, which was set at 1% of business plan totex for the wastewater network plus control.[77] For Yorkshire Water this was £2,503 million, meaning to be material the claim would need to be £25 million. If it passes the materiality threshold, it then needs to provide compelling evidence against a number of relevant assessment criteria, such as 'need for adjustment', 'best option for customer' and 'efficiency of costs'.

CMA's provisional findings', Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding, p. 9.

[76] Ofwat, 'Final methodology for the 2019 price review, Appendix 11: Securing cost efficiency', December 2017, pp. 11-16

[77] Ofwat, 'Final methodology for the 2019 price review', December 2017, p, 149, Table 9.1.

Materiality

A2.24 Firstly, we estimate the implicit allowance for reducing sewer flooding risk for Yorkshire Water.

A2.25 We can estimate an implicit allowance for sewer flooding enhancement funding by calculating the difference in modelled allowance for Yorkshire Water including and excluding wastewater growth categories (new development and growth, growth at sewage treatment works, and reduce sewer flooding risk) from the historical model input data. We then allocate the difference in cost allowance either by the company specific weights of historical costs between the three categories, or by industry weighting. We have included the CMA's increased negative growth adjustment in our calculation and estimate Yorkshire Water's implicit allowance for reducing sewer flooding is between £77 million and £118 million depending on the method of calculation.

A2.26 In the CMA's provisional findings, there was an additional allowance of £23 million for the sewer flooding enhancement investment in Hull and Haltemprice. Therefore, in total, there is an implicit allowance of between £100 million and £141 million already in the provisional findings cost allowances for Yorkshire Water to improve its performance in sewer flooding.

A2.27 The company's September 2018 business plan included a request for £43 million enhancement funding for reducing sewer flooding risk. This was in addition to the base cost adjustment claim referred to above. We made an allowance covering the scope of the requested £43 million in our base modelled allowance.

A2.28 We assume the company is now requesting an additional £79 million, enhancement possibly in addition to the £43 million in its business plan but it is not clear if that is the case. If it is, then in total the company would be requesting £122 million to improve sewer flooding performance. The request in excess of our implicit allowance is therefore between £0 and £22 million.

A2.29 We therefore consider the £79 million additional enhancement funding requested by Yorkshire Water to reduce sewer flooding risk is covered by the base modelled allowance, is below the materiality threshold and that **no additional cost adjustment is needed**.

A2.30 Notwithstanding, and for sake of providing further information on the merit of Yorkshire Water's claim, we now consider the evidence put forward by Yorkshire Water against our assessment criteria for cost adjustment claims.

Need for adjustment (eg is there compelling evidence of unique circumstances)

A2.31 Yorkshire Water provides a calculation of the effect of cellars on its performance to evidence its unique status. It bases this on two different sources of information, both of which are more than 19 years old – a 1998 MORI survey and a census in 2001. We consider our previous assessment of this evidence in relation to performance commitment levels is still valid.

A2.32 In our published cost adjustment claim model for Yorkshire Water[78] we assessed the MORI survey (being the only evidence provided at the time) as not relevant for the use to which Yorkshire Water has put the survey's findings. First, it related to all water escapes (such as burst water pipes) and not only internal sewer flooding. We noted the MORI report states that 'the aim of the survey is to establish the consequences of recent water escapes (either flooding, a water or sewage escape or a damp patch).' Yorkshire Water provided 110 unique customer details for the survey that were either the complainant, bill payer or spouse, i.e. customers that had experienced water escape. The table on page 3 of the report shows that for the Yorkshire Water region 17% of the properties had a cellar and/or basement compared to a national average of 5%. This is based on a survey sample of 19,656 ie Yorkshire Water's data made up 0.5% of the sample. Based on this data Yorkshire Water claim that they have 4.6 more cellared properties (17% against 3.9% – Reference 2). The Report mentions an appendix setting out the statistical reliability of the survey but this was not provided. Yorkshire Water do not justify how the survey results can be considered to be representative of their supply region, nor whether the data from the other companies are also representative of their region. Indeed it appears that the survey shows that in 1998, of the properties that experience escape of water or wastewater, 17% of these have cellars. Reference 2 ("Ref 2") above refers to the cost adjustment claim document submitted by the company in its September 2018 business plan and the 3.9% national average properties with cellars there

[78] Ofwat, 'Yorkshire Water's final determination cost adjustment claim model', December 2019

which was different to the MORI report which stated that the national average was 5%.

A2.33 We therefore consider any use by the company stating it has 4.6 times the average number of cellars is not reliable. The MORI survey also indicates that only 17% of the properties flooded had cellars. This is markedly different from its 2015-20 shadow reporting which suggests 71% of sewer flooding incidents were at properties with cellars.[79] No explanation for that difference is provided.

A2.34 We consider the information from the 2001 Census could be more reliable. However Yorkshire Water did not submit the raw census data. Nor is it clear from its summary on what basis it calculates industry averages, whether weighted or unweighted. The internal sewer flooding case study Yorkshire Water provided with its 27 May submission[80] presents two sets of data. The first shows the company proportion of properties with cellars according to the census is 6.2% with an industry average of 2.4% (ie the company is 2.6 times the industry average). A second set of data is "adjusted for new property building". This shows the company has 5.5% prevalence of cellars, and an unweighted average of the ten company figures reveals an average of 2.28%. This data suggests the company has a 2.41 times the average level of cellars. However, details of the adjustment made by the company are not provided. Moreover, these differences indicate a degree of uncertainty over the level of cellars in the company's region when compared to the industry, and a lack of verifiable evidence to back up the company's claims.

A2.35 The recent Stantec report[81] sets out that part of the issues concerning the flooding events Yorkshire Water experiences are caused by transferred sewers.[82] It should be noted that as well as allowing enhancement funding for reducing sewer flooding at PR14 we made a cost allowance for Yorkshire Water of £61.6 million (2017-18 prices)[83] derived using a cost model based on annual number of blockages and collapses in the transferred private sewer network. Any money that the company spent on these transferred assets is incorporated within our PR19 base cost model data input. So there will be an additional implicit

[79] Yorkshire Water, 'Response to provisional findings', October 2020, Annex 4, p.18, figure 5.
[80] Yorkshire Water, 'Response to Ofwat Reply', Annex 06 0 YWS – Internal sewer flooding case study, 27 May 2020, pp. 8-9.
[81] Yorkshire Water, 'Response to the provisional findings', Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding, October 2020.
[82] These are sewers that were privately owned and were transferred to water company ownership in 2011.
[83] Ofwat, 'Yorkshire Water's PR14 final determination sewerage cost model', December 2014, tab DD05.

allowance for addressing such issues that is not related to enhancing sewer flooding performance but rather for continuing to address the issues inherent in the transferred asset base.

A2.36 The Stantec report also outlines that only 3% of Yorkshire Water's properties are "back-to-backs" whereas in Yorkshire Water's description of the problem the company conflates cellars with back-to-back properties, and sets out a standard solution cost for each property, whether or not any difficulties with access are present.

A2.37 Finally, the company has not considered any mitigating circumstances by which it is at an advantage in the area of sewer flooding, such as topography, where hills, rather than flat sewerage systems, provide a cleansing effect on sewers preventing some blockages, or the impact of rainfall, with Yorkshire Water not being in such a high area of rainfall as companies in the west, such as South West Water, Welsh Water and United Utilities. It would be reasonable to assume that higher rainfall is likely to lead to relatively more sewer flooding incidents.

A2.38 We therefore consider the evidence presented means the claim fails the need for adjustment to a modelled allowance.

Best option for customers

A2.39 The company does not set out in detail the options it has considered for investment relevant for the different housing stock and locations of sewer flooding risk, and nor why its chosen suite of solutions are the best options for customers.

A2.40 The new data provided by the company states that over 90% of incidents are caused by either blockages or collapses.[84] We consider that Yorkshire Water needs to address the underlying issues with blockages through customer education in order to prevent fats, oils and debris entering the sewer system. This will help address the issue with internal sewer flooding and these types of campaigns do not generally require access to properties - which the company has flagged as a driver of increased costs.[85] We consider it is unclear how the

[84] Yorkshire Water, 'Response to provisional findings', Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding, p. 2.
[85] Yorkshire Water, 'Response to provisional findings', Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding, pp. 7-10.

£79 million requested reflects the blend of solutions between customer education and interventions more directly contingent upon access. We would also like to draw the CMA's attention to business plan data in which the company states it '…will be deploying behavioural interventions more widely in the future.'[86]

A2.41 The engineering report states that customer engagement is part of the company's blend of proposed investment to address the causes of sewer flooding. It is unclear from the evidence presented why this cannot be targeted to mitigate risk at any locations with sewer access issues without incurring excessive costs.

A2.42 The engineering report acknowledges the uncertainty in the analysis presented by the company, stating 'we do note though that due to the random nature of where blockage issues occur in and around cellared properties, a precise out-turn is difficult to predict.' This raises further concerns about the quality of the data and the process used to justify a cost of £79 million.[87]

Robustness and efficiency of costs

A2.43 Yorkshire Water's Annex 04[88] uses a top down "unit cost" approach to deriving the required allowance of £79 million. It states, without providing any evidence, that 'internal sewer flooding is more costly to address in regions of high cellar prevalence'. However, the Stantec report[89] shows how the issue of cellars is concentrated in particular areas. This means that addressing sewer flooding due to cellars can be focused in those particular areas and the company can achieve economies of scale, which was not accounted for in a top down unit cost approach.

A2.44 The 'efficient unit cost' of £0.33m per incident is taken from 'YWS's previous request for enhancement expenditure for internal sewer flooding.' The annex to the Economic Insight report (Annex 04) provides some further detail. However, it

[86] Yorkshire Water, 'Exhibit 66 - 155, 31_Internal Sewer Flooding_19c.pdf', Yorkshire Water, September 2018 business plan submissions, appendix 19c, internal sewer flooding, p. 5.
[87] Yorkshire Water, 'Response to provisional findings', 27 October 2020, Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding, p. 3.
[88] Yorkshire Water, 'Response to provisional findings', Annex 04 Economic Insight, Funding and incentives for internal sewer flooding, October 2020.
[89] Yorkshire Water, 'Response to provisional findings', Annex 05 Stantec, Evaluation of the CMA Findings related to internal sewer flooding, October 2020, p.6, Figure 2.

refers to costs put forward by Yorkshire Water in its response to the IAP of £78.1m for meeting sewer flooding upper quartile performance that were in addition to £42.3 million for reducing sewer flooding risk. There is no explanation of the difference between these two requested sums of money and why some of it should be counted in calculating a unit cost but not all of it. Including all of its costs means a unit cost of around £0.5m per incident which is significantly higher than both the benchmarking comparisons it makes, and undermines the company's claim of efficient unit costs.

A2.45 Annex 04 provides very limited unit cost comparisons with one other disputing company and the CMA's provisional allowance for Hull. Such limited evidence does not pass our evidential bar for 'compelling evidence'. At any rate, the comparison is with a company whose costs have been found to be inefficient across a number of benchmarking approaches. Comparing the cost of addressing sewer flooding in Hull using blue-green solutions with undertaking wholly different activities to address sewer flooding in the rest of its region is not an appropriate comparison to make.

A2.46 There is insufficient evidence to be able to assess the robustness of costs on a bottom up basis. Both the Economic Insight and the Stantec reports (Annexes 4 and 5) list activities that the company plans to undertake to reduce sewer flooding incidents but neither give data as to activity levels nor the costs of each activity.

A2.47 We therefore consider there is insufficient evidence that the costs the company proposes are robust or efficient.

Our assessment of Yorkshire Water's proposed incentive structure for its internal sewer flooding ODI

A2.48 In its response to the CMA's provisional findings, Yorkshire Water proposes that should the CMA allow the additional enhancement funding it seeks, then a two-tier ODI structure similar to other companies' leakage ODIs should apply. Yorkshire Water's ODI proposals are set out in detail through a report from its advisor Economic Insight. Specifically, Yorkshire Water and Economic Insight propose that:

- If Yorkshire Water is allowed its requested enhancement funding, there should be two underperformance ODI rates applicable to internal sewer flooding. The Tier 1 ODI rate would claw back proportionate enhancement funding in the event of moderate under delivery. The Tier 2 ODI rate would penalise the company for more severe underperformance, and would be set equal to the existing underperformance ODI rate for internal sewer flooding.
- The Tier 1 ODI rate would apply in the performance range between the PR19 performance commitment levels (PCLs) and the 'cellar-adjusted' PCLs Yorkshire Water has calculated. The rate would be calibrated in order to reimburse the full enhancement allowance if the cellar-adjusted PCLs are exactly met. The Tier 1 ODI rate would not incorporate any additional penalties for underperformance.
- The Tier 2 ODI rate would apply in the performance range between the 'cellar-adjusted' PCLs and the underperformance collars proposed by Yorkshire Water. We note that there is no gap between the 'cellar-adjusted' PCL and the proposed collars over the 2020-22 period, so the Tier 2 rate could only apply in the final three years of the PR19 control period.

A2.49 We strongly disagree with Yorkshire Water's request for additional enhancement funding, as explained above. Consequently, there should be no need for a two-tier structure to Yorkshire Water's internal sewer flooding ODI, and the existing ODI structure should be retained.

A2.50 However, should the CMA decide to allow Yorkshire Water the additional enhancement funding it seeks, then a two-tier ODI structure would be an appropriate means of protecting customers.

A2.51 Even so, we disagree with Yorkshire Water's proposed Tier 1 ODI rate under the two-tier structure. Yorkshire Water claims to have followed an approach consistent with the CMA's provisional policy on leakage ODIs yet, unlike the CMA, its proposed Tier 1 rate does not include penalty incentives for underperformance: instead it only claws back the allowed enhancement funding.

A2.52 As noted in our response on leakage ODIs, we set two-tier ODIs at our PR19 final determination for those companies that were given leakage enhancement funding. We allowed companies' Tier 1 rates to be clawback-only where companies are leading performers with highly stretching performance

commitments, as measured by strict criteria.[90] For companies that didn't meet these criteria (such as SES Water), the Tier 1 rate incorporated both funding clawback and penalty incentives for underperformance.

A2.53 Just as Yorkshire Water is not a leading performer on leakage, neither is it a leading performer on internal sewer flooding and therefore it clearly fails our final determination requirements for clawback-only Tier 1 rates across both performance commitments. If the CMA does allow Yorkshire Water additional enhancement funding, then it should ensure the Tier 1 ODI rate includes both funding clawback and penalty incentives to protect customers from underperformance.

[90] For further detail, please see Ofwat, 'PR19 final determinations: Delivering outcomes for customers policy appendix', December 2019, pp. 115–116.

A3 Leakage

A3.1 In our response to the provisional findings we commented on the CMA's provisional methodology, focusing on Yorkshire Water.[91] In our responses to RFI020 we provided reasons for caution in applying a 'bottom-up' methodology.[92] We also have provided our observations on evidence submitted by the companies in their response to RFI020.[93] In this appendix we focus our response on new evidence provided by companies in their responses to the provisional findings. In case the CMA chooses to apply its provisional findings' methodology we suggest adjustments to make the approach more robust. We provide a comment on each company for completeness and to briefly reconfirm our position in the context of its submission.

Yorkshire Water

A3.2 Our position is unchanged from our response to the CMA's provisional findings. **We consider that Yorkshire Water is fully funded through its base allowance to achieve its leakage performance commitment levels and therefore no enhancement funding is needed.** The company's response to the CMA's provisional findings does not provide any new information and therefore we find no reason to revise our position. In its response to RFI020 question 6c, the company has stated it intends to provide further analysis in its 16 November submission in response to the points we have raised previously regarding leakage enhancement expenditure. We would welcome opportunity to comment on any significant new information it provides.

Northumbrian Water

A3.3 Northumbrian Water has not previously requested enhancement expenditure to reduce leakage in its business plan submissions or subsequent submissions to the CMA. **We do not therefore consider Northumbrian Water's request for**

[91] Ofwat, 'Reference of the PR19 final determinations: Costs and Outcomes – response to CMA provisional findings', pp. 7-10 and Annex 3.
[92] Ofwat, 'Response to RFI020 (Q8-Q10)', November 2020 and Ofwat, 'Response to RFI020 (Q11)', November 2020.
[93] Ofwat, 'Response to RFI020 (Q11)', November 2020.

enhancement expenditure to be credible or supported by convincing argument.

A3.4 The company has stated that the identified expenditure offers the CMA 'an alternative route of closing the gap in funding our efficient costs and allowing us to move even closer to our original business plan.'[94] This appears to be an opportunistic approach without foundation in a funding need.

A3.5 Our view is that if the CMA considers it has made an efficient allocation of base expenditure then Northumbrian Water should be able to deliver its leakage reduction at no extra cost in accordance with the company's business plan proposals. However, if the CMA does decide to award some level of enhancement funding to Northumbrian Water following this opportunistic request, we provide our assessment of a maximum potential allowance that could be made based on the method proposed by the CMA in its provisional findings.

A3.6 Our approach and applied challenges are based on further analysis of the supporting information provided in the company's response to the provisional findings, RFI018A and RFI020. We outline our key considerations and evidence to support our assessment below and then calculate a revised cost allowance in Table A3.1.

Any allowance should recognise Northumbrian Water's relatively poor leakage performance and ensure customers do not pay twice for improvements.

A3.7 The company's performance has deteriorated over the 2015-20 period[95] and its current three-year average position of 200 Ml/d[96] is approximately 10 Ml/d higher than the historical minimum for the 2000-20 period. We therefore consider it is inappropriate for customers to fund any reductions to the level of 189.7 Ml/d that was previously achieved by the company.[97]

[94] Northumbrian Water, 'Response to provisional findings', p. 35, paragraph 152.
[95] Ofwat, 'Reference of the PR19 final determinations: Costs and Outcomes - response to CMA provisional Findings', p. 112, Figure A3.3:
[96] Expressed in terms of the new leakage reporting method.
[97] 2013-14 three year average figure, expressed in terms of the new leakage reporting method.

It is appropriate to challenge the company's assumptions regarding the range of leakage reduction options considered and the benefits from pressure management.

A3.8 We have previously stated that the information submitted by companies contained insufficient evidence to demonstrate how optimal levels of proposed leakage activities had been determined.[98]

A3.9 Northumbrian Water has only presented consideration of a single alternative option to those it selected, the high cost mains replacement option.[99] In 2018 the company identified a number of potential innovative and customer focused options that it was not able to adequately quantify in terms of costs and benefit at that point.[100] The company does not provide an update on progress in these areas or the impact of the innovations it has delivered (e.g. leakage hotspot analysis tool[101]) in its forecasts of required leakage activity and costs in the 2020-25 period.

A3.10 For pressure management schemes the company has removed 23% of the entire benefit in its proposals on the basis that the schemes it has already delivered were the most cost beneficial. The company provides no further evidence to justify this substantial reduction.[102] This assumed reduction is important because it results in the company having to undertake greater activity in options that are of higher unit cost than pressure management. This therefore results in an increase in overall cost requested. We consider it is appropriate to revise the company's costs on the basis of assuming the full benefit can be delivered from pressure management schemes.

It is appropriate to apply an efficiency challenge to any enhancement allowance.

A3.11 We have previously stated that the information submitted by companies contained insufficient evidence to demonstrate proposed costs were efficient.

[98] Ofwat, 'Response to RFI020 (question 11)', November 2020.
[99] Northumbrian water, 'Response to RFI018A', p.7, paragraph 38.
[100] Northumbrian Water, 'PR19 Water resources management plan Appendix 5: Demand management options appraisal', August 2018, pp. 10-12.
[101] Northumbrian Water, 'Response to RFI018A', October 2020, p. 10, paragraph 52.
[102] Northumbrian Water, 'Response to RFI018A', October 2020, p. 5, paragraph 25.

The limited information relating to the company's proposed investment in acoustic noise loggers is an example of this. [103]

A3.12 Therefore, based on our assessment of these factors, if the CMA decides an enhancement allowance is necessary and applies its provisional decision methodology, this should be up to a maximum of £6 million. We show the details of this calculation in table A3.1.

Table A3.1: Assessment of Northumbrian Water's enhancement allowance (for use if the CMA concludes one is necessary)

Area of challenge	Cost challenge applied	Total enhancement allowance	Detail of challenge
Company request	n/a	£15.6 m	Request made: Northumbrian Water, 'Response to provisional findings', p.53.
Challenge pressure management assumptions	-£4.4m	£11.2m	Challenge is applied on the basis of the company achieving the full unadjusted benefits from its pressure management schemes, i.e. reinstating the 23% removed, then assuming any remaining reduction required in each area is delivered by ALC.[104]
Set starting point to historical minimum	-£4.6m	£6.6m	Northumbrian Water leakage reduction to deliver performance commitment was calculated as 12.7%. Reduction from 200 Ml/d (2019-20) to 174.6 Ml/d (2024-25). Enhancement only applicable to reduction from 189.7 Ml/d therefore 59.4% of total.
Apply efficiency challenge, RPE and frontier shift[105]	-£0.4m	£6.2m	These are applied consistently with the approach used by the CMA in 'Leakage totex calcs tables 8-2 & 8-3 PFs'. We however adjust the efficiency challenge to 5% from 0.2%. This represents the minimum efficiency challenge we applied in PR19 deep dive assessments where we found insufficient evidence of efficient costs.[106] We recognise the CMA may revise this challenge specifically for leakage on

[103] Ofwat, 'Response to RFI020 (question 11)', November 2020, p. 6.
[104] We apply this first prior to resetting the starting point in order to calculate a revised cost for the entire reduction proposed. This includes a correction because the company has only provided a cost breakdown for its previous calculation of enhancement cost which totalled £16.1 million.
[105] The CMA should consider the appropriateness of applying RPE and frontier shift based on the evidence companies provide relating to the derivation of the numbers they submit.
[106] We describe the deep dive assessment process in Ofwat, 'PR19 final determinations: Securing cost efficiency technical appendix', section 4.1, pp. 52-57.

Area of challenge	Cost challenge applied	Total enhancement allowance	Detail of challenge
			the basis of the further information it has received.

Anglian Water

A3.13 In both our final determinations and the provisional findings of the CMA Anglian Water's base allowance was adjusted and enhancement allowances were made on the basis of considering the company's leakage performance. The remaining question is therefore what is an appropriate level of adjustment/allowance that represents efficient costs for maintaining/reducing leakage. In this section we comment on the new evidence provided by the company and then calculate our view of appropriate adjustments and allowances.

The supply demand challenge faced by Anglian Water does not remove the requirement for the company to provide sufficient evidence to support its leakage request and to demonstrate costs are efficient.

A3.14 Anglian Water has included a new report in its response to the provisional findings that emphasises the importance of leakage reduction in ensuring resilience to drought.[107] However, we do not see the relevance of the report to the question of ensuring costs that are presented are efficient. Neither Ofwat nor the CMA has suggested that leakage reduction is not required or that it should not be efficiently funded. The need for reduction has previously been established in the company's water resources management plan. Therefore this report does not provide any new evidence that supports the efficiency of its costs or that it's proposed leakage reduction activities represent an optimised programme.

A3.15 The report, in fact, proposes that leakage costs can be expected to reduce with innovation which is aligned with the opinion of the National Infrastructure commission. 'Leakage reduction can and should be scaled up. The cost is high, but continued innovation, economies of scale and property-specific data from smart metering, mean that there is a realistic prospect of costs coming down.'[108]

[107] Anglian Water, PF013 'The urgent challenges to water supply in the South and East of England', Professor Jim Hall and Dr Helen Gavin, October 2020.
[108] Anglian Water, PF013 'The urgent challenges to water supply in the South and East of England', Professor Jim Hall and Dr Helen Gavin, October 2020, p. 9.

There is no mention of timescale for such cost savings in the report but we would expect the company to provide evidence of accounting for the potential for innovation to lead to cost reduction in its leakage cost forecast.

There is no basis for making an adjustment to Anglian Water's allowance to account for company specific factors.

A3.16 Anglian Water states that pipe material, soil conditions and extreme/volatile weather conditions make its leakage reduction more challenging. The company has submitted a supporting report from Dr Timothy Farewell in its submission which we note has also been submitted as a third party submission.[109]

A3.17 We have previously responded that it is appropriate to set a high evidential bar and consider symmetrical adjustments when considering the need for any company specific adjustments.[110] We highlight key points below which the CMA should consider with respect to both Anglian Water's additional evidence and general considerations for company specific adjustments:

- The factors identified are a subset of the multiple factors that can impact the leakage challenge an individual company will face. The disputing companies have identified a wide-range of different factors in their response to RFI020. Therefore focusing solely on a subset of factors risks overestimating the scale of challenge a company faces;
- Anglian Water has not provided the supporting data and detail of any assumptions that may have been used in Dr Farewell's report. This prevents assessment of the potential impact of these factors on other companies and challenge of any necessary assumptions. For example, the dataset and method used in the report to identify network coverage of different pipe materials by different companies would merit further scrutiny;
- The report focuses on factors that have the most significant impact on Anglian Water. However, it also implies that companies with larger proportions of iron pipe material who suffer harsher winters would also face different but

[109] Anglian Water, PF014, 'Impact of environmental factors on leakage', Dr Timothy Farewell, October 2020. We have noted that Dr Farewell refers to 'Ofwat-approved WISPA models' on page 3 of his report. The author provides no further explanation to this designation of the models, but, for the avoidance of doubt, we would like the CMA to note that we do not officially endorse models produced by companies or third parties.
[110] Ofwat, 'Response to RFI020 (Q8-Q10)', November 2020, question 8, pp. 3-4 and Ofwat, 'Response to RFI020 (Q11)', November 2020, p. 3.

significant challenges. This illustrates the complexity on understanding if a company's position 'in the round' is significantly different to others;[111]

- Weather and soil moisture deficit data used in the analysis is not stated at a company level but rather on a less granular aggregated level.[112] Therefore, conclusions drawn from this data would apply for example to a number of companies in the South East of England. The data quoted from the British Geological Survey also indicates that a number of companies in the South East will face challenges resulting from shrinkable clays.[113] Also while the report identifies that the region in which Anglian Water is located has more extreme summer temperatures the fact winter conditions are comparable with the English average means other regions suffer more extreme conditions during these periods;
- The model outputs discussed focus on large mains repairs as this is the available data, however, it is likely that small mains may be disproportionately impacted by harsher winters than those experienced on average by Anglian Water. This factor would lead to an increased challenge for other companies;
- As we have previously stated, with all factors it is important to consider that in the 30 years since privatisation the company has had significant investment opportunity to address significant hot-spots of pipe risk in a similar manner to other companies.

Anglian Water's base adjustment claim of £132 million is excessive and the company does not provide sufficient evidence to justify this amount.

A3.18 Anglian Water asserts that £95m of funding is implicit in the base allowance. This comes from their Cost Adjustment Claim in August 2019, which states that 'Our assumption is that the cost baselines will allow for expenditure to maintain leakage at industry average.'[114] Similarly, Oxera's report[115] for Anglian Water disputes the CMA's position that base funding is sufficient for maintaining current upper quartile performance. It argues that the companies who are

[111] Anglian Water, PF014, 'Impact of environmental factors on leakage in the Anglian Water region', Dr Timothy Farewell, October 2020, p. 19, Figure 17 - the rate of failure per 1000 km pipe, per week, by mean weekly temperature.
[112] See for example: Anglian Water, PF014, 'Impact of environmental factors on leakage in the Anglian Water region'', Dr Timothy Farewell, October 2020,p. 20, Figure 18 – Mean winter temperature, p.23, Figure 23 – Average soil moisture deficit values.
[113] Anglian Water, PF014, 'Impact of environmental factors on leakage in the Anglian Water region'', Dr Timothy Farewell, October 2020, p.14, Figure 12 (BGS Geosure – aggressive ground conditions).
[114] Anglian Water, 'PR19 Draft Determination Leakage Cost Adjustment Claim', August 2019 p. 1.
[115] Anglian Water, PF015, 'Quantifying a company-specific leakage base cost adjustment for Anglian Water', Oxera, October 2020.

upper quartile for efficient base costs are not upper quartile for leakage performance.

A3.19 **Our position remains that base funding is sufficient to achieve 2024-25 upper quartile performance.** We recognise however the CMA proposes to take a much more conservative approach for leakage, i.e. assuming 2019-20 upper quartile leakage performance is funded by through base.

A3.20 The £95 million implicit allowance figure that Anglian Water derives from its cost adjustment claim is based solely on consideration of its own average historical leakage costs and performance. The figure of £95 million is not directly attributable to the base models that we have produced and does not represent a robust calculation of implicit allowance. The company produced its own model as part of the cost adjustment claim and we have previously raised our concerns regarding its appropriateness.[116] Due to the emphasis Anglian Water has put upon the model outputs in its response to the provisional findings we have further reviewed it. We do not consider the model presents a valid calculation of the implicit allowance and identify the following key points of challenge for the CMA to consider:

- The company does not use any comparative data; it simply asserts that its own historic costs of maintaining leakage are what is included as implicit allowance in base funding;
- The company does not provide any evidence to support the assertion that its average historical costs represent efficient delivery of leakage management activities;
- The company combines historical capex and opex costs but it is not clear if all of these costs are related to leakage activities. For example the company has used reported 'Reactive and planned maintenance infrastructure' costs which included other activities such as meter replacement and dam and aqueduct maintenance in addition to leakage;
- The company ignores any autocorrelation issues in calculating its own historic unit cost, calculating a relationship between absolute (not changes in) leakage in year t and certain costs in year t-1. This approach also ignores the impact of in-year spend, which the company regularly claims is a key part of

[116] Ofwat, 'Reference of the PR19 final determinations: Response to Anglian Water's statement of case, p. 64, paragraph 391.

maintaining leakage performance. It also ignores the impact of spend in earlier years, e.g. noise loggers installed in year t-2;

- The company does not explain how the data from 2011 onwards has been recorded or assured; and
- We do not consider that the company demonstrates the benefits of historical investment in leakage management improvements or that the proposed enhancement activities for 2020-25 are accounted for in its derived cost.

A3.21 The argument that Anglian Water should receive additional base allowance because the cost allowance derived from upper quartile base costs does not fund upper quartile leakage performance is incorrect– the companies that are upper quartile in costs are often leading performers on other services such as sewer flooding and supply interruptions. Neither we nor the companies have a separate upper quartile costs model for leakage alone, and Anglian Water has not presented any evidence on upper quartile costs for leakage. Our previous evidence presented to the CMA has repeatedly demonstrated there is no clear empirical link between costs and services for water companies.[117]

A3.22 Overall, Anglian Water's approach to estimating the implicit allowance is not plausible; and there is no evidence that base funding is insufficient for achieving at least 2019-20 upper quartile performance, or even 2024-25 upper quartile performance. As such, nothing in Anglian Water's submission justifies completely replacing the approach taken to calculating leakage base adjustments in the CMA's provisional findings. We do consider as suggested that there is merit in revising the calculations on the basis that it currently uses incremental base costs rather than entire base costs[118]. There is some merit in this logic, however it re-emphasises the need to scrutinise the base cost request carefully.

A3.23 We note that the conclusion of the company and Oxera is that Anglian Water should be awarded its full £232 million allowance, less the implicit allowance of £95 million it claims is included in base. The report provides some selective evidence arguing Anglian Water's expenditure is relatively efficient, however this is for all spend associated with treated water distribution (infrastructure opex and capital maintenance) rather than leakage-specific. The categories selected for comparison in the report include expenditure associated with

[117] For example, Ofwat, 'Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes', May 2020, Chapter 4.
[118] Anglian Water, 'Response to provisional findings', pp. 59-60.

activities such as maintenance of dams, reservoirs and sea outfalls in addition to leakage. A small reduction is applied to the claim to reflect RPE/frontier shift since 2017/18, resulting in a £132.5m total. The report also suggests a catch-up target of 10% efficiency challenge for Anglian Water for leakage, recognising the limitations of the data.[119]

A3.24 We outline a revised based cost adjustment for Anglian Water considering the points made above in Table A3.2. We have based the adjustment on the revisions to the CMA's provisional finding calculations suggested by both Anglian Water and Bristol Water. Therefore, we consider the total base leakage cost identified by the company and then consider any allowance not covered by the base model on the basis of variance of the company's 2019-20 position to the appropriate geometric mean. We adopt use of the geometric mean to ensure consistency with the approach proposed by Bristol Water.[120] Despite Anglian Water's dismissal of normalisation of leakage on the basis of number of properties we consider that the industry has not agreed a position on this point. During our assessment of PR19 business plans we received representations from companies arguing for normalisation on both a property and mains length basis.[121] We therefore consider Bristol Water's proposed approach appropriate and have utilised the geometric mean which is consistent with the approach our final determinations. We note that although the company requests a base adjustment of £132 million, in its response to the provisional findings it also produces an alternative figure of £44 million based on its interpretation of the CMA's approach.[122]

Table A3.2: Assessment of Anglian Water's base adjustment allowance (for use if the CMA concludes one is necessary)

Area of challenge	Cost challenge applied	Base allowance adjustment	Detail of challenge
Calculation of funding to maintain leakage	N/A	£5.2m to £36.6m	Anglian Water presents its total base costs as £232m in 'Response to provisional findings', p. 59 table 14. We review the company's 2019-20 three year average performance against the upper quartile geometric

[119] Anglian Water, PF015, 'Quantifying a company-specific leakage base cost adjustment for Anglian Water', Oxera, October 2020, pp. 11-12. Note that the base adjustment claim identified in the Oxera report is £132.5m while in the company's response to provisional findings it is stated as £132m.
[120] Bristol Water, Response to provisional findings', p. 40.
[121] Ofwat, 'PR19 final determinations: Securing cost efficiency technical appendix', December 2020, p.81.
[122] Anglian Water, 'Response to provisional findings', p. 59, Table 14, p.60, table 15

levels outside of base model			mean. Our view is that the 2024-25 geometric mean[123] should be used but the CMA has previously used 2019-20. Company performance is therefore in a range of 2 to 16% beyond 'upper quartile' depending on the choice of 2024-25 or 2019-20 (following calculation method used by the CMA in 'Leakage totex calcs tables 8-2 & 8-3 PFs'). We proceed with the calculation using the range. Allocating 2 to 16% of the base request as an adjustment to the base modelled allowance.
Apply efficiency challenge, RPE and frontier shift[124]	-£0.6m to -£4.2m	£4.6m to £32.5m	These are applied consistently with the approach used by the CMA in 'Leakage totex calcs tables 8-2 & 8-3 PFs'. We have retained the CMAs efficiency challenge and recognise the CMA may revise this specifically for leakage on the basis of the further information it has received. We note that the Oxera report submitted by the company also suggested consideration of a 10% efficiency factor. We consider any challenge applied should be a minimum of 5% on the basis of the challenge applied in PR19 deep dive assessments where we found insufficient evidence of efficient costs. [125]

It is appropriate to apply an efficiency challenge to Anglian Water's enhancement expenditure and to exclude expenditure included in the base allowance.

A3.25 We have previously stated that the information submitted by the disputing companies contained insufficient evidence to demonstrate proposed costs were efficient. For Anglian Water we have previously challenged cost efficiency on the basis of limited breakdown of costs, limited evidence of benchmarking, limited detail of how optimal activity levels have been identified, lack of appropriateness of cost models used, assumptions made in WRMP and comparison to historical cost models.[126] The company has not provided sufficient evidence to address these concerns and we therefore consider it appropriate to maintain the 10% efficiency challenge used by the CMA which aligns with the challenge suggested

[123] Based on all companies delivering their PR19 performance commitments from their 2019-20 three-year average starting positions

[124] The CMA should consider the appropriateness of applying RPE and frontier shift based on the evidence companies provide relating to the derivation of the numbers they submit.

[125] We describe the deep dive assessment process in Ofwat, 'PR19 final determinations: Securing cost efficiency technical appendix', section 4.1, pp. 52-57.

[126] Ofwat, 'Reference of the PR19 final determinations: Costs and Outcomes – response to CMA provisional findings', October 2020, pp. 112-115 and Ofwat, 'Response to RFI020(Q11)', November 2020, pp. 7-10.

by Oxera for base costs and the maximum efficiency challenge we used in our deep dives at final determinations.[127]

A3.26 We also identified concerns that some activities included in Anglian Water's leakage enhancement request were already wholly or partially covered by an implicit base allowance.[128]. Therefore, where we consider this is the case for an activity, we consider it appropriate to apply a range of 25% to 50% reductions to illustrate a potential challenge. We appreciate this is further challenge than we applied in our final determination but we now have increased information available to us and we are applying a different methodology that has been proposed by the CMA. Anglian Water has made an enhancement expenditure request of £76.7 million while our calculations in Table A3.3 propose a range of £59.4 million to £55.1 million based upon the challenges identified above.

Table A3.3: Assessment of Anglian Water's enhancement allowance

Activity	Request	Proposed allowance	Detail of challenge
ALC: additional leakage detection	£2.6m	£2.3m	10% efficiency challenge applied
New sensors to allow more rapid detection of leaks	£28.6m	£25.7m	10% efficiency challenge applied
Intelligent Network Systems - Advanced Pressure Sensors	£17.4m	£11.7m to £7.8m	The company states sensors will lead to fewer bursts and reduce the duration of supply interruptions. [129] Therefore we consider a proportion of this request will be covered by an implicit base allowance associated with these performance commitments. We have assumed a range of 25% to 50% of the total cost is included in an implicit base allowance but recognise that the CMA would need to consider the company's evidence further in order to establish an appropriate level. 10% efficiency challenge applied.
Intelligent Network Systems - Automated Network Assets	£2.8m	£0m	We consider this activity represents installation of latest modern equivalent asset and therefore relates to an implicit base allowance for valve replacement. The company states this will facilitate optimisation schemes, reduce interruption to supply risk and

[127] We describe the deep dive assessment process in Ofwat, 'PR19 final determinations: Securing cost efficiency technical appendix', section 4.1, pp. 52–57.
[128] Ofwat, 'Reference of the PR19 final determinations: Costs and Outcomes – response to CMA provisional findings', October 2020, pp. 112–115 and Ofwat, 'Response to RFI020(Q11)', November 2020, pp. 8–9.
[129] Anglian Water, 'Response to RFI20', p.5.

Activity	Request	Proposed allowance	Detail of challenge
			improve water quality. The implicit base allowances for these other performance commitments should also be considered. Therefore, we have assumed this activity is wholly included in base allowance.
Targeted mains renewals for leakage	£13.9m	£12.5m	10% efficiency challenge applied
New pressure management	£3.79m	£3.4m	10% efficiency challenge applied
Optimisation of existing pressure mgt	£2.70m	£2.4m	10% efficiency challenge applied
DMA Splits	£1.35m	£0m	We consider this activity represents network operational management activities which have been historically recorded in base expenditure undertaken by companies and therefore included in our base allowance
Intelligent Network Systems - Advanced Flow Sensing	£2.18m	£0m	Battery upgrade for an existing asset (DMA meter). Replacement of existing batteries is an activity included in the base allowance.
ILPM - Leakage reporting software	£1.16m	£0m	Software upgrades which we consider as a normal operating activity undertaken by all companies, captured in historical costs and therefore included in our base allowance. It is expected that all companies will have different suites of software requiring update on various timescales.
MADB/config log - DMA and meter management software	£0.24m	£0m	Software upgrades which we consider as a normal operating activity undertaken by all companies, captured in historical costs and therefore included in our base allowance. It is expected that all companies will have different suites of software requiring update on various timescales.
Total (pre-RPE and frontier price effects)	n/a	£58.1m to £54.2m	
Total (post RPE and frontier price shift)	n/a	£56.5m to £52.7m	Real price effects and frontier shift applied consistently with the approach used by the CMA in 'Leakage totex calcs tables 8-2 & 8-3 PF'.

Bristol Water

A3.27 Bristol Water requests a £6.2 million base adjustment (reduced from £6.5 million) and enhancement expenditure of £4.8 million.[130] We still consider the

[130] Bristol Water, 'Response to provisional findings', October 2020, pp. 42-43.

allowances we gave in the final determination appropriate but comment here on the additional evidence provided by Bristol Water.

A3.28 Bristol proposes two adjustments to the CMA's top-down methodology for base funding. First, it proposes using the geometric mean of the two normalised leakage measures in its determination of any base adjustment. This aligns to our approach to enhancement expenditure and we consider it an appropriate approach, if applied consistently to all companies.

A3.29 Second, it states adjustments should be made on the basis that base funding covers industry median performance only. We do not find any evidence provided by the company to support its assertion that '…base cost models only remunerate companies at an industry-average level of performance….'[131] Our final determinations represent stretching but achievable leakage performance levels and it would not be in customers' interest to presume that the base cost allowance did not allow companies to at least achieve upper quartile levels of performance previously delivered in 2019-20.[132] The CMA supported this approach in its provisional findings 'even for these high-performing companies the implicit allowance should cover the bulk of their costs, specifically the part that corresponds with upper quartile performance.'[133] Per our final determination, we consider that 2024-25 upper quartile can be achieved within base funding for all performance commitments, though we note the view of the CMA's provisional findings that for leakage only 2019-20 upper quartile is included.

There is no basis for making an adjustment to Bristol Water's leakage allowances to account for company specific factors.

A3.30 We have previously discussed that it is appropriate to set a high evidential bar and consider symmetrical adjustments when considering the need for any adjustments based on company specific factors. The general points made in the Anglian Water section above and in our response to RFI020 apply also to Bristol Water. We have assessed the new consultancy report[134] on leakage expenditure submitted, which takes a high-level approach and does not conduct any

[131] Bristol Water, 'Response to provisional findings', October 2020, p. 41.
[132] Ofwat, 'Reference of the PR19 final determinations: Costs and Outcomes – response to CMA provisional findings', October 2020, pp. 7-10.
[133] Competition and Markets Authority, 'Provisional findings report,' September 2020, p. 490-491.
[134] Bristol Water, 'Bristol Water Leakage Management Review', October 2020.

benchmarking. It highlights some disadvantages faced by the company but does not systematically compare these or the company's areas of advantage to other companies. Considering the challenges we have previously raised we do not consider that the new report submitted by the company provides sufficient evidence to meet the high evidential bar for an adjustment.

It is appropriate to apply an efficiency challenge to any base adjustment or enhancement allowance.

A3.31 We have highlighted in our wider consideration of Bristol Water's leakage expenditure that the company has not demonstrated its costs are efficient. We have identified areas of challenge such as the potential use of acoustic noise loggers and assumptions made with regards to the rate of leakage identification by its inspectors and the impacts of winter conditions on burst rates.[135] We did not find any evidence in the new report or Bristol Water's response to the CMA that sufficiently addressed these issues. We note that the report only concludes Bristol Water's options '..at high-level - appear to be least cost when compared to other options available.'[136] Applying only an efficiency challenge rather than an efficiency and optioneering challenge on this basis may be a conservative approach that the CMA wish to reconsider.

A3.32 We outline a revised base cost adjustment for Bristol Water considering the points made above in Table A3.3. We have based the adjustment on the revisions to the CMA's provisional findings calculations suggested by both Anglian Water and Bristol Water. Therefore, we consider the total base leakage cost identified by the company and then consider any allowance not covered by the base model on the basis of variance of the company's 2019-20 position to the appropriate geometric mean. Bristol Water has requested a minimum adjustment of £6.2 million while our calculations in Table A3.4 conclude an adjustment up to a maximum of £2.8 million is appropriate.

[135] Ofwat, 'Response to RFI020(Q11)', November 2020, pp. 10 - 12
[136] Bristol Water, 'Bristol Water Leakage Management Review', p. 3.

Table A3.4: Assessment of Bristol Water's base adjustment allowance (for use if the CMA concludes one is necessary)

Area of challenge	Cost challenge applied	Base allowance adjustment	Detail of challenge
Calculation of funding to maintain leakage levels outside of base model	N/A	£0.29m to £3.11m	Bristol Water presents its total base costs as £20.6m[137] in 'Response to provisional findings', p. 41 paragraph 189. We review the company's 2019-20 three year average performance against the upper quartile geometric mean. Our view is that the 2024-25 geometric mean[138] should be used but the CMA has previously used 2019-20. The company's performance is therefore in a range of 1 to 15% beyond 'upper quartile' depending on the choice of 2024-25 or 2019-20. We follow the calculation method used by the CMA in 'Leakage totex calcs tables 8-2 & 8-3 PFs'. We note that Bristol Water adopted an approach that was not consistent with the CMA's in its own calculations and could lead to counterintuitive results. We proceed with the calculation using the range. Allocating 1 to 15% of the base request as an adjustment to the base modelled allowance.
Apply efficiency challenge, RPE and frontier shift	-£0.03m to -£0.35m	£0.26 to £2.76m	These are applied consistently with the approach used by the CMA in 'Leakage totex calcs tables 8-2 & 8-3 PFs'. We have retained the CMAs efficiency challenge and recognise the CMA may revise this specifically for leakage on the basis of the further information it has received. We consider any challenge applied should be a minimum of 5% on the basis of the challenge applied in PR19 deep dive assessments where we found insufficient evidence of efficient costs. [139]

A3.33 Regarding enhancement expenditure, Bristol Water proposes the CMA applies an efficiency challenge to Bristol's own pre-efficiency numbers, £5.66 million. This is not an appropriate approach – companies' should submit their best view of their efficient costs, and the CMA should then decide whether further efficiency challenge is necessary. The points made above regarding company specific factors and cost efficiency are apply to both base and enhancement

[137] This is not the company's view of efficient base costs therefore the CMA should consider if further challenge is appropriate to the starting position. Bristol Water states this figure is 'prior to any efficiency and/or real price effects adjustments". Bristol Water, 'Response to provisional findings', p41, paragraph 189.
[138] Based on all companies delivering their PR19 performance commitments from their 2019-20 three-year average starting positions
[139] We describe the deep dive assessment process in Ofwat, 'PR19 final determinations: Securing cost efficiency technical appendix', section 4.1, pp. 52-57.

expenditure. Our calculation of an enhancement allowance of £4.3 million is included in Table A3.5.

Table A3.5: Assessment of Bristol Water's enhancement allowance

Area of challenge	Adjustment made	Total enhancement allowance	Detail of challenge
Company request	N/A	£4.83m	Company request from 'Response to provisional findings', p. 43 paragraph 201.
Apply efficiency challenge, RPE and frontier shift	-£0.58m	£4.25m	These are applied consistently with the approach used by the CMA in 'Leakage totex calcs tables 8-2 & 8-3 PFs'. We have retained the CMAs efficiency challenge and recognise the CMA may revise this specifically for leakage on the basis of the further information it has received. We consider any challenge applied should be a minimum of 5% on the basis of the challenge applied in PR19 deep dive assessments where we found insufficient evidence of efficient costs. [140]

[140] We describe the deep dive assessment process in Ofwat, 'PR19 final determinations: Securing cost efficiency technical appendix', section 4.1, pp. 52–57.

A4 Anglian Water – Cost adjustment claim regarding pumping costs

Anglian Water response to the CMA's provisional findings

A4.1 Anglian Water has responded to the CMA's provisional findings by proposing a new cost adjustment claim (CAC) regarding its pumping costs,[141] with support from Oxera.[142] Anglian Water considers it faces higher pumping costs relative to the majority of the industry because it operates in a relatively flat region, operates in a sparsely populated region, and abstracts a relatively large proportion of its distribution input from boreholes. Anglian Water also states that it does not consider average pumping head (APH) is more affected by measurement error than other variables in the CMA's cost models, and presents evidence to suggest that APH is a more relevant driver of power costs than number of booster pumping stations.

Average pumping head data is significantly more unreliable than booster pumping stations data

A4.2 Average pumping head measures the proportion of water that is pumped out of the total volume of water (the remainder of water is gravitated), adjusted for average delivery pressure across all pumps. APH would be impacted by the geography of the region – the location of water supply compared to water demand (elevation and distance).

Average pumping head is significantly less reliable than booster pumping stations

A4.3 We recognise that, in theory, APH may offer some advantages over other factors to control for variation in energy requirements across companies. We reiterate, however, that the underlying quality of the APH data means it is significantly less reliable than the number of booster pumping stations.

[141] Anglian Water, 'PR19 CMA Redetermination – response to provisional findings', October 2020, p. 13–17, paragraphs 78–97.
[142] Oxera. 'Average pumping head: topography and sparsity cost adjustment claim', October 2020.

A4.4 From a technical perspective this is intuitive. Capturing APH is complex and requires real time data on volumes, lift and pressure to be captured across company assets at all locations. This is reflected in the relatively low confidence grades assigned to APH by companies.

A4.5 In contrast, counting the number of booster pumping stations is simpler and relies mainly on the underlying definition that is used. We have worked with the industry to ensure that all companies report the number of booster pumping stations using the same definition. We have recently submitted queries to water companies to ensure that the 2019-20 booster pumping station data is consistent with previously submitted data.

A4.6 The inferior quality of the APH data relative to the other wholesale water explanatory variable data is demonstrated in the figure below, which presents the most common confidence grade across companies for each variable over the historical period.[143]

Table A4.1: Wholesale water explanatory variables historical confidence grades

Wholesale Water Explanatory Variable Historical Confidence Grades			
Average pumping head - Water resources	Average pumping head - Raw water distribution	Average pumping head - Water Treatment	Average pumping head - Treated water distribution
B3	B3	B3	B3
Total water treated at all SW5 works	Total water treated at all GW2 works	Total water treated at all GW3 works	Total water treated at all GW4 works
B2	B2	B2	B2
Total water treated at all GW5 works	Total length of potable mains as at 31 March	Number of booster pumping stations	Total household connected properties at year end
B2	A2	A1	A1
Total non-household connected properties at year end	Total length of non-potable and partially treated main for supplying customers	Total water treated at all SW simple disinfection works	Total water treated at all SW1 works
A1	A1	A1	A1
Total water treated at all SW2 works	Total water treated at all SW3 works	Total water treated at all SW4 works	Total water treated at all SW6 works
A1	A1	A1	A1

[143] The confidence grade is an alphanumeric code that companies assign to data in their annual performance review submissions. The letter refers to reliability and the number to accuracy.

Total water treated at all GW simple disinfection works	Total water treated at all GW1 works	Total water treated at all GW6 works
A1	A1	A1

A4.7 We also consider it is inappropriate to use June 2010 return data as evidence that APH at a wholesale water level is as reliable as the number of booster pumping stations as a direct read across cannot be made. Firstly, the June return data is 10 years old, which makes it challenging to use for comparison purposes. Secondly, APH data in the June Return was collected at the wholesale level. Whereas, APH at the wholesale water level used by Oxera is the sum of APH variables across the value chain (water resources, raw water transport, water treatment and treated water distribution), which may be affected by unreliable APH data at the value chain level.

A4.8 In addition, analysis of APH data included in the 2010 June Return indicated that companies do not use a consistent denominator when reporting APH data, with some using the flow through each stage of the value chain and others using distribution input. These inconsistencies also make it difficult to make meaningful APH comparisons between companies.

Anglian Water is not 'special' in relation to pumping costs

A4.9 The evidence presented by Anglian Water is very selective and does not provide a full picture. Operating in a flat region will require water to be pumped across relatively longer distances but there are many other factors that affect pumping costs that Anglian Water does not consider:

- Proximity of demand centres to water sources.
- The extent that water needs to be pumped across undulating terrains.
- The extent to which water needs to be pumped to villages at higher elevations.
- The depth of boreholes, which can vary significantly (e.g. between <20 and >200 metres).

A4.10 Moreover, Anglian Water is by no means an exception in terms of APH relative to the sector (ranked six out of 17 during the sample period), albeit this is based on unreliable data.

Booster pumping stations is a good driver of power costs

A4.11 Anglian Water presents evidence to suggest that APH is a more relevant driver of power costs than number of booster pumping stations. But the evidence presented by Anglian Water is again very selective. In particular, the company only uses 2019 data rather than the full historical sample.

A4.12 The figures below present the correlation between wholesale water power costs and number of booster pumping stations over the full sample period and shows a strong positive relationship.

A4.13 In contrast, the relationship between APH and power costs is very weak when using the full sample period, and actually suggests a negative relationship between APH and power costs. We do not expect a negative relationship between APH and power costs – this is further evidence that the APH data is of poor quality.

A4.14 We also note that Severn Trent Water outlined in its recent submission to the CMA that it considered the booster stations variable provides a helpful way to capture energy costs involved with operating a water network.[144]

[144] Severn Trent, 'CMA Submission', May 2020, p. 12-13.

Figure A4.1: Wholesale water power costs versus number of booster pumping stations

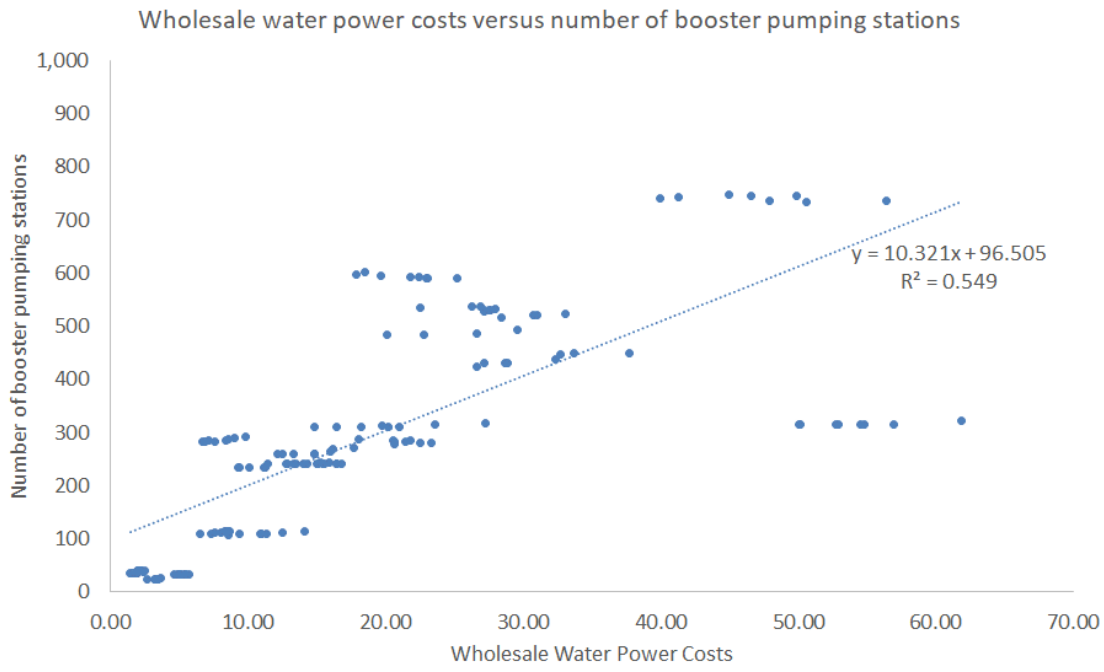
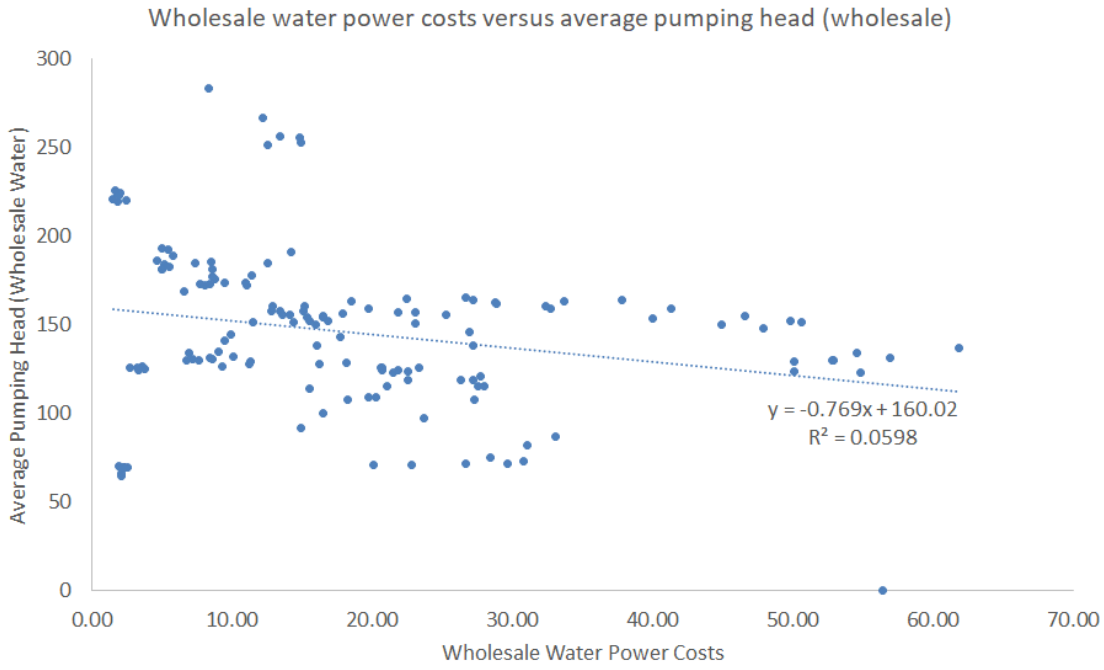


Figure A4.2: Wholesale water power costs versus average pumping head (wholesale)



A4.15 The power cost econometric models used by Oxera for the purpose of the cost adjustment claim are also very selective, as they only include the estimated impact under one set of models. It is unclear how the impact would change under different power cost model specifications.

A4.16 The models presented have also not been through the same level of scrutiny as our base cost models. This is demonstrated by the omission of model robustness test results presented in the paper. Oxera also does not consider whether the weak relationship between APH and booster pumping stations is the result of the underlying APH data issues.

A4.17 We also reiterate that the inclusion of APH in the wholesale water base cost econometric models did not produce robust results. This was not only in terms of low statistical significance but also in terms of inconsistent results. For example, we tested average pumping head variables in our wholesale water econometric models and found that the sign and magnitude of the estimated coefficient on APH changes between different model specifications. These results may be

because of poor quality data. This point was also demonstrated by Northumbrian Water.[145]

[145] Competition and Markets Authority, '[Provisional findings report]', September 2020, p. 113, paragraph 4.51.

A5 Anglian Water cost modelling issues

A5.1 In this annex we respond to three issues brought up again by Anglian Water in response to the Provisional Findings. The issues relate to the base econometric models and the setting of the catch-up efficiency challenge.

Mis-specification of water models[146]

A5.2 Anglian Water claims that as the CMA has accepted Professor Saal's critique on the specification of sewage collection model 1, the CMA should change the specifications of our treated water distribution and wholesale water models.

A5.3 Anglian Water notes that in our wholesale water models "the apparently single output models used by Ofwat in fact result from what amounts to a statistically rejectable imposition of parameter restrictions on a three output model, which imposes a negative elasticity of costs with respect to network length".

A5.4 We disagree with Anglian Water's arguments. Anglian Water's interpretation of our models is inappropriate (this was noted also by Oxera in their report for Yorkshire Water[147]).

A5.5 Anglian Water's "three-output model" argument is based on a log transformation of one of our cost drivers (a transformation could have been proposed for the other variables in the model as well). Therefore, it is argued that our model - with a single output plus control variables - actually turns out to be a model with three outputs (properties, length of mains and booster pumping stations). That is not the case. Just because it is possible to re-write a logarithmic model that contains a ratio as the logarithms of the two separate variables, this does not make it the same model in all cases, as equation (3) shows.[148]

A5.6 Our models cannot be interpreted as three-output models. Our models have one output, connected properties, and other variables that control for density, geography etc. In setting up a model that suggests that a ratio (capturing

[146] Anglian Water, 'Response to CMA provisional findings', October 2020, pp. 19-20, paragraphs 106-117.
[147] Oxera response to CMA PFs, page 15.
[148] Anglian Water, PR19 CMA Redetermination, Response to Provisional Findings, 27 Oct. 2020, Paragraph 112, p. 20.

geography) is expected to increase cost, it is then clear that we are not distinguishing between how the different parts of the ratio fraction change.

A5.7 Whenever a logarithm of a ratio is used, by definition, it will be the case that the coefficient on the top and bottom variables of the ratio is the same. That is the nature of saying that a ratio affects costs.[149] We have not set up our models to answer the question "what happens to cost when length of mains increases, holding properties, density and booster pumping stations constant?". This question is irrelevant both from an engineering perspective and in light of the data.

A5.8 The alternative models suggested by Professor Saal for treated water distribution and wholesale water models are:[150]

a) *Treated water distribution model:*

$$\ln(\text{costs}) = a + b*\ln(\text{lengths of main}) + c*\ln(\text{booster}) + d*\ln(\text{density}) + e*[\ln(\text{density})]^2$$

b) *Wholesale water model 1:*

$$\ln(\text{costs}) = a + b*\ln(\text{properties}) + c*\ln(\%\text{ of water treated at levels 3-6}) + d*\ln(\text{booster}) + e*\ln(\text{density}) + f*[\ln(\text{density})]^2$$

c) *Wholesale water model 2:*

$$\ln(\text{costs}) = a + b*\ln(\text{properties}) + c*\ln(\text{wac}) + d*\ln(\text{booster}) + e*\ln(\text{density}) + f*[\ln(\text{density})]^2 + g*(\text{lengths of main})$$

where booster denotes number of booster pumping stations, wac refers to weighed average treatment complexity index, and % levels 3-6 relates to the percent of water treated at complexity levels 3-6.

A5.9 In the models proposed by Professor Saal, property and length are measures of size, which are correlated at above 90%. Similarly, the number of booster

[149] Oxera also noted that the use of ratios is common among other regulators and the CMA used similar models in their PR14 final re-determinations. See Oxera report on behalf of Yorkshire Water: "Responding to the CMA's provisional findings on costs", page 16.
[150] See workbook "PF020 AW provisional findings response botex data, tab "1. Water mis-spec 8 year panel".

pumping stations are highly correlated with other output variables. Given the correlation between the variables, it does not seem to be a sensible strategy to propose these models. In these models the prediction would be less accurate (ie higher variance), and the coefficients would lose significance and intuitive interpretation, and would therefore be difficult to explain to the industry.

A5.10 The issue of high multicollinearity in the models proposed by Professor Saal is further shown in the table below, which shows the variance inflation factor (VIF) used to detect multicollinearity.[151] VIF above 10 suggests a strong presence of multicollinearity. The VIFs confirms these models are not appropriate due to multicollinearity.

	Highest variance inflation factor value
Treated water distribution model 1	26.39
Wholesale water 1	25.40
Wholesale water 2	115.14

Use of an eight-year random effects estimation in five-year data panels[152]

A5.11 In its response to the CMA's provisional findings, Anglian Water contends that it is incorrect to use random effects computed from an eight-year panel to calculate the catch-up efficiency challenge over a five-year period. It suggests the CMA should retain only the more recent five years of data in the base models to estimate the company-specific random effect, which would align with the period the catch-up efficiency challenge is estimated on.

3.2 Anglian Water appears to have misinterpreted the use of random effects in our models. We use random effects models to obtain consistent and efficient estimates of the parameters, by recognising the panel structure of the data explicitly. However, the decomposition of the residual into a time-invariant "random effects" component and an "idiosyncratic error" is not used in the

[151] When calculating the VIF we excluded squared density, otherwise the test would produce artificially high scores due to the inclusion of a squared term, as explained in our previous response to Professor Saal's concern about multicollinearity in our models.
[152] Anglian Water, 'Response to CMA provisional findings', October 2020, pp. 20-22, paragraphs 118-125.

calculation of the catch-up efficiency challenge, where we base the computation on the overall residual, as it would be with OLS models.

A5.12 The decomposition of the residual in random effects models may be useful for inefficiency purposes if we are interested in isolating the 'persistent inefficiency', that is, the firm specific inefficiency that is constant over time. In this case it may be more appropriate to use the full sample in the calculation of efficiency scores so that the idiosyncratic error for each company is averaged out.[153] However, computing an efficiency score which is deemed time invariant is not our objective. Our objective is to capture the recent trend in inefficiency, which would be captured in the idiosyncratic error. For that reason, we use the full residual for the calculation of efficiency scores.

A5.13 Therefore, it is appropriate to adopt a longer time series to estimate the parameters of the models as accurately as possible, based on a larger sample and more years of information. Having obtained accurate parameter estimates, we can then use the residual from the model to obtain sensible estimates of efficiency scores.

A5.14 We use the most recent five years to calculate the catch-up efficiency challenge to ensure the catch-up efficiency challenge is not based on a single low-cost year by any one company. In its provisional findings, the CMA concluded that using the most recent 5 years strikes the appropriate balance between using recent data and using a large enough sample for the calculation of the catch-up challenge.[154]

A5.15 This approach is consistent with common regulatory practice. In its RIIO-GD2 draft determinations, Ofgem used 13 years of data to estimate the parameters of its COLS models, while using only the last 5 years of data to compute the catch-up efficiency benchmark.[155] It followed a similar approach at RIIO-1 in gas and electricity.[156]

[153] Although the same information could be obtained from each individual year in the sample, as the persistent inefficiency, proxied by the full or partial random effect, is constant.
[154] Competition and Markets Authority, 'Provisional findings report', p. 159, paragraph 4.266.
[155] Ofgem, Draft Determinations – RIIO GD2 Totex Model Suite 2, workbook 'Cost Assessment'.
[156] Ofgem, 'RIIO-GD1 Final Proposals – Supporting document – Cost efficiency', pp. 22-24, paragraphs 4.1-4.12, and pp. 116-117, paragraphs 1.14-1.15.

Catch up benchmark[157]

A5.16 In its response to the CMA's provisional findings, Anglian Water provides new analysis by Oxera[158], which attempts to show that the CMA's base cost models are not more accurate than the CMA's cost models in Bristol (2015) determination. In light of that it asks the CMA to consider using an average efficiency benchmark, which would lead to a £122m increase in its allowance.

A5.17 We note that companies did not raise concerns with the use of an upper quartile benchmark based on our models in response to our draft determination[159], which raises questions as to why Anglian Water is raising this issue at this point.

A5.18 Suggesting the use of an average benchmark ignores the wider cost assessment framework; the fact that the cost assessment process is dynamic, where companies have multiple opportunities to make representations (which only ever highlight factors that lead to them incurring higher costs), and the objective of the price review to reveal and set efficient cost allowances to water companies.

A comment on standard errors

A5.19 The CMA used cluster robust standard errors in its assessment of our models, as it did at the Bristol Water 2015 Final Determination.[160] The assessment shows that the water models at PR19 are more accurate than PR14.

A5.20 The Oxera report then argues that the basis for the standard errors should be changed, arguing that it is more appropriate to use a more general approach to robust standard errors for pooled OLS models (used in PR14).

A5.21 However, cluster robust standard errors are likely to be more appropriate because we have a clear prior expectation – given the panel structure of the data – of the nature of the correlation in the errors. So it is unclear that Oxera's

[157] Anglian Water, 'Response to CMA provisional findings', October 2020, pp. 22-23, paragraphs 131-135.
[158] Oxera, 'An assessment of the CMA's provisional findings on the efficiency benchmark'.
[159] Except for Thames Water.
[160] CMA, 2015. Bristol Water plc: A reference under section 12(3)(a) of the Water Industry Act 1991, A4(2)-50, para. 225.

suggestion of using standard errors with more general assumptions when using pooled OLS is an improvement on the existing approach.

A5.22 We are also not clear that a bootstrap approach is appropriate for this context. Considering the evidence in the Oxera paper, there is a large discrepancy between the variability in table 3.1 with the clustered robust errors, in the order of 15%, and the variability in table 3.3 with bootstrapped standard errors, of the order of 50%. The discrepancy is not discussed, nor is evidence provided that a bootstrap method is appropriate in a situation with relatively small number of observations (we note the properties of bootstrap estimators depend on asymptotic theory) and correlated errors.

Prediction error in efficiency model

A5.23 At PR19 we developed more parsimonious models relative to PR14. The benefit of this approach is a more intuitive set of parameter estimates, with a specification that is easier for the sector to understand and overall gives greater "confidence" in the models. This approach can lead to larger model residuals.

A5.24 However, our models are efficiency models. In efficiency models the error term, which forms part of the prediction interval, is used to capture inefficiency- not only random factors and data errors as in other models. So, what is often referred to as 'forecasting error' in this specific case also includes efficiency variation between companies. Hence, in the context of regulatory/efficiency models, wider model predictions may be because of wider efficiency variation across companies rather than because of poor model prediction.

A5.25 In fact, over-specifying an efficiency model risks a situation where the cost drivers start explaining the inefficiency, in particular if the additional drivers are under management control. In such a case the prediction error will be small for a less accurate efficiency model.

Model robustness

A5.26 The Oxera analysis is focused on the CMA models of Bristol 2015, which were developed for the purpose of determining cost for a single company. However, the PR19 models seem to compare favourably relative to the PR14 models. Given

the rich nature of the data collected on wholesale water and wastewater cost drivers, it is likely that the PR19 cost models are more robust than models used to assess cost efficiency by regulators in other sectors. For example, the Competition Commission set the benchmark at the fifth out of fifteen companies in its benchmarking analysis for Northern Ireland Electricity Network's 2014 Final Determination[161], which was based on econometric models that had much lower predictive power (as indicated by R-squared) than the PR19 models.

A5.27 This highlights that the CMA's decision to apply an average catch-up challenge for Bristol Water in 2015 was very context specific and cannot, and should not, be used as a reason not to apply a stretching catch-up challenge. The CMA noted themselves that its determination in 2015 was for a single company, Bristol Water, whose recent levels of expenditure were substantially higher than the estimates incurred by the models.[162] The CMA continue by saying that there may be a different set of issues to consider when setting price controls for multiple companies, some of which have costs below the level suggested by the models for an averagely-efficient company, which is certainty the case on this occasion.

[161] Competition Commission, 2014. 'Northern Ireland Electricity Limited price determination. A reference under Article 15 of the Electricity (Northern Ireland) Order 1992. Final Determination', 8-24, para. 8.129.
[162] CMA, 2015. 'Bristol Water plc: A reference under section 12(3)(a) of the Water Industry Act 1991', Final Report, p. 72, para. 4.235.

A6 Base models update with 2019-20 data

A6.1 Following the publication of the CMA provisional findings, on 15 October 2020 Bristol Water shared with the CMA an updated version of the wholesale water base cost econometric models including an additional year of data (2019-20).[163] The additional year reflects data companies published in July 2020 as part of their Annual Performance Reports (APRs), which was not available at the time of our final determinations.

A6.2 In their response to the CMA provisional findings, Anglian Water, Northumbrian Water and Yorkshire Water also provided the CMA with similar analysis.[164]

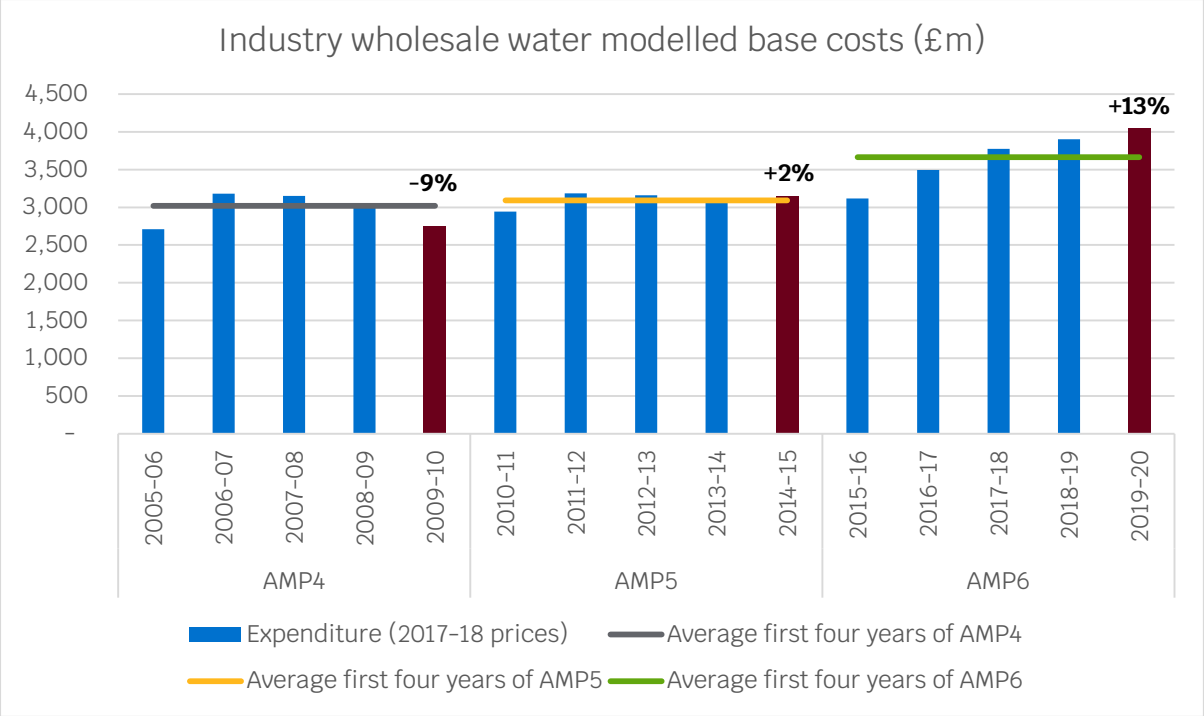
A6.3 In our response to RFI 019 (13 November), we shared with the CMA an updated set of feeder models which incorporates the outturn 19-20 data, including any data changes companies identified through our query process. We provide below our considerations on the use of this data as part of the CMA's redetermination process.

Significant investments in 2019-20 in preparation for the 2020-25 period

A6.4 The cost data of 2019-20 is heavily affected by pre-spending for 2020-25. This is evident from companies' APR commentaries and responses to queries.[165] In wholesale water, it is also evident when comparing the expenditure in 2019-20 to the average expenditure in the price control period. Typical cyclicality of expenditure within price controls is such that the last year of a price control period has relatively low expenditure relative to mid-year. However, as shown in Figure A6.1, wholesale water expenditure in 2019-20 was 13% (or about £380 million) higher than the average of the other years in AMP6. For comparison, in previous AMPs the closing year was between -9% and +2% higher than other years in the same AMP.

[163] Bristol Water, 'Email to the CMA – 2019-20 update to base model data', October 2020.
[164] Anglian Water, 'PF001 2019-20 Oxera base modelling update', October 2020.
[165] For a full account of relevant commentary, see our response to RFI 019 (13 November 2020).

Figure A6.1: Wholesale water modelled base costs, comparison of the last year of expenditure to the average of the AMP



Source: Ofwat analysis.

A6.5 We also note that in 2019-20 the sector delivered an unprecedented 7% average reduction in leakage, with some companies delivering reductions in excess of 10%. This is in stark contrast to the lack of progress in previous years, and is a driver for the significantly higher expenditure observed in water. This pace of change is well above that required by a 15% reduction, and spending in this period such as installing acoustic loggers will have significant benefits in future years.

A6.6 This is also acknowledged by one of the disputing companies, Bristol Water, which said: *"Our analysis of this [2019-20] data shows clear evidence, for the water service, that costs are increasing because of the need to meet new and more challenging performance commitments […]."*[166]

[166] Bristol Water, 'Response to CMA provisional findings (Non-Confidential)', October 2020, p. 2, paragraph 5.

A6.7 The investment brought forward would have an impact on modelling results, and in wholesale water result in allowances that are £980 million higher compared to the allowance under the CMA provisional decision, or £1.5 billion higher than companies requested. This is not credible, and indicates that the data would not assist in identifying an efficient cost baseline and promote the interest of customers. We note that the £980 million increase is much larger than the difference between 2019-20 cost and the 2015-20 average cost (£380 million), or the £141 million increase from 2018-19 year to the 2019-20 year.

A6.8 Conversely, in wastewater, where expenditure in 2019-20 is not higher than the average of the AMP, the inclusion of 2019-20 data implies a reduction in sector allowances compared to our FD by £300 million.

A6.9 We note that a dummy variable for the year 2019-20 in wholesale water models (which picks up the year-specific effects not captured by other explanatory variables in the model) reflects the uniqueness of this year of expenditure. The dummy for 19-20 is significant and is greater in magnitude than any dummy related to previous years in the sample.[167]

Our view on the use of 2019-20 data

A6.10 We do not think the 19-20 data should be used for the following reasons:

- **Impact of brought forward expenditure:** The impact of the inclusion of the 2019-20 data has a clear disproportionate effect in wholesale water. Given the uniqueness of expenditure in this year, including the 2019-20 data would have a distortive impact on the results, with, by way of illustration, an increase in sector allowances of £1.5 billion more than requested in water. We note that the use of a 2019-20 dummy would partly mitigate the impact of this year of data. However, this is an imperfect tool to capture the full and accurate effect of the additional investment brought forward.
- **Base allowances remain appropriate in light of base cost projections for 2020-25:** In our PR19 methodology we said that we would use companies' cost forecasts to inform our cost baselines. We have clearly set out our expectations and incentivised companies to identify significant scope to

[167] Source: 'WW results with dummies' workbook, provided in the folder submitted alongside this document.

improve efficiency in the delivery of their services. In light of the forward looking information companies have submitted in August 2019 – once the performance commitment levels for AMP7 were well understood – we consider that the base allowances we have set at final determinations, and those set by the CMA in its provisional findings, remain appropriate. Under our final determination, the sector's allowance for modelled base costs was already 0.8% higher than it requested, and the CMA's provisional base allowances reflect a similar level of allowance. Including the new year of data, which uniquely includes investment brought forward to deliver AMP7 performance commitments, would result in too high an allowance for the sector and for the disputing companies, as the sector's allowance on total modelled base costs would be over £1 billion higher than what companies have planned to spend in AMP7. This is not in the interest of customers, would not incentivise companies to identify more scope for efficiency over time and would not be consistent with companies' cost projections for 2020-25.

- **Interactions with the wider framework:** In its provisional findings, the CMA acknowledged that its redetermination is a package "in the round", and that many issues are cross-cutting or interconnected.[168] If the CMA were to include the 2019-20 and change the modelling baselines, it would be appropriate to reconsider other elements of the determinations, such as the efficiency challenge, decisions on cost adjustment claims, and its assessment of some enhancement expenditure, including leakage. In addition, it would need to consider the impact of 2019-20 data on outcomes and recalibrate the levels of performance commitments for the disputing companies, many of which based on, or cross checked against, historical data.[169] However, as with cost, we do not recommend that the CMA re-considers performance commitment levels in light of 2019-20 performance.
- **Disputed companies forecasts remain inefficient:** The modelling results with 2019-20 data show that the impact on disputing companies is less than the average impact in the sector. In other words, the absence of 2019-20 data does not affect the disputing companies disproportionately relative to the sector. This means that there is not a bias in the disputing companies' allowance under our final determinations or the CMA's provisional findings.

[168] Competition and Markets Authority, 'Provisional findings report', pp. 740-741, paragraph 12.68.
[169] For example, the PR19 water supply interruptions performance commitment levels were based on a linear trendline between the upper quartile of 2018-19 performance and an end point in 2029-30. If the methodology is updated and the 2019-20 data is used as a starting point, the performance commitment levels would be more demanding. Similarly, the mains repairs performance commitment levels were set with reference to average of the best five years performance, which would have increased had we had 2019-20 data available.

Where the disputing companies' cost forecasts were identified as inefficient, this remains the case even with the new data. This indicates that the disputing companies' allowance is not understated without the use of 2019-20 data.

A6.11 To conclude, we think that the CMA should not use the 2019-20 cost data in setting base allowances for the disputing companies for the reasons set out above. There is significant risk of using material new information, which is endogenous to a sector to which we have just set a price control, at this stage of the process. Given the evidence on the scale of investment brought forward, the use of this data can undermine a long process of careful and well calibrated assessment of costs, on the expense of customers.

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