

Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations

Provisional findings

29 September 2020

© Crown copyright 2020

You may reuse this information (not including logos) free of charge in any format or medium, under the terms of the Open Government Licence.

To view this licence, visit www.nationalarchives.gov.uk/doc/open-government-licence/ or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email: psi@nationalarchives.gov.uk.

The Competition and Markets Authority has excluded from this published version of the provisional findings report information which the inquiry group considers should be excluded having regard to the three considerations set out in section 244 of the Enterprise Act 2002 (specified information: considerations relevant to disclosure). The omissions are indicated by [X]. [Some numbers have been replaced by a range. These are shown in square brackets.] [Non-sensitive wording is also indicated in square brackets.]

Contents

	<i>Page</i>
Summary	9
Provisional findings	35
1. Introduction	35
2. Background.....	37
Introduction	37
Background to the water industry and regulation	37
The four Disputing Companies	41
Anglian	43
Bristol	44
Northumbrian.....	45
Yorkshire	46
The statutory framework and regulation.....	47
The statutory duties and strategic priorities and objectives statement	49
The Ofwat PR19 price review	53
Setting the PR19 price controls	53
Building blocks of the PR19 determination	58
The final determination	64
Main Parties' views on the context and themes of PR19	65
Ofwat's view on the context of the PR19 determination	65
The Main Parties' views on interpretation of duties	69
Reasons for the rejection by the four companies	73
Anglian	74
Bristol	77
Northumbrian.....	79
Yorkshire	81
3. Our approach.....	84
Introduction	84
Our approach to the redetermination	84
Prioritisation and deprioritisation of issues	87
Household retail.....	88
Business retail	89
Bioresources reconciliation mechanism	89
PR14 reconciliation.....	89
Grants and contributions (other than one aspect of potential double-counting)	89
Issues already consulted on	89
Other small impact issues	90
Conduct of the investigation.....	90
COVID-19.....	92
Third party submissions	96
Calculation of a K-factor based on our determination	97
Structure of the provisional redeterminations report	98
4. Base costs	100
Introduction	100
Base cost modelling.....	100
Introduction and summary	100
What is the correct estimation technique?	102
What is the correct functional form?	106

Which explanatory variables should be used?.....	108
Assessment of alternative model specifications	131
Is capital maintenance addressed appropriately?.....	133
Is there a log-transformation bias?	140
Which forecast data should be used?.....	144
What is the appropriate aggregation and triangulation approach?	147
Summary of our provisional decision on base cost models	150
Catch-up efficiency challenge	156
Ofwat's PR19 efficiency challenge	156
Methodological issues raised.....	157
CMA approach to efficiency challenge	166
Frontier shift.....	166
Ofwat PR19 approach to frontier shift.....	166
Methodological issues in assessing the frontier shift level.....	171
Overall level of frontier shift	182
The application of frontier shift to different costs	184
True-up and link to real price effects (RPEs).....	186
Summary of our provisional decision on frontier shift	187
Real price effects	187
Ofwat's PR19 approach to RPEs.....	188
Issues raised	189
Our provisional decision on RPEs	204
Growth	204
Ofwat PR19 approach to growth.....	205
Methodological issues raised.....	205
CMA approach to growth.....	224
Adjustment for enhancement opex	225
Introduction.....	225
Ofwat PR19 approach to enhancement opex.....	225
Methodological issues raised.....	227
Our provisional decision on opex enhancement adjustment	230
Anglian cost adjustment claims.....	230
Capital maintenance.....	230
Sludge transport	234
Unmodelled costs	235
Ofwat's PR19 approach.....	236
Disputing Companies	236
Part A: Cross-cutting issues	237
Part B: Specific issues.....	238
Overall effect on unmodelled base costs.....	256
Summary of provisional decisions on base totex allowances	257
Modelled base costs.....	257
Unmodelled base costs	258
5. Enhancement costs	259
Introduction	259
How enhancement spend fits into the broader framework	259
Ofwat's overall approach to enhancement assessment in PR19	261
Our approach to enhancement assessments	263
Benchmark models for enhancement	266
Wastewater models	267
Water models	288

Wastewater WINEP cost efficiency challenges	294
Ofwat's Final Determination	294
Water companies' views	294
Ofwat's views.....	295
Our provisional assessment	296
Deep and shallow dive efficiency challenges	297
Company-specific efficiency factor (shallow dive)	298
Company-specific efficiency factor (deep dive)	304
Scheme-specific efficiency challenge	306
The assessment of specific projects ('deep dives')	306
Deep dive 1: Yorkshire - Living with Water Partnership in Hull and Haltemprice	308
Deep dive 2: Northumbrian - Essex Resilience Scheme	316
Deep dive 3: Northumbrian - Sewer Flooding Resilience Scheme	327
Deep dive 4: Anglian – Strategic Interconnectors Programme	337
Deep dive 5: Anglian – Smart Metering Scheme	352
Deep dive 6: Anglian – Water Resilience Scheme	363
Deep dive 7: Anglian – SEMD/non-SEMD	367
Deep dive 8: Anglian – Bioresources Scheme.....	372
Anglian metaldehyde costs: treatment of uncertainty.....	377
Ofwat's approach in the final determination.....	378
Dispute between the parties	378
Our provisional assessment and decision	379
The application of frontier shift on enhancement allowances.....	380
Water companies' views	381
Ofwat's views.....	381
Our assessment and provisional decision	382
Implications for enhancement allowances for the Disputing Companies	384
6. Overall Totex assessment	386
Introduction	386
Totex allowances	386
Modelled base costs.....	386
Unmodelled base costs	392
Enhancement costs	395
Leakage Totex.....	404
Total Totex allowances	405
Cost-sharing incentives.....	406
Cost basis.....	406
Sharing rates	406
Disputing Companies' views.....	408
CMA analysis: choice of sharing rate	409
Provisional determination – choice of sharing rates	412
7. Outcomes: Performance commitments and incentives	415
Introduction	415
Overview of Ofwat's PR19 approach	416
Ofwat's PR19 process	416
Overview of Ofwat's approach.....	418
Assessment of the overall approach to the incentive framework	424
Our approach.....	424
Our assessment – framework for assessing ODIs and PCs	425
Assessment of common PCs and ODIs.....	441

The three upper quartile PCs	442
Other common PCs and ODIs	454
Assessment of bespoke PCs and ODIs	469
Water quality contacts	469
Bathing water quality	471
Yorkshire low pressure	474
Overall reward cap	476
Overall package of incentives	477
Summary of our provisional determinations	478
8. Leakage	480
Introduction	480
Ofwat's approach to setting targets for leakage	482
Our provisional decision on the leakage PCs	485
Leakage Totex	486
Introduction	486
Parties' submissions on the costs of reducing leakage	486
Assessment of base costs for leakage	488
Assessment of Enhancement Costs adjustments for leakage	491
Leakage incentives	498
Incentive rates	498
Analysis of leakage incentives	500
Summary of our provisional determinations on leakage	503
9. Cost of Capital	504
The Weighted Average Cost of Capital and the Capital Asset Pricing Model ...	505
Inflation and estimating 'real' levels of the cost of capital	507
Inflation – Parties' views	507
Inflation – CMA assessment	508
Inflation – CMA provisional determination	509
Gearing	509
Background	509
PR19 Decision	510
Gearing – CMA assessment	510
Gearing - CMA provision determination	510
Risk-Free Rate	511
Introduction	511
Background	511
Ofwat PR19 Decision	513
Submissions in support of using AAA non-government debt yields as a proxy for the RFR	516
ILGs and low-risk non-government bonds – CMA assessment	520
Submissions in favour of using alternative data as a proxy for the RFR	524
Submissions in favour of using alternative data as a proxy for the RFR – CMA assessment	528
Submissions relating to the appropriate measurement period for market data	530
Submissions relating to the appropriate measurement period for market data – CMA assessment	531
The use of forward rate adjustments	532
The use of forward rate adjustments – CMA assessment	532
Estimating the RFR - Our provisional approach	533
RFR - CMA provisional determination	534

Total Market Return	534
Introduction.....	534
Ofwat's PR19 Decision	535
Key arguments	536
Historic 'ex-post' approach	537
Historic 'ex-ante' approach	549
Forward-looking approach	553
Survey evidence and practitioner forecasts	555
CMA assessment of evidence on TMR	556
TMR - CMA provisional determination	557
Beta	558
Introduction.....	558
Calculating equity betas	559
Calculating debt betas	559
Ofwat PR19 Decision	560
Key arguments	563
Submissions relating to the measurement of equity betas – CMA assessment	570
Submissions relating to the measurement of debt beta.....	577
Arguments relating to the measurement of debt beta – CMA assessment..	582
Summary and CMA provisional determination.....	585
Cost of Debt.....	586
Introduction.....	586
The cost of embedded debt.....	586
Cost of embedded debt - summary of CMA assessment	594
Cost of embedded debt – provisional determinations	595
The cost of new debt	595
Cost of new debt - summary of assessment.....	598
Cost of new debt – provisional determination	599
The proportion of embedded and new debt used in our WACC calculation	599
Proportion of embedded and new debt – CMA assessment.....	602
Proportion of embedded and new debt – provisional determination	603
Issuance and liquidity costs	604
Issuance and liquidity costs - summary of assessment	605
Issuance and liquidity costs – provisional determination	605
Cost of debt – summary and CMA provisional determinations	605
Bristol's Request for a Company Specific Adjustment to their Cost of Capital	
Allowance	606
Background	606
Ofwat's PR19 decision	607
Key arguments	608
Summary and CMA provisional determination.....	636
Retail Margin Adjustment.....	636
Background	636
PR19 Decision.....	637
Submissions on the Retail Margin Adjustment	638
Retail Margin Adjustment – CMA assessment.....	641
Retail Margin Adjustment – CMA provisional determination	643
Gearing Outperformance Sharing Mechanism.....	643
Introduction and PR19 Decision	643
Key Arguments.....	644

GOSM - CMA provisional determination.....	657
WACC range and our provisional assessment of the appropriate cost of capital allowance.....	659
Arguments in favour of ‘aiming straight’ (picking the midpoint of the range as the point estimate):.....	660
Arguments in favour of ‘aiming up’ by picking a point estimate above the midpoint of the range:.....	665
Aiming up/down – CMA analysis	670
WACC – CMA provisional determination	672
Our Cost of Capital allowance in context	676
Our decision in the context of PR19 and PR14	676
10. Financeability.....	678
Introduction	678
Background and Ofwat’s approach at PR19	678
Ofwat’s decisions on PAYG and RCV run-off rates	680
Financeability – Disputing Companies’ Views.....	681
Anglian	681
Bristol	682
Northumbrian.....	683
Yorkshire	684
Financeability – Third Party Views	685
Financeability – CMA approach	687
Background and effect of our provisional decisions on financeability	688
Approach to measuring and interpreting credit ratios	689
Results and interpretation of credit ratio analysis	694
Overall conclusion on financeability	699
Choice of PAYG rates	700
Anglian’s request to change revenues to reflect misallocation of Capex and Opex.....	701
11. Other issues.....	702
Introduction	702
Taxation	702
Introduction.....	702
Ofwat’s PR19 final determination Approach	702
Views of Disputing Companies	702
CMA Review of Alternative Pass-through Arrangements	703
CMA Assessment and Provisional Findings	703
PR14 Reconciliation – Revenue Forecasting (WRFIM) – Yorkshire only.....	704
Introduction.....	704
Background	704
Yorkshire’s reasoning	705
Ofwat’s views.....	707
Third Party Views	708
Our assessment	709
Value of adjustment.....	710
Provisional CMA decision on value of adjustment.....	713
Potential Grants & Contributions Error – Northumbrian only.....	713
Introduction.....	713
Background	714
Northumbrian’s reasoning	714
Ofwat’s views.....	716

Third party views	716
Our assessment	716
Provisional CMA assessment.....	719
Separate Price Controls.....	719
Retail Price Controls.....	720
Bioresources (sludge).....	720
12. The provisional determination for Anglian	722
Introduction	722
Totex allowances	723
Modelled base costs.....	723
Unmodelled base costs	725
Enhancement costs	726
Other costs	729
Overall Totex	729
Outcomes	731
WACC and financeability	733
WACC	733
Retail margin adjustment.....	736
Gearing outperformance sharing mechanism.....	736
Financeability.....	737
Implied calculations of revenue and implication on bills.....	738
Revenue adjustments.....	738
Implied Anglian revenue in AMP7.....	738
13. The provisional determination for Bristol.....	742
Introduction	742
Totex allowances	743
Modelled base costs.....	743
Unmodelled base costs	745
Enhancement costs	746
Other costs	747
Overall Totex	747
Outcomes	749
WACC and financeability	751
WACC	751
Retail margin adjustment.....	754
Gearing outperformance sharing mechanism.....	755
Financeability.....	755
Implied calculations of revenue and implication on bills.....	756
Revenue adjustments.....	756
Implied Bristol revenue in AMP7.....	757
14. The provisional determination for Northumbrian	760
Introduction	760
Totex allowances	761
Modelled base costs.....	761
Unmodelled base costs	763
Enhancement costs	764
Other costs	766
Overall Totex	767
Outcomes	768
WACC and financeability	770
WACC	770

Retail margin adjustment.....	772
Gearing outperformance sharing mechanism.....	773
Financeability.....	773
Implied calculations of revenue and implication on bills.....	775
Revenue adjustments.....	775
Implied Northumbrian revenue in AMP7.....	776
15. The provisional determination for Yorkshire.....	779
Introduction.....	779
Totex allowances.....	780
Modelled base costs.....	780
Unmodelled base costs.....	782
Enhancement costs.....	783
Other costs.....	784
Overall Totex.....	785
Outcomes.....	787
WACC and financeability.....	789
WACC.....	789
Retail margin adjustment.....	792
Gearing outperformance sharing mechanism.....	792
Financeability.....	792
Implied calculations of revenue and implication on bills.....	794
Revenue adjustments.....	794
Implied Yorkshire revenue in AMP7.....	795
16. Next steps.....	798

Appendices

- A: Ofwat's duties under the Water Industry Act 1991
- B: List of enhancement categories, and Ofwat's FD assessment methodology
- C: Cost of capital

Glossary

Summary

Overview

1. This report contains the Competition and Markets Authority (CMA)'s provisional price control determinations for four companies: Anglian Water Services Limited (Anglian); Bristol Water plc (Bristol); Northumbrian Water Limited (Northumbrian); and Yorkshire Water Services Limited (Yorkshire) (together defined here as the Disputing Companies) that rejected the Ofwat PR19 price control determinations.
2. For the reasons set out in the report, we have provisionally:
 - (a) agreed with Ofwat that the four companies should be subject to a challenging set of performance targets, reinforced by financial incentives;
 - (b) provided limited additional funding to allow for more resilient networks as well as enabling the companies to achieve substantial reductions in leakage;
 - (c) made adjustments to Ofwat's allowed rate of return to reflect market evidence and best regulatory practice and with a view to ensuring continued investment in the sector;
 - (d) reduced to some extent the companies' exposure to financial risk to achieve what we consider to be the right balance between incentivising out-performance and ensuring that the companies can finance themselves.
3. The allowed rate of return in our provisional determination is significantly lower than the rates applied by Ofwat and the CMA in the previous price control period. This largely reflects market movements in the period and means that customers will receive lower bills than in the previous control period, although they will be higher than those under Ofwat's proposed price control. This reflects the judgements the CMA has made about financing investments that are needed in the sector both now and in the future.
4. The indicative impact of our provisional findings on average annual customer bills are indicated in Table 1.¹

¹ As discussed in paragraph 99, we have not yet implemented all the technical steps required to convert our determination to changes to the price control licence conditions. In addition, the price control sets revenue allowances for the individual companies. This determines the average bill that the company can charge its

Table 1: Indicative impact of our provisional determination on annual customer bills

	<i>Company historical bills (2019/20)</i>	<i>Company average bill in April business plan*</i>	<i>Company average bill under Ofwat's Final Determination (FD)</i>	<i>Company average bill under CMA provisional decision</i>
Anglian (water and sewerage)	£422	£418	£386	£400
Bristol (water only)	£182	£174	£160	£166
Northumbrian (water and sewerage)	£429	£343	£323	£335
Yorkshire (water and sewerage)	£383	£379	£364	£379

*The April business plan figure here is taken from Ofwat's published documents, and may not align with all of the implications of the company's submissions in its Statement of Case.
Source: CMA analysis

5. The Disputing Companies requested us to look at a great many issues where we have provisionally found no reason to change the proposed price controls. These include, for example:
 - (a) Rejecting some proposed revisions to the various models used to estimate expenditure.
 - (b) Rejecting the argument that driving improved service will generally require greater expenditure.
 - (c) Rejecting some planned enhancement projects where the need for additional funding had not been demonstrated.
6. On some matters, we have imposed tighter controls than Ofwat, including reducing allowances where forecast demand growth is less than industry average, and greater efficiency challenges on certain large enhancement projects.
7. We have considered our provisional determinations in the round and concluded that they are consistent with our statutory duties. Among other considerations, we are satisfied that each of the provisional determinations protects the financial and service quality interests of the current and future customers who pay for water services. At the same time, they secure resilient services particularly in the face of increased challenges from climate change. We are also satisfied that the provisional determinations ensure that the companies are able to finance the proper carrying out of their functions by providing a sufficient but not over-generous return to investors.
8. We are issuing these provisional determinations for consultation. We intend to publish our final determinations in December 2020.

customers. Individual bills will vary depending on the charging scheme adopted by the company, see [information on charging schemes](#).

Background

9. Ofwat is the economic regulator for the monopoly water suppliers in England and Wales. Every five years, it carries out reviews of the price controls applying to these suppliers. These set the maximum revenues the companies can raise from customers. Ofwat's most recent PR19 price review, which governs the period 2020 to 2025, is the subject of these redeterminations.
10. Ofwat's themes for PR19 included long-term resilience in the round, affordable bills, innovation and responding to customer's needs. Ofwat said that from the initial development of the PR19 methodology it had been clear with companies that the price review was not going to preserve the status quo as the sector faced profound challenges, such as climate change, population growth and shifting customer expectations and so the sector needed to strengthen its operational performance. It said it was important to set a stretching but achievable level of overall challenge. It said that its view reflected concerns including little productivity growth or leakage reduction, even though some companies had managed to achieve high performance on service measures and high cost efficiency. It noted though that companies, on average, have tended to outperform the cost allowances in past periods.
11. In its 'Putting the sector in balance' position statement in 2018,² Ofwat raised concerns about high dividend payments; levels of executive pay; and complicated and potentially risky financial structures which call financial resilience into question. At PR19 it introduced the Gearing Outperformance Sharing Mechanism (GOSM) with the aim of ensuring highly-g geared companies shared any associated benefits with customers.
12. On 17 December 2019, Ofwat published its Final Determination of the PR19 price controls applying to all the water and wastewater service suppliers in England & Wales for the asset management period 2020 – 2025 (also referred to as AMP7).
13. The four Disputing Companies asked that Ofwat refer their price controls to the CMA for redetermination and Ofwat did so on 19 March 2019.
14. The main reasons for rejecting the PR19 determinations identified by the Disputing Companies included that Ofwat had:
 - (a) provided insufficient funding to deliver business plans including enhancement expenditure to improve resilience;

² Ofwat (2018), [Putting the sector in balance: position statement](#), Section 6

- (b) failed to recognise the link between costs incurred and delivering higher levels of service (the ‘cost-service disconnect’);
 - (c) inappropriately set too low a cost of capital;
 - (d) given insufficient weight to evidence on customer views; and
 - (e) increased levels of risk for companies (notably from asymmetric outcome delivery incentives (ODIs)) and, together with the other elements of the determination, this had undermined their financeability.
15. The Disputing Companies operate in different areas of the country and face, to some extent, different topographies, populations and climates which, in turn, impact the nature of the cost and service challenges they face. There are also differences in their activities: Anglian, Northumbrian and Yorkshire all supply both water and wastewater (sewerage) services, while Bristol supplies only water.
 16. The price paid by each customer is not set directly by the price control. Rather, the companies’ tariffs must be consistent with the revenue limits, which are derived from costs and levels of profit which the regulator identifies as allowable on the basis of its statutory duties. Ofwat also sets service quality targets, reinforced by a package of financial and reputational incentives. When reaching its determination, Ofwat is bound by a number of statutory duties, both primary and secondary, and, with respect to English water companies, it has to act in accordance with objectives set out in a Strategic Policy Statement (SPS) issued by the Department of Environment, Food and Rural Affairs (DEFRA).
 17. In carrying out a redetermination, the CMA is not bound simply to accept or reject the position adopted by Ofwat; rather it evaluates the evidence and adopts what it considers to be the best approach or outcome. In doing so we must take account of the same statutory duties as Ofwat (including the SPS).
 18. The scope of our determinations extends to all aspects of the price control and not just the issues raised by the water companies. However, we have prioritised our consideration of what we regarded as the key elements of the price controls in light of the time and resources available and so have not carried out an in-depth consideration of all aspects of the price controls.
 19. Water and wastewater services are essential to customers. We have been mindful of the issue of vulnerable customers, both those who are financially vulnerable and so face difficulties meeting their water bills and those who are vulnerable for other reasons. There are a variety of measures in use by the water companies to address these concerns, for example, in running a priority

services register and offering social tariffs. While we consider these extremely important, most of these measures lie outside the scope of the PR19 price control. Where relevant to the price control, we have given these careful consideration.

20. We are using the same regulatory building blocks as Ofwat used in its determinations. In particular, we have maintained Ofwat's approach of:
 - (a) setting four wholesale price controls and a retail price control; and
 - (b) separating our assessment into its major component parts around costs, service and financial returns.
21. While we did not consider it would be sensible or practicable to adopt a wholly different regulatory framework within the context of our re-determination, we have noted in our report where consideration should be given to changes to aspects of the regime in the future.
22. This report sets out our provisional decisions in relation to each of the major building blocks of the price control. In reaching our decisions we have taken account of the same statutory duties as applied to Ofwat, and we have had regard to the principles of best regulatory practice and the need to act in accordance with the SPS, but have exercised our own regulatory discretion in appropriately balancing these statutory duties.
23. In reaching our provisional conclusions we have taken into account evidence that was not available to Ofwat at the time of its determination. In general, we have considered updated market data, submissions of the main parties and third parties, reviews of business plans and specific projects, and the advice of engineering consultants, to reach these provisional conclusions.
24. In order to finally determine the price controls for each company for each activity, we will need to translate our decisions on each of the building blocks into a revenue allowance for each company. We will be consulting Ofwat and the Disputing Companies about the modelling we intend to undertake to reach these figures.
25. We have considered the extent to which we should take account of the impact of COVID-19 on water companies' costs and performance in our provisional determinations. However, there are significant difficulties in assessing these impacts within the framework of the redetermination at this stage. There is significant uncertainty regarding the full impact of COVID-19 on the water sector as well as the timing, duration and scale of such impacts. This uncertainty is likely to remain at the time of our Final Determination. For these reasons, we provisionally consider that the best mechanism for taking direct

account of impacts of COVID-19 is for Ofwat to consider these as part of an industry-wide process; Ofwat has proposed it will consider the needs for any ex-post adjustments at a time aligned to its normal PR19 reconciliation process.

Totex (total expenditure)

26. We have primarily set a funding allowance (totex) to cover forecast necessary costs, covering both base expenditure, which covers routine costs that companies incur, and enhancement expenditure, which covers the costs of enhancing the capacity or quality of the service. Base costs account for approximately 70% of totex.
27. Totex covers both operating expenditure (opex) and capital expenditure (capex); this approach was introduced by Ofwat at the previous PR14 price control to incentivise overall efficiency and address concerns that previous approaches assessing capex and opex separately had led to a focus on capital solutions.
28. In order to mitigate the risk that we set a totex allowance that turns out to be either too low or too high, we have, in line with Ofwat's approach, included an overall totex cost sharing mechanism which applies to the majority of totex. Under the cost sharing mechanism, if a company underspends its allowance, customers share in the saving made. Conversely, if the company needs to overspend to deliver the necessary services, it can recover part of the costs from customers. Cost sharing enables us to rely less on other mechanisms in the price control that provide some protection from uncertainty.
29. The proportions in which any cost difference is shared between customers and investors is known as the sharing rate. Ofwat applied a formula to determine the sharing rate for each company which was designed both to provide incentives for information revelation and to provide incentives to be more efficient.
30. While we agree with Ofwat there is merit in providing incentives on companies to provide accurate business plan information during the price control process, we were concerned, in particular, that the rates resulting from its formula could create unintended consequences, including in relation to schemes that require investment over multiple periods. We have therefore provisionally decided to depart from Ofwat's cost sharing rates and apply the same asymmetric rate to all of the Disputing Companies. Our approach results in the company bearing 55% of the cost of any overspend and 45% of the benefit of any underspend.

Modelled base costs

31. Water companies conduct many routine activities in order to run their businesses and provide a base level of service to customers. As noted above, these activities account for more than two-thirds of the totex for all the Disputing Companies.
32. We have adopted an econometric modelling approach to assess most of the costs of this base level of service relying on data from across the sector. Comparative benchmarking of this nature allows us better to estimate the efficient costs for these day to day operations than simply relying on individual company data or forecasts. Our modelling approach is similar to Ofwat's, although we select a slightly different set of model specifications. This results in some modest adjustments to the base costs allowances.
33. Our cost models estimate how much it would cost the average water company to cover base operations. However, we wanted to set cost allowances for an efficient water company, and so we have applied a catchup efficiency challenge based on our assessment of the upper quartile performers. Our provisional conclusion is to apply an upper quartile benchmark which we consider sets a challenging benchmark whilst acknowledging the limitations of our econometric modelling (and the consequent risk that the company will have insufficient allowed revenue to ensure a base level of service). Our benchmark is set at a similar, although slightly less demanding, level to Ofwat's.
34. Future costs are likely to differ from the historical benchmarks because of changes to productivity levels and costs. We have therefore:
 - (a) Applied a 'frontier shift' which reduces the modelled allowance by 1% per year to reflect expected productivity gains from improvements in technology and new ways of working. This is slightly lower than the equivalent adjustment made by Ofwat and reflects our judgement based on the evidence of productivity changes.
 - (b) Provided a real price effect adjustment ('RPE') for labour costs, which are a material cost item. We have also included a reconciliation mechanism for these labour costs to protect both customers and the company against forecasting error.
35. Serving new properties involves additional costs for water companies, both from the cost of installing a new connection, and more broadly from an overall increase in demand in an area necessitating reinforced or additional

infrastructure (like the cost of an additional treatment works). Like Ofwat, we have:

- (a) allowed for differences in forecast growth for the number of properties served by the different water companies, by reducing or increasing the allowance depending on whether forecast growth is above or below industry average;
 - (b) included a reconciliation mechanism to protect against inaccuracy in these forecasts, which is calibrated using total growth costs.
36. However, the growth adjustments we have used differ from those applied by Ofwat. In particular we have imposed symmetrical downward and upward adjustments for the impact of growth (whereas Ofwat had applied a more limited downward adjustment in revenues in respect of lower than average expected growth).
37. Ofwat's historical data collection approach contained no distinction between base opex and enhancement opex. Therefore, Ofwat's modelled base costs could double count enhancement opex if an adjustment was not applied. We address this issue by applying an adjustment to cost allowances using the same approach as Ofwat used in its PR19 final determination.
38. Our approach is reliant on econometric models which are based on a limited set of explanatory variables. This means that there could be company specific circumstances which are not reflected in our modelling. We have therefore, like Ofwat, assessed whether any cost adjustments should be made to reflect individual Disputing Companies' specific circumstances.
39. In general, our provisional decision is to apply an adjustment to cost allowances using the same approach as that used by Ofwat. We assessed a small number of cost adjustment claims specifically raised by Anglian. These included claims relating to capital maintenance and sludge transport, which we provisionally decide to reject. Nonetheless, we recognise that capital maintenance is a complex issue, which may become more important in the future. We therefore suggest that Ofwat considers developing indicators to track this issue and triangulate its base modelling with bottom-up capital maintenance modelling.

Unmodelled base costs

40. In designing our base models discussed above, we have excluded certain costs that are unsuitable for modelling where, for example, there is insufficient data for modelling or where exceptional circumstances apply to particular

companies. We refer to these as unmodelled base costs. These include costs associated with abstraction, business rates, and compliance with the Industrial Emissions Directive (IED) and Traffic Management Act (TMA), amongst others.

41. Ofwat made an allowance for the companies' unmodelled costs, and we provisionally decide that these are largely appropriate. We have also generally agreed with Ofwat's approach to applying a cost-sharing mechanism to these costs which took account of the extent to which they lie within management control.
42. We have made some company-specific decisions on certain unmodelled costs as follows:
 - (a) Bristol: We have allowed a small cost adjustment claim to reflect its costs of abstracting water from the Gloucester and Sharpness Canal (G&S Canal) which are atypically high;
 - (b) Northumbrian:
 - (i) Northumbrian has atypical abstraction costs associated with the Kielder Reservoir, that have increased following an Environment Agency consultation which finished after the Ofwat FD was published. We reflect this latest information by provisionally allowing Northumbrian an additional allowance to cover these costs.
 - (ii) Business rates: Ofwat was not aware of, and did not reflect in its final determination, a revision of Northumbrian's rateable values which took place in 2018. This resulted in an over allowance, which we remove in our provisional determination.
 - (iii) IED compliance costs: We provisionally decide to make a relatively small allowance to cover some costs to ensure compliance with the IED due to changing interpretation of this legislation.
43. Consistent with our provisional decision on base costs above, we have applied a frontier shift on these unmodelled costs of 1% together with a labour RPE (with a true-up mechanism where labour costs differ from forecasts). We do not consider our approach gives rise to any double counting necessitating an adjustment.
44. We have also concluded that the cost-sharing rates for business rate costs should differ to some extent from those applied more generally to unmodelled costs, reflecting the limited degree of management control over these costs.

45. Our provisional conclusions with respect to the base cost allowance for each Disputing Company are set out in Table 2:

Table 2: Base cost allowances for each Disputing Company

	£m (over 5 years)			
	Anglian	Bristol	Northumbrian	Yorkshire
Raw base models	3,518	357	2,099	3,070
Catch-up	-74	-14	-56	-72
Frontier shift + RPEs	-78	-8	-46	-67
Growth	36	4	-42	-50
Enhancement opex	-14	-2	-11	-14
Cost adjustment claims	26	6	5	16
Total modelled base costs	3,414	343	1,949	2,883
Abstraction charges	49	17	193	26
Traffic management	6	4	6	21
Business rates (Local authority and cumulo rates)	304	23	181	273
IED compliance costs	0	0	12	0
Total unmodelled base costs	359	44	391	320
Total base costs	3,773	388	2,340	3,204

Source: CMA analysis

Enhancement costs

46. Within Ofwat's framework, the enhancement allowance is intended to cover the costs for the water companies of undertaking investment to enhance the resilience, capacity or quality of service beyond a base level, such as building a new reservoir or treatment works, building strategic interconnectors to connect up parts of the network, and introducing new measures to protect wildlife.
47. Enhancement expenditure may be driven by a number of factors, including new statutory obligations and strategic priorities. The largest of these are generally:
- (a) **Environmental improvements:** Water companies have proposed numerous environmental projects, whilst also facing increasing obligations to improve their environmental outcomes including from the increased scope of the water industry national environment programme (WINEP) which is a set of statutory requirements overseen by the Environment Agency. In particular, Anglian, Northumbrian and Yorkshire face significant additional costs to remove phosphorus (which can cause excessive algal growth if discharged into rivers) from wastewater.
 - (b) **Supply-demand balance:** One of the responsibilities of a water company is to secure a balance of supply and demand including in light of ongoing

trends such as climate change and population growth. Water companies have a statutory requirement to develop a water resource management plan (WRMP) every five years, setting out how they intend to balance supply and demand over at least the next 25 years. Supply-demand balance can be influenced by investment in major new infrastructure (e.g. reservoirs) but also by measures to reduce leakage or reduce consumption.

(c) **Resilience:** Enhancement funding aims to provide improved operational resilience by funding schemes which address the risk of low-probability high-consequence events, such as ensuring properties are not reliant on a single source of supply or adding in additional support / back-up for critical infrastructure.

48. In Ofwat's FD, the four Disputing Companies were awarded enhancement allowances totalling £2.7 billion. This is substantially higher than their expenditure in previous periods, and reflects (amongst other things) substantial new WINEP obligations.
49. Ofwat's preferred method of assessment for enhancement was a benchmarking analysis of forecast costs. For other categories, Ofwat followed a 'risk-based process' of having a lighter touch ('shallow dive') assessment for low materiality costs and a more thorough assessment of the evidence ('deep dive') for high materiality costs, each based on the company's business plans.
50. In our review of enhancement expenditure, we have generally focused on areas where Ofwat and the water companies have provided conflicting views and where we need to resolve these in coming to our determination. These accounted for the majority of enhancement spend. For other enhancement expenditure, including some major schemes which met Ofwat's evidential threshold to receive additional enhancement funding, we provisionally adopt the same approach as Ofwat did in its final determination.
51. We have adopted the same broad overall approach as Ofwat to assess enhancement allowances, including a combination of benchmarking, deep dives and shallow dives. We have applied these approaches to categories of spend for the Disputing Companies, and, like Ofwat, considered any efficiency challenges which should be applied to these allowances. Our approach often involved an assessment of additional evidence or arguments which were not available to Ofwat at the time that it made its final determination.
52. We have made use of comparative data (including econometric modelling, engineering comparisons and cost benchmarking comparisons) where available to develop our best estimate for efficient enhancement costs. Where

a comparative approach was not appropriate, we are more reliant on evidence provided by the company proposing the enhancement. In these cases, we have, with the assistance of our independent engineering advisors, where appropriate, reviewed the evidence provided by the companies about the need for and costs of the more material schemes to assure ourselves that the proposed investment is both appropriate and efficiently delivered.

53. We apply efficiency challenges and reduce allowances where we are concerned about the robustness of the evidence provided for enhancement schemes. In doing so we are seeking to ensure that customers do not overpay for inefficient service whilst also ensuring sufficient allowance is available to achieve the enhanced level/quality of service. Consistent with our provisional decision on base costs above, we apply a frontier shift on all enhancement costs (not just WINEP and metering as Ofwat did) together with a labour RPE. In doing so, we consider that no adjustments are necessary to account for double-counting.
54. The most material enhancement area where both Ofwat and we decided to use benchmarking related to phosphorus-removal and WINEP allowances more generally, which are large and broadly-comparable programmes of work. Our provisional decision is to make adjustments to Ofwat's phosphorus-removal allowances based on alternative model specifications but to adopt the same overall approach. This results in relatively modest increased allowances for Northumbrian and Yorkshire of around £4 million and £9 million respectively.
55. The Disputing Companies raised a number of specific projects which we have assessed in greater detail and make provisional decisions on.
56. For Anglian these projects are:
 - (a) Strategic Interconnector Programme: Anglian proposed to build a series of interconnectors to transport water around its region in order to provide for an improved supply demand balance and increased resilience. We are, as is Ofwat, supportive of this aim and the benefits it will bring customers. After careful review, we consider that Anglian has demonstrated its plans are prudent and costs are efficient. We have provisionally provided Anglian with its full requested additional allowance for this scheme.
 - (b) Smart Metering Scheme: Anglian proposed to install smart meters in nearly all properties in its region by 2030, which would particularly assist with reducing leakage and water consumption in an area of the country which has relatively little rainfall. We are supportive of Anglian's proposal

but concerned that certain elements of its requested allowance would result in customers paying twice for the same activities as metering forms an element of base activities. We therefore have provisionally allowed some but not all of Anglian's requested allowance to cover the incremental costs of installing smart meters.

- (c) Water Resilience Scheme: Anglian included a request for additional funds for the replacement of certain assets within its water treatment works, and development of a new risk planning tool. Our provisional decision is that these activities represent incremental improvements which the sector has delivered, and continues to deliver, as part of its day-to-day operational functions, and so we have provisionally rejected Anglian's request for additional allowance for this scheme.
- (d) Security-related activities: Anglian included a request for additional funds for the delivery of certain water security-related activities. We provide Anglian with its full requested allowance on Security and Emergency Directive (SEMD)³ activities which arise from new legal obligations, but we apply an efficiency challenge on aspects of non-SEMD where the evidence provided on cost efficiency is insufficiently robust.
- (e) Bioresources Scheme: Anglian proposed to expand one of its sludge treatment centres to accommodate expected increases in the level of sludge being produced in the future. We find that this proposal is reasonable given the limited availability of alternative capacity from other suppliers, and reflects an efficient whole-life approach to the issue identified. We have provisionally provided Anglian with its full requested additional allowance for this scheme.

57. In addition to the above schemes, we have assessed Anglian's concerns around its uncertainty of recovering its costs of treating metaldehyde following the overturning of a ban on the use of this pesticide. Our provisional decision is that the best approach to mitigate this risk is to allow Anglian its full requested allowance but to protect customers by including a claw-back

³ [The Security and Emergency Measures \(Water and Sewerage Undertakers\) Direction 1998](#) directs undertakers to maintain plans to provide a supply of water at all times. [The Security and Emergency Measures \(Water Undertakers\) Direction 2006](#) places a qualified duty on undertakers to provide a water supply to a licensed water supplier where (i) there is an access agreement in place and (ii) the licensed water supplier requests the water undertaker to provide it with a supply of water in the event that the licensed water supplier is unable to provide a supply to its customers due to an emergency or security event.

mechanism to remove the funding for the remaining years if the ban is reintroduced.⁴

58. For Northumbrian, these projects are:
- (a) Essex Resilience Scheme: Northumbrian proposed to build a new interconnector to allow the transfer of raw water between its reservoir in Abberton to its reservoir in Hanningfield, to mitigate the risk of substantial supply loss to the local area (in the context of ongoing climate change, population growth, and other risk factors). We consider that, in light of the nature of the risk, the cost of addressing the issue is relatively modest particularly given the number of households affected and the long-life nature of the solution which would provide ongoing benefits for many years to come. We have provisionally allowed Northumbrian its full requested additional allowance for this scheme; and
 - (b) Sewer Flooding Resilience Scheme: Northumbrian proposed to undertake a 'proactive' scheme to reduce the risk of internal sewer flooding in properties which have not previously been flooded. We have not included any increased allowance for this scheme as we have not seen robust evidence that the scheme proposed by Northumbrian represents incremental benefits for customers which should attract additional enhancement funding, rather than simply reflecting an alternative approach to carrying out its base activities (which are already funded).
59. Yorkshire raised one specific project, which we have assessed in greater detail, and on which we make decisions, specifically its Living with Water Partnership in Hull and Haltemprice. We provide additional enhancement funding to help address the unique circumstances in this area which result in an increased risk of flooding. However, we apply an efficiency challenge to the estimate included in Yorkshire's business plan.
60. When providing companies with specific funding to undertake additional activities, there is a risk that the company does not subsequently choose to proceed with the scheme while customers nonetheless bear the cost. In order to ensure that the higher level of service being funded by these schemes is delivered, we have included a number of scheme-specific mechanisms to protect customers from non- or under-delivery of these schemes.

⁴ We note that on 18 September 2020, DEFRA announced a decision to ban metaldehyde and phase it out by 31 March 2022. Given the timing of this announcement, we have not reflected this in our provisional decision. Defra (18.09.2020). [Press release Outdoor use of metaldehyde to be banned to protect wildlife](#)

61. Our provisional determination of the Disputing Companies' wholesale totex allowances is shown in Table 3.

Table 3: Implication of provisional determination on Disputing Companies' enhancement allowances, including variations from Ofwat's FD (£ million)

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
Ofwat FD allowance	1,425	30	352	906
Water models	0	0	0	0
Wastewater models (incl WINEP)	0	N/A	+4	+9
Shallow dive challenges	0	0	0	0
Deep dive challenges	0	0	-7	-5
Deep dives	+54	0	+20	+7
Metaldehyde	+63	0	0	0
Frontier shift*	-16	-1	-5	-1
Net change in leakage	-3	-1	0	+93
Total enhancement allowance	1,522	29	365	1,008
<i>Change vs Ofwat FD</i>	<i>+97</i>	<i>-1</i>	<i>+13</i>	<i>+103</i>

* Figures reported in the table above this line do not include the effects of frontier shift – all of this challenge is included in the specified row; this row includes both changes to scope and scale of frontier shift

Source: CMA analysis

Note: The numbers for net change in leakage for Anglian, Bristol and Yorkshire are indicative and subject to further review prior to our final determination.

Overall Totex

62. Our provisional determination of the Disputing Companies' wholesale totex allowances is shown in Table 4.

Table 4: Totex by type of cost, 2020-25 (£ million, 2017-18 CPIH deflated prices)

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
Modelled base allowance (including CAC)	3,414	343	1,949	2,883
Unmodelled allowance	359	44	391	320
Enhancement allowance	1,522	29	365	1,008
Other totex allowances*	-85	-6	-54	-67
Total	5,209	410	2,651	4,146
<i>Change vs Ofwat FD</i>	<i>+144</i>	<i>+5</i>	<i>+22</i>	<i>+92</i>

* Other totex allowances include operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset); and pension deficit recovery costs. Prices are deflated for inflation (based on Consumer Prices Index Including Owner Occupiers' Housing Costs (CPIH) measure).

Source: CMA analysis.

Outcomes

63. Ofwat's price control included a large number of performance targets or commitments for each company, supported by a package of financial and reputational delivery incentives (ODIs).

64. The performance commitments (PCs) and ODIs were derived from proposals made by the companies having conducted research into customer's priorities and willingness to fund incentives. Ofwat intervened in the companies' proposals on PCs and ODI rates or structure where it considered appropriate having conducted a comparative evaluation of company proposals, and taking account of customer views, and performance in previous price control periods.
65. The resulting package included eleven common PCs applying to all water companies and a further four common PCs applying to all WASCs, as well as a number of bespoke PCs for each company. The common PCs covered areas such as:
- (a) performance level measures (for example, water supply interruptions and pollution incidents);
 - (b) asset health measures (such as mains repairs and sewer collapses);
 - (c) measures to reduce water demand (leakage and per capita consumption); and
 - (d) measures to help vulnerable consumers (priority service register).
66. Most PCs were accompanied by financial incentives in the form of ODIs, either as designed by the companies based on customer research, or as amended by Ofwat. In some cases, Ofwat set symmetrical ODI rates with the same rates for out and under-performance, while in other cases asymmetrical rates were used. Ofwat also made use of so-called penalty-only ODIs, which carry a penalty for under-performance but no reward for out-performance. Ofwat also made use of so-called 'enhanced ODI rates', which provide a higher rate of reward (or penalty) for performance beyond (or below) a given threshold.
67. The ODIs included caps on the level of outperformance rewards (both at standard and enhanced rates) in some circumstances to limit these and the consequent impact on customer bills. Likewise, the ODIs included penalty collars to limit the company risk of incurring substantial underperformance penalties. In some cases, the ODIs also included 'deadbands', which allow for a degree of under-performance before a penalty is triggered.
68. Ofwat's approach to outcomes and PCs at PR19 included:
- (a) Setting three common PCs on the basis of upper quartile forecast performance, with the remainder set with reference to the ranges of anticipated performance included in companies' business plans.

- (b) Seeking a minimum reduction of 15% for leakage.
 - (c) Having a 3% gross RORE (return on regulatory equity) limit on the overall size of any outperformance rewards earned and a 3% gross limit on the overall size of any underperformance penalties incurred by a Company.
69. Overall, we provisionally decide that the package of PCs and ODIs imposed by Ofwat should largely remain in place. In doing so, we have provisionally concluded that:
- (a) Ofwat was right to intervene in company business plans to take account of comparisons between companies and that doing so did not inappropriately ignore differences between topographies or weather conditions;
 - (b) There is no simple cost-service relationship whereby more demanding PCs should always be accompanied by higher costs. Moreover, for the PCs other than leakage, we have not found that the improvements in performance required by the common PCs are sufficiently large as to justify an increase in cost allowances.
 - (c) The extensive engagement and research undertaken by companies in PR19 has gone a long way to encourage company business plans and regulatory decisions to reflect the specific priorities and values of customers and the outcomes framework is an area where customers and key stakeholders properly play a role in determining the standards of performance that companies should be held account for. That said, we consider there are limits to the weight that can or should be placed on customer research evidence in this area.
70. We have also provisionally concluded that the use of asymmetric or penalty-only incentives may be appropriate in certain circumstances, for example, where there is evidence that customers would not be willing to pay for outperformance or there are diminishing economic benefits to outperformance. Where this results in residual financial risks for investors, this should be taken into account as part of the assessment of the appropriate cost of capital and whether the company is financeable.

Common PCs

71. We focused our assessment on the common PCs and the related ODIs and have provisionally concluded that:
- (a) the PC levels for the three common performance measures set at the forecast upper quartile level are appropriate. These cover water supply

interruptions, pollution incidents and internal sewer flooding. It is normal regulatory practice to make assessments using comparative regulation, and upper quartile is a common measure used when promoting improvements in efficiency;

- (b) we are proposing some adjustments to the ODI rates, caps and collars for the common PCs relating to unplanned outages and mains repairs. In particular, we propose to introduce deadbands which would mitigate the risk of penalties that might arise in respect of these PCs due to factors outside the companies' control;
- (c) we welcome the common PC linked to vulnerable customers that encourages companies to identify those customers most likely to need additional support. A thorough and up-to-date Priority Services Register may also prompt companies to identify further innovations that will allow the sector better to help vulnerable customers; and
- (d) we have considered the leakage PC separately due to the interaction of the funding and outcome incentives in relation to leakage and because of the attention it has been given.

Bespoke PCs and ODIs

72. Other than in a very limited number of cases, we generally did not identify a need to intervene on bespoke PCs or their associated ODIs.

Leakage

73. Each of the Disputing Companies has a PC which requires them to achieve a step change in the level of leakage reduction compared to previous periods. We have provisionally decided to retain these PCs at the level set by Ofwat.
74. We have, however, provisionally determined that some of the Disputing Companies may require an additional allowance to achieve the required level of performance. In particular:
- (a) We have provisionally concluded that there is a link between maintaining higher performance on leakage and costs such that the base cost model we used will not adequately compensate companies that are maintaining performance above the upper quartile. We have therefore adjusted the base cost allowance for the two Disputing Companies that are higher performers on leakage, Anglian and Bristol, to allow for this.

- (b) We provisionally conclude that the Disputing Companies which identified that they required enhancement cost funding for achieving the leakage reductions they committed to should be allowed the efficient cost of doing so. In particular, we provisionally consider that companies should be allowed to recover at least some of the costs of achieving leakage reductions even though they are not an upper quartile performer because there is no evidence that the Disputing Companies have profited in the past by underperforming their leakage targets or by obtaining excessively generous funding for those targets.
- (c) We intend to do further work to establish the appropriate level of enhancement funding for Anglian, Bristol and Yorkshire for leakage between our provisional and final determinations. As an indication of the effect of this approach, we have calculated indicative allowances for the three companies based on applying their company-specific efficiency factor, frontier shift and RPE adjustment to their requested allowances. This approach results, in particular, in an increased allowance for Yorkshire. Northumbrian (which is also a below upper quartile performer) has not sought additional adjustments for base or enhancement costs relating to leakage reduction, so we have not included any allowance for this in our provisional determination.

75. We have also considered the ODI rates relating to the leakage PC and in particular have rejected the use of enhanced ODI rates to reward substantial outperformance in this area. As explained above, we have concluded that leakage improvements will require additional funding and so will impose costs on customers. In the circumstances, and in the absence of evidence for the cost-benefit trade off of further leakage reductions, we do not consider it would be appropriate to use enhanced ODIs to shift the frontier in this area. We also made adjustments to increase the companies' penalty rates for underperformance ODIs, as we have provisionally concluded that this would make the calibration of the ODIs more consistent with our determination on enhancement costs.

Overall Changes to PC and ODIs

76. The summary of changes we have made to PCs and ODIs in Ofwat's FD including leakage (excluding scheme-specific PCs) are set out in Table 5:

Table 5: CMA provisional conclusions on the revisions to the PC arrangements set at PR19

<i>Category</i>	<i>PC</i>	<i>Change proposed</i>
Common performance measures	Water supply interruptions	no change
	Pollution incidents	Anglian: increase collar to 41.6
	Internal sewer flooding	Yorkshire: increase collars in years 2,3,4 and 5
Reducing demand	Leakage	All four companies: remove enhanced rates, and adjust funding. For Anglian, Bristol and Yorkshire, make changes to penalty rates.
	Per capita consumption	Bristol: reduce ODI rates to £-0.03m and £0.025m
Statutory measures	Compliance risk index	no change
	Treatment works compliance	no change
Asset health measures	Mains repairs	Deadband of 10 for all four companies
	Unplanned outage	Deadband of 1.2 x PCL for all four companies
	Sewer collapses	no change
Vulnerability measures	Priority services register	no change
Bespoke ODIs	Low pressure	Yorkshire: remove outperformance incentive
	Water quality contacts	no change
	Bathing water quality	no change
Other	Overall reward cap	no change, pending additional evidence

Source: CMA

Cost of Capital

Weighted Average Cost of Capital (WACC)

77. The cost of capital is an input to the calculation of the companies' allowed revenue and is used to calculate the profit that the companies need to earn to repay their investors within the PR19 price control.
78. Ofwat and the Disputing Companies had very different views on the right level of the cost of capital. As a result, the assumption on allowed profit was a large source of difference between Ofwat and the Disputing Companies. Ofwat chose a 2.96% appointee level cost of capital allowance, significantly below the cost of capital allowances suggested by the Disputing Companies during this redetermination, which are set out in Table 6:

Table 6: Ofwat PR19 appointee WACC versus Disputing Company positions.

Inflation adjusted CPIH-real point estimate or midpoint of range	Anglian	Bristol (industry level)	Bristol (inc. CSA)	Northumbrian	Yorkshire	Ofwat PR19
Appointee WACC	3.62%	3.32%	4.04%	3.54%	3.78%	2.96%

Source: Anglian SoC, 1221 (based on midpoint of an RPI-real range of 2.5% to 2.9%), Bristol SoC, para 150 (industry estimate based on nominal point estimate of 5.35%, Bristol SoC, para 24 (inc SCA estimate based on a nominal point estimate of 6.08%), Northumbrian estimated figure relates to KPMG expert report for Northumbrian, section 8.1 and an RPI-real range of 2.49% to 2.75%), Yorkshire estimate is based on KPMG's metrics other than Yorkshire's specific requests on cost and proportion of debt. The companies did not use the same WACC submissions to the CMA as were used in the business plans, and in some cases did not provide a single point estimate for the WACC in their submissions to the CMA.

Note: Where no overall point estimate or range was explicitly presented, we have estimated the company's view from either component metrics or other sources such as commissioned expert analysis. This table should be read as indicative only.

Note: The appointee WACC is the term used in Ofwat's determination for the weighted average cost of capital allowance for the relevant water or water and sewerage companies considered within our price control determination.

79. We have performed our own determination of the cost of capital using the Capital Asset Pricing Model (CAPM). The CAPM is an established methodology with well-understood theoretical foundations and which is based on the use of observable market data, together with some judgment on how to balance different sources of data. The CAPM is used by all UK regulators when calculating the cost of capital, and was the framework used by Ofwat in its PR19 final determination. We perform our own assessment of each of the parameters of this model, although our analysis is often built on our interpretation of the analysis and data provided by the Parties. We have included additional and more up-to-date market data in our assessment.
80. The main components of the CAPM which we provisionally decide on are (in inflation adjusted CPIH-real terms):
 - (d) The total market return (TMR) (6.2% to 7.2%): To calculate the TMR, we have placed the most weight on historical ex post returns (from 1900 to the present day), and placed some weight on both historic ex ante approaches and forward-looking evidence as a cross-check when selecting our range;
 - (e) The risk free rate (-1.4% to -0.8%): We have calculated a risk free rate by placing weight on both long-tenor index-linked gilts and AAA-rated non-government bonds (the highest quality commercial debt);
 - (f) The equity beta (0.65 to 0.80): We have calculated an equity beta based on a range of approaches of analysing the observable market data of WASC comparators, including a potential debt beta; and
 - (g) The industry cost of debt (2.3% to 2.9%): We have calculated a weighted average of new and embedded debt, including issuance and liquidity costs. In doing so, we largely rely on a notional approach using external indices and we did not apply a so-called 'outperformance wedge'

because, unlike Ofwat, we do not consider there is evidence that water companies could systematically outperform our chosen index once tenor and credit rating are adjusted for.

- (h) We agree with the use of a true-up mechanism for the cost of new debt in the next price control process and would expect this to be conducted on a like for like basis (with, no performance wedge applied when calculating the true-up).
81. We also form views on related metrics, particularly inflation (CPIH of 2%, with a 0.9% RPI-CPI wedge) and notional gearing (60%).
82. Having established a range for our appointee WACC of 2.82% to 3.99% using the parameters above, we have then selected a point estimate. The selection of this point estimate requires the application of judgement in weighing up various considerations. In particular, we need to take account of the potential for error in our estimates whilst also considering the need to adjust for any risks to customers from underinvestment without being unnecessarily generous to shareholders.
83. We have varied our approach to picking a point estimate based on the associated level of uncertainty involved in the calculation. As a result, for the costs of embedded (historical) debt allowance, we are picking a point estimate at the bottom of the range as we can observe that average historical benchmark costs of debt will fall over the period. For the cost of new debt allowance, we are estimating a current cost that will be subject to a true-up mechanism at PR24 and so consider the midpoint of our range to be the most appropriate estimate. For the cost of equity allowance, we are predicting a future cost with a number of uncertain component variables. Because there is a higher risk of error when estimating the cost of equity, we consider it prudent to pick an estimate between the midpoint and the top of our range. Taken together, these estimates lead us to provisionally estimate a cost of capital allowance that is marginally above the mid-point of the range, at 3.50%.
84. Our cost of capital approach within the provisional determination, in conjunction with our other provisional decisions, implies that customer bills at the four Disputing Companies will fall by an average of 9.3% in this price control. If we had picked the midpoint of our cost of capital range as our estimate, customer bills would have fallen by approximately a further 0.50%. Using Ofwat's PR19 cost of capital allowance would have resulted in customer bills at the four Disputing Companies falling by approximately 12.6% on average. However, we consider our provisional cost of capital allowance

achieves the right balance for customers, who benefit not only from lower bills but also from continued investment in the water and sewerage networks.

85. Ofwat's PR19 decision included a 0.04% reduction in WACC in order to avoid water companies receiving compensation for systematic risks that were already covered by the margin in the retail price control. Our own assessment suggests that the potential for overcompensation is higher than initially calculated by Ofwat, but that this should be incorporated as a reduction in each companies' allowed revenues rather than as an adjustment to the cost of capital. We will apply this adjustment in our Final Determination.
86. Our cost of capital allowance of 3.50% is 0.54% higher than Ofwat's PR19 decision but represents a significant 1.17 percentage point reduction in comparison to the allowance awarded to companies in PR14. This largely reflects market movements.

Bristol Company Specific Adjustment

87. Ofwat has made specific adjustments to one or more metrics within some water-only companies' cost of capital to reflect structurally higher costs faced by smaller companies within the industry. Bristol claimed a Company Specific Adjustment (CSA) as part of the CMA's redetermination of the price control, in the form of an uplift to the cost of debt allowance and the cost of equity allowance.
88. Ofwat in the PR19 final determination rejected Bristol's claim for a CSA uplift to the cost of debt allowance on the basis that customers did not benefit sufficiently from being served by Bristol to compensate for the increased costs of financing a small company.
89. We have provisionally decided to award Bristol a small uplift in its embedded debt allowance of 0.10% primarily reflecting the increased transaction costs of a small company. In doing so, we are conscious of the importance of regulatory consistency and the fact that the CMA has previously rejected the application of a customer benefits test in this area. We have not applied a customer benefits test to Bristol's costs of capital allowance and it remains our view that the key consideration in this regard is the return on capital that allows a notional company of the size of the appointee to finance its activities.
90. We have, however, provisionally assessed a smaller difference in Bristol's cost of debt than the CSA Ofwat awarded to other small companies and have rejected Bristol's request for a cost of equity uplift on the basis of new evidence, including the equity premiums paid for small companies in recent market transactions. We have applied an uplift only to the cost of embedded

debt as there is evidence that, due primarily to recent changes in the way debt markets operate, Bristol no longer faces higher costs on its new debt. Given that Bristol's embedded debt was raised towards the start of our 20-year trailing average for measuring embedded debt, we would anticipate significantly less need for Bristol to be awarded a CSA in future price controls.

Gearing Outperformance Sharing Mechanism

91. Ofwat introduced a GOSM for the first time in PR19. Ofwat stated that equity investors benefit from higher equity returns that are associated with their increased risk, but there is no substantive benefit passed to customers. In addition, Ofwat stated where companies adopt high levels of gearing, they may reduce financial resilience and transfer some risk to customers and / or potentially taxpayers in the event that a company fails. To address this, Ofwat introduced a mechanism that it said would share the benefits of higher gearing with customers.
92. We consider that Ofwat has legitimate concerns that customers may face costs where the water companies have gearing well above notional levels, and this increase in gearing could have an adverse effect on financial resilience. However, we have concerns about the GOSM implemented to address these concerns by Ofwat at PR19. These concerns relate to the effectiveness of a GOSM in improving financial resilience and the specifics of its design and, more fundamentally, whether the financial benefits of higher gearing assumed by Ofwat in its design of the GOSM exist. As a result, we have provisionally decided not to include a GOSM in our re-determined price controls.

Financeability

93. We are required to ensure that companies can continue to finance their functions. We have therefore completed a financial ratio analysis similar to that which would be undertaken by the credit rating agencies, in particular regarding the level of cash flow. We found that the Disputing Companies should be able to achieve strong investment-grade credit ratings based on the notional capital structure, and this is consistent with our assumptions in the WACC for the cost of debt. We also find that under a reasonable downside scenario, Disputing Companies ratios are worse than the baseline model but still investment-grade. We have also considered the overall risk/return package and take note that, compared to Ofwat's FD package, our re-determination has resulted in lower risk exposure in a number of areas.

94. We consider that companies facing a financeability constraint, such as to address a downside scenario, may consider a range of mitigating actions to address impact, such as absorbing headroom in credit ratios, the contribution of equity to forego dividends or inject fresh capital. We conclude that this supports the view that our provisional redetermination for each of the Disputing Companies is financeable.
95. The companies earn revenues through the PAYG (pay as you go) share of allowed totex, which is comparable to operating expenditure or current expenses, and RCV run-off (a form of depreciation of regulated assets). The companies proposed PAYG rates and RCV run-off rates for each of the four price controls (water network, wastewater network, bioresources and water resources). The use of these measures is intended to mirror the standard accounting concepts of operating expenditure, recovered from current customers, and capital expenditure, recovered over the life of the assets. The use of the regulatory measures of PAYG and RCV run-off as an alternative to accounting measures should allow the companies and Ofwat to set the recovery of costs over a suitable period and to address any timing issues.
96. We have concluded that our provisional determination would be financeable on the basis of these measures being set at a rate which is consistent with the underlying totex in this period. In particular, we consider that our provisional determination would be financeable without Ofwat's adjustment to bring forward more revenues to this period than implied by the Disputing Companies' business plans. We therefore propose that PAYG rates should be set at the levels proposed by the companies.

Conclusion and Next Steps

97. For the purposes of this provisional determination, we have calculated an indicative revenue allowance for each of the Disputing Companies for AMP7, which is reflected in Table 7:

Table 7: Calculation of indicative wholesale allowed revenue for each water company (£m)

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
PAYG	2,587	305	1,453	2,484
RCV Run-off	1,915	127	1,019	1,322
Return on Capital (Appointee)	1,242	81	634	1,066
Retail margin adjustment	-32	-2	-16	-27
Other CMA adjustments	0	0	0	35
Reconciliation	24	-7	-1	51
Tax	0	12	74	13
Grants and contributions	236	15	115	92
Deduct non-Price control income	-64	-10	-50	-18
Innovation competition	21	2	12	18
Revenue reprofiling	0	0	-1	0
Wholesale revenue	5,929	523	3,239	5,035

Source: CMA analysis.

98. We emphasise that while we have looked at individual components in detail, and necessarily made decision on each of these, we have also considered any cross-cutting or interconnected issues when making such decisions. In particular, the inter-relationship between cost and service, as well as risk, return and financeability have influenced our decisions in each of the major areas of the determination (outcomes, totex and WACC). This is a determination of a whole package ‘in the round’, and our provisional decision is that this package secures compliance with all our duties.
99. We will consult with the Main Parties in parallel to our consultation on this Provisional Determination on the technical steps required to convert our determination to changes to the price control licence conditions. Our intention is to publish the calculations and consequences for the licence and the supporting modelling alongside our Final Determination.

Provisional findings

1. Introduction

- 1.1 Under the Water Industry Act 1991 (WIA91) the Secretary of State appoints water companies and sets licence conditions governing their appointment.⁵ Water companies have the power to charge for any of the services provided in the course of carrying out their statutory functions.⁶ Under the terms of their licences, the charges that water companies can make for their retail and wholesale activities are controlled by the Water Services Regulation Authority (Ofwat). The licence conditions allow Ofwat to carry out periodic reviews and to make price control determinations that are designed to limit the revenue allowed to the relevant company and as a result the charges levied by it. Ofwat is required to carry out 5-yearly ‘periodic reviews’ (or ‘price reviews’) for this purpose.
- 1.2 On 15 December 2019, Ofwat gave notice to each of the water companies in England and Wales of its price control determinations in relation to them for the 5-year period from 1 April 2020 (PR19).
- 1.3 On 19 March 2020, Ofwat informed the Competition and Markets Authority (CMA) that the four companies – Anglian Water Services Limited (Anglian), Bristol Water plc (Bristol), Northumbrian Water Limited (Northumbrian) and Yorkshire Water Services Limited (Yorkshire) (together defined here as the Disputing Companies) – had not accepted Ofwat’s Final Determination (Ofwat’s FD) and had required Ofwat to refer the Disputed Determination to the CMA. Ofwat, as required by section 12(3)(a) of the Water Industry Act 1991 and the Appointments, referred the Disputed Determinations to the CMA (the References).⁷
- 1.4 The CMA was required to report on and re-determine the Disputed Determinations within a period of six months from 19 March 2020. However, on 24 March 2020, following a request from the CMA, Ofwat decided that given the nature and scale of work involved in four water industry price control References and the possible disruption from the COVID-19 situation, that there were special reasons why the reports cannot be made within the period specified in the References, and so extended the period specified in the

⁵ The Water Industry Act 1991, [section 6](#)

⁶ The Water Industry Act 1991, [section 142](#)

⁷ Ofwat’s notices of reference are published on our [website](#).

References by an additional six months. The CMA is therefore required to report on and determine the Disputed Determinations by 18 March 2021.

- 1.5 This report presents our provisional determinations for the four Disputing Companies. It covers our determination of the provisional revenue allowances and our reasoning for these. We invite submissions on our provisional determinations by 9am on Tuesday 27 October 2020, see paragraphs 16.1 to 16.5.

2. Background

Introduction

2.1 We set out below:

- Some background to the water industry and the process of regulation;
- Details of the four Disputing Companies;
- A summary of the statutory framework for the water sector and its regulation;
- Details of the statutory duties and strategic priorities applicable to Ofwat;
- A summary of the PR19 price review and how it developed from PR14;
- The context of PR19 from Ofwat's and the Disputing Companies perspective;
- Observations from the Disputing Companies about how Ofwat had balanced its duties; and
- The reasons why the four Disputing Companies rejected the determinations.

2.2 Our approach to the redetermination process is set out in Section 3.

Background to the water industry and regulation

2.3 The water industry in England has been operated by privately owned companies since privatisation in 1991.^{8, 9} There has been consolidation of ownership of water companies over time. The number of WOCs has reduced substantially following merger with each other or with larger water and sewerage companies (WASCs). Only two water companies remain as listed companies.

2.4 Different structures apply in Scotland, where Scottish Water is publicly owned. There is a separate Scottish Regulator, the Water Industry Commission for Scotland.

⁸ At the time of privatisation, there already existed a significant number of private water-only companies (WOCs, see paragraph 2.22).

⁹ In Wales, since 2001 Dŵr Cymru Welsh Water has been a not-for-profit company.

- 2.5 Since privatisation, water company services in England and Wales have been largely funded by customer bills and with private investment being used to finance capital projects. Water infrastructure networks require substantial capital investment and maintenance, and the need for investment is sometimes large and unforeseeable.¹⁰ Companies issue debt or raise additional equity to allow them to undertake projects without relying entirely on upfront charges to customers. This limits fluctuations in customer bills and allows long-lived water assets to be paid for over time by more of the users who ultimately benefit. In return, investors require a return on finance, which customers also pay for over time.
- 2.6 Following privatisation, the water industry has made substantial investment into the enhancement of infrastructure. There is evidence that there were significant improvements in the industries' efficiency and effectiveness after privatisation.¹¹
- 2.7 On privatisation of the water sector, three regulatory bodies were created for the sector – the Director General of Water Service supported by the Office of Water Services Regulation (Ofwat), which became the Water Services Regulation Authority as the economic regulator; the Drinking Water Inspectorate (DWI) which provides independent assurance on the quality of drinking water; and the National Rivers Authority (now the Environment Agency and Natural Resources Wales) as the environmental regulator.¹²
- 2.8 Water companies are licenced to operate in particular geographic areas. They are monopoly suppliers for wholesale provision of water and sewerage services, and associated retail, except the supply of water supply to business customers. Water undertakers and sewerage undertakers have the power to charge for any services provided in the course of carrying out their statutory functions in relation to water and wastewater services. These charges are ultimately borne by customers of water and wastewater companies.
- 2.9 As the economic regulator in England and Wales, Ofwat is responsible for regulating the monopoly companies. It has roles in protecting customer interests, and encouraging competition and adequate investment within the industry. It does this principally through administering and enforcing the

¹⁰ National Audit Office 2015, [The economic regulation of the water sector](#), paragraph 1.5

¹¹ For example see [Ofwat 'The form of the price control for monopoly water and sewerage services in England and Wales – a discussion paper'](#), p3.

¹² DEFRA sets the overall policy framework in England, including standard setting and drafting of legislation, and set strategic policy statements for Ofwat (the Welsh Government does this for Wales). Other relevant bodies include CC Water, which represents consumers within the water and wastewater sector and investigates consumer complaints not satisfactorily resolved by water companies, and Natural England which is the Government's adviser on the natural environment.

licensing regime for WASCs. Under the licences, Ofwat conducts five-yearly price reviews which are intended to protect customer interests and permit water companies to make an adequate return on capital (permitting investment into the water infrastructure), while encouraging efficiency. The most recent PR19 price review is the seventh since privatisation and is the subject of our redeterminations.¹³

- 2.10 At privatisation, it was anticipated that regulation would follow an approach whereby allowed revenues would be increased for inflation but adjusted to account for cost changes not otherwise captured by the inflation measure and productivity improvements. With periodic 5-year price reviews, companies would be incentivised to outperform their revenue allowances by retaining any underspend as profits. They would thus be incentivised to adopt improvements in efficiencies and reveal these, with the consequence that allowed revenues would be driven down in subsequent review periods to the benefit of customers.
- 2.11 Regulation has evolved over time. The level of detail on company operations which is examined and controlled, together with the process of developing price controls has become a much more extensive activity for the sector and regulator over successive price reviews.
- 2.12 All of the price controls set by Ofwat are in the form of revenue controls. These do not specify the individual prices or tariffs that companies charge for water services (such as unit charges, standing charges, or business tariffs). Final tariffs that are charged to customers are constrained so as to recover only the allowed revenues for both wholesale activities and retail activities. There are separate regulatory processes that apply to companies' decisions concerning the structure of tariffs and how they may vary across consumer groups subject to the overall revenue constraint.¹⁴
- 2.13 Ofwat's price control framework for wholesale price controls is based around the regulatory capital value (RCV). The RCV comprises the value of investment by a water company in its licensed activities that is recognised as such by Ofwat. This investment is returned over time to investors through a RCV run-off or depreciation charge that makes up a component of allowed revenues. At the price control review, Ofwat includes in its calculations an allowance for what it considers to be a reasonable level of return on the RCV, based on the cost of capital over the price control period. This allowed rate of return is estimated to reflect likely returns that investors would otherwise be

¹³ Ofwat's price reviews are known by reference to the year preceding their implementation. The predecessor to the current PR19 review was the PR14 determination.

¹⁴ These tariffs tend to be set annually, subject to the overall constraints from the aggregate revenue control.

able to earn on their investments in competitive markets appropriately adjusted for risk and is designed to attract appropriate investment to the sector at a fair price.

- 2.14 Under the RCV-based approach, estimates or assumptions of each company's expenditure requirements, over the five-year price control period, are also an input to calculation of the wholesale price control. Ofwat seeks to assess what each company's expenditure requirements would be if its spending was in line with that of an efficient company. Ofwat's cost assessment feeds into the calculation of the total allowed wholesale revenue, along with other elements including, as described above, allowances for regulatory depreciation and returns on past investment.
- 2.15 Ofwat uses a comparative regulation approach. It uses comparative analysis of all the water companies to inform its assessment of the efficient expenditure requirements of each individual company (along with target performance and incentive rates); by looking at all the different water companies and making allowances for differences between them, it seeks to estimate what revenues an efficient company performing its functions would require, given the geographic area in which it operates. For example, it may use econometric models to estimate an efficient benchmark based on costs and characteristics of different companies' actual operations.
- 2.16 However, there are limits in relying purely on comparative regulation. For example, they may not be able to fully determine and measure efficiencies; this could arise due to the many and varied differences between companies, the many factors that can contribute to efficiencies, the limited number of comparators, and possible information asymmetries between companies and the regulator.
- 2.17 Of the other sector regulators, the DWI checks that the water companies in England and Wales supply water that is safe to drink and meets the standards set in the Water Quality Regulations. DWI's roles include agreeing and managing water company programmes for improving drinking water quality including the DWI's input into Ofwat's periodic review of water prices.¹⁵
- 2.18 The Environment Agency is the principal adviser to the government on the environment, and the leading public body protecting and improving the environment of England.¹⁶ It is engaged in flood management, regulates discharges to water, and has a role in conservation and ecology. The Environment Agency has a duty to maintain and improve the quality of surface

¹⁵ [Drinking Water Inspectorate Webpage, about us](#)

¹⁶ Natural Resources Wales undertakes the equivalent role in Wales.

waters and ground-waters and, as part of the duty, it monitors the quality of rivers, lakes, the sea and groundwater. The Environment Agency manages the use and conservation of water through the issue of water abstraction licences for activities such as drinking water supply, artificial irrigation and hydro-electricity generation.

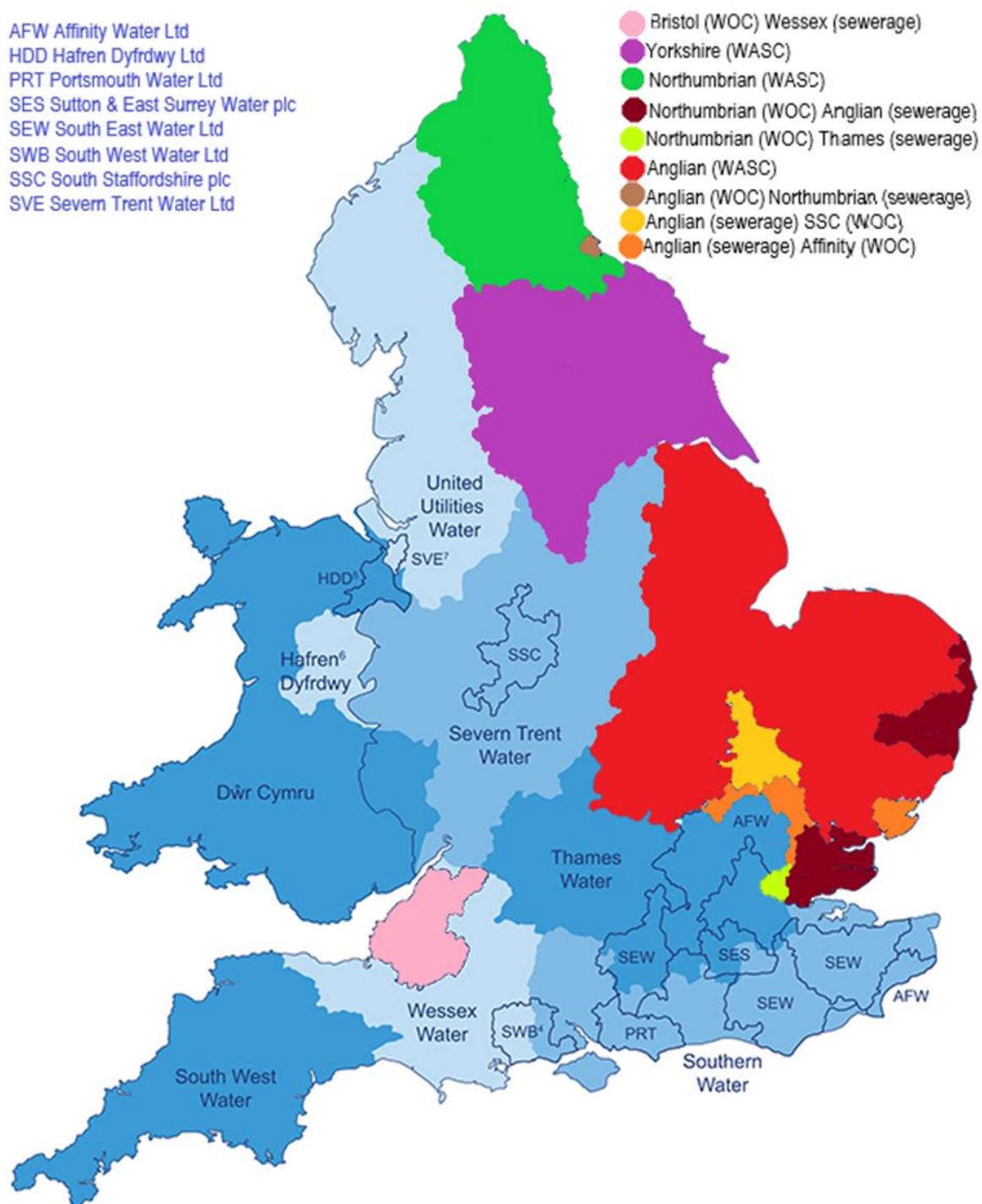
- 2.19 The consequence is that the DWI and the Environment Agency have important roles in determining how water companies operate and how they invest to manage water supplies, avoid pollution and assure water quality.
- 2.20 Overall, the average combined household water and sewerage bill is around £400 per year. Of this, around 40% relates to current costs, and 30% relates to RCV run-off which is similar to depreciation and relates to expenditure recovered over time (in other words, the return on capital investment in assets). Around 20% relates to the return on capital, in other words financing debt and providing a return to shareholders, and the remaining 10% relates to tax, the cost of retail activities and other less material items.
- 2.21 There is considerable variation in household bills between water companies, reflecting the challenges faced by different service areas in England and Wales, for example the state of existing infrastructure, the availability of raw water and how it is abstracted, stored and transported, the scale of treatment required, as well as population density and the pace of investment programmes. For example: there can be markedly different costs in treating water to make it suitable for drinking depending on whether it is drawn from a chalk aquifer or a river, which may be subject to industrial or agricultural pollution; similarly, pumping water or sewage over long distances and hilly terrain costs more than where it is treated close to centres of demand; and the need to enhance capacity and provide alternative sources may be highest where water supplies are under greater demand due to relatively limited rainfall and high population.

The four Disputing Companies

- 2.22 There are 11 water and sewerage companies (WASCs) and 6 water-only companies (WOCs) in England and Wales. In areas where WOCs operate, the WOC provides drinking water, while wastewater services are provided by a WASC.
- 2.23 Figure 2-1 shows the operating areas of the various water companies in England and Wales. The operations of the four Disputing Companies are shown in colours other than blue. Bristol is a WOC. Yorkshire supplies fresh and waste water services in its area. Anglian and Northumbrian are also WASCs, but in parts of their areas of operation, other WOCs are responsible

for water supply. Moreover, both have some water-only operations. Anglian owns Hartlepool Water, which is a WOC where sewerage is provided by Northumbrian. Northumbrian owns Essex and Suffolk Water, which is a WOC where sewerage is provided partly by Anglian and partly by Thames Water. For price determination purposes, Ofwat includes Hartlepool Water, and Essex and Suffolk Water with their parent WASCs although they have different allowed revenues from their parent and so different customer tariffs.

Figure 2-1: Map of the operating areas of water companies in England and Wales



Source: CMA adapted from Ofwat

2.24 Table 2-1 sets out some indicators of the size of each of the Disputing Companies. Bristol is relatively small as a WOC serving just over half a million properties. The other three Disputing Companies each serve over two million properties with both water and sewerage services and hence have markedly higher revenues and RCVs.

Table 2-1: Indicators of the size of the Disputing Companies

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
RCV (2019/20)	£8,242m	£563m	£4,316m	£6,951m
Ofwat's PR19 determination allowed revenues over 5 years	£5,600m	£462m	£2,900m	£4,400m
Number of connected properties	3,153,478	545,956	2,128,892	2,466,857
km of water mains	38,709	6,875	26,200	31,891
km of sewer	76,857	n/a	30,106	52,315
Population served	6.7m	1.2m	4.5m	5.1m
Annual revenue (2019/20)	£1,309m	£125m	£837m	£1,063m
Number of employees (FTE, directly employed)	4,834	560	2,911	3,525

All values are as at 31 March 2020, unless otherwise stated

Source: CMA, from company information. Allowed PR19 revenues from Ofwat, [Reference of the PR19 determinations: overview](#)

Anglian

2.25 Anglian is the largest WASC in England and Wales by geographic area and the fourth largest in terms of its RCV. It supplies services to more than three million connected properties in the east of England. In several areas such as Cambridge, Chelmsford and Basildon, Anglian provides wastewater services only (for historical reasons). In Hartlepool (trading as Hartlepool Water), Anglian provides water-only services. At 31 March 2020, Anglian directly employed 4,834 full time equivalent staff.

2.26 Anglian was one of the WASCs floated as public limited companies on the London Stock Exchange on privatisation in 1989 but was de-listed in 2006. The ultimate holding company is Anglian Water Group Limited (AWGL). AWGL is in turn owned by a number of pension funds and private equity funds.¹⁷

¹⁷ AWGL is a Jersey registered company which was incorporated on 14 September 2006. AWGL is owned by a consortium of investors comprising: (i) The Canada Pension Plan Investment Board (Hong Kong) Limited (32.9%); (ii) First Sentier Investors (Australia) RE Ltd and First State Investments Fund Management S.á.r.l. (15.6%); (iii) Global InfraCo (HK) E. Limited, which is controlled by IFM Investors (19.8%), a global asset manager owned by 27 Australian pension funds; (iv) Camulodunum Investments Ltd (15%), a joint investment vehicle for Dalmore Capital and GLIL Infrastructure LLP; and (v) Infinity Investments S.A. (16.7%). AWGL's wholly-owned subsidiary, Osprey Acquisitions Limited, acquired Anglian Water Group Plc (now known as AWG Parent Co Ltd) and its subsidiaries, including Anglian, on 23 November 2006.

- 2.27 In 1997, it acquired Hartlepool Water plc and, on 1 April 2000, Anglian was appointed, through a merger of the businesses, as a water undertaker for the Hartlepool area and its 90,000 customers.
- 2.28 Anglian told us that the most acute issues in its region were climate change, population and housing growth and the need to protect and enhance the natural environment.
- 2.29 It said that the Anglian region is one of the driest in England and Wales with 71% of the UK national average rainfall. Anglian obtains water from a variety of sources; the main sources of water are groundwater (48.6%) and pumped storage reservoirs (42.3%). Water is taken from river intakes, groundwater sources, reservoirs, storage points and pipeline routes across the operating region, but the company described these sources as highly disparate and subject to limited connectivity.¹⁸
- 2.30 The Environment Agency classifies 59 out of the 129 catchments in Anglian's region as already over-abstracted or 'over-licensed', meaning more water is being taken from river and groundwater systems than is considered environmentally sustainable to meet 'good' ecological status under the Water Framework Directive.¹⁹ The principal land use of Anglian's region is arable farming and Anglian said its area has one of the highest usages of arable pesticides such as metaldehyde, which is difficult to remove from water.²⁰
- 2.31 Anglian also said it has a high proportion of flat and low-lying areas, including The Fens in Cambridgeshire and the Norfolk Broads, where it faces a risk of flooding and where more energy is required to pump water from place to place.
- 2.32 It told us its predominantly residential customer base is growing at higher than average rates and this high growth is projected to continue.

Bristol

- 2.33 Bristol is a WOC based in the South West, sourcing, treating and distributing water for a population of 1.2 million people across more than half a million connected properties in Bristol and the surrounding area. At 31 March 2020, Bristol directly employed 560 full time equivalent staff.
- 2.34 Following privatisation in 1991, the Bristol Waterworks Company became Bristol Water plc, a subsidiary of Bristol Water Holdings plc. In April 2016,

¹⁸ [Anglian SoC](#), paragraph 349

¹⁹ [Anglian SoC](#), p23

²⁰ Anglian Water, [Help and advice working with farmers webpage](#)

iCON Infrastructure Partners acquired a 50% stake in Bristol, which was subsequently increased to 80% in December 2016.

- 2.35 Bristol obtains water from a variety of sources. Its main sources of water are: rivers, principally the River Severn via the Gloucester & Sharpness Canal (approximately 47% of the supply); shallow surface water reservoirs in the Mendips (around 37%); and some small springs and boreholes.
- 2.36 Bristol told us that as a small WOC, it faced higher costs of financing than larger companies.
- 2.37 Bristol told us that it has changed significantly since its PR14 determination was referred to the CMA: it has new ownership; a new Board structure; a new management team; and has established a social contract with customers and stakeholders which it feels gives it a clear social purpose. It said it had undertaken a transformation programme to deliver increased cost efficiency, a stronger focus on operational management, and improved service for customers.

Northumbrian

- 2.38 Northumbrian is a large WASC providing services in the North East of England (trading as Northumbrian Water) and water-only services in Essex and Suffolk (trading as Essex & Suffolk Water).²¹ It serves more than 2.1 million connected properties in total and directly employed 2,911 full time equivalent staff at 31 March 2020.²²
- 2.39 CK Hutchison Holdings Limited (CKHH), listed on the Stock Exchange of Hong Kong Limited, is the ultimate legal owner of Northumbrian.^{23,24}
- 2.40 Northumbrian obtains water from a variety of sources. Northumbrian's main sources of water are from river abstractions (43%), pumped storage reservoirs (29%) and impounding reservoirs (22%), but there are significant differences between its two regions.²⁵
- 2.41 Northumbrian said that the key challenge in the North East is increased storm intensity increasing the risk of flooding. It said its water supply system in the

²¹ Northumbrian SoC, section 2, paragraph 46

²² Northumbrian SoC, section 2, paragraph 49

²³ Northumbrian is a wholly-owned subsidiary of Northumbrian Water Group Limited (NWGL), and is a member of Northumbrian Water Group (NWG). The legal owners of NWGL (via intermediate holding companies) are CKHH, CK Infrastructure Holdings Limited (CKI) and Li Ka Shing Foundation Limited (LKSF).

²⁴ Northumbrian has three directly and indirectly owned financing subsidiaries: Northumbrian Water Finance plc, Reiver Holdings Limited and Reiver Finance Limited.

²⁵ Northumbrian SoC, section 2, paragraph 46

area is characterised by predominantly upland raw water reservoirs (including Kielder Water) and water treatment works in the west of the region. This allows it to take advantage of natural topology to enable treated water to be fed by gravity to the main population centres in the east.²⁶ However, it said the east of the region is prone to severe storms. The resulting surface water flows, when combined with the main population centres, present a challenge regarding sewer flooding risk.

- 2.42 Northumbrian told us that water resources in the Essex area are primarily surface water-based complemented by a small amount of groundwater, along with water transferred into the Essex supply area from two sources.²⁷ Its Suffolk area has three separate supply zones, fed by a combination of ground water (from boreholes) and surface water.²⁸
- 2.43 It said that the Essex & Suffolk supply area is located within some of the driest areas of the country, and faces growing demand. We were told that climate change created increased risks as it could make rainfall less reliable, while in this supply area Northumbrian faced a lack of new intrinsic water resource; hence a key challenge related to maintaining resilient supplies.²⁹

Yorkshire

- 2.44 Yorkshire is a WASC providing services to around 2.5 million connected properties in the Yorkshire and Humberside region.³⁰ At 31 March 2020, Yorkshire directly employed 3,525 full time equivalent employees. Yorkshire manages over 600 water and wastewater treatment works across the area.
- 2.45 Yorkshire is owned by Kelda Group plc, previously named Yorkshire Water plc and was originally formed following water company privatisations in 1989. The Kelda Group was de-listed from the London Stock Exchange on 12 February 2008, following its acquisition by the global infrastructure fund, Saltaire Water.³¹
- 2.46 Yorkshire is one of the largest landowners in Yorkshire managing 28,000 hectares of land.³² Yorkshire obtains water from a variety of sources including reservoirs (around 74% of its requirements), water abstractions and

²⁶ [Northumbrian SoC](#), section 2, paragraphs 52–53.

²⁷ Namely the Chigwell raw water bulk supply from Thames Water Utilities and the Ely Ouse to Essex Transfer Scheme, owned by the Environment Agency, which brings water from Denver in Norfolk; [Northumbrian SoC](#), section 2, paragraph 60

²⁸ [Northumbrian SoC](#), section 2, paragraph 62

²⁹ [Northumbrian SoC](#), section 2, paragraph 51

³⁰ [Yorkshire Annual Performance Report 2019-20 Tables](#), Table Q4 line 8

³¹ KeldaGroup webpage: [Kelda Group's History](#).

³² [Yorkshire Annual Performance Report 2020](#) (APR 2020), p90

boreholes. Yorkshire collects around 1 billion litres of wastewater daily for treatment.³³

- 2.47 Yorkshire told us that it faces specific regional challenges. These included a higher than average proportion of cellared properties in the county which presents a higher risk of internal sewer flooding, and the problems of reducing the flood risk in Hull which it said constitutes the biggest flood risk outside of London.³⁴

The statutory framework and regulation

- 2.48 The post-privatisation provisions for the water industry in England and Wales are consolidated in the Water Industry Act 1991 (WIA91). The WIA91 has been amended over time including new primary statutory duties. The Water Act 2003 amended the WIA91 to include new regulatory arrangements for the water industry and the consumer objective as a primary duty. The Water Act 2014 amended some of the procedural arrangements relevant to these references and added the resilience objective as a new primary duty. New provisions in the Water Act 2014 also allow Ofwat to set charging rules with which all water companies must comply.³⁵ This Act also created a market for the retail of non-household supply.
- 2.49 Water companies have the power to charge for services provided in the course of carrying out their statutory functions.³⁶ The licence conditions include Condition B (charges), which allows Ofwat to carry out periodic reviews and to make price control determinations that are designed to limit the revenue allowed to each water company. In charging customers, water companies need to levy charges in a way which complies with the price controls set by Ofwat.³⁷
- 2.50 Through the licence conditions, Ofwat sets the following price controls³⁸ for WASCs in England and Wales:

³³ [Yorkshire Annual Performance Report 2019/2020](#), p19

³⁴ [Yorkshire SoC](#), paragraphs 11(d) & 8

³⁵ Section 143B WIA91

³⁶ Section 142 WIA91

³⁷ Condition B clause 9.1/8.1

³⁸ See Licence Condition B clause 9.4 and Ofwat [Reference of the PR19 final determinations: Overview](#) paragraphs 3.25 – 3.35 for an overview of the price controls. Ofwat also sets a sixth price control for [Thames Water](#) in respect of the Thames Tideway tunnel. Thames has a bespoke licence condition that allows this.

- (a) Water Resource Activities;³⁹
 - (b) Network Plus Water Activities (wholesale water activities covering raw water distribution, water treatment and treated water distribution);⁴⁰
 - (c) Network Plus Wastewater Activities (wholesale wastewater activities covering sewage collection and treatment);⁴¹
 - (d) Bioresource Activities (ie sludge treatment and disposal);⁴² and
 - (e) Household Retail Activities.⁴³
- 2.51 Ofwat sets a sixth control for Business Retail Activities for Welsh Water only, and limits revenue to different customer groups depending on usage. It does not set such a price control in England as the business retail market is already open to competition. Companies can also undertake unregulated activities.
- 2.52 For WOCs in England and Wales, Ofwat sets the following price controls:
- (a) Water Resources Activities;
 - (b) Network Plus Water Activities;⁴⁴ and
 - (c) Household Retail Activities.
- 2.53 For Network Plus Water and Wastewater Activities, the price controls consist of a measure of inflation⁴⁵ plus 'K', which is a percentage figure determined at each price review which limits allowed revenues.⁴⁶

³⁹ Defined as activities carried out by the water company in performance of its functions as a water company in connection with abstraction licences, raw water abstraction, raw water transport and raw water storage, and such ancillary activities, as may be so designated from time to time by Ofwat.

⁴⁰ Defined as all activities carried out by the water company in performance of its functions as a water company other than Water Resources Activities and Retail Activities.

⁴¹ Defined as all activities carried out by the water company in performance of its functions as a sewerage company other than Bioresources Activities and Retail Activities.

⁴² Defined as activities carried out by the water company in performance of its functions as a sewerage company in connection with sludge transport, sludge treatment, sludge disposal and Network Plus – Sludge liquor treatment, and such ancillary activities, as may be so designated from time to time by Ofwat but excluding sewage collection, sewage treatment and sewage disposal.

⁴³ See Condition B clause 8.3/9.3 The retail price control covers household-related services that the companies provide – such as sending customers' bills and responding to customer enquiries and non-household water supply but excluding water treatment and treated water distribution.

⁴⁴ Condition B clause 8.4/9.4

⁴⁵ From April 2020 the licence conditions use CPIH as the relevant index rather than the Retail Price Index (RPI). RPI and CPIH are ONS inflation measures.

⁴⁶ Formally, these price controls are expressed as:

(a) the percentage change (positive, negative or none) in the Consumer Prices Index including owner occupiers' housing costs (CPIH) between that published for the month of November between November in the year prior to the relevant charging year and November in the preceding year; and

(b) a number, 'K', which may be a positive number or a negative number or zero. (Condition B clause 8.4/9.4)

- 2.54 For Water Resource Activities, Bioresource Activities and Retail Activities, the licence conditions require Ofwat to set the price control by reference to what is the appropriate nature, form and level of price controls in respect of these activities, how the company can demonstrate that it levies charges in compliance with the revenue allowances as well as the duration of these controls.⁴⁷ This takes slightly differing forms.⁴⁸

The statutory duties and strategic priorities and objectives statement

- 2.55 Ofwat's general statutory duties are split into primary and secondary duties.⁴⁹

- 2.56 The primary duties set out in section 2(2A) WIA91 (see Appendix A Section 2 General duties with respect to water industry) require Ofwat to perform its powers and duties in the manner which it considers is best calculated:

- (a) to further the consumer objective, which is to protect the interests of consumers, wherever appropriate by promoting effective competition between persons engaged in, or in commercial activities connected with, the provision of water and sewerage services (consumer objective);
- (b) to secure that the company's functions under the WIA91 are properly carried out in respect of every area of England and Wales (functions duty);

which together shall be expressed as a percentage, and which shall limit the change in the revenue allowed to the relevant water company in each year of the price control.

⁴⁷ Licence, Condition B, para 8.3/9.3 and 8.4/9.4

⁴⁸ Ofwat has set the price controls for Water Resource Activities, Bioresource Activities and Retail Activities in the formats set out below.

For Water Resources Activities, the price control set by Ofwat consists of:

(a) the percentage change (positive, negative or none) in CPIH (or RPI pre-April 2020) between that published for the month of November between November in the year prior to the relevant charging year and November in the preceding year; and

(b) a number, "K", which may be a positive number or a negative number or zero;

which together shall be expressed as a percentage, and which shall limit the change in the revenue allowed for the relevant water company in each year of the price control. (Condition B, clause 8.4/9.4)

For Bioresource Activities, the price control set by Ofwat consist of:

(a) a total amount of revenue which is modified to reflect differences between outturn sludge production and forecast sludge production;

(b) an adjustment to reflect any over- or under-recovery of revenue in previous charging years in the price control period; and

(c) an adjustment to reflect any profit made by the relevant water company where assets belonging to the relevant water company are used by any other person (Or by any business or activity of the relevant water company other than its appointed business activities);

and shall limit the revenue allowed to the relevant water company in each charging year of the price control.

For Retail Activities, the price control consists of a limit on the total revenue allowed to the relevant water company in each charging year of the price control in respect of the Retail Activities concerned (Condition B clause 8.3/9.3).

⁴⁹ The language of primary and secondary duties was utilised by the CMA in the Bristol Water PR14

Determination (Bristol Water PR14 Final Report paragraph 3.4), and is also found in Defra policy documentation (Defra – Updating the General Duties with respect to the water industry to reflect the UK Government's resilience priorities - April 2013 para 6.4).

- (c) to secure that the company is able (in particular, by securing reasonable returns on its capital) to finance the proper carrying out of those functions (financing duty);
- (d) to secure that the activities authorised by the company's licence and any statutory functions are properly carried out (licence duty); and
- (e) to further the 'resilience objective'.⁵⁰

2.57 The secondary duties (set out in Appendix A Section 2 General Duties with respect to water industry) require Ofwat to exercise these primary duties in the manner which it considers is best calculated to:

- (a) promote economy and efficiency on the part of companies holding licences (efficiency duty);
- (b) secure that no undue preference (including for the relevant body itself) or undue discrimination is shown in the fixing of water or drainage charges;
- (c) secure that no undue preference (including for itself) is shown and that there is no undue discrimination in the doing by a water company of things which relate to the provision of services by itself or another company or things as relate to the provision of services by a water supply or sewerage licensee;
- (d) secure that consumers are protected as regards benefits that could be secured for them from the proceeds of any disposal of a company's protected land;
- (e) ensure that consumers are protected as regards any activities of a company which are not attributable to the exercise of its functions under the WIA91, in particular by ensuring that any transactions are carried out at arms-length and that in the exercise of its functions companies maintain and present themselves in a suitable form and manner; and
- (f) contribute to the achievement of sustainable development (sustainability duty).

⁵⁰ The resilience objective is defined for these purposes in section 2(2DA) WIA91 as: (a) to secure the long-term resilience of water undertakers' supply systems and sewerage undertakers' sewerage systems as regards environmental pressures, population growth and changes in consumer behaviour; and (b) to secure that undertakers take steps for the purpose of enabling them to meet, in the long term, the need for the supply of water and the provision of sewerage services to consumers, including by promoting: (i) appropriate long-term planning and investment by relevant undertakers; and (ii) the taking by them of a range of measures to manage water resources in sustainable ways, and to increase efficiency in the use of water and reduce demand for water so as to reduce pressure on water resources.

- 2.58 In exercising its powers and performing all of its duties, Ofwat is required to have regard to the principles of best regulatory practice, including the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed.⁵¹
- 2.59 In addition to these statutory duties, the Secretary of State may publish from time to time a strategic policy statement (SPS) which sets out strategic priorities and objectives which Ofwat must act in accordance with when it is carrying out its functions in England (see Appendix A under ‘Section 2A strategic priorities and objectives: England’). The SPS must take account of Ofwat’s statutory duties, social and environmental matters and other matters that the Secretary of State thinks fit.⁵² The SPS is not just relevant for price controls but for all the functions that Ofwat carries out. A separate SPS is published for Wales by the Welsh Ministers, but our discussion in this redetermination relates to England given the operating areas of the Disputing Companies.
- 2.60 The most recent SPS was published in 2017.⁵³ It contains three areas where it sets priorities and objectives for Ofwat. These are in relation to (i) securing long term resilience,⁵⁴ (ii) protecting customers,⁵⁵ and (iii) making markets work.⁵⁶
- 2.61 Securing long term resilience includes protection from service failures. This requires Ofwat to challenge the water sector to plan, invest and operate to meet the need of current and future customers.⁵⁷ As part of securing this priority the government expected companies to take account of the full range of pressure on water and wastewater services and consider a broad and innovative range of options to tackle these issues with a view to delivering the best value for money over the long term considering the wider costs and benefits to the economy, society and the environment.⁵⁸ There was also an expectation that companies carry out meaningful and effective engagement with consumers and demonstrate that their plans are acceptable to

⁵¹ Section 2(4) WIA91

⁵² Section 2A(3) WIA91

⁵³ [SPS 2017](#)

⁵⁴ SPS paragraph 4

⁵⁵ SPS paragraph 4

⁵⁶ SPS paragraph 36

⁵⁷ SPS paragraph 8

⁵⁸ SPS paragraph 9

consumers. The government said Ofwat should intervene if it does not have assurance that companies are planning in a resilient long-term manner.⁵⁹

- 2.62 In respect of 'protecting customers'⁶⁰ Ofwat must require water companies to go further in identifying and meeting the needs of customers who are struggling to afford their charges.⁶¹
- 2.63 The third area in the SPS, making markets work, required Ofwat to promote markets to drive innovation and achieve efficiencies in a way that takes account of the need to further (i) the long term resilience of water and waste water systems and services; and /or (ii) the protection of vulnerable customers.⁶² Under this priority the SPS set out an expectation that Ofwat explore the full range of ways in which it can bring competitive pressures to bear in the water market focusing on areas where the industry has significant potential to improve.⁶³ It also said Ofwat should seek to sustain long-term investor confidence in the sector in line with its duty including protecting current and future consumer interests.⁶⁴
- 2.64 Ofwat set out how it considered it had fulfilled the priorities and objectives of the SPS in PR19.⁶⁵
- 2.65 When a reference is made to the CMA by Ofwat (on request of a water company) for a redetermination of Ofwat's price control, the CMA is to decide the matter on its own merits in accordance with the statutory duties that apply to Ofwat.⁶⁶ The CMA has received four separate references and has a duty to make four determinations of the price control - one for each company's reference.
- 2.66 In carrying out these redeterminations, the CMA will be exercising its own regulatory discretion as to how to appropriately balance these statutory duties. As the CMA is making a fresh determination, the CMA considers that it should, in principle, consider any further issues that have arisen since Ofwat made the disputed determinations.⁶⁷

⁵⁹ SPS paragraph 10

⁶⁰ SPS paragraph 4

⁶¹ SPS paragraph 28

⁶² SPS paragraph 36

⁶³ SPS paragraph 37

⁶⁴ SPS paragraph 38

⁶⁵ [Ofwat – UK Government priorities and our 2019 price review final determinations](#) (Ofwat Gov priorities 2019)

⁶⁶ Section 12(3)(b) WIA91

⁶⁷ Also see consideration in CMA Bristol PR14 Determination, paragraph 2.15

- 2.67 The legislation does not set out any hierarchy of the primary duties.⁶⁸ The CMA has previously set out (in the CMA's Bristol PR14 Determination) that the primary duties are equally important and are intended to complement one another. They should not be applied in isolation. The secondary duties are subordinate to, or subject to, the primary duties but are still legal requirements that must be taken account of.⁶⁹
- 2.68 In balancing the primary duties, the CMA has had regard to previous decisions of the CMA and the Competition Commission (CC) to the extent relevant. There is precedent value in these previous decisions, but previous approaches can be departed from where justified.⁷⁰ Previous decisions will not, however, have taken account of updates to the legislation, such as the introduction of the resilience objective (see paragraph 2.56(e)) or the SPS, and will have applied the duties in different circumstances.
- 2.69 The SPS does not require extra weight to be given to one statutory duty over another. Ofwat's statutory duty is to carry out its functions in accordance with the SPS and to that extent it may prioritise certain work areas over others, but this does not affect the weight given to each primary duty. The expectation is that the regulated water industry will reflect the priorities and objectives in its strategic direction. Accordingly, there should not be a conflict between the SPS and the primary and secondary duties.

The Ofwat PR19 price review

- 2.70 In this section we summarise some key aspects of Ofwat's approach to PR19 that are relevant to our determinations. We do not seek here to cover all elements of Ofwat's PR19 price control framework and final determination. We describe more detailed aspects of Ofwat's approach as they arise in subsequent sections of our provisional determinations report.

Setting the PR19 price controls

- 2.71 In PR19, Ofwat set five separate price controls relevant to our determinations (see paragraph 2.50). All the price controls run for the five-year period from 1 April 2020.

⁶⁸ Case law has also set out that the order in which duties are listed does not create a hierarchy. See *R v Director General of Telecommunications, ex p. Cellcom* [1999] ECC 314 and Competition Commission SES PR04 Interim Decision at paragraph 4.52

⁶⁹ [Bristol Water PR14 Decision Final Report](#), paragraph 3.4

⁷⁰ [Bristol Water PR09 Decision Final Report](#), paragraph 9.21–9.22

2.72 Ofwat said that the PR19 methodology built on PR14 and earlier price controls. Significant developments at PR14 included:

- (a) Ofwat introduced separate price controls for wholesale and retail activities.
- (b) Ofwat required each company to focus on customer priorities and establish an independent Customer Challenge Group (CCGs, formed from local groups of customer representatives and other stakeholders), to review and challenge the way companies engaged customers and took customer views into account and to provide assurance to Ofwat about the quality and effectiveness of companies' direct engagement with their customers.
- (c) Ofwat went through a process to incentivise outcome performance. Ofwat set certain performance commitments (PCs) under which a target level of outcome was set for a number of defined measures of performance (see paragraph 2.96). Companies were encouraged to set financial incentives (outcome delivery incentives (ODIs), both reward and penalty) directly linked to performance above and below their committed performance level for each outcome and relative to allowed total expenditure. The intention behind the design of ODIs was that these should be based on customer research and agreed with the CCGs. Companies were asked to come up with their own list of metrics and targets, based on the customer research. Ofwat chose to intervene in a number of these areas, particularly regarding the target levels of service required.
- (d) In PR14 Ofwat introduced an approach to incentivise overall efficiency where it set a single wholesale expenditure allowance, or total expenditure (known as Totex), covering both Opex and Capex. This was to address the concern that differences in the way Ofwat assessed remunerated and incentivised Opex compared to Capex encouraged a focus on capital solutions. Ofwat's Totex approach applied across cost assessment, cost recovery and the RCV.⁷¹
- (e) Companies were required to submit business plans to Ofwat which were then assessed. Different targeted approaches were followed to further develop these depending on Ofwat's assessment of the quality of the plans and the need for detailed analysis.

⁷¹ A fixed proportion of the wholesale Totex allowance (reflecting Ofwat's cost assessment) was remunerated directly through revenues collected during the price control period. This proportion is given by the pay as you go (PAYG) rate. The remainder was added to the RCV and remunerated over a longer time period.

- (f) Where a company's actual expenditure varies from the wholesale expenditure allowance, a cost sharing incentive applies by setting a proportion of any over- or under-spend to be retained by the company, rather than being passed through to consumers. For PR14, Ofwat applied the cost sharing rate to Totex with no distinction between Opex and Capex.
 - (g) Ofwat applied a 'menu regulation' scheme for PR14 (this was not carried over, see paragraphs 2.80 to 2.83 for PR19). This was a complex regulatory mechanism that determines the cost sharing incentive rate that each company faces and the allocation of a company's allowed wholesale revenues between the coming price control period and subsequent price control periods. Ofwat's assessment of each company's efficient wholesale expenditure requirements is an input to the scheme, alongside a forecast from each company of its expenditure requirements over the price control period.
- 2.73 Ofwat started to develop the PR19 methodology in 2015 when it published the PR14 lessons learnt, followed by a consultation on its proposals for changes to the regulatory framework. It consulted on the PR19 methodology in July 2017 and published its final PR19 methodology in December 2017. The price review process continued until final determinations were published in December 2019.⁷²
- 2.74 Ofwat told us the process of setting the price control went through four stages:
- (a) First, Ofwat set the framework and methodology;
 - (b) Companies then submitted business plans based on this methodology, setting out a range of matters including: what companies propose to invest, what they propose to charge customers, how they will support vulnerable customers and how they will ensure the long-term resilience of their infrastructure and operations;⁷³
 - (c) Ofwat checked and challenged these business plans, making its initial assessment and intervening where it felt this was required; and
 - (d) Ofwat then consulted on its proposed interventions before making its draft determinations and final determinations.
- 2.75 The process described above can result in companies making successive developments and submissions of their business plans as a result of this

⁷² See [Ofwat PR19 Final Determinations: policy summary](#), s1.5.3

⁷³ <https://www.ofwat.gov.uk/water-companies-set-plans-2020-2025/>

interaction with Ofwat and seeing what good evidence looks like in other company plans. Ofwat said that while extensive, this process is partly intended to address concerns of information asymmetry between Ofwat and the water companies.

- 2.76 The key changes from PR14 were that separate price controls were introduced for water resources and bioresources (as well as wholesale water network plus, wholesale wastewater network plus, and residential retail, and business retail in Wales). In each of the wholesale controls, allowed revenue is indexed by CPIH rather than RPI from April 2020, with RCV transitioning from RPI to CPIH.⁷⁴ Ofwat said the move to disaggregate price controls since 2009 (when there was a single control) was to facilitate the development of new markets (eg in providing for vertical separation between wholesale and retail activities) and provide greater focus.
- 2.77 Ofwat retained its broad approach to PCs and ODIs from PR14 but sought to make PCs more 'stretching' in PR19 requiring a higher level of outcome relative to cost allowances.⁷⁵ Common PCs were introduced for all companies and companies were encouraged to offer additional bespoke PCs based on individual circumstances and customer preferences. Outperformance payments and underperformance penalties (ODIs) were also further developed with the intention of aligning shareholder and management interest with those of customers by rewarding effort and risk-taking to deliver performance improvements and by penalising non-delivery of PCs.
- 2.78 In order to respond to concerns that companies were not always acting in a way that promoted trust and confidence in the sector, Ofwat published its 'Putting the sector in balance' position statement in 2018.⁷⁶ This referred to concerns that had been raised about: high dividend payments undermining the long term capacity of companies to perform; levels of executive pay being out of step with what has been delivered for customers; and complicated and potentially risky financial structures which call financial resilience into question.
- 2.79 To address these views, it therefore proposed measures that required highly geared companies to share what it considered to be financing gains with customers. Ofwat introduced the Gearing Outperformance Sharing Mechanism (GOSM) into the price control regime for the first time in PR19. Ofwat stated that equity investors benefit from higher equity returns that are

⁷⁴ Revenue is indexed by CPIH from 1 April 2020. RCV transitions to CPIH from 1 April 2020 with 50% of the RCV at 1 April 2020 indexed by RPI, the remainder, including any RCV additions is indexed by CPIH.

⁷⁵ Ofwat explained that by 'stretching', it meant stretching performance by reference to each company's business plan, see Ofwat, [July 2018, Putting the sector in balance: position statement on PR19 business plans](#), p7

⁷⁶ Ofwat, [Putting the sector in balance: position statement, 2018](#), section 6

associated with their increased risk, but that there is no substantive benefit passed to customers. In addition, Ofwat stated where companies adopt high levels of gearing, they may reduce financial resilience and transfer some risk to customers and / or potentially taxpayers in the event that a company fails. To address this, Ofwat introduced a mechanism that it said would share the benefits of higher gearing with customers. Under the PR19 GOSM, companies are required to share the difference between the allowed cost of equity and their actual cost of debt for gearing levels starting at 74% for the year 2020-21, reducing by 1% each year to 70% for the year 2024-25.⁷⁷ The Position Statement also set out expectations that companies should demonstrate how dividend and related pay policies reflected performance delivery for customers, and that they should demonstrate how they will maintain long-term financial resilience.⁷⁸

Assessment of business plans, fast tracking and cost sharing

- 2.80 Ofwat sought to push companies to further improve efficiency, customer service and resilience. It looked to provide companies with incentives to take on the responsibility for preparing efficient business plans, which it would then review. At the stage of its initial assessment of business plans, Ofwat applied a categorisation process (between fast-track, slow-track and significant scrutiny)⁷⁹ which helped it to give prominence to companies that had satisfied its expectations, and to prioritise further review of company business plans where necessary. Ofwat said that fast-track status companies received early draft determinations and financial and reputational benefits. The financial incentives included an uplift to the allowed return and a symmetrical cost-sharing rate for companies.
- 2.81 The initial assessment (stage c, see paragraph 2.74(c)) tested the water company business plans against three overarching criteria: quality, ambition and innovation. Fast-track status was given to plans that were considered to be of high quality and where limited, minor or no intervention was required to protect customers' interests. Slow-track status was given to plans where Ofwat considered a material level of intervention was required to protect the interests of customers. Slow-track companies were required to resubmit their business plans and provide additional evidence. 'Significant scrutiny' status was given to plans that Ofwat considered fell well short of the required quality

⁷⁷ Ofwat, PR19 final determination: [Aligning risk and return technical appendix](#), section 9.3

⁷⁸ These are not matters covered in the price controls.

⁷⁹ There was also an 'exceptional' category potentially available.

and where Ofwat considered an extensive material intervention was required to protect the interests of customers.

- 2.82 Ofwat's approach to the treatment of business plans included a consequential impact on the cost sharing incentive rate (see paragraph 6.93) that it determined for each company.⁸⁰ Ofwat's approach was to bundle symmetrical cost sharing rates with other incentives awarded to fast-track companies, and to set asymmetrical cost sharing rates in favour of customers for slow-track companies. This scheme was intended to incentivise companies to submit more accurate forecasts of their future expenditure requirements within their price control business plans and to incentivise performance. Ofwat's assessment of each company's efficient wholesale expenditure requirements was an input to the scheme, alongside a forecast from each company of its expenditure requirements over the price control period.
- 2.83 For slow-track companies, the cost sharing rates were set by reference to the difference between Ofwat's assessment of Totex and two iterations of the company's business plan submitted during the business plan assessment process. The asymmetrical cost sharing rates for under and outperformance were determined by a formula that moved further in favour of customers (away from companies), in proportion to the excess of Totex estimates prepared by a company over Ofwat's estimates. However, if a company submitted a business plan with Totex estimates below Ofwat's assessment, then the formula was not applied in relation to underperformance and the company would receive a symmetrical cost sharing rate.

Customer engagement

- 2.84 Building on PR14, Ofwat encouraged significant customer engagement in the preparation of business plans. It said companies needed to understand customers' preferences and priorities, in particular in relation to the bespoke, company specific PCs that they put forward and into financial ODIs. It found there was a marked improvement in companies' engagement with their customers in this price review, helping the development of their business plans.

Building blocks of the PR19 determination

- 2.85 There were three main building blocks of the PR19 price determination:

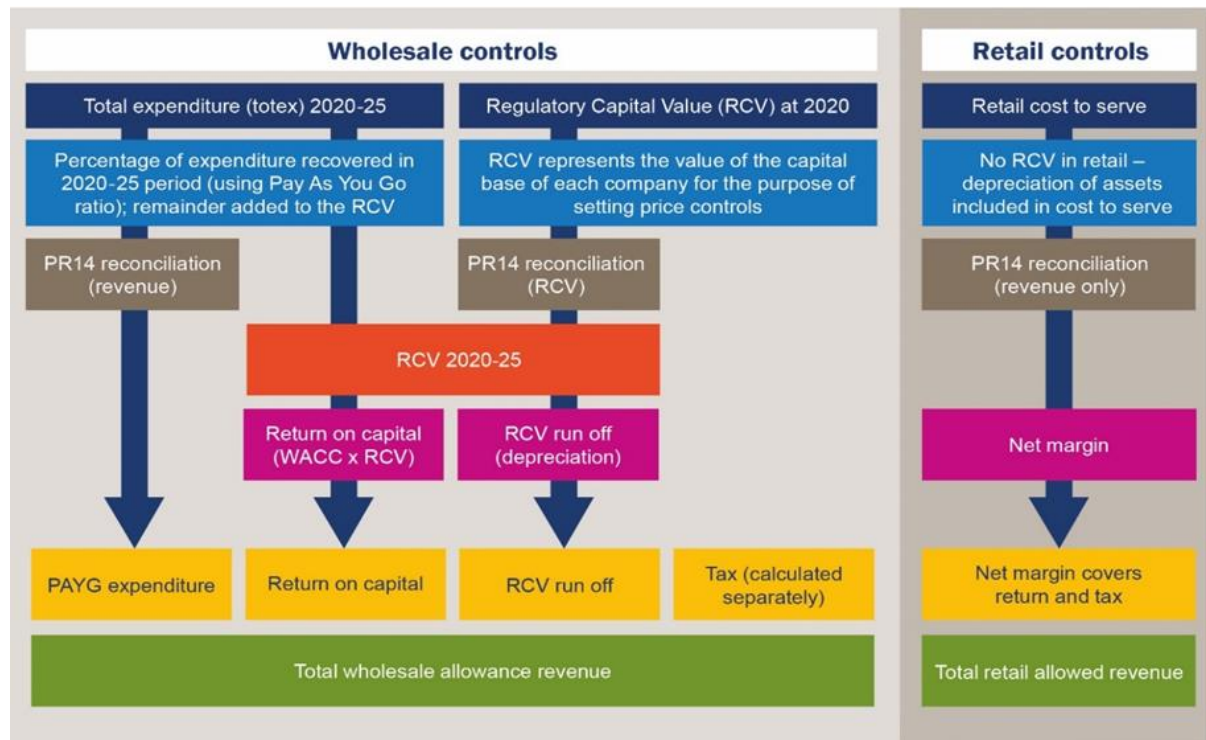
⁸⁰ There were other benefits, including an uplift of 10 basis points on the return on regulatory equity.

- (a) Costs assessment: Ofwat reviewed the expenditure forecasts that companies submitted in their business plans to set an efficient cost allowance for each of base and enhancement expenditure. Base costs are routine costs that companies incur to provide a base level of service while enhancement costs are those required to enhance the capacity or quality of the service beyond the base level.
 - (b) Outcomes: Ofwat set the level of the outcome targets for certain PCs, together with a package of financial and reputational incentives or penalties (ODIs) relating to whether it fails to meet or surpasses these targets.
 - (c) Risk and return: Ofwat set a WACC (Weighted Average Cost of Capital) with the intention of ensuring that water companies can finance their activities and sets other financial penalties and incentives. It also developed risk protection mechanisms to allow for unforeseen cost developments and other situations.
- 2.86 Ofwat said that while these building blocks were assessed separately, it also examined the overall package in the round to ensure that in its judgement it was achievable and appropriately funded.
- 2.87 Overall revenue allowances were derived from these building blocks in the following way:
- (a) Under wholesale controls, 2020-25 Totex expenditure is either recovered in period as pay as you go (PAYG) expenditure, or it is added to the RCV. The WACC is applied to the RCV to give the allowed return on capital. The RCV at the start of the period is also subject to run off (or depreciation). Additionally, these factors are adjusted for any revenue reconciliation adjustments⁸¹ and an allowance for tax. Taken together, these provide the total wholesale allowance revenue.
 - (b) For retail controls, the retail allowed revenue is based only on the cost to serve, any reconciliation adjustments⁸² with PR14 outturns, and a net margin to cover returns and tax. There is no RCV for retail and depreciation of any associated assets is included in the cost to serve.
 - (c) This is illustrated in Figure 2-2.

⁸¹ Revenue reconciliation adjustments include adjustments for the wholesale revenue forecasting incentive mechanism, Totex sharing and ODIs.

⁸² For both revenue forecasting and ODIs.

Figure 2-2: Determination of overall revenues from the building blocks



Source: Ofwat

Cost assessment

- 2.88 In order to set cost allowances, Ofwat reviewed the company business plans. Where possible, it did this by comparing costs across companies using cost models such as econometric or unit costs models in order to help identify benchmarks of efficient cost.
- 2.89 Ofwat used econometric models to estimate a relationship between a set of explanatory variables (such as number of customers or treatment complexity) and the cost of an overall service. This relationship is given by the estimated coefficients. The coefficients were then used to set a benchmark for required expenditure in 2020-25 based on a forecast of the explanatory variables for this period. Ofwat's models are based on eight years of historical data on 17 companies in wholesale water and retail activities, and 10 companies in wastewater activities. Companies were also able to submit 'cost adjustment claims' to request an adjustment to Ofwat's modelling results for unique company circumstances.
- 2.90 Some non-routine costs, such as some large bespoke enhancement projects, were not suitable for benchmarking of some or all of their costs. These projects were reviewed through a 'deep dive' assessment of the need for and efficiency of the investment. This covered whether there was good evidence of a need for the investment and whether customers supported it, whether the

proposal was the best solution, whether the cost estimates were robust and efficient, and whether customers were protected if there were delays or reductions in the investment. Smaller costs were subject to a 'shallow dive' where the efficiency of the expenditure was challenged on the basis of the efficiency of the wider business plan.

- 2.91 Ofwat subjected costs to an efficiency challenge, reducing allowed costs to allow for productivity growth and eliminate inefficiencies. The approach adopted varied depending on the category of costs. For example, in the case of econometrically modelled base costs, estimates of a catch-up challenge were applied to reflect where companies were operating less efficiently than other companies. This resulted in an efficiency challenge of between 2-4% across the sector. For wholesale water services Ofwat used the 4th most efficient company (out of 17 water companies) to set the catch-up efficiency challenge. For wholesale wastewater services it used the 3rd most efficient company (out of 11 wastewater companies). Second, there was a dynamic frontier shift challenge to reflect general improvements in productivity and technological improvements, which would not be reflected in historical spend. There was also an adjustment for real changes in input prices, where the level of input prices increases or decreases faster than the inflation indexation mechanism.
- 2.92 In addition to modelled base and growth costs, there were some base costs which are not suitable for modelling and have a bespoke assessment (including for example costs for business rates (see paragraph 4.622) and Traffic Management Act measures (see paragraph 4.615). Those 'unmodelled' costs that were considered within the cost sharing incentive were worth around £4 billion out of a total industry requested base and growth cost of £41.5 billion.
- 2.93 Companies requested enhancement expenditure in addition to growth for a total of around £11 billion (Ofwat finally approved industry-wide enhancement expenditure of around £13 billion, including growth allowances).⁸³ Such costs may be driven by, for example new statutory obligations such as expenditure on environmental outcomes as set by the environment regulators (such as reducing phosphorous or nitrogen in wastewater discharge).

⁸³ This was more than the £11 billion total requested enhancement expenditure. See 'New infrastructure for increased resilience Our package includes £13 billion for new and improved services that go above and beyond water companies' day-to-day operations.' [Ofwat PR19 Final Determinations – overview of companies' final determinations](#).

- 2.94 Costs also included an allowance for PR14 reconciliation – this reflects the true-up of incentive payments, such as outcome delivery incentives, incurred in the PR14 price control period (2015-20).
- 2.95 Ofwat also determined that for schemes forecast to cost at least £100 million, companies should assess whether direct procurement for customers would be an efficient mechanism for delivering the investment.⁸⁴

Outcomes

- 2.96 Ofwat sets certain PCs which for each measure set the target level for these measures. There are 15 common PCs applying to all WASCs, and 10 applying to WOCs, although the target levels may vary between companies. These cover:
- Common performance level measures: water supply interruptions, pollution incidents and internal sewer flooding.
 - Reducing water demand: leakage and per capita consumption.
 - Statutory measures: compliance risk index and treatment works compliance.
 - Asset health measures: mains repairs, unplanned outages and sewer collapses.
 - Resilience measures: risk of sewer flooding in a storm and risk of severe restrictions in a drought.
 - Vulnerability measures: the priority services register.
 - Customer experience: customer experience measure and developer services experience measure.
- 2.97 In addition, there are a large number of PCs bespoke to individual companies. These reflect other areas of importance to customers and wider stakeholders. Companies propose these commitments.
- 2.98 Ofwat said that in setting PC levels, the baseline level of performance against which companies' proposed PC levels were assessed was based on companies' 2019-20 forecasts. These forecast levels were scrutinised against

⁸⁴ Ofwat said this is a process for water companies to competitively tender for a third-party competitively appointed provider to design, build, finance, operate and maintain infrastructure. Ofwat said this initiative has the potential to provide significant benefits for customers through promoting innovation and enabling capital and operational cost savings as well as a reduction in financing costs ([Ofwat - Consultation on proposed PR19](#)).

PR14 levels and actual performance, where applicable, to ensure they represented realistic performance baselines. There was also customer engagement in setting appropriate performance levels. The level of 'stretch' was tested using a range of approaches, including cost-benefit analysis, comparative and/or historical information.

- 2.99 All PCs are accompanied by ODIs. In addition to the reputational incentives associated with failing PCs, Ofwat said it was aiming to sharpen incentives by linking a higher proportion of revenues to service performance through financial ODIs than at PR14. There are also enhanced ODI payments for performance that shifts the frontier of outcomes.

Risk and return

- 2.100 Ofwat said that its approach was intended to align the interests of companies and investors with those of customers by aligning risk and return. It said that its Totex cost sharing and ODIs provided significant scope to earn outperformance returns as well as lower returns from underperformance. There are risk protection mechanisms for companies in Ofwat's determinations such as inflation indexation, Totex sharing, reconciliation adjustments for revenue, cost of new debt and tax, and differences in growth rates, and additional cost protection mechanisms for other aspects including labour costs, business rates and Environment Agency abstraction licence charges. In extreme cases of revenue fluctuations Ofwat can also reopen the determinations.
- 2.101 Ofwat assessed an allowed real return on capital of 2.96% adjusted for CPIH inflation (2.92% for wholesale), 5.02% nominal (unadjusted for inflation). This is the lowest allowed return since privatisation. Ofwat said that while a number of independent reviews of previous determinations have identified that Ofwat and other regulators have tended to allow an over-generous return on capital, its reasons for determining this low rate reflect benign capital market conditions and changes to the approach for estimating the appropriate return on capital rather than being an additional reduction in allowed returns. The allowed return is based on a notional capital structure, rather than any allowance being made for companies' choice of financing. Ofwat said that in the light of the lower allowed returns at PR19, some companies may need to take action to strengthen their balance sheets.

- 2.102 Company Specific Adjustments were made to the allowed return on debt for Portsmouth Water and South Staffs Water which as small companies were deemed to be facing higher debt costs than other larger companies.⁸⁵
- 2.103 Ofwat then assessed financeability (see paragraph 2.56(c)) to check that an efficient company could generate cash flows sufficient to meet its financing needs, on the basis of the notional capital structure assuming no out/underperformance.
- 2.104 Ofwat noted that companies may suffer cashflow constraints primarily due to the imbalance between real returns on capital and the nominal cost of debt. For 12 companies, including Anglian, Northumbrian and Yorkshire, Ofwat advanced revenue that would otherwise be capitalised in the RCV (for recovery at a later period) in order to improve financeability.

The final determination

- 2.105 Ofwat told us that in coming to its final determination it took full account of and acted consistently with its duties and in accordance with the statements of strategic priorities and objectives from the UK and Welsh governments.
- 2.106 It said that it considered the overall 'stretch' across costs, outcomes and the allowed return on capital and where appropriate made adjustments to its approach at draft determination which reduced the level of revenue challenge to companies. These adjustments included reducing the frontier shift estimate from 1.5% to 1.1% per year, refining its approach to base cost modelling by including 2018-19 data, amending the way that catch-up and frontier shift efficiency were applied, providing additional funding to reduce leakage for better performing companies and reviewing the 'stretch' on water supply interruptions and other PCs and adjusting collars to limit penalties in early periods on specific outcomes. It concluded that the overall challenge across costs, outcomes and the allowed return on capital in the final determination was stretching but achievable, and that the final determination s were financeable.
- 2.107 In presenting the PR19 determinations,⁸⁶ Ofwat stated that it was a £51 billion package over 5 years, which included £13 billion for new and improved services that go above and beyond water companies' day-to-day operations. It said this includes more than £1 billion to reduce the impact of flooding across England and Wales, and measures to ensure companies work

⁸⁵ Ofwat said it applied a three stage appraisal of such company specific claims for cost of capital adjustments, that (i) there was evidence the level requested was appropriate, (ii) customers were adequately compensated from the increased cost and (iii) there was evidence of customer support for the increased cost.

⁸⁶ See Ofwat (2019) [PR19 final determinations – overview of companies' final determinations](#).

together to solve long-term drought resilience challenges. It pointed to almost £500 million allowed to support 17 major resilience schemes, including developing new water resources and the transfer of water across the country. It said there would be reduced pollution (reducing pollution incidents by 30%), stretching targets on customer service, supply interruptions, bursts, leakage (cut by 16%), and increasing help for vulnerable customers. It also introduced a £200 million innovation fund. It said these measures would take place alongside an average 12%, or about £50 in each year, fall in customer bills, before inflation, achieved as a result of a £6 billion efficiency challenge and lower financing costs.

2.108 Ofwat reported that the relative materiality of its allowed Totex costs across the whole of PR19 were: 68% modelled base costs; 7% unmodelled base costs; 17% enhancement costs and 8% retail costs.⁸⁷

Main Parties' views on the context and themes of PR19

Ofwat's view on the context of the PR19 determination

2.109 We first set out some of Ofwat's views on the context of the PR19 determination and the Disputing Companies' responses to this.

2.110 Ofwat said that based on its duties and the SPS from the UK and Welsh governments, it set four key themes for PR19:⁸⁸

- Great customer service – It challenged companies to do much more to understand customers' needs and reflect them in their business plans.
- Long-term resilience in the round – It encouraged companies to consider all aspects of resilience, including operational, corporate and financial resilience, in line with its resilience planning principles.
- Affordable bills – Recognising that water is an essential service, it said it expected companies to understand and address affordability concerns for both current and future customers.
- Innovation – In order to deliver on the above themes, it said companies needed to innovate to deliver more of what matters to customers and the

⁸⁷ Ofwat, [PR19 final determinations: Securing cost efficiency technical appendix](#), Figure 3 page 11.

⁸⁸ Ofwat, [Reference of the PR19 final determinations: Overview](#), paragraph 3.14.

environment, including developing new ways of working and building on best practice from within and outside the water sector.

2.111 Ofwat said that from the initial development of the PR19 methodology Ofwat had been clear with companies that the price review was not going to preserve the status quo.⁸⁹ It said the sector faces profound challenges, such as climate change, population growth and shifting customer expectations and the sector as a whole needed to strengthen its operational performance to provide reliable and affordable services against these challenges. It said it was important to set a stretching but achievable level of overall challenge, so customers pay no more than efficient costs and receive high quality services from their water company.

2.112 Ofwat said that since privatisation, the water sector has made significant improvements in service delivery. However, it said in recent years company performance has stagnated and even deteriorated on a number of measures:

- (a) since 2011, productivity growth in the sector has effectively been zero, even after allowing for quality improvements;
- (b) at PR14, more than half of companies achieved the historical upper quartile on the upper quartile common PCs by the first year of the price control – then improvements stagnated in 2017-18 and 2018-19; and
- (c) over the past two decades, despite material technological progress, the sector has achieved little overall reduction in leakage. Ofwat said that overall leakage level declined following privatisation by 37% between 1994-95 and 2000-01. However, since then it has shown little change. Between 2012-13 and 2018-19 overall leakage has increased by 2.3% (although it fell by 7% in 2019-20).

2.113 It said in a number of areas, some companies have performed relatively well in recent years, while others have lagged behind. Hence overall sector performance tends to mask significant gaps in the relative performance of individual companies. On leakage, some individual companies have made large improvements, including Portsmouth reducing leakage by 17% and Dŵr Cymru by 8% since 2012-13 whereas there had been increases by 25% for Southern Water and by nearly 10% for Yorkshire.

2.114 It said some companies demonstrated at PR14 that delivering high quality and high efficiency at the same time is achievable. For example, Portsmouth and

⁸⁹ Ofwat views from [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#).

Wessex Water have achieved upper quartile performance on a number of service measures whilst also achieving high cost efficiency.

2.115 It noted though that companies, on average, have tended to outperform the cost allowances set in past determinations. It was concerned that some companies have continued to pay high dividends to investors throughout the PR14 period (see paragraphs 2.78-2.79). Ofwat expressed concern about the adoption of complex highly geared financial structures, payment of high dividends and loans from the regulated companies to shareholders, and service failures and misreporting.

2.116 Ofwat pointed to sections of certain independent reviews of water and other regulated sectors which, among other issues, have criticised regulators for repeatedly setting over-generous controls, resulting in investors earning excess returns and customers paying higher bills than necessary. For example:

- (a) The EFRA Select Committee (2018) Regulation of the water industry report stated – ‘In the absence of real competition in the sector, Ofwat must strike a difficult balance between consumer interests and making it financially worthwhile for water companies to satisfy their investors. That balance has been skewed in favour of the latter. The regulator’s proposals to ‘balance the sector’ are now heading in the right direction but we are sceptical about whether they go far enough.’⁹⁰
- (b) The National Infrastructure Commission (2019) Strategic investment and public confidence report stated ‘In future price controls, regulators should take direct account of information asymmetries in assessing the WACC and total expenditure allowances, ‘aiming off’ to ensure a fair outcome for consumers and investors’.⁹¹
- (c) Citizens Advice (2019) – Missing billions report said ‘Regulators have allowed water, energy, broadband and telephone networks to overcharge customers by £24.1 billion over the past fifteen years’. ‘These overpayments partly occurred because regulators made forecasting errors. They predicted that costs, such as debt, would be higher than they in fact were. Regulators also over-estimated how risky these businesses were for investors’.⁹²

⁹⁰ [EFRA Select Committee \(2018\), Regulation of the water industry](#), paragraph 56

⁹¹ [The National Infrastructure Commission \(2019\), Strategic investment and public confidence report](#), p16

⁹² [Citizens Advice \(2019\), Missing billions report](#)

2.117 Ofwat said this stagnation in sector performance, despite significant improvements since privatisation, led it to conclude that there needed to be a step change.

2.118 The Disputing Companies, while acknowledging that it was appropriate for an economic regulator to seek to push for improvements in productivity, efficiency and service, disagreed with elements of Ofwat's views on these issues. For example:⁹³

(a) The companies disputed that there had been excessive returns to shareholders or that such an observation applied to them. Yorkshire said during AMP6,⁹⁴ it had reinvested all outperformance in better service levels for customers and when considering only dividends that are not immediately returned to Yorkshire as interest, it paid among the lowest amount in dividends of the WASCs during that period.⁹⁵ Bristol denied that the characterisation of companies outperforming their base returns and returning high dividends to shareholders applied to it.⁹⁶ Anglian said its shareholders had shown their long-term commitment to the sector, through conservative dividend policies in AMP6, and in AMP7 planned to pay no dividends to shareholders outside the Anglian Water Group.⁹⁷

(b) The Disputing Companies noted that the regulatory system deliberately provided incentives to companies to outperform against allowances in order to drive efficiencies which were then built into subsequent price controls. Anglian said its track record showed it had paid dividends to shareholders when it has delivered strong performance, and submitted that this is precisely the outcome that the incentive-based regulation system aims to deliver.⁹⁸ Similarly, Northumbrian said that Ofwat had previously recognised the benefits for customers of outperformance but was now characterising outperformance as simply 'underspending' and failing to identify whether it considers each instance of underspend to be efficient or inefficient.⁹⁹

(c) The Disputing Companies disagreed with Ofwat's characterisation of low productivity growth in the sector, arguing that Ofwat was using

⁹³ These are a few illustrative examples, specific arguments against Ofwat's implementation in PR19 are addressed throughout this provisional determination report.

⁹⁴ Price limit periods are sometimes known as AMP (Asset Management Plan) periods. AMP6 is so called because it was the sixth cycle, covering 2015 to 2020, since the water industry was privatised in 1989. AMP7 covers the PR19 period, ie 2020-2025.

⁹⁵ [Yorkshire's Reply to Ofwat's Response](#), 1.1.20d

⁹⁶ [Bristol's Reply to Ofwat's Response](#), p8

⁹⁷ [Anglian SoC](#), paragraph 159

⁹⁸ [Anglian's Reply to Ofwat's Response](#), paragraph 5

⁹⁹ [Northumbrian's Reply to Ofwat's Response](#), paragraph 655

inappropriate time periods for the comparisons (in particular that the comparison was heavily weighted towards pre-financial crisis performance disregarding industrial performance over the last 13 years) or based the comparisons on a selective range of best performing sectors.¹⁰⁰

- (d) On leakage, Yorkshire said in previous price reviews, water companies were required to set leakage targets by reference to the 'sustainable economic level of leakage' (SELL, see paragraph 8.10). Therefore, sector performance had reflected this regulation, whereas Ofwat had moved away from this only in PR19 in favour of target levels of leakage reduction.¹⁰¹

The Main Parties' views on interpretation of duties

2.119 As is evident from the Disputing Companies' reasons for rejection of Ofwat's determinations (see paragraphs 2.131 to 2.157(f)), there were some broad disagreements with how, in their perception, Ofwat had discharged its duties in the determinations.

2.120 A key theme in the case of most of the Disputing Companies was that Ofwat had chosen to implement a step-change in regulation, to stretch the performance of the companies as a result of its perception that previous regulation had been overly generous.¹⁰² The consequence was that they believed the consumer objective had been prioritised at the expense of other objectives, and an emphasis on limiting customer bills had led to an overly-narrow interpretation of the consumer objective. In particular they claimed that insufficient priority had been given to the resilience objective, and that the determinations did not allow the companies to properly finance their activities.

2.121 For example, Yorkshire told us:

one of [Yorkshire's] key concerns with the is that in an effort to address the perceived shortcomings in previous price controls by focusing on reduction in customer bills, Ofwat has not found the right balance between short-term price cuts on the one hand and the capital expenditure needed to ensure long-term resilience and sustainability on the other. In other words, Ofwat appears to have elevated its secondary duty to promote

¹⁰⁰ For example, [Yorkshire SoC](#), paragraph 199

¹⁰¹ [Yorkshire SoC](#), paragraph 32

¹⁰² Bristol did not run this balance of objectives arguments although it did draw attention to the step-change in performance metrics, a much lower WACC, an asymmetric cost sharing rate and a GOSM moving the balance of risk of the package towards the downside. Bristol Statement of Case paragraph 717.

economy and efficiency above its primary duty to customers, to the maintenance of the resilience of [Yorkshire]'s infrastructure and to the financeability of [Yorkshire]'s operations.¹⁰³

2.122 Anglian told us:

Almost every aspect of Ofwat's FD falls short of providing Anglian with the means to carry out the work necessary to meet the stated preferences of its customers and the requirements set by the quality regulators – the Environment Agency and the Drinking Water Inspectorate – in terms of water quality and environment.¹⁰⁴

Anglian does not consider this represents a proper balancing of Ofwat's regulatory duties, particularly regarding financeability and resilience.¹⁰⁵ Ofwat's FD appears heavily weighted towards a narrow and short-term interpretation of the consumer duty in the form of low bills for this price control period.¹⁰⁶ This approach is at the expense of wider consumer and environmental interests both now and in the future, long-term operational resilience to growth and climate change, and the ability of companies to finance the proper performance of their functions.¹⁰⁷ Ofwat's approach is also incompatible with the Government's SPS as the focus on low bills prevents Anglian from delivering best value solutions in the long-term, taking into account wider environmental and social impacts and customers' stated priorities.¹⁰⁸

2.123 Northumbrian said:

We consider that Ofwat has failed to discharge its statutory duties by creating an unequal balance between the primary duties ...Ofwat has erred in prioritisation of short-term customer bill reduction over the promotion of longer-term investment and Resilience Objectives.¹⁰⁹

2.124 The Disputing Companies also told us that Ofwat had ignored evidence from customers that they assigned great importance to resilience and environmental objectives and that bill reductions were somewhat less of a

¹⁰³ [Yorkshire SoC](#), paragraph 55

¹⁰⁴ [Anglian SoC](#), paragraph 20

¹⁰⁵ [Anglian SoC](#), paragraph 38

¹⁰⁶ [Anglian SoC](#), paragraph 39

¹⁰⁷ [Anglian SoC](#), paragraph 40

¹⁰⁸ [Anglian SoC](#), paragraph 43

¹⁰⁹ [Northumbrian SoC](#), paragraph 134

priority. They said that this was in conflict with Ofwat's proposed methodology for PR19 which had required companies to undertake extensive customer research to shape and inform their business plans. For example, Northumbrian said:

Customer engagement was a key building block for Ofwat's PR19 methodology and we carried out extensive customer engagement alongside robust challenge and scrutiny from the independent Water Forums in developing our [business plan] BP19. That engagement demonstrated that our customers were not singularly focused on short-term bill reductions...[Ofwat's] FD19 reflects an unduly narrow view of the Consumer Objective, with bill reduction prioritised at the expense of other customer concerns...FD19's emphasis on short-term bill reductions ignores other, equally relevant, customer priorities...FD19 risks promoting inter-generational unfairness.¹¹⁰

- 2.125 The Disputing Companies said that in general Ofwat had not taken account of customer evidence. Bristol told us 'Based on the final determination, we do not believe there is a single example of Ofwat diverting from its calculated range [of ODI rates] for customer evidence'.¹¹¹
- 2.126 Ofwat told us that it had been clear to companies throughout the PR19 process that the price review was not going to preserve the status quo.¹¹² Rather, it had concluded that there needed to be a step change.¹¹³
- 2.127 Ofwat disagreed with the Disputing Companies' contention that it had not met its statutory duties, arguing that the companies' points were disagreements as to the merits of its decisions. It said this was an exercise of regulatory judgement, in which the regulator strikes a balance between the objectives set out in the Act read in the light of the SPS, the evidence and its own experience and expertise.¹¹⁴ It said it had been motivated by all of its statutory duties, protecting customer interests and finding the right outcome in light of

¹¹⁰ [Anglian SoC](#), paragraph 137138.

¹¹¹ [Bristol SoC](#), annex 4 paragraph 25

¹¹² [Ofwat Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 1.1

¹¹³ [Ofwat Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 2.11

¹¹⁴ [Ofwat Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 3.12

the duties in the round, including looking to the long term, and making sure companies can earn a reasonable return and can finance their functions.¹¹⁵

- 2.128 It said it had taken account of challenges to the sector such as climate change, population growth and shifting customer expectations. To address this, it needed the sector to strengthen its operational performance. It said PR19 had challenged the companies to achieve this, without asking customers to pay extra for inefficiency or to accept lagging performance, or indeed to pay out inflated returns to investors.¹¹⁶
- 2.129 It said that by challenging inefficiency, it had saved customers £6 billion across England and Wales without compromising services.¹¹⁷ But it said it did not aim for a particular level of customer bills as part of the price review, rather the level of bills is a product of the different elements of the price review, which in turn contribute towards the company's revenue allowance.¹¹⁸ It said its final determinations would significantly increase the resilience of the water sector, allowing £13 billion of investment for new and improved services and to tackle environment challenges, above and beyond what companies need to do as part of their day-to-day operations, funding solutions to long-term drought resilience challenges in the south and south east, provide protection from flooding and investment in major new infrastructure across England and Wales.¹¹⁹
- 2.130 Ofwat said that some companies had suggested that Ofwat had failed to satisfy its duty in relation to the consumer objective because it had not adopted preferences indicated by their customers through the customer engagement process.¹²⁰ Ofwat said this was a misrepresentation,¹²¹ as the customer research provided by companies is just one input it asked companies to consider in setting PC levels alongside for example cost benefit analysis, comparative performance, historical information, minimum improvement possible, maximum level attainable and expert knowledge. It said it had applied a wider set of tests than just evidence of customer

¹¹⁵ Ofwat [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 1.6

¹¹⁶ Ofwat [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 1.1

¹¹⁷ PR19 final determinations: Overview of companies' final determinations.

¹¹⁸ Ofwat [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 2.17

¹¹⁹ PR19 final determinations: Overview of companies' final determinations

¹²⁰ Ofwat [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 3.109

¹²¹ Ofwat [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 3.110

support,¹²² and that customer engagement was not intended to replace either the role or judgement of Ofwat.¹²³ It said that there are areas where customers are not best placed to determine whether a company's business plan is appropriate, for example, in determining whether companies' proposed PCs are stretching but achievable in relation to PC levels.¹²⁴ It said companies' customer research varies in quality and so it needed to scrutinise and, where appropriate, challenge the results of companies' customer research, based on the wider set of information available to it.¹²⁵

Reasons for the rejection by the four companies

- 2.131 Under their licence conditions, where a water company disputes Ofwat's determination following a periodic review, it can give notice, within two months of the determination, requiring Ofwat to refer the matter to the CMA for a further determination.^{126,127}
- 2.132 The four Disputing Companies did not accept the PR19 determinations. We now summarise their reasons for not accepting them, as set out in their initial statements of case.
- 2.133 Apart from their view on how Ofwat had applied its interpretation of the balance of duties (see paragraphs 2.119 to 2.130), the main themes identified by the Disputing Companies included that Ofwat had:
- (a) provided insufficient funding to deliver business plans (see Figure 2-3) including enhancement expenditure to improve resilience;
 - (b) failed to recognise the link between costs incurred and delivering higher levels of service (the 'cost-service disconnect');
 - (c) inappropriately settled on too low a cost of capital;
 - (d) given insufficient weight to evidence on the views of customers; and

¹²²Ofwat [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 3.113

¹²³ Ofwat [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 3.114

¹²⁴ Ofwat [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 3.115

¹²⁵ Ofwat [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 3.116

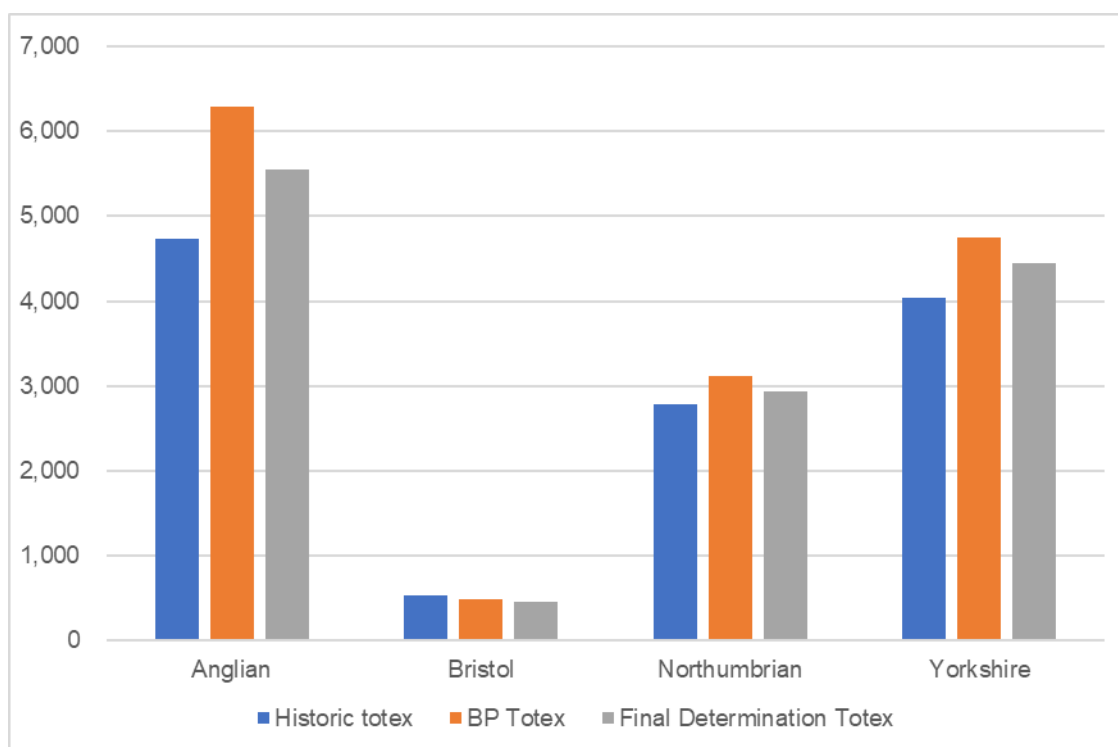
¹²⁶ Condition B Part V; section 12(2)(b) WIA 91.

¹²⁷ Under s.12(3) WIA 91, it is the duty of Ofwat on request by the water company to make the reference to the CMA.

- (e) increased levels of risk for companies (notably from asymmetric ODIs) and together with the other elements of the determination this had undermined financeability.

2.134 Figure 2-3 shows for the four Disputing Companies their historic (PR14) Totex allowances, the companies' final business plan funding requirements, and the PR19 allowance set by Ofwat, based on Ofwat's figures.

Figure 2-3: Disputing companies' Totex allowances relative to final business plans and historic (PR14) Totex, £million over 5 years



Source: CMA, based on Ofwat figures

2.135 The percentage differences between the business plan requirement and allowed Totex were: Anglian 11.7%, Bristol 6.5%, Northumbrian 5.8% and Yorkshire 6.4%.

2.136 Each company also raised a variety of issues as described below. Further details and supporting evidence are referenced throughout the report in relation to specific issues.

Anglian

2.137 Anglian told us that it had submitted an ambitious business plan which enjoyed wide customer support gained through an extensive customer

engagement process.¹²⁸ Its plan proposed what it considered to be stretching targets for outputs and cost reductions, with a claimed step change in investment and service level improvements relative to the previous AMP.¹²⁹

2.138 Anglian told us that its plan had been co-created with customers through a detailed and extensive customer engagement process. It submitted that its Customer Engagement Forum believed that the plan faithfully reflected the preferences expressed by customers. When offered the choice between investing now for better and more resilient services and improved environmental outcomes rather than postponing investment and focussing on reduced bills, Anglian submitted that customers overwhelmingly favoured the former approach.¹³⁰

2.139 Anglian believed its plan had been tested for efficiency and exposed the company to a fair balance of downside risks should it underperform, alongside upside opportunities should it deliver.¹³¹

2.140 Anglian felt the Ofwat FD failed to deliver a fair balance and did not provide best value for customers.¹³² Its main disputes with the final determination were that:

- (a) Cost allowance errors: it failed to recognise the higher costs the company faces which result from its high performance relative to the sector, new service obligations and higher capital maintenance needs, consequently underfunding Anglian's base expenditure requirements by £265 million;¹³³
- (b) Enhancement errors: it underfunded Anglian's enhancement plan, which the company felt was largely driven by statutory obligations, by £161 million;¹³⁴
- (c) Growth errors: it provided a major shortfall on growth allowance (valued by the company as £318 million), both by ignoring what the company felt were important categories of cost in relation to new connections, as well as by providing a reconciliation mechanism which the company felt would not fully compensate them in the event growth was higher than Ofwat estimated;¹³⁵

¹²⁸ Anglian SoC, p3

¹²⁹ Anglian SoC, p3

¹³⁰ Anglian SoC, p3

¹³¹ Anglian SoC, p3

¹³² Anglian SoC, p4

¹³³ Anglian SoC, p4

¹³⁴ Anglian SoC, p4

¹³⁵ Anglian SoC, p4

- (d) That these three elements summed to a total claimed shortfall of £744 million (around a 12% difference). Anglian also highlighted the importance of the distinction between capital and operating expenditure and alleged there had been a misallocation. It observed that whilst the final determination provided an uplift of £678 million in capital expenditure allowance since AMP6, this was insufficient and came with a simultaneous reduction of operating expenditure allowance of £91 million compared to AMP6;¹³⁶
- (e) Elsham scheme and metaldehyde programme: The company further took issue with the final determination on the basis that it left the company exposed to significant contingent costs of £190 million in relation to the Elsham scheme and metaldehyde programme by offering a reconciliation mechanism the company claimed had no practical effect; and
- (f) ODIs: Anglian believed that the ODIs in Ofwat's FD were significantly skewed toward penalties over rewards. It believed the ODI package to be incoherent because it was based on an inconsistent view of an upper quartile notional company, ignored customer views and would penalise Anglian even if it delivered significant improvements.

2.141 As a consequence of these perceived flaws in the final determination, Anglian argued that the overall final determination package would create the 'near-certain' prospect of it making a financial return for investors which was below Ofwat's view of the WACC. It also said that Ofwat's assessment of WACC was significantly less than Anglian's actual cost of capital. In particular, it felt this had occurred due to Ofwat ignoring its actual cost of embedded debt.¹³⁷

2.142 The consequential challenges to financeability it highlighted were, Anglian argued, evidenced by the fact at least one of the rating agencies had subsequently downgraded their ratings for nine of the Ofwat regulated water companies and placed a further company (Northumbrian) on negative watch.¹³⁸ In its view, Ofwat's advancement of PAYG revenues to assist with financing had brought them above natural levels, above what companies requested or customers supported, and did not change rating agency views.

2.143 Anglian stated that Ofwat had missed an opportunity to set stretching targets to meet what Anglian considered was the need for a step change in resilience and performance, whilst still allowing some bill reduction, because it had instead prioritised large short-term bill reductions. The consequence of this, it

¹³⁶ Ofwat told us that the gap between Anglian's final requested cost and the allowance in PR19 was £732 million.

¹³⁷ [Anglian SoC](#), p5..

¹³⁸ [Anglian SoC](#), p5

argued, was that Anglian would be forced to cut back on asset maintenance activity, undertake short term fixes, and delay service, resilience and environmental improvements. It stated that this would mean investment costs being deferred so that future customers would have to bear them, resulting in intergenerational inequity and poor value for money compared to the proposed business plan, and could undermine the reputation of the industry and regulators.¹³⁹

2.144 Anglian referred to a cost-service disconnect in Ofwat's price control,¹⁴⁰ whereby Ofwat had rejected the existence of a trade-off between cost reduction and quality but had not evidenced reasons for doing this. Instead, it argued, Ofwat's approach unduly benchmarked high-quality networks against the costs of low-quality networks, treating the additional costs for the former as inefficiency. It told us Ofwat undervalued quality and as a consequence both failed to provide sufficient funding for high performers like Anglian, and also created a long run incentive for mediocre performance. Anglian argued it was particularly exposed on leakage, where it is the frontier performer.¹⁴¹

2.145 Finally, Anglian raised concerns about the GOSM. The company disagreed that gearing above the threshold levels poses an inherent risk to customers, and it stated the approach also ignored countervailing benefits higher gearing provides to customers. It argued that Anglian's equity investors have repeatedly demonstrated a commitment to invest in the business on a long-term basis and argued that they were entitled to earn a reasonable return on the basis of that investment and risk exposure.¹⁴²

Bristol

2.146 Bristol described the 2020-25 business plan it submitted to Ofwat as innovative and ambitious. It believed the plan to be built upon extensive customer engagement, upper quartile cost efficiency and stretching service performance targets to meet customers' needs, balanced with the investment needed to meet current and future requirements. It reported that Ofwat had recognised the strength of the engagement and of customer support for ambitious service levels on areas such as leakage and supply interruptions.¹⁴³

2.147 Bristol said it was supportive of Ofwat aims and objectives for PR19 and agreed with Ofwat's overall vision for the water sector. It felt that there was

¹³⁹ Anglian SoC, p6

¹⁴⁰ Anglian SoC, p218

¹⁴¹ Anglian SoC, p218

¹⁴² Anglian SoC, p6

¹⁴³ Bristol SoC, p1

agreement or close alignment on many aspects of its plan, including on PCs, ODIs and resilience investment. There was no dispute over retail controls, nor over 'significant elements'¹⁴⁴ of the wholesale controls. Bristol reported that its Board was reluctant to make a third consecutive reference to the CMA, but did so after careful consideration 'on the grounds that Ofwat's FD was not financeable for a small WOC like Bristol Water'.¹⁴⁵

2.148 It described Ofwat as having made a series of specific decision-making errors which mean it cannot efficiently finance delivery of its plan for customers.¹⁴⁶ These errors, in Bristol's view, were:

(a) Cost of capital errors:

- (i) It said the 'most concerning and by far the most fundamental issue' was its belief Ofwat had set the cost of capital too low. It argued that Ofwat had failed to apply a Company Specific Adjustment uplift on their cost of debt for its small size and that this, alongside other errors, meant it could not earn a reasonable rate of return on efficient costs in the 2020-25 period. This, it observed, had occurred despite what it described as 'significant regulatory precedent'¹⁴⁷ established by references to the CMA in 2015 and the CC in 2010, and despite having provided robust evidence that it faced higher financing costs than the notional company.
- (ii) Bristol argued that Ofwat had also not considered precedent from previous references on the cost of equity, where it felt it had evidenced that higher operational gearing circumstances for smaller WOCs meant an uplift was required.¹⁴⁸
- (iii) Bristol also observed that Ofwat had cut industry cost of capital parameters for the PR19 period to levels not supported by the evidence, whilst also making errors in the setting of total market return (TMR), risk-free rate (RFR), asset beta, debt beta and the ratio of new to embedded debt.¹⁴⁹

(b) Cost allowance errors: Bristol objected to the £30 million cost challenge Ofwat imposed on its base costs, arguing that this challenge goes beyond upper quartile benchmarks and is inconsistent with the high-quality

¹⁴⁴ Bristol SoC, p1

¹⁴⁵ Bristol SoC, p1

¹⁴⁶ Bristol SoC, p1

¹⁴⁷ Bristol SoC, p1

¹⁴⁸ Bristol SoC, p1

¹⁴⁹ Bristol SoC, p2

service Bristol proposed for customers. It believed Ofwat made unjustified assumptions on industry wide productivity improvements and also made incorrect cost adjustments to some items, for example on the costs of abstraction from the Gloucester and Sharpness canal (G&S canal).¹⁵⁰

(c) Balance of risk errors: Bristol believed that Ofwat had imposed a series of financial incentives which expose the company to downside risk, thus compromising the financeability of the business and its ability to deliver a reasonable return for shareholders. Specifically, it took issue with:

- (i) the penalty rate for ODIs, which it stated was set too high;
- (ii) the asymmetric Totex risk sharing mechanism, which meant Bristol must bear 60% of any cost overruns, but can retain only 40% of underspend; and
- (iii) the imposition of the GOSM in circumstances where gearing is not expected to increase as part of the business plan.¹⁵¹

2.149 Bristol argued that the combined impact of these balance of risk decisions was that it could not reasonably be expected to maintain an investment grade credit rating, deliver reasonable return for shareholders, or retain sufficient financial resilience to weather even minor shocks. Given these observations, Bristol felt that a financeability error had also been made, whereby the Ofwat's FD was 'not financeable for a relevant notional (small water only) financial structure for a company like Bristol water'.¹⁵²

Northumbrian

2.150 Northumbrian told us that its business plan offered the largest bill reduction of any company in the water and wastewater sector alongside improving and delivering above average levels of service and investment in resilience and sustainability and that it had strong support from customers.

2.151 Northumbrian submitted that PR19 failed to achieve the right balance in the round, in both the short and long-term, and that Ofwat had failed to discharge its duties under the Water Industry Act.

2.152 Northumbrian also said that Ofwat had failed to meet its statutory duty to further the resilience objective. Northumbrian said that, overall, Ofwat's approach had misrepresented the consumer objective and not given enough

¹⁵⁰ Bristol SoC, p2

¹⁵¹ Bristol SoC, p2

¹⁵² Bristol SoC, p2

weight to the resilience objective by prioritising short-term bill reductions over the need for these schemes.

- 2.153 Northumbrian told us that PR19 failed to provide the efficient costs that the company needs to fulfil its functions. It said that the efficiency challenges set by Ofwat fail to reflect the reasonable cost pressures faced by Northumbrian and the degree to which those costs are within management control.
- 2.154 Northumbrian said that its customers have said they do not want a reduction in bills at the expense of long-term resilience and the risk of increased bills for future generations. Northumbrian also said Ofwat's interventions create inter-generational unfairness by prioritising short-term bill reductions and deferring major investments that it argued are necessary to improve resilience in both areas it operates.
- 2.155 Northumbrian's main issues with Ofwat's FD were:
- (a) Cost of capital errors: Northumbrian said that Ofwat had made errors in setting the WACC. Northumbrian told us that while it accepted some reduction from PR14 was supported by evidence, it did not agree that such a substantial reduction was justified.¹⁵³
 - (b) Financeability: Northumbrian told us that Ofwat's approach to financeability was not sustainable and created unacceptable levels of risk for the company. Northumbrian argued that in this instance Ofwat had not discharged its duty to require that companies can finance their functions, including by reference to securing reasonable returns on their investments. Northumbrian said that the combination in PR19 of, in its view, unrealistically low-cost allowances, challenging and stretching performance measures and asymmetrically and downwardly skewed ODIs has materially increased risk exposure for the company.
 - (c) Northumbrian raised specific points about a number of issues in PR19 including:
 - (i) Business Rates: Northumbrian said that Ofwat's proposed funding for business rates did not reflect the degree of management control and variability and would likely result in a funding shortfall.

¹⁵³ [Northumbrian SoC](#), paragraph 1.34

- (ii) Abstraction Charges: relating to abstraction charges charged by the Environment Agency for the Kielder Transfer Scheme (KTS), which Northumbrian said had not been appropriately funded.¹⁵⁴
 - (iii) Resilience: Northumbrian referred to two specific resilience schemes: a scheme to reduce the risk of internal sewer flooding in the North East of England; and the Abberton to Hanningfield transfer main designed to tackle water demand issues in Essex and Suffolk.
 - (iv) Phosphorus removal: Northumbrian submitted that Ofwat was inconsistent in its approach towards setting allowances for Phosphorus removal (P-removal).
- (d) Grants and Contributions: Northumbrian said that in the Grants and Contributions model, Ofwat made an adjustment to add a one-off contribution of £14.4 million to the Grants and Contributions component of the projected water network plus control. Northumbrian told us that this was an error as it double counted a contribution that was already included in the infrastructure charge receipts.¹⁵⁵
- (e) Industrial Emissions Directive: Northumbrian told us that compliance with the Industrial Emissions Directive (IED), an EU instrument regulating pollutant emissions from industrial installations, will require it to make one-off structural changes to many of its facilities. Northumbrian said that PR19 does not allow sufficiently for the potential costs it is likely to incur in complying with the IED.¹⁵⁶

Yorkshire

2.156 Yorkshire told us that its business plan was arguably one of the most ambitious in the sector and met Ofwat's objectives of driving improvements in service to customers alongside a step change in efficiency. Yorkshire also told us that its business plan and long-term strategy received high levels of customer support.¹⁵⁷

2.157 Yorkshire's main issues with Ofwat's FD were:

¹⁵⁴ a regional water grid constructed in the late 1970's which transfers water across Tyneside, Wearside, and Teesside. Northumbrian told us this could leave it exposed to a windfall loss of £8.25m in the first year of AMP7 under PR19.

¹⁵⁵ [Northumbrian SoC](#), paragraph 964 and 966

¹⁵⁶ [Northumbrian SoC](#), paragraph 918 and 923

¹⁵⁷ [Yorkshire SoC](#), paragraphs 1, 5. 128

- (a) Cost of capital errors: Yorkshire submitted that Ofwat had set the WACC too low. The company told us that Ofwat had failed to ensure that the notionally efficient firm can raise finance on reasonable terms and failed to ensure the notionally efficient firm was investable. Yorkshire also told us that Ofwat had failed to correctly calibrate key incentives and introduced an inappropriate GOSM.¹⁵⁸
- (b) Cost modelling errors: Yorkshire submitted that flaws in Ofwat's cost modelling has meant that it allowed the company insufficient funding to deliver its business plan.¹⁵⁹ Yorkshire told us those flaws included: unevidenced efficiency benchmarks, flawed and incorrectly applied frontier shift and a failure to account for all relevant real price effects.
- (c) Enhancement errors: Yorkshire also told us that Ofwat's enhancement models were simple and as such were likely to have omitted important cost drivers.¹⁶⁰ The company gave an example that only the third of Ofwat's models for P-removal accounts for the impact of the Urban Waste Water Treatment Directive (UWWTD). Specifically in relation to P-removal, Yorkshire told us that when Ofwat introduced the third model it averaged the outcomes with the two original models, lowering the impact of the UWWTD on Yorkshire's estimated efficient cost by £29 million.¹⁶¹
- (d) Performance assessment errors: Yorkshire said that Ofwat assumed in PR19 that service improvements could be achieved by making efficiency savings.¹⁶² Yorkshire argued that Ofwat's position in PR19 was indefensible because it relied upon a 'backward looking' assessment of performance at PR14 and relied upon econometric models using an 'implausibly' low estimate for the additional cost to an efficient company of meeting Ofwat's stretching leakage PC. Overall, Yorkshire said that Ofwat had failed to properly account for the interaction between costs and performance.
- (e) PCs and ODIs: Yorkshire told us that in respect of PCs and ODIs, Ofwat had made arbitrary and unjustified changes and, in doing so, replaced the views of customers with the view of the regulator. Yorkshire said that these changes do not reflect genuine differences between Yorkshire and the rest of the industry.¹⁶³

¹⁵⁸ Yorkshire SoC, paragraphs 16

¹⁵⁹ Yorkshire SoC, paragraphs 188, 203

¹⁶⁰ Yorkshire SoC, paragraph 195

¹⁶¹ Yorkshire SoC, paragraph 197

¹⁶² Yorkshire SoC, paragraphs 134, 142, 148

¹⁶³ Yorkshire SoC, paragraph 153d

- (f) Yorkshire also raised specific points about a number of areas in PR19 including:
- (i) Internal Sewer Flooding: Yorkshire specifically raised this as a concern referring to the higher proportion of properties with cellars in Yorkshire than the industry average. Yorkshire told us that this was a particular challenge for the company as over 70% of sewer flooding instances occur in cellared properties.¹⁶⁴
 - (ii) Leakage: Yorkshire told us that Ofwat had substantially changed its approach to leakage in PR19 and required companies to achieve at least a 15% reduction in leakage during AMP7. Yorkshire said that it supports Ofwat's desire to reduce leakage but that additional costs (outside of base costs) must be allowed.¹⁶⁵
 - (iii) Drinking water quality: Yorkshire highlighted the target set in relation to the quality and appearance of drinking water. The company told us this was another area where regional differences impact its ability to meet a more stretching target, due to the high proportion of upland water sources and the type of water pipes (cast iron) in the area.¹⁶⁶
 - (iv) Resilience: Yorkshire told us that Ofwat's decision in relation to the company's 'Living with Water' project in Hull and Haltemprice has materially underfunded an innovative programme to strengthen the resilience of the area against extreme flooding events.¹⁶⁷
 - (v) Data input in PR14: Yorkshire said that in PR14 it made a data input error in its submission to Ofwat that incorrectly reduced the amount of revenue that it was entitled to recover from its customers.¹⁶⁸ Yorkshire said it uncovered this error when preparing its Annual Performance Report for 2015-16 and told us that it had immediately notified Ofwat. Yorkshire told us that Ofwat acknowledged the company had made an error and agreed that this would be reflected within PR19, however, Ofwat subsequently disallowed the adjustment on the basis that it was not an unambiguous error.

¹⁶⁴ Yorkshire SoC, paragraphs 160, 37

¹⁶⁵ Yorkshire SoC, paragraphs 32, 162–165

¹⁶⁶ Yorkshire SoC, paragraph 172

¹⁶⁷ Yorkshire SoC, paragraphs 8, 120g, 318

¹⁶⁸ Yorkshire SoC, paragraphs 205, 207–208

3. Our approach

Introduction

3.1 In this section we set out our approach to the Disputed Determinations.

Our approach to the redetermination

3.2 The CMA has received four separate references and so we are making four new price control determinations. The CMA is required to produce a report on each reference made to it, which it must provide to Ofwat, and which sets out definite conclusions on the questions or matters in the reference and reasons for those conclusions.¹⁶⁹ Ofwat has referred the whole determination for each of the Disputing Companies. Our provisional determinations for all of the Disputing Companies are included in this report but we separately identify our conclusions in respect of each of the Disputing Companies (see sections 12 to 15).

3.3 In carrying out the redetermination of the price controls, the CMA is required to determine the reference in accordance with the principles which apply to Ofwat under Part I WIA91,¹⁷⁰ ie the CMA is required to make its determinations in accordance with the primary and secondary statutory duties set out in section 2 WIA91 (see paragraphs 2.55 – 2.57) and subject to the same principles of best regulatory practice (see paragraph 2.58) and the need to act in accordance with the SPS (see paragraph 2.59-2.60) as applied to Ofwat when it made the Disputed Determinations.

3.4 As noted at paragraphs 2.65-2.66, the CMA exercises its own regulatory discretion as to how to appropriately balance these statutory duties. As we have explained in previous redeterminations,¹⁷¹ we consider that each of the primary duties is equally important and that they are intended to complement one another and should not be applied in isolation. The secondary duties are subordinate, or subject to, the primary duties but are still legal requirements of which account must be taken.¹⁷²

3.5 Our approach to these provisional determinations has been to reconsider the constituent blocks of the determinations following the structure used by Ofwat,

¹⁶⁹ The Water Industry Act 1991, [section 12\(3C\)](#)

¹⁷⁰ The Water Industry Act 1991, [section 12\(3\)](#)

¹⁷¹ CMA (2015), [Bristol Water plc. A reference under section 12\(3\)\(a\) of the Water Industry Act 1991 \(the CMA's Bristol PR14 Determination\)](#), paragraph 3.4

¹⁷² [Bristol PR14 Determination](#), paragraph 3.4

and to reach balanced, evidence-based conclusions on each of these separately on their merits. In particular, we have maintained:

- (a) Ofwat's approach of setting four wholesale price controls (water resources, water network plus, wastewater network plus, and bioresources);
- (b) separating our assessment into its major component parts around costs, service, and financial returns;
- (c) managing bioresources as an average revenue control; and
- (d) setting a separate retail control.

- 3.6 We have then reviewed the overall balance of the provisional redeterminations in the round to check whether they are consistent with all our duties, including the financeability duty.
- 3.7 While we did not consider it would be sensible or practicable to adopt a wholly different regulatory framework within the context of our redetermination, we have noted that consideration should be given to aspects of the regime in the future, for example see paragraph 4.181 on forward-looking capital maintenance issues, paragraphs 6.115-6.116 in relation to cost-sharing and whole-life costing, paragraph 8.98 on evaluating incentives to tackle leakage, and paragraph 9.630 on alternative approaches to the GOSM.
- 3.8 As the CMA is making a fresh determination, we consider that the CMA should examine any further issues that have arisen since Ofwat made the Disputed Determination, as it has done in previous cases.¹⁷³ We are also able to take account of current circumstances and information which is now available, which may not have been available at the time of the original determinations. The CMA can also seek further evidence.¹⁷⁴ Where there is relevant additional and updated information available, produced since Ofwat's determination (including information, views and evidence produced and provided to us by the Main Parties in the course of the redeterminations), we have taken appropriate account of this to inform our determinations. In general, we have considered updated market data, submissions and hearings of the Main Parties and Third Parties, reviews of business plans and specific

¹⁷³ [Bristol PR14 Determination](#) paragraph 2.15

¹⁷⁴ [Bristol PR14 Determination](#) paragraphs 4.58, 5.157, 6.92 and 6.182 and Competition Commission (2010); [Bristol Water plc. A reference under section 12\(3\)\(a\) of the Water Industry Act 1991 \(Bristol PR09 Determination\)](#) paragraph 3.95

projects, and the advice of engineering consultants, to reach these provisional conclusions.

- 3.9 The scope of our determinations extends to all aspects of the price control and not just the issues raised by the Main Parties. We were also conscious that the redeterminations should not be construed as processes that would necessarily lead to an outcome for the Disputing Companies better than the Ofwat determination. We did not limit our assessment to the specific issues raised by the companies in their statements of case and considered whether the allowances set by Ofwat were too generous. We also considered other areas of significance to the outcome not raised by the parties, and invited third parties to tell us if there were any other areas they thought we should consider.¹⁷⁵
- 3.10 We have adopted a proportionate approach given the time available to us and have considered the extent to which issues are in dispute and/or are most likely to impact significantly on the achievement of statutory duties. Thus, some areas have been deprioritised (see paragraphs 3.16 to 3.27). In some areas, where we have not identified superior alternative approaches to those used by Ofwat, we came to a similar decision to those in Ofwat's PR19 determinations. In places, our provisional findings on the determination may be expressed in terms of revisions to or replacements of aspects of Ofwat's determinations.
- 3.11 For the same reasons of proportionality, other than where set out in our report, we have broadly used the same approach as Ofwat to materiality, of where issues warranted in depth analysis (for example the use of deep dives on enhancement expenditure).
- 3.12 As part of its final methodology for PR19 Ofwat set expectations that the companies should engage with customers on areas such as affordability, improvements to customer service, resilience and the setting of PCs. All four Disputing Companies told us that they had undertaken substantial engagement with customers and took account of customer views when finalising their business plans and that these views were not fully reflected in Ofwat's FD.
- 3.13 We consider that customer views are an important element in informing the price review process, including gaining an understanding of ability and willingness to pay, and views on the balance of priorities. There are also likely to be substantial broader benefits of customer engagement in informing

¹⁷⁵ [CMA approach to water redeterminations](#), paragraph 9

company operations, regardless of use in price review processes. However, having examined examples of customer research, we consider that there may be limits to the weight such evidence should be given when considering all evidence in the round. This may derive from questions over the validity of research methods and the fact that customers usually will not have comparative information on other companies, as well as the extent to which customers can reasonably be expected to comment meaningfully on complex technical matters or evaluate between different alternative plans.

- 3.14 We have considered the submissions put forward by Ofwat and the companies. In particular, we have looked at the extent to which we should give weight to customer evidence on the basis of submissions put to us, notably in section 7 in respect of PCs and ODIs. This will depend on the particular context and issues involved as well as the type and quality of research conducted. Our view is that customer research can be highly informative in relation to particular issues, and that there is great potential for development of customer research methodologies and its appropriate application.
- 3.15 Water supply and wastewater services are essential to customers. We have been mindful of the issue of vulnerable customers, both those who are financially vulnerable, and so may face difficulties affording their water bills, and those who are vulnerable for other reasons. Examples of such vulnerability might include age, infirmity, illness, caring for dependents, communications challenges and similar matters, which may affect the quantity of water they need to use or could all make it more difficult for such customers to engage with water companies, to represent themselves and ensure they are receiving appropriate service. There are a variety of measures in use by water companies to address these concerns, for example in running a priority services register, offering help and advice, and offering social tariffs. While we consider these extremely important, most of these measures offered by companies and supervised by Ofwat lie outside the scope of the PR19 price control. Where relevant to the price control (eg PCs and ODIs in relation to the priority services register), we have given these careful attention.

Prioritisation and deprioritisation of issues

- 3.16 The references to the CMA are references for the determination of new price controls for each of the four water companies, not an appeal on specific elements of Ofwat's decision. Accordingly, we are not limited in our consideration to arbitrating disputes between Ofwat and the companies.
- 3.17 While the CMA is able to address any aspect of the price controls in the redeterminations, we have needed to prioritise our work given the limited time

available. We consider it important to adopt a proportionate approach and to scrutinise most closely the areas in the determinations that would have the largest effect on customer prices and other outcomes, and the Disputing Companies.

3.18 We have therefore been mindful of whether in respect to specific issues:

- any concerns have been raised by any Main or Third Party;
- we have identified any potential concerns;
- there is any precedent value or read across to other parts of the redeterminations; and/or
- there is a significant scale of impact on current and future customer bills and other outcomes such as service quality and resilience.

3.19 In our 'Approaches document' published on our webpage,¹⁷⁶ we invited comments on our proposal of areas to deprioritise. We did not receive any responses that challenged our proposed approach. The areas we deprioritised are set out below. In these deprioritised areas, we have decided that our provisional determinations will follow Ofwat's approach. Where we consider it would aid understanding of our provisional determinations we have included information about that approach.¹⁷⁷

Household retail

3.20 Ofwat introduced separate household retail price controls in PR14 and took a comparable approach in PR19. The decisions on retail are largely distinct from the wholesale decisions and Ofwat presented its assessment of charges for household retail charges as being a separate price control in its PR19 decisions. We have not made changes to these retail price controls (including the associated residential retail reconciliation mechanism, and experience measures (C-Mex and D-Mex)).¹⁷⁸

¹⁷⁶ [CMA approach to water redeterminations](#)

¹⁷⁷ However, there are in some cases consequential changes which need to be reflected, for example, certain retail allowances flow from wholesale cost figures, and so if we revised these wholesale allowances we would also need to update the consequential retail figures.

¹⁷⁸ Citizens Advice submitted that it was inappropriate for Ofwat to make a retail margin adjustment to the WACC as this is based on an assumption that debtors are the only relevant working capital item whereas many retail customers pay in advance for water services, see [Citizens Advice submission](#) (6 July 2020). We have taken a different approach to Ofwat's retail margin adjustment, which affects wholesale revenue, rather than retail revenue. This matter is considered in paragraphs 9.534-9.563

Business retail

- 3.21 The four appointed water companies that have asked for a redetermination no longer carry out a non-household retail business and so we have not addressed this matter.

Bioresources reconciliation mechanism

- 3.22 Bioresources allowances are based on an allocation from the overall wastewater allowance, which we have considered as part of the base expenditure assessment. Ofwat's methodology included a step to split this allowance into a fixed and variable component. The variable component will then be (ex-post, in 2024) scaled to reconcile with actual volumes of 'sludge'. This acts as a symmetrical risk mitigation mechanism around the uncertainty of actual outturn volumes. However, the effects of this reconciliation mechanism appear relatively modest. No stakeholders have raised concerns about this reconciliation mechanism. As an ex-ante control being set in PR19, we consider that this reconciliation mechanism falls within the scope of the redeterminations. However, for the reasons stated above, we have chosen not to review it.

PR14 reconciliation

- 3.23 The PR14 reconciliation adjusts the revenue allowances calculated during PR19 for various mechanisms specified during PR14. Other than one point raised by Yorkshire (see paragraphs 11.9 to 11.59), we have not reviewed the PR14 reconciliation adjustments.

Grants and contributions (other than one aspect of potential double-counting)

- 3.24 A process is in place that allows water companies to receive funding income other than normal customer bills, for example, developers paying for services such as laying infrastructure to serve new developments. These are generally not amended by Ofwat and we have not addressed them, other than the one specific issue raised by Northumbrian, see paragraphs 11.60 to 11.92.

Issues already consulted on

- 3.25 There are two areas on which Ofwat widely consulted prior to PR19, and where no concerns have been raised by the Disputing Companies or other parties:

- Switch from RPI to CPIH: a phased switch from RPI to CPIH for the indexation of allowed revenue and RCV was implemented for the first time during PR19.
- Pension deficit recovery costs: At PR19 Ofwat adopted the policy of allowing companies to recover 50% from customers of any remaining pension deficit costs that need to be recovered into the period 2020-25, while shareholders/equity owners take the risk for the other 50%.

Other small impact issues

3.26 There are a number of other issues and adjustments whose impact is small, and where no concerns have been raised by the Disputing Companies or Third Parties:

- Non-price control income which is deducted from allowances: These are technical adjustments relating to forecasted income generated by the water companies from certain charges which are excluded from the price controls. The impact of these adjustments is small, and we have received no evidence to suggest we could improve on Ofwat's review of company forecasts of this income.
- Innovation competition funding: Ofwat established a collectively-funded innovation competition for 2020-25, where funding is collected in proportion to a company's revenue. The amounts available are modest and no stakeholders raised concerns.
- Certain other adjustments to Totex: Ofwat makes various other adjustments when calculating Totex, for example relating to operating leases; strategic regional water resources solutions and other cash items; third party costs; and non-section 185 diversions. These adjustments are relatively also relatively modest – and we are not currently aware of any concerns raised by the Disputing Companies or Third Parties.

3.27 More broadly there have been public concerns around the transparency of dividends/performance-related executive pay. However, we do not consider that this is a price control matter.

Conduct of the investigation

3.28 We have published an [administrative timetable](#) on our web pages showing our expected timing for the stages of our process. Although the statutory deadline for our report is 18 March 2021, we intend, if possible, to produce our final determinations in December 2020. This is to allow time for the determinations

to be reflected in customer bills for next year. In June we published our approaches document on our webpage, setting out our proposed approach to the determinations.¹⁷⁹

- 3.29 Our provisional determinations have been informed by extensive submissions from the Main Parties.
- 3.30 We have reviewed Ofwat's PR19 determinations documentation and supporting consultation documents, provisional decisions, methodology papers etc and the Disputing Companies' submissions on these points.
- 3.31 Ofwat also provided us with a number of teach-in sessions to explain the regulatory process and the background to PR19 ahead of the referrals.
- 3.32 Ofwat's referrals were published on our website on 20 March 2020.¹⁸⁰ We received and published the companies' statements of case,¹⁸¹ Ofwat's response to these statements of case,¹⁸² another response submission from the companies¹⁸³ and an exchange of reply submissions from Ofwat and the companies.¹⁸⁴
- 3.33 The four companies also made opening presentations to us and hosted virtual site-visits, and Ofwat held a number of technical teach-ins with CMA staff on detailed analytical approaches and its financial models. We also held a round table session with the technical advisors to the Main Parties to discuss cost of capital issues.
- 3.34 We received responses from Ofwat and the companies to detailed requests for information. Additionally, the Main Parties have at times sent us further letters and evidence.
- 3.35 We held hearings with all the Main Parties during July and early August to discuss the issues.
- 3.36 We also received submissions from Third Parties (see paragraphs 3.57 to 3.61), these were published on our website.¹⁸⁵ We held a number of Third Party hearings.
- 3.37 We have followed a policy of openness and transparency with the Main Parties in respect of the evidence we are considering, with the exception of a

¹⁷⁹ [CMA's approach to water redeterminations](#)

¹⁸⁰ [References from Ofwat](#) (20 March 2020)

¹⁸¹ [Statements of case](#) (08 April 2020)

¹⁸² [Ofwat responses to Statement of Cases](#) (05 May 2020)

¹⁸³ [Replies to Ofwat's response to Statements of Case](#) (08 June 2020)

¹⁸⁴ [Ofwat's further submissions](#) (20 and 24 July 2020)

¹⁸⁵ [Submissions from third parties](#) (18 May – 06 July 2020)

few minor points which were considered commercially confidential. We asked the Main Parties to copy each other into submissions and responses to the CMA's requests for information. In all cases, transcripts or recordings of meetings (including with third parties), round tables and teach-ins were shared with the Main Parties. We have not issued working papers to the Main Parties and therefore we are seeking responses to our approach and analysis through our consultation on the Provisional Determinations.

- 3.38 We have employed a firm of engineering consultants, WRc, to assist us on technical engineering matters in relation to the Determination. WRc has provided technical input to the CMA on issues including ODIs, issues relating to Anglian's Interconnector, Water Industry National Environment Plan (WINEP) and the IED. We have treated WRc's advice as further evidence to aid the Group's decision making.

COVID-19

Background

- 3.39 The COVID-19 crisis presents short and long-term challenges for the water sector, both on the operations of suppliers and on the levels and types of demand for services. The full impacts of this are not clear and will remain uncertain for some time, including:
- (a) the full economic impact of the crisis;
 - (b) the length of time that restrictive social distancing or lockdown measures are in place;
 - (c) the impact on the economy and water sector once the furlough scheme has ended;
 - (d) the duration of the pandemic; and
 - (e) the longer-term impact of increased home working.
- 3.40 The CMA has sought input from the Main Parties on the impact that COVID-19 is likely to have on the water sector as well as how they consider the CMA should take account of it in its redetermination. The CMA received submissions from Ofwat, Anglian, Northumbrian and Yorkshire. In general, the Main Parties represented that the impact of COVID-19 has led to significant disruption in the operation of the water companies as well as changes in the behaviour and finances of household and non-household customers. In particular there has, and will continue to be, an impact in the following areas:

- (a) Customer Usage
- (b) Affordability/Bad debt
- (c) Costs
- (d) Capital programme
- (e) PCs

3.41 We consider each of these areas in more detail below.

Customer Usage

3.42 COVID-19 measures have meant the closure of offices and increased home-working. The Parties have told us that this has meant that household demand for water has increased significantly while non-household demand has decreased. The decrease in non-household demand will have a significant impact on the liquidity of retailers and bad debt issues in the non-household market. To combat this, Ofwat introduced various changes to the market code in March 2020.¹⁸⁶

Affordability and bad debt

3.43 COVID-19 is expected to have a significant effect on bad debt. It is likely that the full effects of this have not yet been felt. The costs of increased bad debt will fall to the water companies.

Totex

3.44 Northumbrian, Anglian and Yorkshire submitted that there has been an increase in Totex costs due to requirements for additional equipment and activity to undertake routine tasks. These additional costs are in maintaining essential services and complying with government requirements. These include increased residential demand, additional IT equipment to facilitate home working, purchase of PPE, higher staff absences and the impact of social distancing on construction and office work.

¹⁸⁶ These included an ability for retailers to use the market vacancy flag to prevent settlement of wholesale charges for premises that may be affected by Covid-19 closures. These changes were intended to remove financial liabilities from retailers. The second required wholesalers to provide liquidity to retailers through an immediate 50% reduction of liability in relation to the payment of wholesale charges for March 2020. This required the water companies to provide liquidity very quickly.

- 3.45 However, some of the companies and Ofwat note that there have been some cost savings, although these do not offset the cost increases. These include a reduction in non-fleet mileage and travel and subsistence, decreased travel time from home working and increased ease of contacting customers as a result of home working.

Capital Programme

- 3.46 We were told that COVID-19 has had a significant impact on some of the water companies' capital programmes. For example:
- (a) Yorkshire told us that it suspended its capital programme for two weeks to enable the impact of lockdown to be assessed. When the Yorkshire sites remobilised, the operating constraints caused further time delays and increases in project costs owing to having to find alternative suppliers; provide additional welfare facilities on site; additional fleet costs; sourcing limited supplies of PPE; and sourcing alternative materials and parts.
 - (b) Northumbrian told us that it has seen some increased costs and delays in relation to the delivery of its capital programme.
 - (c) Anglian told us that its capital programme was delayed by three months to focus on the delivery of key services.
 - (d) Ofwat told us that companies have taken very different approaches to their capital programmes during COVID-19 with some companies noting significant delays and other companies pressing on with their programmes.

Performance commitments

- 3.47 COVID-19 has also had an impact on companies' likely achievement of PCs and associated payments or penalties under ODIs. While Yorkshire and Anglian consider that the impact of COVID-19 including bad debt and changes to Totex and capital programmes and prioritisation of core services will have negative impacts on PCs, Ofwat and Northumbrian noted that the crisis will impact individual measures differently with some negative impacts and some positive impacts.

CMA's assessment

- 3.48 The CMA must consider the extent to which we take account of the impacts of COVID-19 on the water industry in setting the price controls for the four appealing companies.

- 3.49 We received a letter from Anglian, Yorkshire and Northumbrian which stated that the CMA should consider the wider economic and market evidence as it makes its determinations. It also stated that there should be a sector-wide approach with a reconciliation mechanism for those direct impacts that remain uncertain. It noted that this matter is for Ofwat to address.
- 3.50 Following that, Yorkshire reiterated what it had said in the joint letter and noted that the CMA should use any emerging evidence as part of its redetermination process. Northumbrian Water noted that it expects that, where the information on the impacts of COVID-19 is sufficiently clear by the time of its publication of its provisional and final determinations, the CMA should reflect this where appropriate in line with its general approach of making decisions based on the best information available. It stated that in particular the CMA should take account of the impact on the cost of capital, productivity challenges, frontier shift and financeability. Where the uncertainty cannot be resolved in time, it considered that there will need to be a form of regulatory reconciliation mechanism.
- 3.51 Bristol submitted in May that it supported Ofwat's preference to take account of the impacts of COVID-19 across the sector as part of the PR19 reconciliation process.¹⁸⁷
- 3.52 Ofwat submitted that, given the continued uncertainty around the impacts of COVID-19, any regulatory adjustments should be implemented outside the redetermination process. Ofwat said it will consider the need for any ex-post adjustments following an in-the-round assessment, the timing of which will be aligned with its normal reconciliation processes.

Our view

- 3.53 The CMA considers that, when taking decisions regarding the determination, we should use the most up to date information available. Therefore, where new information available that was not available at the time of Ofwat's FD is available that has an impact on the water industry and, specifically, the price control, the CMA should take account of these changes in circumstance.
- 3.54 However, there are significant difficulties in assessing the impacts of COVID-19 within the framework of the redetermination at this stage. There is significant uncertainty regarding the full impact of COVID-19 on the water sector as well as the timing, duration and scale of any impacts and the

¹⁸⁷ [Bristol's Reply to Ofwat's Response](#)

duration of the COVID-19 crisis. This uncertainty is likely to remain at the time of our Final Determination.

- 3.55 For these reasons, we provisionally consider that the best mechanism for taking direct account of impacts of COVID-19 is for Ofwat to consider these as part of an industry-wide process; Ofwat has proposed it will consider the needs for any ex post adjustments at a time aligned to its normal PR19 reconciliation process.¹⁸⁸ It has been suggested to us that we should provide views and principles to Ofwat on how it should approach this. However, for the same reason that the position and impacts of COVID-19 will be unknown, we do not consider that this would be appropriate, nor is it clear that this falls within our powers.
- 3.56 We have updated our determinations for new information (see paragraph 3.8) that is not directly about the impact of COVID-19, for example market information relevant to the calculation of the WACC.

Third party submissions

- 3.57 We have received 70 third party submissions from 61 interested third parties including environmental, conservation, business and consumer organisations, local government, academics, advisors, water companies and other regulated businesses. These submissions have been published on our [webpage](#). The points raised in these submissions can be broadly grouped into four areas.
- 3.58 Many third parties told us that Ofwat's final determination underfunded investment in environmental and resilience schemes, with the risk that these would be scaled back. These arguments were made by local and regional third parties in particular. These parties often also expressed concern for the future of local partnerships or collaborations with one of the Disputing Companies, or fears that local organisations would be unable to meet their goals as a result of the water companies scaling back schemes.
- 3.59 Many third parties also told us that Ofwat ignored customer views. They said that customers were in favour of environmental and resilience schemes and tended to favour these over bill reductions when offered the choice. In particular, the CCGs for all four Disputing Companies made this point, as did some non-disputing water companies. However, the Consumer Council for Water (CCWater) told us that it had found very high levels of acceptability among customers for Ofwat's Draft Determinations.

¹⁸⁸ Although we have needed to consider arguments on the impacts of Covid-19 in relation to growth, see for example paragraph 4.490.

- 3.60 A few third parties told us that Ofwat was right to adopt a ‘stretching’ final determination given historical performance, past corporate behaviour and the very low levels of risk associated with providing a monopoly essential service. In particular, Citizens Advice told us there was a need for Ofwat to get tougher, consumers should not be paying over the odds for a reasonable level of performance and shareholders should face downsides for under-performance. It said challenge was important and that consumers should not be expected to over-pay for a reasonable and efficient level of performance. CCWater also told us it welcomed Ofwat’s challenge on efficiency.
- 3.61 Finally, some third parties provided comments on technical aspects of the calculation of the cost of capital. These comments did not tend to be made by local or regional third parties but were common in submissions from non-disputing water companies, other regulated businesses, other regulators and academics, some of whom have an interest in forthcoming regulated sector price controls which could be influenced by the CMA’s conclusions here. In contrast to the representations of customer groups in paragraph 3.60, these submissions generally proposed (often on behalf of regulated companies) that Ofwat had set the cost of capital too low for various reasons. For example, the Energy Networks Association told us that the Risk Free Rate and the allowed cost of equity had been set too low, and Heathrow Airport Ltd told us that the Total Market Return had also been set too low.¹⁸⁹

Calculation of a K-factor based on our determination

- 3.62 In order to finally determine the price controls for each company for each activity, we will need to translate our decisions on each of the building blocks into a calculation on the effect on the licence, including as relevant a value of K (the price controls for bioresource and retail activities are also revenue controls but are not expressed as a K factor).
- 3.63 We have not made any changes to the design of the price control, and therefore we would expect that our decisions in the determination should be able to converted directly into a change to the level of the price control, including K. We have not done so prior to the provisional determination, as the modelling is complex and includes areas of Ofwat’s determination which we have not assessed in our redetermination.
- 3.64 We will consult with the Main Parties in parallel to our consultation on this Provisional Determination on the technical steps required to convert our determination to changes to the price control licence conditions. This will

¹⁸⁹ See [our webpage of third party submissions](#).

include any modelling required to reflect the Final Determination. We will then update the modelled numbers to reflect any changes between our provisional determination and our final determination, and also to confirm our preferred approach to modelling, if there are any areas of judgement in how the determination is converted into a number for the price control.

- 3.65 Our intention is to publish the calculations and consequences for the licence and the supporting modelling alongside our Final Determinations.

Structure of the provisional redeterminations report

- 3.66 This document is our provisional findings report in respect of the four redeterminations. For simplicity and clarity, rather than producing four separate reports, we have addressed issues and then drawn out our provisional conclusions and reasoning, and set out how these apply to each of the four disputing companies. Sections 12 to 15 provide details of the provisional determination for each company.

- 3.67 The remainder of these provisional findings are set out as follows:

- (a) In Sections 4 to 6, we consider a range of evidence to assess wholesale costs for the determination:
 - (i) In Section 4, we consider approaches to assessing base expenditure allowances, including evaluation of Ofwat's base assessment and our provisional approach. We also consider various specific unmodelled costs.
 - (ii) In Section 5, we review enhancement allowances.
 - (iii) In Section 6, we consider our overall conclusions on approaches to Totex allowances.
- (b) In Section 7, we address outcomes including PCs and ODIs.
- (c) In Section 8, we consider funding and PCs and ODIs for the issue of leakage.
- (d) In Section 9, we set out our provisional findings on rates of return derived from our calculation of the appropriate cost of capital. We also consider Bristol's request for a CSA and Ofwat's GOSM.
- (e) Section 10 sets out our provisional assessment of financeability.

- (f) Section 11 covers a range of other issues not otherwise addressed, including taxation, matters relating to PR14 reconciliation and remedying previous possible errors.
- (g) In Sections 12 to 15, we set out our provisional findings on the determinations for each of the four Disputing Companies.
- (h) Section 16 identifies how any parties should respond to our consultation on this provisional determination report.

4. Base costs

Introduction

4.1 In this section we set out our approach to determining the Disputing Companies' base cost allowances and cover the following topics:

- (a) base cost modelling;
- (b) catch-up efficiency challenge;
- (c) frontier shift;
- (d) real price effects
- (e) growth;
- (f) adjustment for enhancement opex;
- (g) Anglian cost adjustment claims; and
- (h) unmodelled costs.

Base cost modelling

Introduction and summary

- 4.2 In this section, we discuss our consideration of base cost modelling. This is the first building block of Ofwat's methodology to reach a view of each company's totex allowance. Ofwat used econometric models with the companies' historical costs as the dependent variable and cost drivers, such as the size of the network, as independent variables. Ofwat used this modelling to identify how efficient companies are and to estimate future cost allowances.¹⁹⁰
- 4.3 Below, we provide a detailed assessment of each of the issues that have been raised by the Main Parties concerning base cost modelling, and the additional issues we have assessed. The final sub-section summarises our provisional decisions on the assessment of the base cost models.
- 4.4 Ofwat's models were developed following a consultative and development process involving stakeholders and drawing on lessons from PR14. Ofwat:

¹⁹⁰ Ofwat (2019), [Securing cost efficiency technical appendix](#), p10

- (a) engaged Cambridge Economic Policy Associates (CEPA) to support the development of econometric models for the wholesale water and wholesale wastewater controls. CEPA developed econometric models that Ofwat could use as part of the assessment of costs for wholesale activities during PR19. We understand CEPA tested over 1,500 potential models and used robustness checks to select the models that were presented in its report;¹⁹¹
- (b) engaged Vivid Economics to further develop wholesale wastewater models;
- (c) received assistance from academic advisers, Professor Andrew Smith and Dr Thijs Dekker of the University of Leeds, who provided review and challenge throughout the process; and
- (d) invited companies to submit their views. Thirteen water companies submitted their preferred models for the consultation, including the Disputing Companies. Overall, the companies submitted over 220 models in wholesale water and wastewater activities.¹⁹²

4.5 Ofwat used five models for wholesale water:

- (a) two models for Water Resource Plus (water resource, raw water distribution and water treatment) (WRP1 and WRP2);
- (b) one model for Treated Water Distribution (TWD); and
- (c) two models for aggregated Wholesale Water (WW1 and WW2).

4.6 Ofwat used eight models for wholesale wastewater:

- (a) two models for Sewage Collection (SWC1 and SWC2);
- (b) two models for Sewage Treatment (SWT1 and SWT2);
- (c) two models for Bioresource (BR1 and BR2); and
- (d) two models for Bioresources Plus (bioresources and sewage treatment) (BRP1 and BRP2).

4.7 In our review of the econometric model we consider the following points.

- What is the correct estimation technique?

¹⁹¹ CEPA (2018), [PR19 Econometric Benchmarking Models](#), p51

¹⁹² [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), paragraph 3.37

- What is the correct functional form?
- Which explanatory variables should be used?
- Assessment of alternative model specifications
- Is capital maintenance addressed appropriately?
- Is there a log-transformation bias?
- Which forecast data should be used?
- What is the appropriate aggregation and triangulation approach?

What is the correct estimation technique?

4.8 Econometric models can use different estimation techniques to calculate the estimated coefficients from the data supplied. The estimation techniques we considered were:

- (a) Pooled Ordinary Least Squares (OLS) models. This is a standard OLS regression which includes data for a cross-section of companies and across time. The pooled OLS model treats each data point as if it were a unique firm.
- (b) Random effects models. The random effects approach assumes each company has an unobserved unique time constant factor (such as the company's senior management) that affects costs. This unique factor is assumed to be uncorrelated with other cost drivers.
- (c) Fixed effects models. The fixed effects approach, like random effects models, assumes each company has an unobserved unique time constant factor that affects costs but that this unique factor may be correlated with other cost drivers.
- (d) Stochastic frontier analysis (SFA). This is a modelling technique used to estimate production or cost functions in economics that explicitly accounts for the existence of firm inefficiency. SFA allows the residual term from the econometric modelling to be split between inefficiency and error. For example, the model may predict that a company's costs should have been £200 million, but the company actually spent £225 million. With SFA, the difference of £25 million can be split down further, with an estimate of the actual inefficiency (for example, £15 million) and the underlying error term (for example, £10 million), which could be the result of measurement error (for example, data entry errors).

4.9 In the remainder of this section, we discuss the Main Parties' arguments related to the correct estimation technique and we present our provisional decisions on these topics.

Parties' arguments

4.10 Ofwat used a random effects model to estimate all its models for three reasons.

- (a) it reflected the panel structure of the data (including variation over time and companies);
- (b) the coefficients were more statistically significant compared to using OLS; and
- (c) the standard statistical tests (Breusch-Pagan test) consistently provided results supporting the use of the random effects model over OLS.¹⁹³

4.11 CEPA said that:

While the way in which 'noise' is separated from inefficiency in SFA models is appealing, SFA models require large amounts of data. The reduction in the size of the panel for most of the models in PR19 (due to developing more granular models) makes the implementation of this methodology even less appealing/feasible. In addition, these models are more complex and less transparent and, as a result, they should only be used when other, simpler, models do not provide robust enough estimates. Furthermore, since SFA is not a statistical technique, it is not possible to implement tests to evaluate the accuracy of the results.

It is also worth noticing that SFA models were developed in PR14 and both Ofwat and the CMA found that they provided limited additional value. As a result, this modelling approach was not considered as part of the modelling suite for PR19.¹⁹⁴

4.12 Ofwat said that while SFA was appealing for efficiency analysis, in practice, it had limited use in regulatory applications. SFA models were complex and non-transparent for stakeholders, required large amounts of data and were sensitive to assumptions regarding the distribution of inefficiency.¹⁹⁵ CEPA

¹⁹³ Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), pp7–8

¹⁹⁴ CEPA (2018), [PR19 Econometric Benchmarking Models](#), p38

¹⁹⁵ [Ofwat's response to Yorkshire's SoC](#), paragraph 3.50

had recommended to Ofwat that SFA models should only be used when other, simpler, models did not provide sufficiently robust estimates and Ofwat followed CEPA's advice.¹⁹⁶

- 4.13 Anglian said that Ofwat should have used a wider range of estimation techniques.¹⁹⁷ Saal and Nieswand, in a report for Anglian, said that the Ofwat modelling labelled as inefficiency what could be legitimate cost differences resulting from different operating environments.¹⁹⁸
- 4.14 Yorkshire said that Ofwat's assertion that SFA was 'complex and non-transparent' for stakeholders was a value judgement that Ofwat made which was not supported by evidence.
- 4.15 Oxera, in a report for Yorkshire, commented on SFA:
- (a) SFA was a superior approach to regression analysis, since company-specific noise was separated from company-specific inefficiency. SFA was extensively used in regulation across Europe.
 - (b) Oxera had carried out SFA using the data for Ofwat's wholesale water and wholesale wastewater models. In the five wholesale water models, the SFA results showed no statistically significant inefficiency in all five models. In four of the eight wastewater models, the SFA results showed no statistically significant inefficiency.
 - (c) Ofwat's statement that SFA required large amounts of data was not a valid justification for not conducting SFA.
 - (d) Ofwat's statement that SFA was sensitive to assumptions about the distribution of inefficiency was correct to some extent, but Ofwat itself made strong and unsupported assumptions about the distribution of inefficiency by applying an ad hoc adjustment to companies' efficiency scores.
- 4.16 Vivid Economics, in a report for United Utilities, looked at using SFA, but found that it was not sufficiently robust to enable a decomposition of the results into an error term and efficiency. This was mainly due to serial correlation between the explanatory variables.¹⁹⁹
- 4.17 Ofwat said that Oxera's analysis did not take into account the panel data structure of the data. Once this was accounted for, Ofwat found statistically

¹⁹⁶ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), paragraphs 6.40–6.43

¹⁹⁷ [Anglian SoC](#), paragraph 592 Anglian (April 2020), [Anglian SoC](#), paragraph 592

¹⁹⁸ Saal and Nieswand (2020), [CMA Redetermination of Ofwat's 2019 Final Price Determinations](#), p5

¹⁹⁹ Vivid Economics/Arup, [Use of econometric models for cost assessment at PR19](#), p38

significant inefficiency across the econometric models. Ofwat also tested the distribution of the SFA model error. This test indicated that its distribution was skewed the opposite way from the one suggested by theory, which suggested model specification problems.

Provisional decision

- 4.18 Fixed effects – We tested whether it was appropriate to use a fixed effects approach. The theoretical advantages would be that this approach could address omitted variable bias due to time-constant firm-specific factors, such as uncaptured geographic factors and management.
- 4.19 We ran models using the fixed effects approach, but the results were highly unsatisfactory: none of the variables considered were significant and the R-squared dropped for most of the models, indicating a relatively poor performance modelling base costs.²⁰⁰ We therefore provisionally decide not to use fixed effects.
- 4.20 Pooled OLS – We confirmed Ofwat’s finding that a statistical test (Breusch-Pagan) suggested that random effects models performed better statistically than pooled OLS models for both wholesale water and wastewater.²⁰¹ We therefore provisionally decide not to use pooled OLS.
- 4.21 SFA – We recognise that SFA is a potentially advantageous alternative estimation technique for estimating inefficiency compared to the random effects approach used by Ofwat. This is because the SFA technique is designed to separate the companies’ inefficiency from the random noise in the model.
- 4.22 We analysed the empirical evidence provided by Oxera and found that Oxera had not taken account of the panel nature of the dataset, hence ignoring that we observe companies over time. Consequently, we place little weight on the Oxera results which showed little evidence of inefficiency.
- 4.23 In the SFA model, the inefficiency estimates will be affected by the distributional assumption made. Hence, SFA essentially involves replacing an ex-post judgement about the appropriate catch-up challenge based on an assessment of the quality of the modelling and the need for ‘stretch’ with an ex-ante technical judgement on the appropriate way to model the distribution

²⁰⁰ The R-squared is a measure of how well the model can explain the data. Generally, a higher R-squared is preferable. However, this can be misleading because a too high R-squared may mean that the model loses its predictive power (this is known as overfitting).

²⁰¹ Ofwat (2019), [Securing cost efficiency technical appendix](#), p170

of inefficiency.²⁰² Ofwat's approach does not require this ex-ante assumption. Therefore, we provisionally decide not to use SFA.

- 4.24 We therefore provisionally decide that a random effects model is the most appropriate estimation technique.

What is the correct functional form?

- 4.25 The functional form describes the assumed relationship between the dependent and explanatory variables. We considered two types of functional forms: the translog and Cobb-Douglas.
- 4.26 The translog functional form allows more flexibility with respect to the relationship between cost drivers and base costs because fewer assumptions are required about the form of these relationships. For example, it allows the degree of economies of scale to vary with firm size – for example, a 1% increase in the number of connected properties leads to a 0.5% increase in costs for a small firm but leads to a 0.9% increase in costs for a large firm.
- 4.27 One advantage of translog is that simpler (more restrictive) functional forms are nested within this functional form so, for example if the economies of scale do not vary across firms, this will be reflected in the results. One disadvantage is that this functional form is more data intensive. This is because fewer restrictions are imposed on the modelled relationships, and the data and model must reveal the underlying relationship. If the sample size is small, the results may not be robust or statistically significant.
- 4.28 The Cobb-Douglas functional form is a relatively easy to interpret model specification which, in its simplest form, excludes interaction terms among variables.²⁰³ This functional form imposes a more restrictive relationship between cost drivers and costs. In particular, the degree of economies of scale is restricted to be constant and does not vary with other cost drivers.²⁰⁴

Parties' arguments

- 4.29 CEPA in their work for Ofwat considered but rejected translog functions for two reasons.²⁰⁵ First, the use of translog models made it more difficult to

²⁰² The academic literature discusses several ways to model inefficiency in an SFA approach but it is unable to point to an ex-ante assumption that would be appropriate for our modelling purposes. We therefore consider that the SFA introduces additional modelling uncertainty relating to the appropriate way of modelling the inefficiency.

²⁰³ Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p7

²⁰⁴ CMA interpretation of Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), Table 1 (WW1 column)

²⁰⁵ CEPA (2018), [PR19 Econometric Benchmarking Models](#), p39

identify the specific effect of each variable on costs. Second, translog models required the introduction of a larger number of explanatory variables and CEPA was concerned about having too many explanatory variables due to the small sample size.

- 4.30 In PR19, Ofwat used a Cobb-Douglas functional form.²⁰⁶ There were four reasons why Ofwat did not use a translog functional form:²⁰⁷
- (a) Translog coefficients often had a counter-intuitive sign. For example, the effect of the number of connected properties might be expected to show that water companies experience economies of scale, but instead the results implied diseconomies of scale (such as higher costs per property for larger firms than for smaller firms).
 - (b) Some translog explanatory variables (such as length of mains multiplied by density) were insignificant. This meant that they did not have a material effect on cost.
 - (c) Some translog terms were unstable. For example, during sensitivity analysis (including removing years, removing companies and including different cost drivers/measures) some coefficients changed from positive to negative.
 - (d) The specification took up more degrees of freedom compared to Cobb-Douglas. It imposed more constraints on one variable after controlling for the rest of the parameters in the model, and a better approach was to use more relevant cost drivers.
- 4.31 Saal and Nieswand, in a report for Anglian, supported the use of a translog functional form and said that water supply systems involved complex cost interactions between the volume of output, transportation, water resource availability, topography and other factors. They said that the substantial academic literature and consulting work done for both Ofwat and some companies (Anglian, Severn Trent and United Utilities) had found considerable evidence of important cost interactions between the upstream and downstream components. Saal and Nieswand said that the model should include interactions between cost drivers.²⁰⁸

²⁰⁶ Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p7

²⁰⁷ Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p7

²⁰⁸ Saal, David (2018), [Comments on CEPA's Methodological Approach in its PR19 Econometric Benchmarking Models for Ofwat](#), p5

4.32 Thames Water said that it supported Ofwat's use of more flexible functional forms, such as squared terms, in the econometric model.²⁰⁹

Provisional decision

4.33 Based on our review of the evidence above, we provisionally decide to rely on Cobb-Douglas models.²¹⁰

4.34 We provisionally decide against using the translog functional form for the following reasons.

- (a) Translog requires the addition of several explanatory variables. We note that the Ofwat dataset has a relatively small sample size of at most 141 observations. As we add additional variables to a regression model, we may find that the model explains more of the variation in cost (in other words, the cost for each company-year combination); however, the additional explanatory variables may not reflect the true underlying relationship between the cost drivers and cost. This means the estimated model would not be reliable for estimating the cost allowance for the 2020/21-2024/25 period.
- (b) Additional explanatory variables, combined with the small sample size, also reduces the degrees of freedom in the model, leading to less precise estimates.
- (c) Translog models make it more difficult to identify and interpret the specific effect of an explanatory variable on cost. As translog models have interaction terms and squared terms, the relationships are more complex. We opt, where possible, to have a parsimonious and easy-to-interpret model as this facilitates the application of our framework.

Which explanatory variables should be used?

4.35 The companies' production process comprises the combination of several inputs. When estimating cost functions, it is therefore important to understand and model the relationship between cost and the cost drivers. In this section, we review the relationship between costs and its key drivers and provisionally decide on the explanatory variables that should be used.

²⁰⁹ Thames Water (2020), [Thames Water Submission to the CMA inquiry into PR19 Price Determinations](#), paragraph 2.11

²¹⁰ We note that there is some flexibility in the application of the Cobb-Douglas form, eg including a squared term.

Parties' arguments

- 4.36 Ofwat's FD is based on a report by CEPA. The process followed by Ofwat was described in paragraph 4.4.
- 4.37 In its final determination, Ofwat produced models for wholesale water and wholesale wastewater base costs. For these base cost models, Ofwat decided that there were four key categories of cost drivers.²¹¹
- (a) Scale – 'Scale is a key driver of costs. Larger operations deliver more output and incur greater costs.'²¹²
 - (b) Density – 'The density of an area could have two opposing effects on costs. On the one hand, the density variable captures the potential for a water treatment business to treat water using larger and fewer treatment works incurring lower unit costs. On the other hand, dense areas may be associated with higher property, rental and access costs.'²¹³
 - (c) Treatment complexity – 'The complexity of treatment reflects both the quality of the raw water source supplying the treatment process and the treated output quality requirements.'²¹⁴
 - (d) Topography – 'Topography and the distribution of demand centres across the region can influence a company's distribution costs through greater requirements to pump and transport water to customers.'²¹⁵
- 4.38 Ofwat selected explanatory variables for each of the different cost models. The variables in each model differ to account for differences in the cost function. For example, the wholesale wastewater model includes a variable for sludge, which the wholesale water model does not account for because sludge is not a factor for wholesale water.
- 4.39 Ofwat used the following explanatory variables across the wholesale water and wastewater models.²¹⁶

²¹² Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), section 3.4, p12

²¹³ Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), section 3.4, p14

²¹⁴ Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), section 3.4, p12

²¹⁵ Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), section 3.4, p13

²¹⁶ Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p9

Table 4-1: Ofwat's econometric models for wholesale water activities – variables included in each model

Model name	WRP1	WRP2	TWD	WW1	WW2
Dependent variable (log)	Water resources + Raw water distribution + Water treatment		Treated water distribution	Wholesale water total	
Connected properties (log)	✓	✓		✓	✓
Lengths of main (log)			✓		
Water treated at works of complexity levels 3 to 6 (%)	✓			✓	
Weighted average treatment complexity (log)		✓			✓
Number of booster pumping stations per lengths of main (log)			✓	✓	✓
Weighted average density (log)	✓	✓	✓	✓	✓
Squared term of log of weighted average density	✓	✓	✓	✓	✓
Constant term	✓	✓	✓	✓	✓

Source: [PR19 final determinations, Securing cost efficiency technical appendix](#), table A2.1.

Table 4-2: Ofwat's econometric models for wholesale wastewater activities – variables included in each model

Model name	SWC1	SWC2	SWT1	SWT2	BR1	BR2	BRP1	BRP2
Dependent variable (log)	Sewage collection		Sewage treatment		Bioresources		Bioresources + Sewage treatment	
Sewer length (log)	✓	✓						
Load (log)			✓	✓			✓	✓
Sludge produced (log)					✓	✓		
Load treated in size bands 1-3 (%)			✓		✓		✓	
Load treated in size band 6 (%)				✓				✓
Pumping capacity per sewer length (log)	✓	✓						
Load with ammonia consent below 3mg/l (%)			✓	✓			✓	✓
Number of properties per sewer length (log)	✓							
Weighted average density (log)		✓			✓			
Sewage treatment works per number of properties (log)						✓		
Constant term	✓	✓	✓			✓		✓

Source: [PR19 final determinations, Securing cost efficiency technical appendix](#), table A2.2.

4.40 Anglian said that Ofwat's modelling was excessively simplistic to account for Anglian's atypical characteristics (in particular in terms of topography,

complexity, growth and quality of service) and these characteristics were not appropriately captured in Ofwat's models.²¹⁷

- 4.41 Anglian also referred to a paper by Saal and Nieswand, its advisers, which concluded that Ofwat's models did not appear to have controlled sufficiently for the complexity of water supply.^{218, 219}
- 4.42 Bristol said that Ofwat models should include service level variables.²²⁰
- 4.43 Northumbrian did not have any criticisms of the explanatory variables. Northumbrian stated that 'the PR19 models have been simplified to ensure that the key drivers are modelled effectively.'²²¹
- 4.44 Yorkshire was concerned that Ofwat's models were not able to distinguish inefficiency from omitted cost drivers, which may lead to an unrealistic efficiency challenge. It provided specific examples of cost drivers which it considered important, but which were not included in the base cost model.²²²
- 4.45 United Utilities said that additional explanatory variables should be added when there was engineering evidence of a relationship between these variables and costs.²²³

CMA framework

- 4.46 In this section, we describe the criteria we have adopted to decide whether to include an explanatory variable.
- Does the variable make sense from an engineering and economic perspective? When considering whether to include explanatory variables, we include variables which are consistent with the underlying engineering tasks and economics of supplying water. For example, the costs of supplying water are likely to be related to the number of properties supplied and therefore including variables which represent the scale of the network makes sense from an engineering and economic perspective.
 - Are the variables substantially under management control? Including variables which are substantially under management control is likely to

²¹⁷ [Anglian SoC](#), section 4.1

²¹⁸ [Anglian SoC](#), section 4.1, paragraph 562

²¹⁹ Saal (2019), [A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19](#), p34

²²⁰ [Bristol SoC](#), Chapter 10

²²¹ [Northumbrian SoC](#), paragraph 286

²²² [Yorkshire SoC](#), paragraph 197

²²³ Vivid Economics/ARUP (2017), [Understanding the exogenous drivers of wholesale wastewater costs in England and Wales](#), p9

cause statistical problems, including biased estimates, and could lead to unintended incentive issues. Service variables, such as leakage levels and the number of water supply interruptions, are under the substantial control of the water companies.

- Are the coefficients of the expected value and significance? We want to include variables where the coefficient is consistent with our understanding of how the variable should influence costs. For example, larger networks are likely to be more expensive to operate, so an explanatory variable related to scale, such as length of mains, should have a positive coefficient.²²⁴
- Is the variable highly correlated with other variables? We are concerned where there is the potential for high correlation between explanatory variables. The concern is that a high correlation between variables leads to model instability. The common approach in econometrics, which we follow, is to exclude variables that are highly correlated.
- Are there too many variables compared to the sample size? In the sample used by Ofwat, the number of observations is not large, which means that we may be able to only include a limited number of explanatory variables.

4.47 In the sections below, we assess in turn each of the disputed explanatory variables and a selection of other variables.

Average pumping head (APH)

4.48 Pumping water is energy intensive and therefore APH is considered a proxy for the energy requirement of companies.²²⁵ We would therefore expect a positive relationship between costs and APH. APH is, among other things, related to topography because the topography determines how high water must be pumped.

Parties' arguments

4.49 In some wholesale water models, Ofwat measured topography using the number of booster pumping stations per length of mains.²²⁶

²²⁴ For non-linear terms we may conduct a check for joint statistical significance.

²²⁵ This average is calculated by averaging over pumping stations and over time. For a reference see [Ofwat \(2020\), RAG 2.08 – Guideline for classification of costs across the price controls Consultation version](#)

²²⁶ Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p13

- 4.50 Anglian said that in the wholesale water model APH should replace booster pumping stations per length of main.²²⁷ This was for three reasons:
- (a) APH was more clearly defined relative to pumping stations, which was a variable being used for the first time. In the absence of a detailed definition of a pumping station, companies had interpreted differently what constituted a pumping station.²²⁸
 - (b) APH was a better measure for topography especially for a water and sewage company serving a flat rural area.²²⁹ In particular, borehole pumps and on-site high lift pumps, of which Anglian had many, were excluded from the pumping station measure.²³⁰
 - (c) The number of booster pumping stations per length of mains did not cover the entire value chain (only the distribution part).
- 4.51 Northumbrian used sensitivity analysis to check the robustness of Ofwat's findings. One of those analyses included replacing the number of booster stations with APH. Northumbrian said that APH passed the engineering and economic rationale test because it was a good proxy for the energy intensity of companies. However, Northumbrian said that APH was not statistically significant in its specifications, which implied that APH had a low predictive power.
- 4.52 Ofwat responded to the companies' arguments and said that APH may 'offer some advantages over other factors to control for variation in energy requirements across companies.'²³¹
- 4.53 However, Ofwat said it had two concerns with respect to APH. First, Ofwat had tested APH in its specifications and found that it was not robust in some specifications.²³² Second, it was concerned about the quality of the APH data because the water companies rated the quality of the data as low. This could be responsible for the lack of robustness in the econometric model.²³³ Ofwat said that Anglian itself had expressed concerns about the APH variable: 'We [Anglian] also share Ofwat's disappointment that there remains insufficient consistency in reporting across the industry to allow the use of its preferred

²²⁷ [Anglian SoC](#), paragraph 563 (i)

²²⁸ [Anglian SoC](#), paragraph 563 (i)

²²⁹ [Anglian SoC](#), paragraph 563 (i)

²³⁰ [Anglian SoC](#), paragraph 563 (i)

²³¹ Ofwat (2020), [Reference of the PR19 final determinations](#), paragraph 3.16

²³² Northumbrian Water's SoC shows that the APH variable is statistically insignificant. Ofwat (2020), [Reference of the PR19 final determinations](#), paragraph 3.16

²³³ Ofwat (2020), [Reference of the PR19 final determinations](#), paragraph 3.16, table 3.2, and paragraph 3.17

variable, average pumping head (APH). Efforts to address this issue must continue.’²³⁴

- 4.54 Based on the reasoning above, Ofwat decided not to use APH in the base costs model despite using it in previous AMPs. Ofwat said it tested alternative explanatory variables to capture differences in network complexity and energy requirements, including APH and pumping capacity, but did not find a more robust cost driver.²³⁵ However, it recognised the points related to Anglian’s topography and therefore addressed this through cost adjustments and alternative model specifications.²³⁶
- 4.55 Oxera, in a submission for Anglian, said that Ofwat was mistaken in attaching a relatively low confidence level to the APH variable. First, Oxera said that the booster pumping station variable also had uncertainty around it because Ofwat asked companies to re-submit data. Second, Ofwat used booster stations per length of main, but assessed only the confidence in booster stations. Third, the uncertainty reported for APH ‘relates to how APH is allocated between the different areas of the value chain, rather than the absolute level.’ Fourth, Oxera said that there was uncertainty around booster stations because they could vary in their use, such as how many and which types of pumps they used.
- 4.56 Anglian said that its confidence in the reported APH variable was higher than that presented by Ofwat.
- 4.57 Severn Trent welcomed the use of the number of booster stations to capture how energy costs for water companies varied across the country.²³⁷ United Utilities said that where there were doubts about the consistency of the data underlying a cost driver, a valid alternative should have been used.²³⁸

Provisional decision

- 4.58 Applying our framework, we consider that APH could make sense from an engineering and economic perspective. However, based on the evidence provided by Ofwat, we are concerned about the quality of the data on APH – notwithstanding Anglian’s argument on its own confidence in the reported variable.

²³⁴ Ofwat (2020), [Reference of the PR19 final determinations: Final submission to the CMA](#), pp19–20

²³⁵ Ofwat (2019), [PR19 draft determinations, Securing cost efficiency technical appendix](#), p26

²³⁶ Ofwat (2020), [Reference of the PR19 final determinations](#), paragraph 3.17

²³⁷ [Severn Trent submission](#), p13

²³⁸ [United Utilities \(2020\) submission](#), paragraph 1.2.4

- 4.59 We tested econometric models including APH as explanatory variables and this showed that APH was not statistically significant in Ofwat's WW1 and WW2 models.²³⁹ In comparison, the number of booster pumping stations per length of main (log) explanatory variable was statistically significant in these Ofwat models.
- 4.60 Therefore, we provisionally decide that APH should not be included as an explanatory variable in the econometric models.

Treatment complexity

- 4.61 In order to comply with water quality requirements, companies need to treat the abstracted water, so that it becomes fit for consumers. A higher treatment complexity means higher costs, including costs for power and chemicals.²⁴⁰ Water companies report the volume of water treated at treatment works of different complexity levels, ranging from zero to six.²⁴¹

Parties' arguments

- 4.62 Ofwat selected two measures of complexity of water treatment to use in its models:
- Percentage of water treated at level three or higher. Ofwat said there was a step change in treatment costs between zero to two and three to six.
 - Weighted average complexity. Ofwat said complexity was calculated as the weighted average of the numbers one to seven, where each number corresponded to a treatment complexity level. The weight for each level of complexity was determined by the proportion of water treated at that level.²⁴²
- 4.63 Whilst Ofwat considered additional measures, these were not pursued because Ofwat did not consider them direct measures of treatment complexity and they did not perform well statistically.²⁴³
- 4.64 Anglian said that the measure of complexity needed to be revised:²⁴⁴

²³⁹ In contrast to the number of booster stations variable which is statistically significant.

²⁴⁰ Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p12

²⁴¹ Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), pages 12 and 13

²⁴² Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p13

²⁴³ Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p13

²⁴⁴ [Anglian SoC](#), paragraph 563

- (a) *Water treated above complexity level three.* Anglian said that the percentage of water treated above complexity level three was problematic because, ‘as there was very little surface water treated below level three, the comparison was between all high treatment water and low treatment ground water.’²⁴⁵
- (b) *Weighted average complexity.* Anglian said that it was concerned about this variable because Ofwat did not provide a justification of the weights that it used in the calculation of the variable.
- 4.65 Anglian said that a better approach to model complexity was to look at the share of water with low treatment complexity (level two and below) and the share of water with high treatment complexity (level five and above).^{246, 247}
- 4.66 Severn Trent welcomed the use of water treatment complexity in the econometric models, but said that it was preferable to use treatment bands four to six, given there was a significant jump in treatment costs at bands three to four and this variable had more explanatory power.²⁴⁸
- 4.67 Saal and Nieswand noted that in model WRP2, where weighted average complexity was used, the density variable was not significant, a finding they suggested shows that Ofwat’s reliance on weighted density was inappropriate.²⁴⁹
- 4.68 Ofwat did not agree with Anglian’s suggestions. Ofwat said that the proportion of water treated at complexity levels two and below was the complement of the proportion of water treated at complexity levels three and above and therefore statistically equivalent. Ofwat also tested water treated at levels five and above in its models.²⁵⁰ Ofwat found this variable had no effect in the water resource plus models (WRP1 and WRP2). Ofwat said that its models appropriately accounted for treatment complexity.^{251, 252}
- 4.69 Yorkshire said that Ofwat’s approach could not account for the type of increase in treatment complexity that Yorkshire was expecting.²⁵³ As a result,

²⁴⁵ [Anglian SoC](#), paragraph 563

²⁴⁶ [Anglian SoC](#), paragraph 564(ii)a

²⁴⁷ Saal (2019) suggested that the share of treatment complexity between complexity bands three and six was conceptually more appropriate than weighted average treatment complexity. However, Saal (August 2019) indicated that the thresholds (three to six) used for treatment complexity were arbitrary/poorly justified.

²⁴⁸ [Severn Trent submission](#), p4

²⁴⁹ Saal and Nieswand (2019), [A Review of Ofwat’s January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19](#), p39

²⁵⁰ Ofwat did not test both variables at the same time.

²⁵¹ [Ofwat’s response to common issues in companies’ statements of case: Cost efficiency](#), paragraph 3.14

²⁵² [Ofwat’s response to Anglian’s SoC](#), paragraph 3.23

²⁵³ [Yorkshire SoC](#), paragraph 197(b)

the expenditure associated with raw water deterioration in Yorkshire was not funded. Yorkshire suggested using alternative cut-off thresholds which could account for this increased treatment complexity. Yorkshire said that this approach would address the issue of changing the treatment complexity it was facing and would increase Yorkshire's allowance to fund the expected funding shortfall. Similarly, on wastewater, Yorkshire was facing statutory requirements to tighten phosphorus consents. Ofwat's models only controlled for tightness of ammonia consents, so this increased expenditure was also unfunded.²⁵⁴

4.70 Yorkshire's economic consultants (Oxera) said that Ofwat did not respond to Yorkshire's comments, but that Ofwat had responded to similar issues raised by Anglian. Oxera said the following:²⁵⁵

- Ofwat was presenting selective evidence to support the exclusion of the alternative treatment complexity variable from its cost assessment models. Oxera said that while the coefficient was statistically insignificant when it was included as an additional variable in Ofwat's water resources plus models, it was both positive and statistically significant when it was included in its wholesale water models.
- Oxera questioned whether Ofwat's models were the appropriate basis for the inclusion of the treatment complexity variables as proposed by Oxera. Oxera had developed models that controlled for this variable and the coefficient was positive and statistically significant (or close to being statistically significant).

4.71 Oxera said that if Ofwat's models were not revised to reflect these problems, then an upward adjustment should be made to Yorkshire's modelled cost allowance.

4.72 Finally, Oxera said that Yorkshire was undertaking a significant phosphorous removal programme, which affected Yorkshire wastewater base costs and enhancement expenditure.²⁵⁶ Oxera said that this had not been addressed in Ofwat's response. Furthermore, Oxera acknowledged that accounting for

²⁵⁴ [Yorkshire SoC](#), paragraph 197(b)

²⁵⁵ Oxera criticised Ofwat's decision to model the weighted average complexity measure in logarithms as inappropriate because it limited the impact of increased treatment complexity on Yorkshire's cost allowance.

²⁵⁶ Phosphorus is a normal part of domestic sewage and ends up at sewage works as it is contained in household products such as shampoo, washing powders and washing up liquid. The problem with phosphates is when they are at high levels in water bodies, they can trigger algal blooms that block sunlight from reaching lower waters, thereby causing plants to die. As the plants and algae decay they cause depletion of oxygen levels, resulting in fish suffocating. Upgrading wastewater treatment processes can remove more phosphorus (p-removal) so that it is not released into the natural environment where it can negatively impact on aquatic life. See: Yorkshire Water website, '[£17m phosphorus removal schemes to improve water quality of northern becks and rivers](#)', 21 February 2019.

Phosphorus-consents in the historical models was complicated due to limited historical variation across the industry. However, it did consider it was possible to create a variable to address this issue.

Provisional decision

- 4.73 We provisionally decide that Anglian's argument on the lack of justification over the choice of weights in the weighted average treatment complexity is not a valid concern. Specifically, when calculating a weighted average, it is a common approach to use the sub-populations as weights.
- 4.74 Moreover, Anglian has not specified which weights it considered more appropriate. We therefore provisionally decide that Ofwat's approach to weights is reasonably transparent and appropriate and no alternative approach is warranted at this point.²⁵⁷
- 4.75 We next considered Anglian's argument on using different complexity measures from an engineering and economic perspective. Anglian's argument is that water treated at complexity levels two and below and water treated at complexity levels five and above should be used as variables for complexity. Ofwat consulted with its engineers and the water industry on this measure prior to forming its view. We provisionally decide that, based on the arguments presented above, the alternative proposed by Anglian is not strongly supported from an engineering and industry perspective.²⁵⁸
- 4.76 We find that the results shown by Saal and Nieswand in regard to the density variable in WRP2 do not hold when 2019 data is included. When the whole period 2012-2019 is used in the regressions,²⁵⁹ the explanatory variable for density is statistically significant when either complexity variables are used (that is, both in WRP1 and WRP2).
- 4.77 We assessed the alternatives proposed by Ofwat and the Disputing Companies and, based on the reasoning above, we provisionally decide to use weighted average complexity and water treated above complexity level three.
- 4.78 As they do not directly affect base cost models, we find that Yorkshire's submissions on phosphorus consents are better dealt with outside of the

²⁵⁷ We have not further considered whether the variable meets the additional model selection criteria, such as endogeneity, because we are not satisfied that the criticism is valid on statistical grounds.

²⁵⁸ For clarity, we do not take a view here whether there are merits in Yorkshire's argument to adjust their costs to reflect their specific costs issues related to treatment complexity.

²⁵⁹ And also when the period is restricted to 2013-2019.

econometric modelling. Therefore, they are discussed in the Wastewater enhancement in paragraphs 5.123 to 5.133.

Water volume

- 4.79 Water volume is an explanatory variable which accounts for the volume of water abstracted. It can be calculated as either a gross value, which is the amount of water treated, or a net value, where leakage is subtracted from treated volumes to derive the amount of water delivered.²⁶⁰

Parties' arguments

- 4.80 Ofwat did not use a direct measure for water volume in its base cost model. Instead, it used the number of connected properties to account for companies' scale. Ofwat considered including the total volume of water treated as an input into the base cost model but decided against this because it was concerned that the volume of water treated was within companies' control. Specifically, by reducing leakage, companies could reduce the volume of water treated.²⁶¹
- 4.81 In addition, Ofwat stated that the same view was expressed by a few companies in response to its consultation, and the number of households was generally the favoured driver for WRP1 and WRP2 models.²⁶²
- 4.82 Anglian said that additional scale drivers such as water delivered or distribution input minus leakage had merit as they incorporated the network performance, namely the volume of water distributed and the level of leakage.²⁶³
- 4.83 Professor Saal, in a report for Anglian, said that both water treated and delivered were valid measures.
- 4.84 In response to Anglian's criticism, Ofwat said that it did not agree that Anglian's proposed variable was superior.²⁶⁴ Ofwat said that it had consulted on its econometric model and based its final model on responses from the industry, which included submissions from Anglian, as well as statistical performance and engineering rationale.²⁶⁵

²⁶⁰ Leakage here refers to leakage in the transport of water to customers, excluding leakage on the customer-side.

²⁶¹ Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p2

²⁶² Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p12

²⁶³ [Anglian SoC](#), paragraph 564(iii)

²⁶⁴ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), paragraph 3.27

²⁶⁵ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), paragraph 3.27

- 4.85 Ofwat did not directly respond to the possibility of including delivered water in the explanatory variables.
- 4.86 Oxera, in a submission for Anglian, said that water delivered was not endogenous and was not under substantial management control. The variable could therefore be used in a triangulation approach as an alternative scale driver.

Provisional decision

- 4.87 Applying our framework, we provisionally decide that water treated, which includes leakage, should not be included in the econometric model because it is substantially under management control.
- 4.88 We consider delivered water, in principle, to represent an alternative approximation for companies' scale, based on the views of the Main Parties.²⁶⁶ However, scale is already well approximated by the number of connected properties. This is confirmed by the high correlation we found between delivered water and number of connected properties. We therefore provisionally decide that water volume should not be included as an explanatory variable in the model.

Percentage of lengths of mains renewed or relined

- 4.89 As part of its consultation process Ofwat asked for companies' views on cost drivers and one of the suggestions was lengths of mains renewed or relined.²⁶⁷ Ofwat included this explanatory variable in one of its alternative model specifications (see paragraphs 4.142 to 4.149).²⁶⁸

Provisional decision

- 4.90 None of the Disputing Companies in their submissions to us mentioned this explanatory variable, but we have two concerns regarding this variable.
- 4.91 Applying our framework, we first considered whether the variable makes sense from an engineering and economic perspective. We provisionally decide that this variable does make engineering and economic sense since the rate at which water companies replace and/or renew mains is likely to influence costs.

²⁶⁶ We base our view on that delivered water is a variable that could be included on the Main Parties agreeing that this is a potential variable.

²⁶⁷ Ofwat (2019), [Supplementary technical appendix: econometric approach](#), p15

²⁶⁸ Ofwat (2019), [Base Adjustments Model](#), tab: Analysis. Percentage of length of mains renewed is TV4.

- 4.92 However, we provisionally decide that this variable is substantially under management control. Indeed, the companies' management have considerable discretion over the amount of mains that are renewed or relined.
- 4.93 Therefore, we provisionally decide not to use this explanatory variable in the base cost models.

Number of new connected properties

- 4.94 In PR19, unlike in PR14, Ofwat has included in base costs the expenditure related to new connections from network expansion or improvement.²⁶⁹

Parties' arguments

- 4.95 Anglian said that Ofwat's approach allowed a single per property cost for both maintaining service to a property and adding a new one, and even in the medium term there was not necessarily a direct relationship between the recording of new connections and the expenditure needed to service the needs of those new properties. Furthermore, the off-site costs associated with new connections were 'lumpy'.²⁷⁰
- 4.96 Ofwat considered new connected properties in one of its alternative model specifications (TV2).²⁷¹ This driver was added to the Treated Water Distribution model.
- 4.97 Northumbrian said that it was concerned with the log-log functional form of the TV2 model. It said that a 1% increase in the number of connected properties would be expected to have a different impact on growth expenditure depending on whether it was based on a low or high number of connections. Northumbrian said that the scale drivers in the water models showed constant returns to scale, but this constant returns to scale was not present in the TV2 models. Northumbrian said that this was likely because the number of new connected properties was highly correlated with the scale variable. It said that based on its analysis Ofwat's base model should be preferred over the alternative growth specification.

²⁶⁹ [Anglian SoC](#), Table 8

²⁷⁰ [Anglian SoC](#), paragraph 594 (ii). Anglian said that 'For example, Anglian will incur the cost of laying a main to service a large new development several years before the last properties to be served by it are connected. Conversely, if the demand from the new properties can be met by existing headroom in the network investment might lag behind the connection of those properties.'

²⁷¹ Ofwat (2019), [PR19 Final Determination Securing cost efficiency: Technical Appendix](#), pp36–37. See paragraphs 4.142 to 4.149 for more discussion of Ofwat's alternative model specifications.

Provisional decision

- 4.98 Applying our framework, we consider that the inclusion of the number of new connected properties makes sense from an engineering and economic perspective. We would expect companies to face higher costs as the number of new properties they connect increases.
- 4.99 However, the total number of properties should already reflect, at least to some extent, the variation in (net) new connected properties. We checked the correlation between the two variables, which is 90%. A similarly high correlation occurs between new connected properties and lengths of mains. Therefore, we provisionally decide that the number of new connected properties should not be included as an explanatory variable.
- 4.100 We do not exclude, however, that a cost adjustment may be necessary to fully account for differences in companies' rates of growth. We discuss this in paragraphs 4.513 to 4.521 in the section on growth.

Proportion of metered properties

- 4.101 Ofwat included the proportion of metered properties (in a company's total connected properties) in its retail cost models. We considered whether there was any merit in including the proportion of metered properties as a cost driver in the wholesale water base cost models.

Provisional decision

- 4.102 Following our framework, first, we assessed the engineering and economic rationale of the variable. Water metering affects water consumption, and hence wholesale water costs, through three possible mechanisms.²⁷²
- Awareness – consumers are more aware of their water consumption.
 - Price effect – companies switch metered customers to metered tariffs.
 - Leakage management – companies can better detect leakages when a meter is installed at the final point of consumption.
- 4.103 Second, we considered that the proportion of metered properties was substantially under management control.²⁷³ For example, in the short run

²⁷² See for example, Environment Agency (2008), [The costs & benefits of moving to full water metering](#), and Carmine Ornaghi and Mirco Tonin, (2017), [The Effect of Metering on Water Consumption - Policy Note](#).

²⁷³ This concern was also raised during CMA Bristol Water redetermination. CMA (2015), [Bristol PR14 Determination](#), Appendix 4.2 paragraph 177

companies may promote the use of meters. For this reason, we provisionally decide that the proportion of metered properties should not be included in the base cost models.

The number of properties per sewer length

4.104 In one of its wastewater models, Ofwat included the number of properties per sewer length as a variable to reflect the effect on costs of the density of properties served. The engineering and economic rationale for including density in the regression is to reflect the likelihood that a higher number of properties relative to a given length of sewer may lead to higher costs.

Parties' arguments

4.105 Anglian said that the results showed that the overall effect of the length of sewers on costs was negative. Anglian said that this suggested that all other things being equal (pumping capacity and properties served), increasing the length of the sewerage network would reduce costs.²⁷⁴

4.106 Ofwat said that Anglian's interpretation of the estimated effect was not correct. Ofwat said that the length of sewers variable captured what happened to costs as a water company become bigger, holding the other variables, density and energy intensity per kilometre, constant.²⁷⁵ In Ofwat's view, Anglian's approach, which considered 'what happens to costs when length only increases, means that we are asking the question what happens if we increase length and at the same time decrease the density variable and energy intensity.' Ofwat did not agree with this approach.²⁷⁶

Provisional decision

4.107 Applying our framework, we are concerned that the model has the wrong expected value of the coefficients. Specifically, we think that Anglian's alternative specification suggested that there are some issues with this regression specification.

4.108 We found that the model incorporated the aggregate effect of sewer length on costs, including the direct effect of length of sewer and the indirect effect it

²⁷⁴ Anglian (2020), [SoC](#), paragraph 587

²⁷⁵ [Ofwat's response to Anglian's SoC](#) paragraph 3.41

²⁷⁶ [Ofwat's response to Anglian's SoC](#), paragraph 3.41

has on costs through the density and scale variables.^{277, 278} To illustrate this point, suppose a company increases the length of its sewers. As a result, the company also decreases density, all else equal. The impact on costs, according to the model, is therefore the direct effect plus the indirect density effect.²⁷⁹

4.109 Overall, we are concerned about the counterintuitive results that the overall effect is negative. Ofwat used a second variable, the weighted population density, as an explanatory variable.²⁸⁰ This variable seemed to be a clearer measure of density and thus preferable as a proxy for density. In this specification, the overall effect of the length of sewer remained positive.

4.110 Given the counterintuitive result as well as the availability of a valid alternative density variable, we provisionally decide that this explanatory variable should not be used.

Proportion of load treated

4.111 This explanatory variable reflects the proportion of sewage treatment that is carried out at smaller treatment works, where there are diseconomies of scale. Treatment works are allocated to bands according to their size, with larger treatment works having larger numbers.

Parties' arguments

4.112 Ofwat expected large treatment works to have a lower unit cost of treatment than small treatment works. To capture the economies of scale effect, Ofwat used two different measures of treatment works.²⁸¹

(a) Load treated in size bands one to three (%) as a measure of diseconomies of scale from operating small works, used in models for sewage treatment (SWT1), bioresources (BR1) and bioresources plus (BRP1).²⁸²

(b) Load treated in size band six and above (%) to capture economies of scale at large treatment works in its SWT2 and BRP2 models.

²⁷⁷ In our view, Anglian points to the marginal effect of sewer length on costs, while Ofwat takes a narrow interpretation of the coefficient.

²⁷⁸ Note that we do not disagree with Ofwat's interpretation of the coefficient.

²⁷⁹ Note that Saal and Nieswand proposed an alternative specification. However, this specification had the same issue that we describe here, ie an indirect effect.

²⁸⁰ This is used in a second specification, SCW2, in Ofwat's wastewater model.

²⁸¹ Ofwat (2019), [Supplementary technical appendix: econometric approach](#), p21

²⁸² See paragraph 4.6 above.

4.113 Oxera, advisers to Anglian, stated that Ofwat's definition of large works was too broad and that this variable was unlikely to appropriately capture the impact of the economies of scale present at very large works. Oxera suggested the use of either the proportion of the load treated in bands seven to nine or eight to nine. Oxera presented the following evidence to support the change:

- (a) The population equivalent treated in band six and above was between 25,000 and 3.8 million.
- (b) Defining 'large' works as size band six or above implied that on average, 83% of industry load was assessed as being treated at 'large' works. Drawing stricter thresholds, such that the vast majority of sewage treatment activity was not defined as 'large', would better capture the cost variation resulting from economies of scale.
- (c) There was substantial variation in treatment works size within band six.

Provisional decision

4.114 We have considered whether Ofwat's definition of load treated in size band six and above (%) is too broad. We provisionally decide that, from an engineering and economic perspective, it is appropriate to include this variable to account for possible economies of scale in wastewater treatment. We acknowledge that band six and above covers a large variety of treatment works size. However, it is not clear that, from an engineering perspective, it is appropriate to change the bands. For example, from an engineering perspective there may not be further economies of scale beyond band six. We have not seen evidence that using different size bands is justified.

4.115 Therefore, we did not to investigate this further. Moreover, we do not have access to appropriate and reliable data to empirically test this variable, and, also, it is not practicable for us to collect the data within the timeframe available to us and given the breadth of issues under investigation.²⁸³ Given there is an engineering and economic rationale to include this variable, we provisionally decide to include this variable.

²⁸³ We understand Oxera has provided a dataset constructed by Anglian which provides a band breakdown of load treated in size bands six and above (%) for years 2012, 2013, 2017, and 2018. However, as data for the years 2014, 2015, 2016, and 2019 are inferred (rather than using actual historic data), we do not have reliable data to further our investigation.

Proportion of sludge not produced at a co-location site

- 4.116 Anglian said that Ofwat's models do not fully account for the higher costs incurred by companies facing a high ratio of sewage treatment works to sludge treatment centres. This is because such companies must transport sludge from one to the other to a much greater extent, which increases costs. To capture this effect, Anglian suggested including the percentage of sludge not produced at a co-location site.
- 4.117 We understand Anglian applied for a cost adjustment claim for sludge transport as part of Ofwat's claim process.²⁸⁴ This is discussed in paragraphs 4.576 to 4.580. We therefore provisionally decide not to include this variable in the econometric modelling and instead to treat this issue as a cost-adjustment claim.

Phosphorus consents

- 4.118 Anglian suggested including a variable combining the proportion of load subject to tight ammonia consent with the proportion subject to tight phosphorus consents (below 0.5mg/l) in the sewage treatment and bioresources plus model.
- 4.119 Ofwat has provided separate cost allowances for phosphorus removal. This is discussed further in paragraphs 5.123-5.133. We therefore provisionally decide not to include this variable in the econometric modelling and instead to treat this issue as an enhancement claim.

Service level variables

- 4.120 In this section we consider whether service level variables, in particular leakage, should be included in the econometric models. Providing a high-quality service could be more costly and therefore costs may be related to service quality variables.

²⁸⁴ Anglian (2019), PR19 [Draft determination sludge transport cost adjustment claim](#)

Parties' arguments

- 4.121 CEPA considered including service level variables and tested a large number of different models.^{285, 286} Models with service levels were not included in the final model as they did not fulfil the criteria adopted by CEPA.
- 4.122 The Disputing Companies submitted that Ofwat was wrong to propose that companies could achieve higher performance without additional cost implications. Bristol said that:
- (a) there was no structural link in Ofwat's methodology between costs and service; higher service levels cost more than lower service levels;
 - (b) Ofwat was not comparing like with like because companies were operating at different levels of service; and
 - (c) Bristol was a relatively high performing company so comparing its costs to lower performing companies led to its base costs being underestimated.
- 4.123 Ofwat set out modelling criteria which a model must satisfy to be selected. The models selected satisfied the following conditions.²⁸⁷
- (a) The variables were individually significant at a 10% confidence level.
 - (b) No two variables included in a model were correlated by more than 90%.
 - (c) All coefficients were consistent with CEPA's prior expectations based on engineering and economic rationale.
 - (d) The adjusted R-squared was higher than 80%.
 - (e) The coefficients were consistent with Ofwat's incentives for PR19 (eg models where greater leakage would grant higher allowance to companies would be excluded).²⁸⁸
- 4.124 While Ofwat did not include service level variables in the base cost model, it also carried out some sensitivity analysis on its modelled base cost allowances for wholesale water and wastewater, comparing its model to

²⁸⁵ CEPA (2018), [PR19 Econometric Benchmarking Models](#), p51

²⁸⁶ The service levels tested included: leakage, total number of sewer blockages, total number of gravity sewer blockages, total number of sewer rising main bursts/collapses, number of designated bathing waters, intermittent discharge sites, number of designated bathing areas and number of odour related complaints.

²⁸⁷ CEPA (2014), [Cost assessment – advanced econometric model](#), p50

²⁸⁸ CEPA (2018), [PR19 Econometric Benchmarking Models](#), p50

alternative specifications, informed by company representations. This is further discussed below in paragraphs 4.142 to 4.149.

- 4.125 Ofwat also engaged PwC to assess whether to include leakage levels as explanatory variables.²⁸⁹ PwC used as an explanatory variable the difference between the company's leakage level and industry upper quartile leakage level, because it considered this variable was exogenous.^{290, 291} PwC showed that the coefficient of the leakage measure it used had the expected sign.
- 4.126 Northumbria commented on the coefficients from the PwC model, pointing out that the estimated coefficients for leakage were close to zero or not statistically significant.
- 4.127 Oxera, on behalf of Yorkshire, submitted analysis that included two service level variables.
- To capture quality complaints, Oxera used a variable related to the number of quality contacts per person, which was a measure of the volume of customer complaints relating to water taste, odour and discoloration.
 - To capture leakage levels, Oxera used the volume of leakage above or below the sustainable economic level of leakage (SELL) per property.²⁹² SELL is the level of leakage where the incremental costs and benefits of reducing leakage are exactly equal, taking into account both the costs and benefits to the company, and the costs and benefits to other affected parties.
- 4.128 Northumbrian also undertook work to assess the Oxera model and stated there was a positive correlation between service quality and costs, however, for most models the variable was statistically insignificant, which suggested low predictive power for the variable.
- 4.129 NERA submitted an econometric analysis commissioned by several companies.²⁹³ The NERA analysis included leakage levels and used a similar approach to Oxera. NERA used the volume of leakage above or below the SELL per property.²⁹⁴

²⁸⁹ PwC (2019), [Funding approaches for leakage reduction](#)

²⁹⁰ PwC also include a squared term of the variable.

²⁹¹ PwC considered that leakage levels relative to SELL are not exogenous.

²⁹² Oxera also includes the square of the volume of leakage above or below the SELL per property. The squared term is included to account for potential economies of scale in costs.

²⁹³ Those companies are Sutton and East Surrey Water in collaboration with Affinity Water, Anglian, Dŵr Cymru, South East Water, South Staff Water, Southern Water, Thames Water and Yorkshire Water.

²⁹⁴ NERA also includes a squared term of the variable.

- 4.130 Ofwat, in response to the report by Oxera, said it did not consider it was appropriate to measure and use leakage relative to the SELL because:²⁹⁵
- (a) the positive coefficient created a perverse incentive, providing a higher cost allowance to firms with higher leakage; and
 - (b) SELL was influenced by the companies' own determinations of costs and benefits and did not represent an objective and consistent approach across the industry.²⁹⁶
- 4.131 Ofwat also said that there were multiple problems with the use of SELL, including:
- (a) it tended to reinforce the status quo;
 - (b) it did not incentivise efficiency or innovation;
 - (c) there were many significant uncertainties in estimating SELL, particularly in incorporating the social and environmental costs of leakage; and
 - (d) a company's SELL was evaluated based on the company's own costs of reducing leakage, such that companies that were inefficient in reducing leakage would have a softer leakage reduction target.
- 4.132 PwC, in its report for Ofwat, also excluded this variable because it considered it to be a less important driver of leakage performance.²⁹⁷
- 4.133 Northumbrian also expressed concerns about the use of SELL when measuring leakage because the models were unlikely to capture the complex relationship between service quality improvement and costs and the data may not be comparable, as SELL was evaluated by companies involving judgement on costs and benefits, rather than being a directly observed measure.

Provisional decision

- 4.134 Applying our framework, we considered whether the inclusion of service variables was appropriate. We discuss each of the three variables in turn.

²⁹⁵ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), paragraph 3.41

²⁹⁶ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), paragraph 3.41.

²⁹⁷ PwC (2019), [Funding approaches to leakage reduction](#), p5

- *Leakage relative to SELL*

4.135 We found that leakage relative to SELL was substantially under management control. We also had concerns about measuring leakage relative to SELL, as SELL itself will be influenced by how efficient the company is. For example, if the company has poor technology and has higher costs for repairing leaks, its SELL will be higher. Therefore, SELL is not an exogenous measure to management.

4.136 For the reason above, we provisionally decide not to use leakage relative to SELL as an explanatory variable in the econometric models.

- *Leakage relative to an upper quartile target for leakage*

4.137 We found that leakage is substantially under management control.²⁹⁸ Specifically, by managing their leakage levels, companies may influence their position relative to the upper quartile target for leakage.²⁹⁹ We therefore provisionally decide that leakage relative to an upper quartile target for leakage is endogenous.

4.138 We considered whether it is appropriate from an engineering and economic perspective to measure leakage relative to the upper quartile service level. It is not clear why the distance between the company's actual leakage level and a leakage target set by Ofwat is a meaningful cost driver from an engineering or economic perspective. Companies optimise leakage levels considering their specific circumstances. We therefore found that this difference could not be justified from an economic and engineering perspective.

4.139 For the reasons above, we provisionally decide not to use leakage relative to an upper quartile target as an explanatory variable in the econometric models.

- *Quality contacts per person*

4.140 We found that the number of customer complaints is substantially within management control. For example, if a company decided to reduce the spend on reducing water discolouration, it may receive a higher number of complaints. Including variables which are substantially under management control is likely to lead to endogeneity problems and thus biased coefficient estimates.

²⁹⁸ For PR19 Ofwat moved to an upper quartile performance measure for leakage using historical data. Ofwat argued that its previous measure, a performance commitment set by the companies, was not stretching enough.

²⁹⁹ In other words, we think that there is still a substantial part of the variation of the variable that comes from an endogenous variable, ie leakage.

4.141 For the reasons above, we provisionally decide not to use quality contacts per person as an explanatory variable in the econometric models.

Assessment of alternative model specifications

4.142 In PR19, Ofwat carried out a sensitivity analysis on its main models using econometric models which included different explanatory variables. Ofwat's alternative model specifications were informed by company representations and included the following cost drivers.

- (a) The number of new connected properties to more explicitly control for differences in growth related expenditure.
- (b) APH to proxy for the energy requirements of each company, in place of the number of booster pumping stations.
- (c) The percentage of lengths of mains renewed or relined as a proxy for the level of maintenance activity undertaken and network age.
- (d) The distance from the upper quartile 2024–25 leakage target, and its squared term, as a driver of leakage costs based on PwC analysis.
- (e) The distance from the upper quartile 2019–20 leakage target (and its squared term) as a driver of leakage costs based on PwC analysis.

4.143 These alternative model specifications led to Anglian receiving an extra £50.2 million.³⁰⁰

Parties' arguments

4.144 Anglian stated that alternative model specifications introduced by Ofwat at the final determination did not adequately address Anglian's funding gap in its base costs.³⁰¹ Anglian said that 'at FD, Ofwat still rejected Anglian's cost adjustment claim but allowed a £50.2 million uplift (£24.5 million of which was leakage driven) to Anglian's 'Botex Plus' allowances on the basis of adjusting for alternative specifications to its econometric models, so implicitly admitting the insufficiency of the base allowance.'³⁰²

³⁰⁰ Ofwat (2020), [Securing cost efficiency technical appendix](#), p37

³⁰¹ [Anglian SoC](#), paragraph 563

³⁰² [Anglian SoC](#), paragraph 1039iii

4.145 Anglian stated that the quality of the alternative specification models was low and that the additional allowance made on the basis of these alternative specifications was insufficient.³⁰³

4.146 Bristol said that Ofwat's alternative models on leakage demonstrated that better leakage performance required higher costs and that, given the outcome of applying alternative models, Ofwat was unjustified in not providing Bristol with adequate cost allowances for leakage.^{304, 305, 306}

Provisional decision

4.147 For the reasons explained in paragraphs 4.48 to 4.141, we provisionally decide not to include in our models any of the explanatory variables listed in paragraph 4.142.

4.148 The results of these decisions are summarised in Table 4-3 below.

Table 4-3: Summary of CMA provisional decisions and reasoning on Ofwat alternative specifications

<i>Ofwat model</i>	<i>Explanatory variable</i>	<i>Reasoning</i>	<i>Provisional Decision</i>
TV2 – Growth driver	Number of connected properties	High correlation with scale variables	Do not use
TV3 – Average pumping head	Average pumping head	Poor quality data and lack of statistical significance	Do not use
TV4 – Length of mains	Percentage of mains renewed or relined	Endogeneity concerns	Do not use
TV5 – Leakage specification 1	Leakage and distance from 2024-25 target and Thames interaction variable	Endogeneity concerns	Do not use
TV6 – Leakage specification 2	Leakage and distance from 2019-20 target and Thames interaction variable	Endogeneity concerns	Do not use

Source: CMA analysis.

4.149 Therefore, we provisionally decide not to use any of the alternative specifications. This provisional decision results in our not accepting Anglian's arguments for additional funding and removing the £50.2 million allowance that Anglian receives from these sensitivities. We consider arguments on growth in paragraphs 4.454 to 4.532 and leakage in section 8.

³⁰³ [Anglian SoC](#), paragraph 1039iii

³⁰⁴ [Bristol SoC](#), paragraphs 389 and 390

³⁰⁵ NERA (2020), [Expert Report on Ofwat's Approach to Water Wholesale Cost Assessment in the PR19 Final Determination](#), paragraph 12 and section 4.2

³⁰⁶ Ofwat (2020), [Securing cost efficiency technical appendix](#), p37

Is capital maintenance addressed appropriately?

4.150 Companies use and manage assets to produce water and wastewater services. Those assets need to be maintained in order to function efficiently. Therefore, companies incur capital maintenance costs maintaining the assets they own and operate.

4.151 In this section, we first summarise the points on capital maintenance raised by the Main Parties that concern the base cost models.

Parties' arguments

4.152 Ofwat's approach to capital maintenance was to rely on the econometric model as the starting point. In addition, Ofwat supplemented the base costs allowances with an adjustment process, through which companies can request cost adjustment claims, including capital maintenance costs.³⁰⁷

4.153 Ofwat said that the data used in the econometric model included 'lumpy' investment as well as peaks and troughs in capital investment costs.³⁰⁸ Specifically, it found evidence of peaks and troughs for companies at different percentile levels (for example, upper or lower quartile). However, the econometric model covered eight years which, in Ofwat's view, ensured that the cost allowance was set in the long-run and thus addressed issues relating to peaks and troughs and 'lumpy' investments.

4.154 Northumbrian said that Ofwat's approach to cost assessment had continued to over-emphasise historical data and therefore had not sufficiently taken into account the longer-term and variable nature of resilience investment requirements. Northumbrian said that capital maintenance requirements varied with a company's historical investment profile and therefore the base cost model might not adequately account for those costs. As a result, Northumbrian Water said that capital maintenance might be underfunded.³⁰⁹

4.155 Anglian said that Ofwat's approach was putting assets' health and resilience at risk by underfunding capital maintenance.³¹⁰ It also argued that Ofwat relied on a top-down approach, namely, the econometric models, which led to a shortfall in cost allocation for capital maintenance expenditures in AMP7.³¹¹ Anglian said that Ofwat should have validated its top-down models by using a

³⁰⁷ Ofwat (2019), [Anglian Water – Cost efficiency additional information appendix](#), p4

³⁰⁸ Ofwat (2019), [Anglian Water – Cost efficiency additional information appendix](#), p4

³⁰⁹ [Northumbrian SoC](#), paragraph 592

³¹⁰ [Anglian SoC](#), p8

³¹¹ [Anglian SoC](#), pp11–12

bottom-up approach. To mitigate the issue, Anglian proposed to triangulate costs based on an historical (top-down approach) and forward looking (bottom-up approach) cost assessment.³¹²

4.156 Anglian showed that companies could be in peaks and troughs with respect to their capital maintenance expenditures.³¹³

4.157 In response to Anglian, Ofwat said that its approach to setting an allowance for capital maintenance costs had been consulted upon. While some companies raised concerns about including enhancement costs in the econometric model, they had not raised concerns about capital maintenance.³¹⁴ Ofwat said that it had assessed the peaks and troughs in the data and concluded that there was not an issue.³¹⁵

4.158 In response to Ofwat, Anglian said that Ofwat had not established a framework to monitor 'companies' serviceability'.³¹⁶ To mitigate the issue, Anglian re-iterated its suggestion to triangulate costs based on historical top-down and forward-looking bottom-up assessments.

4.159 Bush and Earwaker, Anglian's advisers, said that Ofwat's approach risked underfunding capital maintenance because the approach did not sufficiently account for differences in capital maintenance needs across companies and within a company over time.³¹⁷ Bush and Earwaker said that Ofwat should triangulate historical and forward-looking cost assessments to address the capital maintenance issue.³¹⁸

4.160 Anglian said that Ofwat incorrectly assumed that companies' long-term capital maintenance requirements were constant over time. Anglian said that the evidence showed that capital maintenance was cyclical and would grow in the future.³¹⁹ Anglian said that the cost benchmark might be set based on companies being in a cost trough. Anglian re-iterated its suggestion that, to assess future needs, Ofwat should use a bottom up approach.³²⁰

³¹² Anglian's approach is informed by a report by Bush and Earwaker which states that Ofwat's approach 'looks to us to create a significant risk of mis-provision for capital maintenance on an individual company basis', which they argue is caused by differences between companies, for example due to difference in asset health or age.

³¹³ [Anglian SoC](#), p11–12

³¹⁴ [Ofwat's response to Anglian's SoC](#), paragraph 1.27

³¹⁵ [Ofwat's response to Anglian's SoC](#), paragraph 1.29

³¹⁶ [Anglian's reply to Ofwat's response to Anglian's SoC](#), Part G, p12

³¹⁷ Anglian pointed out that its business plan forecast has been carefully developed, following the recommendations in Bush and Earwaker.

³¹⁸ Anglian also stated that Ofwat's approach at PR19 was similar to the approach at PR99, which was heavily criticised in the House of Commons Environmental Audit Committee in 2000 for relying on past levels of spend to determine what was appropriate for the forthcoming period.

³¹⁹ It also acknowledged that other costs may be cyclical as well.

³²⁰ [Anglian's Reply to Ofwat's response to Anglian's SoC](#), Part G, p15

- 4.161 Anglian said that Ofwat's econometric models captured scale drivers, but did not address in any form the age, asset condition or risk of failure, which were core drivers of maintenance expenditure requirements.³²¹ Anglian said this meant that there was a likelihood that the econometric models did not fully address the capital maintenance requirements, in particular in light of increasing asset maintenance requirements.³²²
- 4.162 Anglian said that Ofwat used only a limited number of models to set allowances, not taking into account any non-modelling evidence.³²³
- 4.163 Anglian said that it was reasonable to conclude that historical levels of capital maintenance would not be sufficient in future AMPs to ensure the continued serviceability of Anglian's asset base.³²⁴
- 4.164 Ofwat said that it did not use an age-based assessment of capital maintenance because asset age did not directly correlate with asset performance.³²⁵
- 4.165 Oxera said that there was evidence that the benchmark companies were in a capital maintenance trough as capital expenditure per property was lower than the industry average. Oxera said that, contrary to Ofwat's statement, there was evidence that the benchmark firms were in a trough.
- 4.166 Oxera said the issue of cyclical capital maintenance could be mitigated by using a smoothing approach to the cost variable in the estimation of the econometric model and this led to tighter confidence intervals of the predicted costs.³²⁶
- 4.167 In its response, Ofwat said that smoothing had disadvantages as recognised by the CMA in its Bristol PR14 Determination and this approach should not be used.³²⁷ Ofwat said that it decided not to use capital smoothing because of increased substitutability between Opex and Capex.³²⁸ It also said that

³²¹ [Anglian's Reply to Ofwat's response to Anglian's SoC](#), Part G, p21

³²² Anglian also refer to an Oxera report which shows that using smoothed base costs expenditures reduces the accuracy of the model. Anglian's interpretation of this is that the base cost model would under-provision cost allowances for capital maintenance.

³²³ [Anglian SoC](#), paragraphs 578–579

³²⁴ [Anglian's reply to Ofwat's response to Anglian's SoC](#), Part G, p29

³²⁵ Ofwat (2020), [PR19 Final Determinations - Anglian Water Cost efficiency additional information appendix](#) ,p6

³²⁶ Oxera also discusses similar arguments made by Anglian, such as the cyclical nature of capital maintenance. We do not repeat those points again.

³²⁷ [Ofwat's response to Anglian's 27 May submission to the CMA](#), p15

³²⁸ [Ofwat's response to Anglian's 27 May submission to the CMA](#), p15

efficiency scores were calculated over a five-year period in order not to place undue weight on a single year.³²⁹

Provisional decision

- 4.168 We provisionally decide that our base cost models provide funding for capital maintenance costs. This is because capital maintenance costs will be related to the capital employed, which will be related to the scale of the business. Our econometric models include scale variables, so will give higher funding for companies with more assets.^{330, 331} In addition, the base cost allowance permits growth of capital maintenance costs if the increase in costs is related to the growth of the cost drivers.³³²
- 4.169 Anglian also argued that asset health and age should be taken into account when assessing the capital maintenance spend. However, we are concerned that those measures are within the control of a company. For example, a company may decide to reduce spend on maintaining, or postpone replacing, an asset. This means that it may save costs in the short run but increase costs in the long run and, as a result, asset age and health could be biased indicators of capital maintenance requirements.
- 4.170 We recognise that the base cost models may not cover all capital maintenance costs. For example, capital maintenance costs can be 'lumpy', and companies could face peaks and troughs, which may not be reflected in the correlation with the cost drivers. However, while some companies may be in peaks and troughs in individual AMPs, there should be no systematic underfunding in the long run.
- 4.171 We also considered Oxera's submissions that the companies which are the benchmarks may be in a capital maintenance trough. If this is the case this could overstate their efficiency levels, since they could appear more efficient compared to companies which are at peaks of capital maintenance expenditure. If these companies are used as benchmarks this could lead to underfunding average capital maintenance levels.
- 4.172 On the evidence presented by Oxera, we first note that the difference between the benchmark companies and the industry average could be explained by those companies being more efficient, a possibility which Oxera

³²⁹ Ofwat's response to Anglian's 27 May submission to the CMA, p16

³³⁰ For example, a larger network may mean higher cost related to maintaining that network.

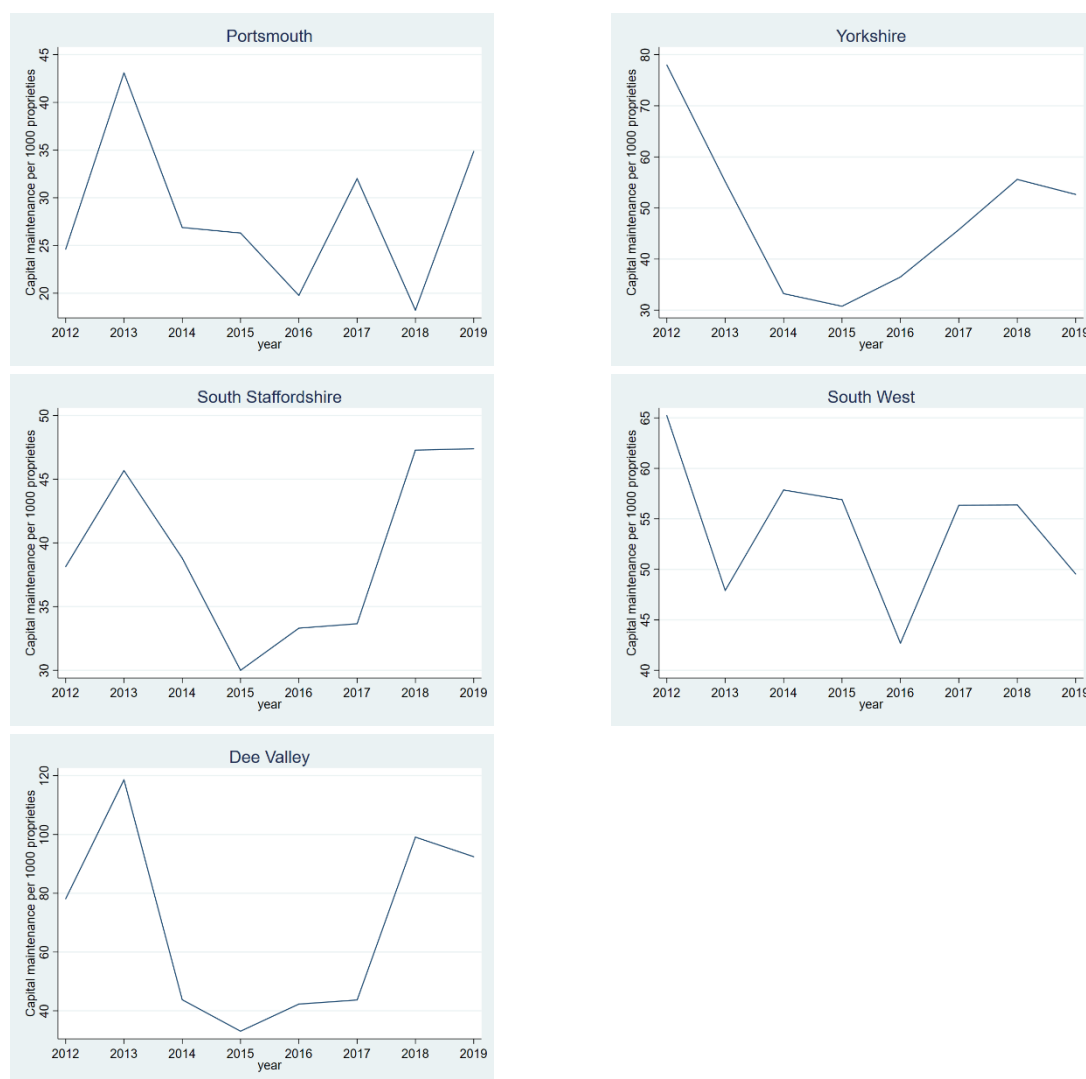
³³¹ Anglian raised the issue that it had taken over private sewers and pumping stations which increased its capital maintenance costs. However, this should be reflected in an increase in the cost drivers in the econometric model.

³³² For example, if the scale of a company is expected to increase, the base cost allowance for capital maintenance increases with it.

acknowledged. Ofwat has also, implicitly, allowed for this issue by not selecting the frontier company as the benchmark.

4.173 We assessed whether there was evidence that the companies which influenced the efficiency benchmark had uncharacteristically low capital spend per property during PR14.³³³ Our analysis for the wholesale water companies is in Figure 4-1.

Figure 4-1: Capital maintenance expenditure for wholesale water



Source: CMA analysis

Note: we use the definition of capital maintenance as proposed by Oxera, which includes renewals opex..

4.174 These graphs do not support the argument that the most efficient companies were in a capital maintenance trough during 2015-2019.

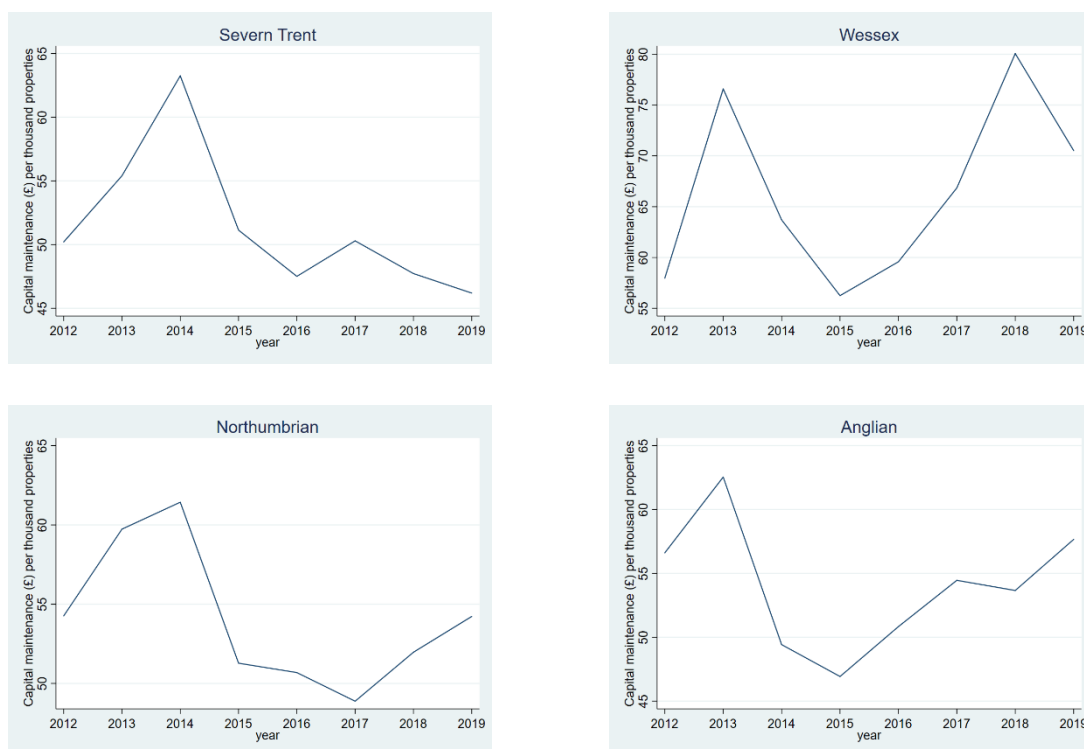
³³³ The CMA's provisional decision to move the efficiency benchmark to the upper quartile implies having five efficient companies, rather than four. Our analysis is limited by the data available, as we have only three years of data before 2015, but this should still be sufficient to give us a reasonable picture of companies' investment cycles.

- (a) Portsmouth shows volatile spending.
- (b) Yorkshire and South Staffordshire started (in 2015) from a trough but reached relatively high levels of expenditure by the end of the time period.
- (c) South West shows volatile spending.³³⁴
- (d) Dee Valley has relatively low levels of expenditure for the first three years, but high levels of expenditure for the last two years. We do not consider the evidence shows Dee Valley is in a trough of capital maintenance expenditure.

4.175 We also note that the graphs above show a variety of distributions, some of which are inconsistent with capital maintenance being cyclical.

4.176 Figure 4-2 shows the same analysis for wholesale wastewater.

Figure 4-2: Capital maintenance expenditure for wholesale wastewater



Source: CMA analysis

Note: we use the definition of capital maintenance as proposed by Oxera, which includes renewals opex.

³³⁴ SWB capital maintenance expenditure was computed as the sum of SWT and BWH from the period before 2016.

- 4.177 These graphs do not support the argument that the most efficient companies were in a capital maintenance trough during 2015-2019.
- (a) Severn Trent is likely to be in a trough. However, this is far from clear, and looking at multiple charts we would expect some companies to be in a trough due to the variation in the data.
 - (b) Wessex and Northumbrian do not appear to be in a trough.
 - (c) Anglian does not appear to be in a trough.³³⁵
- 4.178 Overall, we note that the graphs show a variety of distributions, suggesting that there is no systematic bias in the investment cycles of the companies influencing the efficiency threshold.
- 4.179 Based on the evidence above, in particular the evidence showing no substantial bias in the wholesale water or wastewater companies, we provisionally decide not to adjust our approach to setting capital maintenance allowances.
- 4.180 With respect to using a smoothed model to address the capital maintenance issue we do not see a clear justification to use the smoothed approach. The approach may introduce a distortion between the time covered by the cost variable and the time covered by the cost drivers. Smoothing would reduce the number of periods available in the data and a longer time period of data is preferable.³³⁶ On the former point, if there is a correlation between costs drivers and the peaks and troughs or the 'lumpy' Capex, this will not be picked up by the smoothed model. Therefore, we provisionally decide not to use smoothed data in our econometric modelling.
- 4.181 We acknowledge Anglian's and Northumbrian's argument that Ofwat's cost assessment is backward looking and that potential issues with capital maintenance may be forward looking. This is a complex issue, which, going forward, may become more important. We therefore suggest that Ofwat considers developing indicators to track this issue and to enable it to enhance its analysis with a forward-looking element that will assist in triangulating results from its econometric modelling of historic costs.

³³⁵ While Anglian performed worse than the efficiency benchmark, it still affects the precise level of the benchmark as the upper quartile calculation for wholesale wastewater is based on the average of the third and fourth companies.

³³⁶ We acknowledge that the confidence intervals for the model Oxera provides are tighter. However, this is unsurprising because of the reduction in variation in the dependent variable due to the smoothing.

Is there a log-transformation bias?

- 4.182 Ofwat used log-log models to estimate costs and these models may systematically underestimate costs. This is because log-log models estimate the logarithm of costs and when this is transformed into monetary amount, it can potentially result in transformation-bias.³³⁷
- 4.183 A few potential solutions can be considered to correct for log-transformation bias, however, none of these estimators are unbiased.³³⁸ These estimators include:
- (a) Naïve estimator – This estimator makes no adjustment for the transformation bias.
 - (b) Conditional mean estimator – This adjustment factor is calculated as the exponentiated variance of the error from the model multiplied by 0.5. This adjustment would increase the raw modelled cost.³³⁹ The adjustment factor is not unbiased but is consistent.³⁴⁰ This assumes the errors of the model are normally distributed.
 - (c) Smearing estimate³⁴¹ – The adjustment factor is calculated as the average of the exponentiated errors from the model. This adjustment may increase the raw modelled cost. The adjustment factor is not unbiased but is consistent.³⁴²
 - (d) Alpha factor³⁴³ – This is calculated as the correlation between actual costs (£m) and predicted costs from the model (£m transformed from logs). This should indicate the extent to which predicted costs overstate actual costs. However, in practice, this adjustment may increase or decrease the raw modelled cost. The adjustment factor is not unbiased but is consistent.

³³⁷ We would expect the error from the model to be zero on average (across all companies and years) so there is no need to make an adjustment to the estimated log of base costs. However, for statistical reasons, the average of the exponentiated error from the model may be a multiple of more than 1 – called the 'log-transformation bias'. As this is not incorporated into the estimated base costs, an adjustment may be required. For further explanation see Wooldridge (2012), *Introductory Econometrics: A Modern Approach*, 5th Edition, pp212–214.

³³⁸ The 'raw modelled cost' in this paragraph refers to estimated modelled base costs that exclude the catch-up efficiency and frontier shift adjustments.

³³⁹ Where the variation of the error term from the model is large, the adjustment may be substantially larger than a multiple of one.

³⁴⁰ Intuitively, if an estimator is consistent, this would indicate that as the sample size increases, the estimate will converge to the 'true' value.

³⁴¹ This does not require errors from the model to be normally distributed.

³⁴² This means that with a sufficiently large dataset the adjustment factor gets very close to the 'true' adjustment factor.

³⁴³ The Alpha factor is calculated as the coefficient of the regression when running the actual cost (£m) on the predicted cost (£m transformed from logs) without a constant. This does not require errors from the model to be normally distributed.

Parties' arguments

- 4.184 Ofwat did not make an adjustment for log-transformation bias in its models.
- 4.185 Anglian stated that statistical theory shows that log-log models systematically underestimate costs unless allowances are suitably adjusted.³⁴⁴ Anglian also stated that, as part of PR14, Ofwat recognised and adjusted for this statistical issue which had a material impact.³⁴⁵
- 4.186 Vivid Economics, adviser to Anglian, argued that conditional mean and smearing factor approaches offered more robust ways of obtaining consistent cost estimates from Ofwat's models.³⁴⁶ Vivid Economics also said that in this case, the alpha factor approach did not correct for the statistical issue described since it adjusted all cost estimates downwards in parallel and exacerbated model prediction error.

Provisional decision

- 4.187 We have estimated the smearing and alpha adjustment factors required to adjust the CMA's model for log-transformation bias.³⁴⁷ As the log-transformation bias leads to an underestimation of costs, we would expect the adjustment factors to be more than 100%. Table 4-1 shows the calculated adjustment factors for the wholesale water and wastewater models.
- (a) The smearing factor adjustments implies an upwards adjustment to the raw model cost estimates by 0.8% to 4.4% across the wholesale water and wastewater models.
- (b) The alpha factor adjustments imply either an upward adjustment to the raw model cost of up to 6% or a downward adjustment of up to -2.6%.
- 4.188 We note the alpha adjustment factors that require a downward adjustment (those <100% in Table 4-4) are not aligned with statistical theory and for this reason we provisionally decide that the estimated adjustment factors are unreliable.³⁴⁸

Table 4-4: Smearing and Alpha adjustment factor for wholesale water and wastewater models

Model	Smearing factor	Alpha Factor
Wholesale Water Models		
<hr/>		

³⁴⁴ [Anglian SoC](#), paragraph 610

³⁴⁵ [Anglian SoC](#), paragraph 611

³⁴⁶ Anglian (2019), [Draft Determination Representation, Log Model Prediction Error](#), p5

³⁴⁷ We have not estimated the conditional mean estimator adjustment as this required a normality assumption.

³⁴⁸ We note the alpha factors that are below 100% are not statistically significantly different from 100% at the 95% level.

WRP1	102.9%	104.9%
WRP2	103.3%	106.0%
TWD	102.7%	99.8%
WW1	101.2%	100.7%
WW2	101.0%	101.8%

Wastewater Models

SWC1	100.8%	101.1%
SWC2	101.3%	100.7%
SWT1	101.7%	98.8%
SWT2	101.9%	99.7%
BR1	103.8%	103.0%
BR2	104.4%	101.5%
BRP1	101.2%	97.4%
BRP2	101.1%	98.4%

Source: CMA analysis

4.189 Notwithstanding our criticisms of the adjustment factors, we note that as the application of the adjustment factors affects the modelled cost estimates, it also affects the efficiency scores.

4.190 We separately apply the smearing and alpha factors and recalculate the efficiency scores. Table 4-5 shows a comparison of the efficiency scores. Following the application of the smearing factor, the efficiency score decreases by 1.9 percentage points for wholesale water and 1.5 percentage points for wholesale wastewater. Following the application of the alpha factor, the efficiency score decreases by 1.6 percentage points for wholesale water and increases by 0.3 percentage points for wholesale wastewater.

Table 4-5: Comparison of efficiency scores for CMA model, and models including smearing and alpha factors³⁴⁹

Model	WW model	WWW model
CMA	95.4%	98.9%
CMA with smearing factor adjustment	93.5%	97.3%
CMA with alpha factor adjustment	93.8%	99.2%

Source: CMA analysis.

4.191 We have applied the adjustments for the log-transformation bias and the change to the efficiency scores to estimate the change to the base cost estimates. We provisionally find the overall change to the modelled base costs are not material.³⁵⁰

³⁴⁹ This model includes only provisional decisions taken on updating ONS forecasts, removal of alternative specifications and removal of SWC1.

³⁵⁰ The adjustments were also applied to the CMA final model, also with a provisional finding that the change to the modelled base costs are not material.

4.192 Table 4-6 shows the change to the base costs for the wholesale water model. We find that the change to the base costs is less than 0.4% for all companies, and on average less than 0.1%.

Table 4-6: Comparison of base costs between CMA model, with smearing and alpha adjustments (2020-2025, WW model)³⁵¹

Company	CMA (£m)	CMA + Smearing Factor			CMA + Alpha Factor		
		£m	Change (£m)	Change (%)	£m	Change (£m)	Change (%)
AFW	974.0	973.4	-0.6	-0.1	972.7	-1.2	-0.1
ANH	1,269.4	1,269.2	-0.2	0.0	1,271.5	2.1	0.2
BRL	338.8	338.6	-0.2	-0.1	338.7	0.0	0.0
HDD	100.7	100.7	0.0	0.0	100.5	-0.2	-0.2
NES	1,117.4	1,116.9	-0.6	-0.1	1,118.3	0.9	0.1
NWT	1,903.8	1,903.0	-0.9	0.0	1,903.6	-0.2	0.0
PRT	144.5	144.4	0.0	0.0	144.3	-0.2	-0.2
SES	180.2	180.2	-0.1	0.0	180.3	0.0	0.0
SEW	630.6	630.3	-0.3	-0.1	631.7	1.1	0.2
SRN	661.9	661.6	-0.3	-0.1	661.5	-0.4	-0.1
SSC	398.7	398.5	-0.2	0.0	398.5	-0.2	-0.1
SVE	2,167.6	2,166.7	-0.8	0.0	2,165.5	-2.1	-0.1
SWB	647.0	646.9	-0.1	0.0	647.1	0.1	0.0
TMS	3,193.4	3,192.0	-1.4	0.0	3,181.2	-12.2	-0.4
WSH	1,007.9	1,007.7	-0.2	0.0	1,008.0	0.2	0.0
WSX	463.1	463.1	0.0	0.0	462.7	-0.4	-0.1
YKY	1,326.8	1,325.9	-0.8	-0.1	1,328.0	1.3	0.1
Total	16,526	16,519.0	-6.7	0.0	16,514.1	-11.6	-0.1

Source: CMA analysis

4.193 Table 4-7 shows the change to the base costs for the wholesale wastewater model. We find the change to the base costs is less than 0.3% for all companies, and on average less than 0.1%.

³⁵¹ This model includes only provisional decisions taken on updating ONS forecasts, removal of alternative specifications and removal of SWC1.

Table 4-7: Comparison of base costs between CMA model (excluding SWC1 model) and with smearing and alpha adjustments (2020-2025, WWW model)³⁵²

Company	CMA (£m)	CMA + Smearing Factor			CMA + Alpha Factor		
		£m	Change (£m)	Change (%)	£m	Change (£m)	Change (%)
ANH	2,097.6	2,099.1	1.5	0.1	2,098.1	0.5	0.0
HDD	24.0	24.1	0.0	0.1	24.0	-0.1	-0.3
NES	829.7	829.8	0.1	0.0	829.8	0.1	0.0
NWT	2,061.4	2,062.2	0.8	0.0	2,059.5	-1.9	-0.1
SRN	1,586.3	1,586.2	-0.1	0.0	1,588.5	2.2	0.1
SVE	2,514.2	2,516.0	1.8	0.1	2,513.6	-0.5	0.0
SWB	738.0	738.0	0.0	0.0	737.4	-0.6	-0.1
TMS	3,813.9	3,814.8	0.9	0.0	3,808.9	-5.0	-0.1
WSH	1,107.4	1,107.9	0.5	0.0	1,106.3	-1.1	-0.1
WSX	983.1	983.0	-0.1	0.0	982.9	-0.2	0.0
YKY	1,547.9	1,549.2	1.3	0.1	1,546.8	-1.1	-0.1
Total	17,303.5	17,310.3	6.7	0.0	17,295.9	-7.6	0.0

Source: CMA analysis

- 4.194 Overall, we provisionally decide that although we consider that log-transformation bias may affect companies' cost allowance estimates, adjusting for log-transformation bias adds complexity to the model without necessarily mitigating the bias if the sample size is not sufficiently large.
- 4.195 Also, since some of the alpha adjustment factors required a downward adjustment of base costs, which does not align with statistical theory, we provisionally decide that these adjustment factors should not be used.
- 4.196 Furthermore, and notwithstanding our provisional conceptual concerns, we provisionally find that the smearing and alpha factor adjustments do not have a material effect on the base cost estimates.
- 4.197 For these reasons, we provisionally decide that it is appropriate to use naïve estimators.

Which forecast data should be used?

- 4.198 Ofwat used historical data from 2011/12 to 2018/19 to estimate the PR19 base cost model. Forecasts for each of the explanatory variables for 2020/21-2024/25 were then used, in conjunction with coefficients from the PR19 base cost model, to forecast the cost allowance for 2020/21-2024/25.

³⁵² This model includes only provisional decisions taken on updating ONS forecasts, removal of alternative specifications and removal of SWC1.

4.199 Ofwat estimated forecasts for its cost drivers using a variety of methodologies. These are summarised in Table 4-8.

Table 4-8: Ofwat’s forecast approach of explanatory factors in our base econometric model

Variable	Forecast method
Connected properties (water and wastewater)	Forecasts based on household growth rate projections produced by the Office for National Statistics (ONS).
Length of mains (water), Sewer length (wastewater)	Forecasts based on each company’s forecast of the variable (50% weight) and a linear projection of the historical growth rate of the asset (50%)
Water treatment complexity (water)	Forecasts based on each company’s forecast of the variable.
Number of booster pumping stations (water)	Forecasts based on a linear projection of historical growth rates.
Load received at sewage treatment works (wastewater)	Forecasts based on each company’s forecast of the variable (100%), except for Anglian Water and Northumbrian Water where we place 50% on a linear projection of historical growth rates of sewage load for the company*.
Sludge produced (wastewater)	Forecasts based on each company’s forecast of the variable.
Percent load treated in size bands 1-3 or in size band 6 (wastewater)	Forecasts based on the average of the last four years of historical data for each company.
Pumping capacity (wastewater)	Forecasts based on the average of the last four years of historical data for each company.
Load with ammonia consent below 3mg/l (wastewater)	Forecasts based on each company’s 2018-19 level.
Weighted average density (water and wastewater)	Forecasts based on ONS population projection numbers for water and wastewater.
Sewage treatment works (wastewater)	Forecasts based on each company’s forecast of the variable.

* Anglian Water and Northumbrian Water forecast sewage loads that are significantly higher than would be expected from historical growth rates. We therefore put some weight on historical growth rates for these two companies.

Source: Ofwat (2019), ‘PR19 final determination: Securing cost efficiency technical appendix’, Table 5

Parties’ arguments

4.200 Yorkshire said that Ofwat did not appropriately account for changes in future cost drivers and that Ofwat should have adopted Yorkshire’s forecasts for new connections, length of mains, and booster pumping stations.³⁵³

4.201 Yorkshire said that its forecasts were developed alongside other areas of its plan, including enhancement and maintenance programmes. For this reason, Yorkshire indicated that its forecasts for key variables were aligned with the

³⁵³ Yorkshire SoC, paragraph 198

activity that it had planned to undertake. Yorkshire estimated that its forecasts increased its allowance by £14 million in wholesale water.³⁵⁴

4.202 Ofwat said that during its PR19 process it placed some weight on companies' forecasts where it considered these reliable.³⁵⁵

4.203 Ofwat noted that Yorkshire did not make representations on the forecast of sewer length (which places 50% weight on the company's forecast), nor on any wastewater cost driver, despite challenging Ofwat's forecast of length of water mains. Ofwat considered this clear evidence that companies' representations tended to focus on the areas where the companies considered they deserved a higher allowance.³⁵⁶

Provisional decision

4.204 Yorkshire's criticisms relate to three variables (new connections, length of mains and booster pumping stations), but Yorkshire provided us only with evidence relating to new connections.

4.205 We assessed companies' forecasts on the number of connected properties in the section on growth below (see paragraphs 4.454 to 4.532). There, we provisionally decide to use Ofwat's forecasts based on ONS projections for the number of connected properties.

4.206 We reviewed the Ofwat forecast data for new mains and booster pumping stations. Ofwat's forecasting methodology accounts for companies' historical growth and is relatively simple. Moreover, for the length of mains, Ofwat placed 50% weight on the companies' business plans forecasts, recognising the need to account for companies' specific future plans. We provisionally decide that this is a reasonable approach and we adopt the same approach. Furthermore, we have not received evidence that would suggest adopting a different forecasting methodology.

4.207 We note that Yorkshire did not submit any evidence in support of its forecasts for length mains and booster pumping stations. Therefore, we provisionally decide to use Ofwat's forecasts based on ONS data.

4.208 In addition, we provisionally decide to use the updated forecasts for the number of connected properties and population density as estimated by the ONS.

³⁵⁴ [Yorkshire SoC](#), paragraph 198

³⁵⁵ [Ofwat's response to Yorkshire's SoC](#), p29 and paragraph 3.63

³⁵⁶ [Ofwat's response to Yorkshire's SoC](#), paragraphs 3.70 – 3.72

What is the appropriate aggregation and triangulation approach?

4.209 Models may include a degree of error and uncertainty. Models that focus on specific parts of the value chain may allow the set of explanatory factors to be tailored to each model, whereas more aggregated models help account for differences between companies in cost allocation. Triangulation of models that estimate costs for different parts and levels of the value chain may be helpful to mitigate these risks and avoid relying on one specification only, where possible.

Parties' arguments

4.210 Anglian made four main critiques of Ofwat's aggregation and triangulation methodology:

- (a) Adding together the different parts of the value chain before calculating the gap to the benchmark creates an unrealistic frontier. This is because upstream factors influence downstream structures.³⁵⁷
- (b) Ofwat triangulated similar wholesale water models and did not triangulate models at all for treated water distribution.³⁵⁸
- (c) In wastewater, Ofwat did not produce an integrated wastewater model. According to Anglian, Professor Saal demonstrated that acceptable integrated wastewater models could be created while still following Ofwat's model principles and selection criteria.³⁵⁹
- (d) Ofwat failed to sense-check modelling results with bottom-up evidence of the companies' actual expenditure needs.³⁶⁰

4.211 Oxera, as adviser to Anglian, stated that, while not having thoroughly investigated the development of an integrated wastewater model, it considered that 'it is, in principle, possible to develop aggregate models that are statistically and operationally valid.'

4.212 Ofwat said that:

³⁵⁷ [Anglian SoC](#), paragraph 569. Anglian said: 'For example, the distribution of Anglian's recycling centres (which is driven by demographics and geography) influences the size and location of its sludge treatment facilities.'

³⁵⁸ [Anglian SoC](#), paragraph 581

³⁵⁹ [Anglian SoC](#), paragraph 591

³⁶⁰ [Anglian SoC](#), paragraph 552 (iii) and section 4.2

- (a) The level of aggregation of the models captured different parts of the value chain and this was in support of the engineering rationale.
- (b) Where a particular level of aggregation was excluded, it was due to statistical or engineering reasons.³⁶¹

4.213 Ofwat found the alternative wholesale wastewater specifications proposed by Anglian did not perform well against Ofwat's model principles and selection criteria. It also raised concerns on the use of load as a scale driver³⁶² and the lack of a density variable.³⁶³

4.214 Ofwat's consultants CEPA built a series of integrated wholesale wastewater models which, overall, performed well.³⁶⁴ Ofwat, however, later rejected these models on the basis of scale having different effects in different parts of the value chain, and of density likely having an ambiguous effect across different parts of the value chain.³⁶⁵

Provisional decision

4.215 We assess the Parties' arguments on aggregation and triangulation, in turn.

Aggregation

4.216 On Anglian's argument that adding together the different parts of the value chain before calculating the gap to the benchmark creates an unrealistic frontier, we found that the approach taken by Ofwat aggregates costs before estimating the frontier.

4.217 An alternative approach involving disaggregated benchmarking would involve running a series of separate models for different parts of the value chain, calculating an efficiency benchmark for each model, and then producing an efficiency benchmark as the sum of these separate efficiency benchmarks from each model. This would be vulnerable to the criticism that it provides an unrealistic and unachievable cost benchmark by ignoring the interactions and trade-offs across different parts of the value chain. This specific problem can be addressed by summing the estimated costs across different disaggregated models before calculating any efficiency benchmark.³⁶⁶ Other methodologies,

³⁶¹ [Ofwat's response to Anglian's SoC](#), paragraph 3.32–3.36

³⁶² Ofwat stated that load was not appropriate from an engineering perspective because load only captures sewage collection and treatment activities, but not bioresources activities. Reference: [Ofwat's response to Anglian's SoC](#), paragraph 3.37

³⁶³ [Ofwat's response to Anglian's SoC](#), paragraph 3.37

³⁶⁴ CEPA (2018), [PR19 Econometric Benchmarking Models](#), pp110–113

³⁶⁵ Ofwat (2019), [IAP Supplementary technical appendix Econometric approach](#), p19

³⁶⁶ CMA (2015), [Bristol PR14 Determination](#), paragraph 146

such as either relying on aggregate models only or setting a different frontier for each disaggregated model, carry more risks than Ofwat's approach.

- 4.218 Ofwat specified models at different levels of the value chain. We found that this is a reasonable and appropriate approach as there are benefits and disadvantages for both aggregated and disaggregated models and it is advisable to use both. This avoids over-reliance on a single set of models.
- 4.219 We reviewed CEPA integrated wholesale wastewater models. Our review of these models indicated that these models were not suitable because of problems with the specification of the functional form.³⁶⁷
- 4.220 We have reviewed Professor Saal's model proposed by Anglian. We agree with Ofwat that the lack of a density variable is particularly concerning as it is proven to be a key cost driver in other models. Moreover, we replicated the proposed model with updated data and found that some coefficients considerably changed in size and sometimes lost significance.³⁶⁸ For these reasons, we provisionally decide that the proposed integrated wholesale wastewater model is not appropriate.³⁶⁹
- 4.221 Overall, we have not seen a satisfying integrated wastewater model. Therefore, we provisionally decide not to include any model at this level of aggregation.

Triangulation

- 4.222 We considered the arguments of Anglian and Ofwat on the most appropriate approach to triangulation.
- 4.223 We already considered above the definitions of water complexity used in the two triangulated Water Resources Plus (WRP) models and two aggregated Wholesale Water (WW) models. For the reasons explained in paragraphs 4.73-4.76, we found that both variables for water treatment complexity were reasonably defined. Therefore we provisionally decide to use both models for water resources plus (WRP1 and WRP2) and both models for aggregated wholesale water (WW1 and WW2), giving 50% weight each in their relative triangulations.

³⁶⁷ The statistical test RESET indicated that the models likely required additional interaction or quadratic terms.

³⁶⁸ The coefficient for the share of sludge treated non-indigenously fell from 0.2 to 0.09 and became non-significantly different from zero. In addition, the coefficient for pumping capacity/km of sewer increased from 0.257 to 0.326.

³⁶⁹ We have not considered Oxera's suggestion further at this point as it did not provide a robust aggregate model. As Oxera stated, it had not 'thoroughly investigated the development of an aggregate model.' (p19)

4.224 We assessed Ofwat's approach to its lack of triangulation for the Treated Water Distribution (TWD) model. Ofwat relied on one model only. We have not found any alternative model that would perform well enough to triangulate TWD with. We therefore provisionally decide not to triangulate TWD with any other model. This is consistent with our approach to sewage collection where we rely on SWC2 only (see paragraph 4.226).

Summary of our provisional decision on base cost models

4.225 In this section, we summarise our provisional decisions and assess our models against some criticisms made by the Disputing Companies on Ofwat's models.

4.226 Our approach to econometric modelling is similar to that adopted by Ofwat but involved three changes.

(a) We did not find Ofwat's alternative specifications convincing based on our assessment of the following variables: the number of new connected properties (TV2), the average pumping head (TV3), the percentage of lengths of mains renewed or relined (TV4), and performance on leakage targets (TV5–TV6). We therefore provisionally decide to drop these models.

(b) We found the results of one of the wholesale wastewater models for sewage collection (SWC1) counterintuitive. Specifically, we found that the number of properties per sewer length variable had a counterintuitive negative sign. We therefore provisionally decide to drop this specification.

(c) We used updated ONS forecast data for the number of connected properties and population density.

4.227 These changes resulted in different cost allowances for the four companies and these are summarised in Table 4-9 below.

Table 4-9: Effect of CMA decisions on base cost econometric models on the contribution to base costs (water and wastewater) (£m)

	Ofwat modelled base costs net of enhancement opex	Updating ONS forecasts	Impact of removal of alternative specifications	Impact of removal of SWC1	CMA modelled base costs net of enhancement opex †	% change from Ofwat's allowance
Anglian	3,368	+4	-50	+46	3,367	-0.0%
Bristol	340	-1	0	0	339	-0.3%
Northumbrian	1,955	-5	0	-3	1,947	-0.4%
Yorkshire	2,896	+4	0	-24	2,875	-0.7%

Source: CMA analysis.

† This model does not account for CMA decisions on efficiency catch up, frontier shift, RPE, and growth.

4.228 We acknowledge that our model, like any econometric model, is subject to some limitations and a degree of uncertainty in its final estimates. Below, we assess the Parties' arguments in relation to some of these limitations.

Assessment of the quality of our models

4.229 Given the similarities between our models and Ofwat's base cost models, we assess whether criticisms made by the Disputing Companies' on Ofwat's models in regard to modelling principles and model accuracy apply to our models, too. This assessment of the quality of the models also informs our views on the appropriate catch-up efficiency challenge, discussed below in paragraphs 4.253 to 4.297.

Assessment of multicollinearity

- *Parties' arguments*

4.230 One criticism concerned the approach to multicollinearity, in other words, high correlation among the explanatory variables.

4.231 Ofwat adopted the approach to multicollinearity suggested by its consultant CEPA and did not rely on models with a VIF – a measurement of multicollinearity – above ten.³⁷⁰

4.232 Anglian said that Ofwat applied its modelling principles with a lack of transparency and, at times, inconsistently. An example was Ofwat's acceptance of high levels of multicollinearity in its models. This was contrary to its originally stated modelling principles as the five wholesale water models had VIF statistics ranging from 212 to 230. For the alternative models put forward at final determination, the VIF ranged from 215 to 1,570.³⁷¹

4.233 Professor Saal commented that a VIF threshold of ten was too low to reject models and a higher threshold should be allowed to accommodate the industry's complexity.

4.234 Ofwat, in its response to Anglian, said that when its models had high multicollinearity this was driven by the inclusion of density and its square term as explanatory variables.³⁷² Ofwat said that, while high multicollinearity might impair its ability to estimate accurately the impact of the individual terms on the dependent variable, it should not impair its ability to estimate accurately

³⁷⁰ VIF is the variance inflation statistics, a measure used to quantify the severity of multicollinearity in an econometric model.

³⁷¹ [Anglian SoC](#), paragraph 571

³⁷² [Ofwat's response to Yorkshire's SoC](#), paragraph 3.30

their collective impact. Since these two terms (density and its squared term) always varied together, the collective impact, measured by the elasticity of the variable, was more important.

4.235 Thames supported Ofwat's approach to the assessment of multicollinearity.³⁷³ United Utilities tested for multicollinearity in Ofwat's models and found that the removal of density squared terms resulted in VIF scores below two for all models (under OLS) and that this highlighted that the multicollinearity was solely confined to the use of the squared term of density.³⁷⁴

- *Provisional decision*

4.236 We assessed the Parties' arguments on multicollinearity. We found that a VIF of ten is standard in the literature.³⁷⁵ Therefore, we provisionally decide to follow the same approach. However, we also recognise that if a transformation of one explanatory variable is included in the regression then multicollinearity may be higher. Therefore, we provisionally decide that a higher degree of multicollinearity can be accepted due to the presence of both population density and its quadratic form in some of our models.

Assessment of model accuracy

4.237 In this section, we consider the accuracy of our estimates. Beside considering the Parties' arguments, we also recognise that this influences our view on the appropriate level of efficiency challenge.³⁷⁶

- *Parties' arguments*

4.238 Oxera, working for Yorkshire, presented three analytical approaches to examine the uncertainty (a measure of model accuracy) present in cost modelling: confidence intervals, Monte Carlo simulation, and SFA.^{377, 378}

³⁷³ [Thames Water Submission](#), paragraph 7.13

³⁷⁴ [United Utilities submission](#), paragraph 3.4.4

³⁷⁵ Stata 16 manual states that most analysts rely on informal rules of thumb applied to the VIF; see Chatterjee and Hadi (2012). According to these rules, there is evidence of multicollinearity if i) the largest VIF is greater than ten (some choose a more conservative threshold value of 30) or ii) the mean of all the VIFs is considerably larger than one.

³⁷⁶ We acknowledge that other aspects, such as sources of bias, explanatory power, etc., may influence the appropriateness of the efficiency challenge. These have been reviewed throughout this section.

³⁷⁷ Confidence intervals estimate the range of values which the estimated costs almost certainly fall in (with 95% probability).

³⁷⁸ SFA is discussed in paragraphs 4.11 to 4.23.

- 4.239 Oxera used Ofwat's model to compute the 95% confidence intervals around the companies' cost estimates. The analysis found that:
- (a) The cost prediction for the fourth-ranked company in wholesale water (Ofwat's efficiency benchmark) had an uncertainty between +/- 8%-17.5%.³⁷⁹
 - (b) The cost prediction for the third ranked company in wholesale wastewater (Ofwat's efficiency benchmark) had an uncertainty of between +/- 10.5%-25%.
- 4.240 Oxera said that the difference in the efficiency scores between the most and least efficient water companies was significantly larger than that estimated by Ofgem in RIIO-ED1.
- 4.241 In its Monte Carlo analysis, Oxera tested Ofwat's models by adding a random error component to all expenditure and cost drivers.³⁸⁰ Oxera said that, based on data uncertainty alone, there was significant uncertainty regarding the identity of the efficient companies:
- (a) In wholesale water, the 11th most efficient company (as estimated by Ofwat) was estimated to be efficient (within the top four) in at least 1% of the simulations.
 - (b) In wholesale wastewater, the eighth most efficient company was estimated to be efficient (within the top three) in at least 5% of the simulations, and the tenth most efficient company was estimated to be within the top five in 5% of the simulations.
- 4.242 Anglian said that Ofwat's models were not robust because several companies received considerably higher contributions to base allowances than they requested. Allowances ranged from -9% of base costs needs for SES and Yorkshire to 14% in excess of base costs needs for Portsmouth.³⁸¹
- 4.243 Anglian said that its analysis of the quality of the Ofwat models, as measured by the confidence intervals around the cost predictions, showed that there was significantly more variability around the wholesale wastewater models than around the wholesale water models. Therefore, it was not clear why the same efficiency benchmark was used for both wholesale water and wholesale

³⁷⁹ The confidence intervals are symmetric around the central estimate and therefore range from eg -8% to +8%. We use the symbol +/- to indicate this.

³⁸⁰ Oxera add up to +/- 5% to each variable in the data. Note that Oxera's analysis uses the forecasted variables only.

³⁸¹ [Anglian SoC](#), paragraph 554

wastewater. Instead wastewater should have been a less challenging benchmark than water.³⁸²

4.244 Ofwat's response to Oxera said that any statistical model had a degree of error and Oxera did not present alternatives with higher accuracy levels.³⁸³

4.245 Ofwat said that Oxera did not take into account that the models were aggregated and triangulated to obtain the final result. Ofwat said that the confidence intervals could be reduced by including additional variables, however, this might compromise the reliability of the estimated coefficients and increase forecast error.

4.246 Northumbrian tested the models' stability and ran sensitivities on inclusion of certain companies, outlier characteristics, and/or additional years, as well as the ability of the models to provide robust estimate of efficient costs for the sector. Northumbrian said that Ofwat's models appeared to be robust and stable to variations in the underlying data sample. Northumbrian was confident that the sample Ofwat used to determine efficient costs was to a large extent representative of the sector's historical performance.

- *Provisional decision*

4.247 We acknowledge that in any benchmarking of cost assessment there will be a degree of uncertainty attached to the results. We looked at the confidence intervals for the fitted values of our proposed models and compared them to other models by Ofwat and the CMA. Table 4-10 compares these models. We computed the confidence intervals for the 95% confidence level.³⁸⁴

4.248 Table 4-10 shows that the confidence intervals for our models were tighter compared to the CMA's Bristol PR14 Determination or Ofwat's PR14, the same as PR19 for wholesale water and only slightly wider than PR19 for wholesale wastewater. This means that our estimates overall perform better than past models, except in wastewater where our estimates are slightly less precise than Ofwat's.³⁸⁵ The models for wastewater have larger confidence intervals than those for water, and more aggregated models (for example, WW1 and WW2) have narrower confidence intervals than disaggregated

³⁸² [Anglian SoC](#), paragraph 603

³⁸³ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), paragraph 3.27

³⁸⁴ 95% is the probability that the point estimate, ie the estimated costs, is within the confidence interval. In other words, as a thought experiment, if the same population is sampled on 100 occasions and interval estimates are made on each occasion, the resulting intervals would include the true population parameter in approximately 95 cases.

³⁸⁵ We are not able to provide confidence intervals for wastewater for BW19 or PR14 because we do not have the data.

models (for example, WRP1). Finally, we note that the confidence intervals have marginally improved from PR19 Draft Determination to FD.

Table 4-10: Average confidence intervals across models in different price determinations³⁸⁶

	Water 95% confidence interval	Wastewater 95% confidence interval
CMA models	+/-13%	+/-16%
PR19	+/-13%	+/-16%
PR19 Draft Determination	+/-14%	+/-16%
Bristol PR14 Decision	+/-15%	N/A
PR14³⁸⁷	+/-17%	N/A

Source: CMA analysis

Note: Confidence intervals are computed as the simple average across all models. A more complex methodology may be more appropriate to compute confidence intervals for CMA and PR19 models, but this methodology would not allow for a comparison with Bristol PR14 Determination and PR14.

4.249 We also tested Ofwat's models taking the following steps:

- (a) We computed the 95% confidence intervals for each of the Disputing Companies.
- (b) We applied the upper and lower bound of the confidence intervals to each of the Disputing Companies' allowance. We left other companies' allowance unchanged.
- (c) We estimated new efficiency scores for the Disputing Companies.

4.250 These steps led to some changes to the efficiency rankings. In water, the maximum change in the ranking is one position; in wastewater it is three – this is due to Anglian having a similar score to other companies in wastewater. The maximum change in efficiency scores is 3% in magnitude. We also note that no Disputing Company would cross the benchmark threshold set by Ofwat.

4.251 We looked at Oxera's Monte Carlo analysis and we recognise that small variations to the underlying data may have implications on the final outcomes. However, the findings presented by Oxera did not appear particularly concerning because the analysis suggested that there was a low probability of a low ranked company affecting the top of the ranking. Moreover, this is a theoretical exercise and the actual potential for measurement error is hard to judge.

³⁸⁶ The confidence intervals shown in the table are the average of each models' average annual confidence interval around the fitted values.

³⁸⁷ PR14 confidence intervals were computed during the Bristol PR14 Determination with a different method to the one we used to calculate the other confidence intervals. Only percentage confidence intervals were available in the [CMA's Bristol PR14 Determination](#), appendix 1.1–4.2, pA4(2)–47, paragraph 214.

4.252 Overall, both our proposed models and Ofwat PR19 models perform at least in line with past models. We acknowledge that there is a degree of uncertainty for the modelled costs, as reflected by the confidence intervals and the potential change in efficiency scores. We also acknowledge that a degree of uncertainty will be present in any econometric model. We reflect this degree of uncertainty in the choice of the efficiency challenge and other parts of the determination (eg cost adjustment claims).

Catch-up efficiency challenge

4.253 In this section we discuss the analysis we have done on the catch-up efficiency challenge. The section is structured as follows:

- We first summarise Ofwat's PR19 catch-up efficiency challenge.
- We discuss our analysis of Ofwat's approach and the Disputing Companies' criticisms.
- We summarise our approach to efficiency challenge and the implications this has for the companies' base cost allowances.

Ofwat's PR19 efficiency challenge

4.254 Ofwat's cost models estimate how much it would cost the average water company to cover base operations over the next five years, given the company's forecast cost drivers. Ofwat wanted to set cost allowances for an efficient water company and therefore built a ranking of the companies, from most efficient to least efficient. This ranking was based on comparing the companies' historic costs in 2015 to 2019 with the costs the model predicted they should have incurred.

4.255 At draft determination in PR19 Ofwat set an upper quartile efficiency challenge. This means that Ofwat used the company placed at the upper quartile, or 75th percentile, as the benchmark for an efficient company. At final determination Ofwat chose a 'tougher' efficiency challenge

- In wholesale water, Ofwat used the fourth placed company out of seventeen companies – South West Water. This resulted in all the companies' wholesale water cost allowances being reduced by 4.6% compared to them being set using the average efficiency levels.
- In wholesale wastewater Ofwat used the third placed company out of ten companies – Northumbrian Water. This resulted in all the companies'

wholesale wastewater cost allowances being reduced by 2.0% compared to them being set using the average efficiency levels.

Methodological issues raised

4.256 When considering the appropriate efficiency challenge we focused on answering three questions.

- What is the appropriate comparator set?
- What time period should be used to calculate the efficiency challenge?
- What is the appropriate level of the efficiency challenge?

What is the appropriate comparator set?

4.257 Ofwat said that it used a credible set of companies to determine the efficiency challenge. The most efficient water companies included a mixture of smaller and larger companies, performance outcomes and investment cycle positions.³⁸⁸

4.258 Bristol said that the top company, Portsmouth, was incomparable with the other water companies and Ofwat had acknowledged this.³⁸⁹ NERA, in a report for Bristol, said that Bristol's allowance would be £10 million higher if Portsmouth was excluded from Ofwat's models.³⁹⁰

4.259 Northumbrian said that Ofwat had used companies with unique circumstances to set the efficiency challenge. Large and complex water and sewerage companies should not be compared to smaller water only companies which were able to reduce costs to levels which were unachievable by larger companies.³⁹¹ Northumbrian said that in PR09 Ofwat had taken a different approach and had excluded companies when their totex was less than 3% of industry totex. Reworking Ofwat's analysis to exclude smaller companies resulted in a 2% efficiency challenge rather than a 5% challenge.³⁹²

Provisional decision

4.260 The companies' arguments appear selective; they said that only the more efficient companies are not valid comparators. A more balanced approach

³⁸⁸ Ofwat (2019), [PR 19 final determinations securing cost efficiency technical appendix](#), p34

³⁸⁹ [Bristol SoC](#), paragraph 423

³⁹⁰ [Bristol SoC](#), paragraph 424

³⁹¹ [Northumbrian SoC](#), paragraphs 310–311

³⁹² [Northumbrian SoC](#), paragraphs 312–314

might be to remove both the most efficient and least efficient comparators. However, none of the evidence we reviewed showed clear biases in the selection of companies used to set the efficiency challenge and the use of an upper quartile benchmark reduces the impact of outliers on the results. We therefore provisionally decide that it is appropriate to base the efficiency challenge on all the relevant water companies and wastewater companies.

What time period should be used to calculate the efficiency challenge?

- 4.261 Ofwat used data from 2012 to 2019 in its econometric modelling to estimate the efficient cost levels for the water companies. To calculate the efficiency rankings Ofwat used data from 2015 to 2019, to ensure that the catch-up efficiency challenge was not based on a single low-cost year by any one company.³⁹³
- 4.262 Anglian said that this mismatch would lead to biased estimates of the efficiency challenge and efficient base costs.^{394, 395}
- 4.263 Oxera, in a report for Yorkshire, said Ofwat had not justified its decision to use a five-year period to calculate the efficiency challenge and had not checked whether this represented a full investment/maintenance cycle. Oxera said that when efficiency scores were estimated over the full outturn period, the efficiency challenge reduced from 4.6% to 4.2% in water, and from 2.0% to 1.2% in wastewater. Estimating over the full outturn period also changed the composition of the top four in water and top three in wastewater.

Provisional decision

- 4.264 Two factors influenced our decision on the appropriate time period. First, more weight should be placed on more recent data, since this better reflects the recent efficiency levels of the industry. In particular, if the companies are becoming more efficient over time then setting an efficiency challenge using older data risks setting an insufficient challenge. Second, using a small sample of years could lead to results which are unrepresentative of typical efficiency levels.
- 4.265 Figure 4-3 below shows how the efficiency challenge figures for wholesale water and wholesale wastewater vary depending on the time period chosen. The results show that choosing the five-year period results in the second

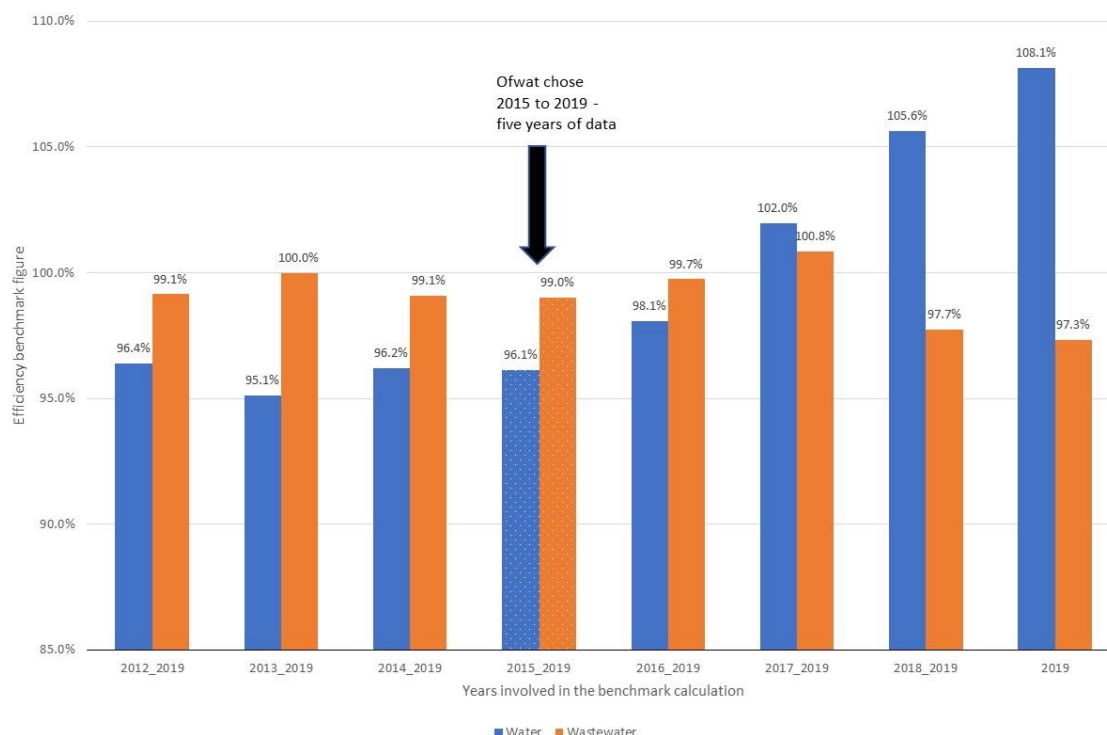
³⁹³ See Ofwat feeder model 2 for [wholesale water](#) and [wholesale wastewater](#) and Ofwat (2020), [Ofwat's response to Anglian's 27 May submission to the CMA](#), p16

³⁹⁴ [Anglian SoC](#), paragraphs 607 and 608

³⁹⁵ Saal (2019), [A Comment on Misspecification and Systematic Bias in Ofwat's PR19 Draft Determination Integrated Wholesale Water and Wastewater Models](#), p4

‘toughest’ efficiency challenge (96.1%) for wholesale water and the third ‘toughest’ efficiency challenge for wholesale wastewater (99.0%). Using the period 2015 to 2019 gives results which, compared to the period 2012 to 2019, are 0.3 percentage points lower for water and 0.1 percentage points lower for wastewater.

Figure 4-3 – Comparison of efficiency challenges and time period chosen



Source: CMA analysis

4.266 Based on the evidence above, we provisionally decide that using data from 2015 to 2019 provides the appropriate balance between using more recent data and using a large enough sample to calculate the efficiency challenge.

What is the appropriate level of efficiency challenge?

4.267 When considering the appropriate level of efficiency challenge, we looked at the arguments on:

- the quality of the econometric modelling;
- how the efficiency challenge evolved over time;
- the outcome of PR14;
- role of intra-industry comparisons; and
- the decisions taken by other regulators.

4.268 We discuss these topics and then present our provisional decision.

The quality of the econometric modelling

4.269 The cost modelling approach used by Ofwat did not allow it to separate inefficiency from error in the model. To take account of this, Ofwat did not set the efficiency challenge at the frontier company, as one might do if one ascribed all the differences between estimates and outcomes to inefficiency. Instead Ofwat set the efficiency challenge at the fourth placed company for wholesale water and the third placed company for wholesale wastewater.

4.270 Ofwat said that the quality of models had improved from draft determination to final determination. Ofwat said the Disputing Companies claimed that there was a large degree of uncertainty in Ofwat's analysis, which was demonstrated by the wide range of efficiency scores. Ofwat said that the improvement in its models was demonstrated by the range of efficiency scores narrowing between draft determination and final determination. Therefore, it was appropriate to apply a more stretching efficiency challenge.³⁹⁶

4.271 Ofwat said that it had mitigated the risk of model error through triangulation of a set of models, careful consideration of the efficiency challenge and consideration of the companies' cost adjustment claims.

4.272 Anglian made three points relating to the quality of the models. First, it said the models used in the final determination were not superior to the draft determination, so did not justify using a tougher efficiency challenge.³⁹⁷ Second, there was significantly more variability around the wastewater models than around the water models, and therefore the wastewater should have a weaker efficiency challenge.³⁹⁸ Third, the uncertainty of the PR19 models was greater than those of the CMA in the Bristol PR14 Water appeal, which had used a median efficiency challenge.³⁹⁹

4.273 Anglian's adviser, Oxera, submitted evidence showing there was a statistically insignificant gap between the efficiency scores for Anglian and the benchmark companies.

4.274 Bristol said Ofwat should not set a 'tougher' efficiency challenge than upper quartile. First, Ofwat's models could not separate inefficiency from data

³⁹⁶ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), paragraph 6.34

³⁹⁷ [Anglian SoC](#), paragraph 602

³⁹⁸ [Anglian SoC](#), paragraph 604

³⁹⁹ [Anglian SoC](#), paragraph 605

error.⁴⁰⁰ Second, the quality of the Ofwat models had not improved materially throughout the course of the price review.⁴⁰¹ Third, Ofwat's estimate of the implicit allowance for enhancement opex, which Ofwat removed as one of its adjustments, was imprecise, which supported a less stringent efficiency challenge.⁴⁰²

4.275 Northumbrian said that an upper quartile efficiency challenge was appropriate. Ofwat should not set a more demanding benchmark because the modelling omitted important cost drivers and the companies' efficiency rankings and scores varied significantly over time.⁴⁰³

4.276 Yorkshire said that the accuracy of Ofwat's models was worse than those used by the CMA in the Bristol PR14 Determination where the CMA had chosen an average efficiency challenge.⁴⁰⁴ Any outperformance may have been due to errors, such as omitted cost or service drivers.⁴⁰⁵ The choice of the efficiency challenge should be influenced by the degree of confidence in the models used.

4.277 Oxera, in a report for Yorkshire, questioned the wide confidence intervals associated with the efficiency estimates produced by Ofwat's modelling. The range of efficiency scores from the Ofwat models was wider than Ofgem's RIIO-ED1 modelling, where an upper quartile efficiency challenge had been applied. The confidence intervals in Ofwat's modelling were larger than the intervals in the Bristol PR14 Determination, where an average efficiency challenge was used. Oxera re-estimated the Ofwat models using AMP7 forecast data and this resulted in lower quality models and wider confidence intervals. Oxera carried out Monte Carlo simulations on the Ofwat cost models to assess the robustness of the econometric models and said that the results showed Ofwat's models were highly sensitive to small changes in the data.⁴⁰⁶

4.278 Thames said that in the random effects models the error could be split into modelling error and inefficiency and specifying this more precisely would help set the efficiency challenge.⁴⁰⁷

⁴⁰⁰ [Bristol SoC](#), paragraph 403–406

⁴⁰¹ [Bristol SoC](#), paragraph 415

⁴⁰² [Bristol SoC](#), paragraph 425–427

⁴⁰³ [Northumbrian SoC](#), paragraphs 318–326

⁴⁰⁴ [Yorkshire's reply to Ofwat's response to Yorkshire's SoC](#), paragraph 3.16.1 (b)

⁴⁰⁵ [Yorkshire's reply to Ofwat's response to Yorkshire's SoC](#), paragraph 3.16.1 (e)

⁴⁰⁶ A Monte Carlo simulation is a model used to predict the probability of different outcomes when the intervention of random variables is present.

⁴⁰⁷ [Thames Water submission](#), paragraph 7.15

The efficiency challenge over time

4.279 Ofwat said that the efficiency challenge had steadily decreased through PR19 and was below the PR14 challenge. Table 4-11 below summarises the Ofwat figures and the figures from our analysis.

Table 4-11: Comparison of efficiency challenges

<i>Efficiency challenge</i>	<i>Efficiency challenge benchmark</i>	<i>Cost reduction in wholesale water</i>	<i>% Cost reduction in wholesale wastewater</i>
PR14	UQ	6.5	10.4
PR19 Initial Assessment of Plans	UQ	4.8	3.7
PR19 Slow track draft determinations	UQ	4.2	1.4
PR19 FDs	UQ	3.9	1.2
PR19 FDs	Third/Fourth	4.6	2.0
CMA Modelling	UQ	3.9	1.0
CMA Modelling	Third/Fourth	4.6	1.1

Source: Ofwat (2020) [Reference of the PR19 final determinations: Cost efficiency – response to common issues in companies’ statements of case](#), Table 6.1 and CMA analysis.

- 4.280 Bristol’s advisers, NERA, said that the upper quartile challenge became less demanding because Ofwat changed the definition of the dependent variable and changes in the companies’ costs forecasts during PR19 did not justify a more demanding efficiency target.
- 4.281 Northumbrian said that Ofwat’s comparison of the PR19 final determination with previous decisions was misleading as the reduction was not driven by a reducing efficiency challenge, but instead by the companies reducing the cost forecasts in their business plans.⁴⁰⁸
- 4.282 Yorkshire said that Ofwat’s comparison between the PR14 and PR19 efficiency challenges was incorrect as the maximum totex gap (the gap between the company’s and Ofwat’s view of efficient costs) was larger in PR19 than in PR14.⁴⁰⁹
- 4.283 CCWater told us that it was appropriate for there to be a strong efficiency challenge for Anglian, Bristol, Northumbrian and Yorkshire because customers should not pay for inefficiency.⁴¹⁰

The outcome of PR14

- 4.284 The industry outperformed the PR14 settlement by an average of 1.4%. The four Disputing Companies’ underspends were Anglian (9.2%), Bristol (4.2%),

⁴⁰⁸ [Northumbrian reply to Ofwat’s response to Northumbrian’s SoC](#), paragraph 241

⁴⁰⁹ [Yorkshire Reply to Ofwat response to Yorkshire’s SoC](#), paragraph 3.15.1

⁴¹⁰ Consumer Council for Water (CCW) [Response to Anglian’s SoC](#), paragraph 6.1, [CCW Response to Bristol’s SoC](#) paragraph 5.3 and [CCW Response to Northumbrian’s SoC](#), paragraph 7.3, [CCW Response to Yorkshire’s SoC](#), paragraph 5.4.

Northumbrian (9.0%) and Yorkshire (1.9%).⁴¹¹ Although we recognise this is based on total allowances, rather than base cost allowances, this could be interpreted as suggesting that the previous upper quartile efficiency challenge was particularly manageable for Anglian, Bristol and Northumbrian.

The role of intra-industry comparisons

4.285 Ofwat said that it had also considered that its efficiency challenge was set using data from long standing monopolies in one industry. Even the relatively efficient companies within this sector were unlikely to be as efficient as companies in other industries facing competitive pressure. This was related to the concept of x-inefficiency, where in non-competitive sectors there was inefficiency due to a lack of competitive pressure.⁴¹²

4.286 Oxera said Ofwat, when it had mentioned x-inefficiency, had not considered the fact that much of the water companies' activity was subcontracted to private companies and the sector had been under intensive regulation since privatisation.

The decisions of other regulators

4.287 Ofwat said that other regulators had previously set 'tougher' efficiency challenges than the upper quartile. The Northern Ireland Utility Regulator used the fourth placed company out of 15, which was 'tougher' than upper quartile, which would have been 4.5. Monitor, Ofcom and Postcomm had used upper decile efficiency challenges.⁴¹³

4.288 Anglian said that other regulators rarely selected an efficiency challenge 'tougher' than upper quartile.⁴¹⁴

4.289 Bristol said that regulatory precedent did not support Ofwat's approach.⁴¹⁵ A NERA report commissioned by Bristol contained similar arguments.

4.290 Northumbrian said that Ofwat, Ofgem and the CMA had not previously chosen 'tougher' efficiency challenges than the upper quartile and produced a table showing that Ofwat, Ofgem and the CMA had never chosen efficiency challenges 'tougher' than upper quartile.⁴¹⁶ Northumbrian said that the

⁴¹¹ [Ofwat's Response to cross-cutting issues in companies' statements of case: introduction and overall stretch on costs and outcomes](#), Table 6.1. These Ofwat figures are based on the first four years of AMP6.

⁴¹² [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), paragraph 6.36

⁴¹³ Ofwat (2019), [PR 19 final determinations securing cost efficiency technical appendix](#), pp33–34 [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), paragraph 6.39

⁴¹⁴ [Anglian SoC](#), paragraph 600

⁴¹⁵ [Bristol SoC](#), paragraphs 417 to 422.

⁴¹⁶ [Northumbrian SoC](#), paragraph 327

circumstances in the Postcomm, Ofcom and Monitor decisions were different and therefore did not support Ofwat's claims.

4.291 Yorkshire said that the regulators cited by Ofwat that applied an upper decile efficiency challenge only did so after conducting SFA. Oxera, in a report for Yorkshire said that the Northern Ireland Utility Regulator had used the fourth placed company, but since the upper quartile would have been the 3.75 placed company, the efficiency challenge was actually less strict than the upper quartile.

4.292 We reviewed the approaches taken by other regulators and our summary is below.

- Ofgem said that in RIIO-1 it set the efficiency challenge at the upper quartile level to explicitly account for the potential measurement errors of models.⁴¹⁷
- After the companies had submitted the above arguments, Ofgem in its recent June 2020 RIIO-2 draft determination decided on an 85th percentile for the gas distribution networks.⁴¹⁸
- In 2016 Monitor assessed the comparative efficiency of NHS Trusts.⁴¹⁹ The data provided in the Monitor report is insufficient to calculate exactly Monitor's efficiency challenge, but it appears to be somewhere between the 50th and 60th percentile.⁴²⁰ This is a softer target than an upper quartile, which would be at the 75th percentile.
- We have found no evidence that Ofcom used an upper decile efficiency challenge in its regulation of Royal Mail. Deloitte's analysis for Ofcom included upper decile efficiency scores, but these were not used directly to regulate Royal Mail.⁴²¹
- The Northern Ireland Utility Regulator used an upper quartile efficiency challenge for its transmission and distribution price control in 2017.⁴²²

⁴¹⁷ Ofgem (2020), [Comments on the issues raised in the references](#), p4

⁴¹⁸ Ofgem (2020), [Consultation - RIIO-2 Draft Determinations - Gas Distribution Annex](#), paragraph 3.14

⁴¹⁹ Monitor (2016), [2016/17 National Tariff Payment System: A consultation notice Annex B5: Evidence on efficiency for the 2016/17 national tariff](#), Table 1

⁴²⁰ Monitor set the target at 2%, which was composed of 1.4% trend and catch-up of 0.6%. The 60th percentile catch up is 2.0%, suggesting that a 0.6% catch-up is somewhere between 50th and 60th percentile.

⁴²¹ Deloitte, [Econometric benchmarking in the UK postal sector](#), p25

⁴²² Northern Ireland Utility Regulator (2017), [Northern Ireland Electricity Networks Ltd, Transmission & Distribution 6th Price Control Final determination](#), paragraph, 5.176

Provisional decision

4.293 In coming to our provisional decision we took account of multiple factors.

4.294 First, we focused on whether there had been substantial improvements in the econometric modelling. The changes we made to the econometric modelling are set out in the section on base costs modelling. These changes, whilst appropriate, did not result in substantial improvements in the econometric modelling. Furthermore, we are wary of placing too much reliance on comparisons of efficiency scores. Over-fitting a model could lead to a smaller range of efficiency scores but would not necessarily imply that the model was better at predicting cost allowances.

4.295 We placed little or no weight on the other factors we considered.

- First, regulators typically choose the upper quartile benchmark and Ofgem was the only regulator which chose an efficiency challenge 'tougher' than upper quartile. Furthermore, this Ofgem decision is provisional, not final. The Ofgem approach to econometric modelling differs from that used by Ofwat and we did not have data to compare the two approaches.
- Second, we noted that there was evidence that the absolute level of the efficiency challenge had fallen, particularly for wastewater, although we note Northumbrian's argument that the apparent reduction in the challenge during PR19 was influenced by the companies reducing their business plan figures. We found that it was more appropriate to set the efficiency challenge based on our assessment of the quality of the econometric modelling, rather than to seek specific outcomes.
- Third the evidence on past outperformance shows the industry, on average, underspent its overall PR14 allowance by 1.4%. Such an outcome, by itself, does not justify a 'tougher' efficiency challenge, since multiple factors could have led to this result and in any event this is only a relatively modest under-spend.
- Fourth, while Ofwat is correct that monopolies may be less efficient than companies operating in competitive sectors, the regulatory regime is designed to mimic aspects of competitive pressure and reduce any x-inefficiency. Furthermore, we have no way of quantifying this theoretical effect.

4.296 Taking these factors into account, we provisionally decide that the upper quartile is the appropriate level of the efficiency benchmark, as this balances our objective of setting a challenging benchmark while acknowledging the limitations of the econometric modelling (and the consequent risk that the

company will have insufficient allowed revenue to ensure a base level of service).

CMA approach to efficiency challenge

4.297 We provisionally decide to adopt an approach similar to Ofwat. We use the same comparator set Ofwat used and the same five-year period to assess efficiency. We differ in that we provisionally decide to set the efficiency challenge at the upper quartile level. This results in an efficiency challenge of 3.9% in wholesale water and 1.0% in wholesale wastewater. These challenges are lower than the Ofwat figures of 4.6% and 2.0%.

Frontier shift

4.298 Frontier shift refers to the reduction of cost allowances on an annual basis to account for the expected productivity improvements in the sector.⁴²³ Frontier shift represents the ability of even the most efficient firms in the sector to increase their efficiency over time through, for example, adopting new technology. It differs from catch-up efficiency gains, where firms lagging in efficiency catch-up with the performance of the industry leaders.

4.299 We have examined Ofwat's approach to setting frontier shift and the areas of concern raised by the Disputing Companies before provisionally deciding on our own approach.

Ofwat PR19 approach to frontier shift

4.300 Ofwat applied the frontier shift on an annual basis to all wholesale base costs,⁴²⁴ WINEP enhancement costs and some metering enhancement costs.⁴²⁵ Ofwat did not apply frontier shift to other wholesale enhancement costs or retail costs.

4.301 Ofwat said that there was scope for frontier shift efficiency improvements in the water sector from two sources:

- on-going efficiency improvements in the economy that the water sector should be able to emulate; and

⁴²³ Productivity is commonly defined as 'a ratio of a volume measure of output to a volume measure of input use' - OECD (2001), [Measuring Productivity OECD Manual](#), p11

⁴²⁴ This included both modelled and unmodelled base costs.

⁴²⁵ Ofwat (2019), [PR19 final determinations - Securing cost efficiency technical appendix](#), p122

- one-off efficiency improvements from water companies making greater use of the totex and outcomes framework at PR19.⁴²⁶

4.302 Ofwat set the frontier shift uniformly at 1.1% per year based on a range of factors. This included analysis conducted by Ofwat's consultants Europe Economics, who estimated a frontier shift efficiency range of 0.6% to 1.2% per year,⁴²⁷ and an estimate from KPMG that there could be an additional impact from one-off efficiency gains of between 0.2% and 1.2% per year from the totex and outcomes framework.⁴²⁸

4.303 The approach taken by Europe Economics and KPMG is set out below, followed by more detail on Ofwat's reasoning for its frontier shift estimate and application.

Europe Economics approach

4.304 Europe Economics assessed the scope for frontier shift based on an analysis of comparative sectors using a historical EU KLEMS dataset on UK productivity.⁴²⁹ Europe Economics selected comparators which were in competitive sectors and had similar activities to the water sector. The comparators they used are set out in Table 4-12.

Table 4-12: Comparators used by Europe Economics

<i>NACE 1 dataset (1970-2007):</i>	<i>NACE 2 dataset (1998-2015)</i>
Construction	Construction
Transport and Storage	Transport and storage
Chemicals and Chemical products	Chemicals and chemical products
Machinery, n.e.c. ⁴³⁰	Machinery, n.e.c.
Total manufacturing	Total manufacturing
n/a	Professional, scientific, technical, administrative and support service activities
n/a	Other manufacturing; repair and installation of machinery and equipment

Source: Europe Economics - Real-Price-Effects-and-Frontier-Shift and the EU KLEMS Growth and Productivity Accounts database

⁴²⁶ Ofwat (2019), [PR19 final determinations - Securing cost efficiency technical appendix](#), p121

⁴²⁷ Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p7

⁴²⁸ KPMG (2018), [Innovation and efficiency gains from the totex and outcomes framework](#), p24

⁴²⁹ The [EU KLEMS Growth and Productivity Accounts dataset](#) provides includes data on growth and productivity variables for most of EU28 countries and sectors over different time periods.

⁴³⁰ 'n.e.c.' stands for Not elsewhere classified (in the database).

4.305 Europe Economics looked at productivity growth of the comparator sectors over different time periods using the available data from the EU KLEMS database.⁴³¹ Europe Economics relied on two different statistical releases.

- The NACE 1 dataset released in 2009 covers the period from 1971 to 2007. Europe Economics calculated a productivity growth estimate using the entire period, the most recent two full business cycles (1990 to 2007 and 1980 to 1989), and the average of the two.
- The NACE 2 dataset released in 2017 includes some new sector classifications to more accurately reflect the modern economy. Europe Economics examined the entire period (1999 to 2014) as well as a period pre-crisis (1999 to 2007) and a period post-crisis (2010 to 2014).

4.306 The estimates used by Europe Economics primarily relied on the gross output total factor productivity (TFP) measure of productivity growth. Gross output is calculated using all the inputs that are used for production in a sector of the economy, including intermediate inputs purchased from other sectors. TFP in gross output terms represents the residual growth in output once growth in capital, labour and intermediate inputs have been taken into account. Value-added TFP on the other hand considers only capital and labour as inputs, thus omitting the effect of intermediate inputs.⁴³²

4.307 Europe Economics calculated the lower bound of its range (0.6%) by focusing on the post-crisis period (2010 to 2014) and taking a simple (unweighted) average of the comparator sectors' productivity growth levels. For the upper bound (1.2%) it focused on stronger performing sectors and their pre-crisis performance.⁴³³ Europe Economics also stated that the upper bound was supported by the average productivity growth of individual comparator sectors in other time periods including the post-crisis period.⁴³⁴

4.308 Europe Economics recommended that Ofwat select a number towards the upper end of their range for two reasons:⁴³⁵

- TFP growth estimates in value added terms were higher than in gross output terms. Although it believed gross output was the most appropriate

⁴³¹ The [EU KLEMS Growth and Productivity Accounts datasets](#) contain data on growth and productivity variables for most of EU28 countries and sectors over different time periods.

⁴³² Europe Economics (2019), [Real Price Effects and Frontier Shift – Final assessment and Response to Company representations](#), p75

⁴³³ Europe Economics Excluded 'Construction', 'Total manufacturing' and 'Transport and storage'.

⁴³⁴ NACE 1 (pre crisis): Chemicals 1.3% and Transport and Storage 1%. NACE 2 (Post crisis): Machinery and equipment N.E.C. 1%, Other manufacturing; repair and installation of machinery and equipment 1.3% and Professional, scientific, technical, administrative and support service activities 1.5%.

⁴³⁵ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final assessment and Response to Company representations](#), p88

measure of frontier shift some lesser weight should also be placed on TFP growth in value added terms.

- A true measure of frontier shift should take into account quality improvements ‘embodied’ in the inputs used by the sector – labour, capital and intermediate inputs. However, the TFP estimates using EU KLEMS data reflect primarily ‘disembodied’ technical change. Although research on the issue was limited, the evidence it had analysed suggested that TFP growth estimates in some cases would need to be uplifted by 60 per cent to account for technical change embodied in capital inputs.

KPMG Approach

4.309 KPMG stated that the shift to a totex and outcomes framework in PR14 removed a regulatory barrier which should allow efficiencies and innovations which were additional to the those seen in comparator sectors.⁴³⁶ This was supported by water company case studies which provided examples of them using the totex framework to realise greater efficiencies.

4.310 KPMG stated that it took a multi-step approach to identify the level of efficiency arising from the totex and outcomes framework and the potential for this to continue over AMP7.

4.311 KPMG first conducted an analysis of the water and energy companies’ current levels of outperformance on costs under totex and outcomes controls.⁴³⁷ It then derived efficiency gains by assuming that after adjusting for other factors the efficiency gains were attributable to the introduction of the totex and outcomes framework.

4.312 To assess the extent to which this impact would continue into AMP7, KPMG compared the levels of outperformance in the second totex and outcomes based price control in electricity distribution against outperformance in the first totex and outcomes price control in electricity distribution.⁴³⁸

4.313 KPMG also carried out two cross checks, one based on changes in performance following other significant regulatory changes and one based on a sample of case studies from the water sector.

⁴³⁶ KPMG (2018), [Innovation and efficiency gains from the totex and outcomes framework](#), p5

⁴³⁷ KPMG (2018), [Innovation and efficiency gains from the totex and outcomes framework](#), p9

⁴³⁸ KPMG (2018), [Innovation and efficiency gains from the totex and outcomes framework](#), p10

Ofwat Reasoning

4.314 Ofwat gave a range of reasons for choosing its overall 1.1% estimate but was not explicit as to the share of this estimate it attributed to each factor.⁴³⁹ Ofwat stated that:

- 1.1% was consistent with using a frontier shift efficiency number towards the upper end of the 0.6% to 1.2% per year range identified by Europe Economics. Europe Economics' advice was to place some weight on the higher valued added measures and to take account of input quality effects. Ofwat highlighted that for the post financial period examined by Europe Economics the value-added measure was 1.3% compared to 0.6% for the gross output measure. It also pointed towards the scope for higher estimates, by up to 60%, if input quality effects were considered.
- An efficiency figure of 1.1% per year was within the range of 0.6% to 2.5% per year indicated by KPMG for the combined effect of frontier shift efficiency and the impact of the totex and outcomes framework.
- Recent performance data released following KPMG's analysis suggested that the additional impact on efficiency from the totex and outcomes framework could be lower than it originally thought, and this was one of the reasons it lowered its draft determination frontier shift estimate from 1.5% to 1.1%.⁴⁴⁰
- A report by Frontier Economics showed the historical scope for efficiency gains in the water sector as well as the lack of recent productivity growth. The report found an average quality adjusted productivity gain of 2.1% per year in the water sector between 1994 and 2017 but only 0.1% per year from 2009 to 2017.⁴⁴¹ Ofwat stated that the recent lower productivity growth contrasted with the reasonable productivity growth in the comparator sectors.⁴⁴²
- Part of its reasoning for lowering its 1.5% draft determination estimate to 1.1% in its final determination was to allow companies additional funding to meet the leakage challenge.⁴⁴³

⁴³⁹ Ofwat (2019), [PR19 final determinations - Securing cost efficiency technical appendix](#), p177

⁴⁴⁰ KPMG (2018), [Innovation and efficiency gains from the totex and outcomes framework](#)

⁴⁴¹ Frontier Economics (2017), [Productivity improvement in the water and sewerage industry in England since privatisation](#), p24

⁴⁴² Ofwat (2019), [Final determination Overall level of stretch across costs outcomes and allowed return on capital](#) p16

⁴⁴³ Ofwat (2019), [PR19 final determinations - Securing cost efficiency technical appendix](#), p63

Methodological issues in assessing the frontier shift level

4.315 There were a range of issues we considered in coming to our frontier shift estimate. This section sets out for each issue the Parties' views before setting out our own provisional decision on each issue.

Choice of comparators and time periods

4.316 The Disputing Companies raised concerns regarding the choice of comparators and the choice of time period.

Parties' views on comparator choice

4.317 Anglian, Bristol and Yorkshire stated that Europe Economics was selective in its choice of comparators for the upper bound and that it focused on higher performing sectors, which introduced upwards bias.⁴⁴⁴

4.318 In response Europe Economics stated that using an average of the comparator sectors was not appropriate for setting the upper bound.⁴⁴⁵ It said this was because the historical performance of some of the comparator sectors demonstrated higher performance was possible and that an average of the comparator sectors was a central value, not an upper bound.

Parties' views on time period choice

4.319 Anglian, Bristol and Yorkshire said that the time periods used by Europe Economics were inappropriate given the pro-cyclical nature of productivity growth. They highlighted that excluding the recessionary years of 2008 and 2009 led to Europe Economics' pre crises estimate (1999-2007) and post crisis estimate (2010-2014) being overinflated.⁴⁴⁶

4.320 Yorkshire stated that in selecting an estimate towards the upper end of the range Ofwat did not put enough weight on more recent, low productivity growth and disregarded the UK's industrial performance over the last 13 years.⁴⁴⁷ It said this was because the upper bound estimate was based on the pre-crisis data.

⁴⁴⁴ [Anglian SoC](#), p189; [Yorkshire SoC](#), p66; [Bristol SoC](#), p111

⁴⁴⁵ Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p136. See also: Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), p9 – 'composite nature of work can be arbitrary'.

⁴⁴⁶ [Anglian SoC](#), p189; [Bristol SoC](#), p111; [Yorkshire SoC](#), p66

⁴⁴⁷ [Yorkshire SoC](#), p66

- 4.321 Ofwat stated that Europe Economics' forecast of frontier shift was based on an appropriate time period as they considered both growth over more recent years and a number of full business cycles.⁴⁴⁸ It said that while data for a full business cycle would be ideal, this data was not available in the NACE 2 dataset. Ofwat said the inclusion of the crisis years would have made the figures downward biased, since the figures would include a full economic contraction but only an incomplete part of the period of economic expansion.⁴⁴⁹
- 4.322 Europe Economics also disagreed that insufficient weight had been placed on the post crisis period. The upper bound was also consistent with evidence from comparator sectors when value-added measures and input quality improvements were taken into account.⁴⁵⁰

Our provisional view on time period and comparator choice

- 4.323 We found that the comparators examined in Europe Economics' analysis (shown in Table 4-13) were appropriate as, having reviewed each comparator, they appeared collectively to be a reasonable approximation for the activities of the water sector.⁴⁵¹ We therefore examined the productivity growth of the same comparator set. Rather than assessing upper and lower bounds we calculated an average estimate using all the comparators as a starting point and then adjusted this based on other factors. We noted that across the comparator sectors there was a range of productivity growth figures with some sectors having relatively higher growth than others. We assessed that there was not strong evidence to weight any comparator more than the others. We therefore focused on the average performance across the relevant comparators as we found this was more likely to reflect the activities of the water sector.
- 4.324 Productivity growth should be assessed over full business cycles because growth is typically procyclical. Therefore, we used the most recent full business cycle for which data was available: 1990 to 2007.⁴⁵²
- 4.325 Table 4-13 shows the average NACE 1 annual productivity growth estimate for each comparator sector for the most recent full business cycle for which EU KLEMS data is available. It also shows NACE 1 estimates based on a

⁴⁴⁸ [Ofwat's response to Yorkshire's SoC](#), p46

⁴⁴⁹ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p85. See also: Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), pp137–139

⁴⁵⁰ Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), p11

⁴⁵¹ Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), pp68–70

⁴⁵² Based on business cycles calculated by Europe Economics using GDP trough-to-trough analysis.

longer time period, as there are some arguments that looking at the longest available period is appropriate, and NACE 2 estimates, which are based on some additional comparator sectors, but straddle two business cycles. The three estimates are within a range of 0.6% to 0.7%.

Table 4-13: Average annual total factor productivity growth of gross output for comparator sectors

			%
<i>Sector/time period</i>	<i>1990-2007 (Most recent NACE 1 business cycle)</i>	<i>1971-2007 (full NACE 1 period)</i>	<i>1999-2014 (full NACE 2 period)</i>
Construction	0.26	0.26	-0.08
Total Manufacturing	0.64	0.64	0.59
Transport and Storage	0.73	1.05	0.02
Chemicals and Chemical Products	1.21	1.26	0.78
Machinery and equipment n.e.c.	0.81	0.48	0.90
Professional, Scientific, Technical, Administrative and support service activities			0.86
Other manufacturing; repair and installation of machinery and equipment			0.96
Average	0.73	0.74	0.58

Source: Frontier shift data pack and CMA analysis.

4.326 As shown in the table above looking at the average productivity growth for the five comparators in 1990-2007 provided an estimate of 0.7%. We have used this as a starting point for our frontier shift estimate. This is towards the lower end of the range recommended by Europe Economics but without accounting for other factors.

4.327 There has been lower UK-wide productivity growth since 2007.⁴⁵³ Therefore, because our estimate was based on the productivity growth of comparators prior to the financial crises we considered adjusting down our estimate.

4.328 Overall, we provisionally decide not to apply a specific quantitative downwards adjustment but consider the lower post crisis productivity growth as a factor in the round when coming to our final frontier shift estimate. The weight we placed on this downwards adjustment was limited for two reasons.

- There were reasons to believe that water companies were likely to be less impacted than other sectors.⁴⁵⁴ For example, the water sector would be less impacted by lower capital investment given the certainty provided by the regulatory regime and the innovation fund encouraging investments in

⁴⁵³ OBR (2020), [EFO March 2020](#), p206 – as demonstrated by chart B.1.

⁴⁵⁴ Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), pp5–6

new technologies. This was demonstrated by the water companies' own frontier shift estimates, ranging from 0.75% to 1.5% (see Table 4-14), being higher than that suggested by the post crisis TFP growth figures.

- Some forecasts have indicated that UK wide productivity growth may begin to rise over the next five years, although there was significant uncertainty given the current COVID-19 pandemic (see paragraphs 3.39 to 3.56).⁴⁵⁵

Value added measure

4.329 There are two different approaches which can be used when measuring output as part of calculating productivity growth. These are both recorded in the EU KLEMs dataset:

- The first measurement is based on gross output. Gross output includes intermediate inputs such as materials, energy and services used up in the process of production.
- The second approach is a value-added approach. Value added output only includes capital and labour as inputs and not the effect of intermediate inputs.

4.330 The value added measure is systematically higher in magnitude than the gross output measure.

Parties' views on value added measure adjustment

4.331 Bristol said that Ofwat's decision to place weight on value added TFP was not appropriate and was not supported by Ofwat's own advisers.⁴⁵⁶ It said that the gross output measure was a more appropriate measure for estimating frontier shift as the cost base Ofwat applied frontier shift to included intermediate inputs, whereas the value-added measure only includes capital and labour inputs.

4.332 Ofwat said that its estimate was consistent with Europe Economics' advice to take account of both gross output and value added measures.⁴⁵⁷ Many of the water companies' consultants originally used value added measures to forecast productivity and other regulators such as Ofgem had used them in the past. Ofwat stated that Europe Economics' frontier shift estimate of 0.6%

⁴⁵⁵ Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), p3
⁴⁵⁶ Bristol SoC, p111

⁴⁵⁷ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p86

to 1.2% per year was based on gross output total factor productivity growth and that Europe Economics advised Ofwat to use a value towards the upper end of this range to take account of the higher value added measures.

Our provisional view on value added measure adjustment

4.333 We agreed with Ofwat that some weight should be placed on the value-added metric for two reasons:

- First, there was some theoretical basis for doing so. The OECD's manual on measuring productivity suggests that there is some empirical support for both approaches as a measure of technical change.⁴⁵⁸
- Second, the gross output estimates may be more prone to error.⁴⁵⁹ This is because producing consistent sets of gross output measures across sectors requires careful treatment of intra-sector flows of intermediate products which may be difficult empirically.⁴⁶⁰

4.334 Our assessment was therefore that we should focus on the gross output measure but place some weight on the higher value added measures.⁴⁶¹ We considered this as a qualitative factor together with other adjustments.

Embodied technical change

Parties' views on adjustment for embodied technical change

4.335 One of the reasons Ofwat gave for choosing a number towards the top end of the Europe Economics range was to account for the impact of embodied technical change (changes in the quality of inputs) on productivity growth, for example having access to more advanced machinery.⁴⁶² Europe Economics set out that the input growth measures it used in its comparator analysis already adjusted for changes in input quality over time, and so reflected 'disembodied' technical change (technical change that was not embodied in labour or capital inputs) for example better management processes.⁴⁶³

⁴⁵⁸ OECD (2001), [Measuring productivity manual](#), p28

⁴⁵⁹ See also: [Competition Commission \(2014\), NIE RP5 final determination](#), appendix 11.1, pp3 –10A

⁴⁶⁰ CEPA (2020), Draft Determinations Frontier shift annex, p12

⁴⁶¹ NACE 2 value added estimate for 1990–2007 is 1.5% Europe Economics (2019), [Real Price Effects and Frontier Shift - Final Assessment and Response to Company Representations](#), p78

⁴⁶² Ofwat (2019), [Securing cost efficiency technical appendix](#), p176

⁴⁶³ Europe Economics (2019), [Real Price Effects and Frontier Shift - Final Assessment and Response to Company Representations](#), p66

- 4.336 Yorkshire Water stated that Ofwat was wrong to suggest Ofwat's frontier shift estimate could be higher because embodied technical change was not accounted for. It suggested that the academic evidence had been misinterpreted and Ofwat could also have included catch-up efficiency in its frontier shift estimate.⁴⁶⁴
- 4.337 Ofwat said that embodied technical change was not the same thing as movements towards the efficiency frontier (catch-up).⁴⁶⁵
- 4.338 Oxera acting for Yorkshire stated that the papers quoted by Europe Economics (Uri and Hulten),⁴⁶⁶ contrary to what Europe Economics stated, suggested there was no change in TFP output measures when embodied technical change was accounted for. Oxera stated that the TFP estimates in Uri's study were similar regardless of the assumed level of embodied technical change. Oxera also stated the analysis by Europe Economics which suggested there could be a 60% uplift to the frontier shift estimate suggested that the TFP estimates published by national statistical agencies were severely understated, which was not credible.
- 4.339 Europe Economics replied that Oxera had misinterpreted the academic papers.⁴⁶⁷ The TFP ranges that Oxera quoted from Uri's paper all excluded embodied technical change, and hence all Oxera's argument showed was that Uri's estimates were similar regardless of the amount of embodied technical change. Europe Economics stated that since embodied technical change is separate from disembodied technical change, Oxera's argument was not relevant to the question of whether an uplift should be applied to take account of embodied technical change.
- 4.340 Europe Economics stated that applying an uplift for embodied technical change did not imply that national statistical agencies had underestimated TFP growth.⁴⁶⁸ The estimates from the national statistical agencies were not seeking to measure productivity growth including embodied technical change.

⁴⁶⁴ [Yorkshire's reply to Ofwat's response to Yorkshire's SoC](#)

⁴⁶⁵ Europe Economics (2020), [Response to Oxera's arguments on Embodied Technical change](#)

⁴⁶⁶ Uri, Noel D. (1983), 'Embodied and disembodied technical change and the constant elasticity of substitution production function', *Journal of Applied Mathematical Modelling*, page 403 and Hulten, Charles R. (1992), 'Growth Accounting When Technical Change is Embodied in Capital', *The American Economic Review*, pp 964–980.

⁴⁶⁷ Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), p12

⁴⁶⁸ Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), p14

4.341 Europe Economics also stated that another economic consultancy (NERA), advising Bristol, said that TFP data understated frontier shift because it did not take account of embodied technological change.⁴⁶⁹

Our provisional view on adjustment for embodied technical change

4.342 We agreed with Europe Economics that the EU KLEMS TFP data used in the comparator analysis did not seek to measure changes in productivity growth resulting from changes in embodied technical change. This is because the EU KLEMS productivity measure we relied on sought to measure disembodied technological change with embodied technical change already accounted for by input price changes.⁴⁷⁰

4.343 We therefore provisionally decide that there is a valid conceptual basis for increasing our 0.7% estimate. We considered this as a qualitative factor together with other adjustments in the round due to the limited evidence available quantifying the impact of embodied technical change.

Totex and outcomes framework

Parties' views on totex and outcomes framework adjustment

4.344 Anglian, Bristol and Yorkshire all raised concerns with the frontier shift being uplifted for additional productivity gains attributed to the implementation of the totex and outcomes framework.⁴⁷¹ Anglian stated that it did not agree with Ofwat's assumption (based on the analysis by KPMG) that water companies could achieve a 'special' productivity increase from the totex and outcomes framework. It said that this was based on flimsy evidence from the energy sector, selective use of comparator sector data and was incongruous with productivity evidence in the rest of the economy.⁴⁷²

4.345 Bristol said that the assumption that outperformance against allowances set in PR14 could be attributed to productivity gains was baseless and that outperformance could have arisen for other reasons.⁴⁷³

4.346 Yorkshire stated that the KPMG evidence was flawed and their advisers Oxera stated that it was incorrect to arbitrarily attribute all outperformance to

⁴⁶⁹ Europe Economics (2019), [Real Price Effects and Frontier Shift - Final Assessment and Response to Company Representations](#), p121

⁴⁷⁰ O'Mahoney, Mary, and Timmer, Marcel P. (2009), [Output, Input and Productivity Measures at the Industry Level : The EU KLEMS Database](#), *The Economic Journal*, pp394–395

⁴⁷¹ [Anglian SoC](#), p189; [Bristol SoC](#), p110; [Yorkshire SoC](#) p66

⁴⁷² [Anglian SoC](#), p189

⁴⁷³ [Bristol SoC](#), p110

the implementation of the totex and outcomes framework when other factors could have driven this.

- 4.347 Ofwat stated that it did provide sufficient evidence to justify an uplift due to the totex and outcomes framework, including case studies put forward by the companies themselves.⁴⁷⁴ Ofwat stated that the uplift it applied was small in comparison with the upper quartile company outperformance of 2.4% per year. It said that the alternative suggestion, that no account should be taken of the totex and outcomes regime going forward, would not reflect the balance of evidence.

Our provisional view on totex and outcomes framework adjustment

- 4.348 We found that the case studies presented in KPMG's analysis demonstrated the potential for efficiency improvements resulting from implementation of the totex and outcomes framework.⁴⁷⁵ However, given the comparators used to inform our frontier shift estimate are sectors which already have flexibility in their approach to costs, we considered that there would only be productivity gains above the comparator estimate for a temporary period while the water sector catches up.
- 4.349 We did not think that the evidence on the extent to which these efficiency gains would continue into AMP7 was strong. We judged the potential additional productivity in AMP7 was unlikely to be as high as the KPMG range indicated and could be zero. There were a number of reasons which could lead to water companies outperforming their cost allowances and we did not think it appropriate to allocate all of this to the impact of the implementation of the totex and outcomes framework. We therefore provisionally decide that only limited weight should be placed on potential additional productivity gains deriving from the implementation of the totex and outcomes framework.

Historical water sector productivity

Parties' views on historical water sector productivity growth

- 4.350 Anglian said that the report by Frontier Economics for Water UK showed that since 2009, productivity growth had dwindled to 0.1% per year.⁴⁷⁶ It suggested this could be a reason for a lower frontier shift estimate.

⁴⁷⁴ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p95–87

⁴⁷⁵ KPMG (2018), [Innovation and efficiency gains from the totex and outcomes framework](#), p39

⁴⁷⁶ [Anglian SoC](#), p186

- 4.351 Thames Water said that it was a stretch to assume that the productivity improvements in the comparator sectors could be applied directly to the water sector and that the same incentives for technology improvements applied across both these sectors and the water sector.⁴⁷⁷ The water sector was subject to strong cost efficiency incentives and so it appeared odd not to include the impact over time of cost changes in the water sector. Frontier shift should be estimated using econometrics techniques, for example through the use of a time trend in the base cost models.
- 4.352 Dŵr Cymru stated that Ofwat's view that the water sector could achieve relatively high productivity from 2018/19 through to 2024/25 because certain other sectors of the economy were able to achieve relatively high productivity growth in the period up to 2014 was an assertion and was not evidence based.⁴⁷⁸ Dŵr Cymru stated that this was despite Ofwat's observation that productivity growth in the water sector had shown little or no improvement over the last ten years.
- 4.353 Ofwat stated that the historical productivity growth in the water sector was lower than relevant comparator sectors and this was one of the reasons it wanted a step change.⁴⁷⁹

Our provisional view on historical water sector productivity growth

- 4.354 We provisionally decide not to place weight on historical estimates of productivity growth in the water industry for three reasons:
- First, it is likely that the high productivity growth in the early years is at least partially explained by efficiency catch-up.
 - Second, the Frontier Economics report notes that quality improvements have not been fully accounted for and so the more recent data should be viewed more cautiously.⁴⁸⁰
 - Third, it is unclear whether historical evidence of low productivity in the water sector justifies more or less challenging targets.

⁴⁷⁷ [Thames Water submission](#), p7

⁴⁷⁸ Dŵr Cymru (Welsh Water) [submission](#), p2

⁴⁷⁹ [Ofwat's response to cross-cutting issues in companies' statements of case: Introduction and overall stretch on costs and outcomes](#), p15

⁴⁸⁰ Frontier Economics (2017), [Productivity improvement in the water and sewerage industry in England since privatisation](#), p2

Parties' views on COVID-19

- 4.355 The COVID-19 pandemic did not start until after Ofwat's determination and the Disputing Companies suggested we should consider reducing our frontier shift estimates to account for the impact of COVID-19.
- 4.356 Yorkshire stated that while the water sector might be less exposed to COVID-19 compared to other sectors, it was unclear why Europe Economics and Ofwat had not at least reconsidered their recommendation to focus on the upper end of their range of frontier shift estimates.⁴⁸¹
- 4.357 Anglian stated that its business plan assumption of 1% productivity growth per year looked excessive given the COVID-19 pandemic. To safeguard the health of employees and customers it had applied restrictions which had reduced operational efficiency. Even in the most optimistic scenario it was essential to assume a reduced level of productivity improvement in year one, while more pessimistic scenarios assumed that UK output would not return to 2019 levels until the end of 2024.
- 4.358 Northumbrian stated that the latest productivity data supported the view that productivity had been negatively impacted by COVID-19. GDP had dropped 19.1% in the three months to May 2020 and a deep recession was anticipated in the first two years of the price control. Given the anticipated deep recession and the emerging impacts on productivity, it no longer seemed prudent to employ more aggressive frontier shift estimates.
- 4.359 Ofwat stated that it was appropriate to have reasonable certainty around the impact of COVID-19 before adjusting the redetermination process. Adjustments could be made if it was appropriate.⁴⁸² Europe Economics analysis, commissioned by Ofwat, had found that while the crisis might reduce economy wide TFP growth, it expected potential productivity growth in the water sector to be less affected.⁴⁸³
- 4.360 Ofwat said that the latest Office for Budget Responsibility's (OBR) productivity and wage forecasts, which took account of COVID-19, showed an initial increase in productivity as the lowest productivity workers were furloughed or lost their jobs, followed by a reduction in productivity as the effect was

⁴⁸¹ Yorkshire reply to Ofwat's response to Yorkshire's SoC, p90

⁴⁸² Ofwat's response to cross-cutting issues in companies' statements of case: Introduction and overall stretch on costs and outcomes, p5

⁴⁸³ Europe Economics (2020) [Impact of COVID-19 Crisis on Real Price Effects \(RPEs\) and Frontier Shift](#), p47. See also: Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), pp3–11

reversed when the furlough scheme ended. Given the limited furloughing of workers in the water sector it did not consider these adjustments relevant. In the upside OBR scenario, there was no overall impact on productivity but in the OBR's central and downside scenarios there was a decline in productivity growth due to economic scarring. Ofwat said that it did not consider that that economic scarring was relevant to the water sector. For example, around a quarter of economic scarring was driven by reduced capital per worker, which was not relevant to the water sector.

Our Provisional view on COVID-19

4.361 We discuss the potential impact of COVID-19 in paragraphs 3.39 to 3.56.

4.362 Given the timing of our redetermination there was limited information on the potential impact of COVID-19 on water sector productivity growth. Europe Economics' analysis of five-year periods starting in recessions showed that average productivity growth was 0.6%, although this ranged from 0%-1.1%.⁴⁸⁴ Based on the information available we found that the evidence did not justify adjusting down the productivity growth estimate for the water sector.

4.363 We provisionally decide that COVID-19's impact on productivity is better addressed by Ofwat examining individual cost and outcome impacts and these should be considered together with other impacts of COVID-19.

Comparator catch-up

Parties' views on comparator catch-up

4.364 Northumbrian stated that the TFP estimates for other sectors used by Europe Economics included both catch-up and frontier shift improvements in those sectors. Northumbrian stated that while the frontier shift challenge of 1.1% on its own represented a challenge that was potentially achievable, the totality of the catch-up and frontier shift challenge was unachievable.⁴⁸⁵

4.365 Ofwat stated that the comparator analysis was only based on competitive sectors.⁴⁸⁶ This limited the effect of catch-up because inefficient firms in the long run will not survive, meaning that surviving firms will only have small catch-up effects.

⁴⁸⁴ Europe Economics (2020), [Impact of COVID-19 Crisis on Real Price Effects \(RPEs\) and Frontier Shift](#), p37

⁴⁸⁵ [Northumbrian SoC](#), p71

⁴⁸⁶ [Ofwat's response to Northumbrian's SoC](#), p37

Our provisional view on comparator catch-up

- 4.366 We considered whether there should be any adjustment to the comparator estimate to account for potential catch-up efficiencies. We provisionally decide that there should not be any adjustment because by using competitive sectors as comparators over a reasonably long time period, the TFP measures related to frontier shift and not catch-up efficiency.

Outcomes and frontier shift

Parties' views on outcomes and frontier shift

- 4.367 Yorkshire stated that if a regulator allocated all the frontier shift to its cost challenge it could not also expect companies to achieve improved outcome performance.⁴⁸⁷
- 4.368 Ofwat stated that it had accounted for the fact that some companies currently achieved good performance on both outcomes and cost efficiency and that most companies achieved their PR14 upper quartile common performance commitments as well as outperforming on their upper quartile based cost allowances.⁴⁸⁸ Improvements in service quality and outcome performance were not fully captured in frontier shift efficiency estimates, and it expected some improvement in quality over time without cost increases.

Our provisional view on outcomes and frontier shift

- 4.369 In our redetermination we sought to ensure that outcomes are appropriately funded in cost allowances. We therefore provisionally decide to not reduce our frontier shift estimate to allow for productivity gains to be spent on improving outcomes.

Overall level of frontier shift

Parties' views on overall level of frontier shift

- 4.370 Anglian said the water companies could not achieve productivity improvements of 1.1% during the 2020-2025 period. Its own 1% per year

⁴⁸⁷ Yorkshire SoC, p50

⁴⁸⁸ Ofwat's response to cross-cutting issues in companies' statements of case: Introduction and overall stretch on costs and outcomes, p13

figure was already exceptionally challenging in light of the low productivity growth observed in the wider economy.⁴⁸⁹

- 4.371 Bristol stated that 1% was at the top end of what was achievable and most of the evidence pointed to a lower frontier shift figure. It highlighted historical evidence from the Bank of England, OBR and Office for National Statistics which showed productivity growth between 0.3% and 0.9%.⁴⁹⁰
- 4.372 Yorkshire said that 1.1% was towards the top end of a range which was already biased upwards.⁴⁹¹
- 4.373 Northumbrian stated that whilst the 1.1% frontier shift on its own was achievable the combined challenge including catchup was excessive.⁴⁹²
- 4.374 Ofwat stated that its frontier shift estimate was consistent with recent and longer term growth in comparator sectors, was consistent with previous regulatory decisions and took account of detailed evidence of the impact of the totex and outcomes framework.⁴⁹³
- 4.375 Ofwat stated that its 1.1% estimate was slightly lower than that put forward by Northumbrian and slightly higher than that applied by the other three Disputing Companies.⁴⁹⁴ Ofwat provided data on the four Disputing Companies' frontier shift assumptions.

Table 4-14: Company assumptions regarding frontier shift on totex

<i>Company</i>	<i>Frontier shift (per year)</i>	<i>%</i>
Anglian		1
Bristol		1
Northumbrian		1 to 1.5
Yorkshire		0.75 to 0.8

Source: Ofwat table 7.1 response to common issues

- 4.376 Ofwat stated that the key reasons for the differences between the company frontier shift assumptions and its own estimate were the weight placed on value added measures, embodied technical change and the uplift to account for the impact of the totex and outcomes regime.⁴⁹⁵

⁴⁸⁹ [Anglian SoC](#), p189

⁴⁹⁰ [Bristol SoC](#), pp105–106

⁴⁹¹ [Yorkshire SoC](#), p66

⁴⁹² [Northumbrian SoC](#), p71

⁴⁹³ [Ofwat's response to Bristol's SoC](#), p41

⁴⁹⁴ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p81

⁴⁹⁵ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p82

Our provisional decision on overall level of frontier shift

4.377 We provisionally decide to apply a frontier shift of 1% per year. We arrived at this figure by considering a number of factors in the round, including:

- Companies in competitive sectors with similar activities to the water companies have achieved average TFP growth of 0.7% per year, based on the gross output measure.
- Productivity gains driven by embodied technical change are not fully captured in the 0.7% figure and, as set out in paragraph 4.424 we also assume real price increases for input costs of around 0.5% per year, which is consistent with quality increases for inputs.⁴⁹⁶
- The value added measure of productivity growth is substantially higher than the gross output measure of 0.7% estimate and there are reasons to place some weight on this.
- The water sector will be affected by some of the factors which have led more recent UK-wide productivity growth to be lower than before the financial crisis.
- Table 4-14 shows the majority of the Disputing Companies' own frontier shift assumptions were in line with or higher than this estimate.⁴⁹⁷

The application of frontier shift to different costs

4.378 Ofwat's application of frontier shift to cost areas other than modelled base costs was raised as a concern by the Disputing Companies. We considered whether frontier shift should be applied to unmodelled costs and enhancement costs as well as the link between frontier shift and RPEs

Unmodelled base costs

4.379 Ofwat stated that frontier shift should be applied to unmodelled costs because the frontier shift figure was based on comparator sectors which also faced costs such as business rates.⁴⁹⁸

4.380 Broadly, two concerns were raised by the Disputing Companies:

⁴⁹⁶ Ofwat (2020), [PR19 final determinations – securing cost efficiency technical appendix](#), p212

⁴⁹⁷ As shown in Table Anglian and Bristol applied a 1% frontier shift assumption and Northumbrian 1% or 1.5%.

⁴⁹⁸ Ofwat (2020), [PR19 final determinations – securing cost efficiency technical appendix](#), p189

- First, Anglian and Yorkshire stated that there was double counting of the productivity assumption as an efficiency challenge had already applied to the costs before the frontier shift was applied.⁴⁹⁹
- Second, Bristol and Northumbrian stated that it was fundamentally incorrect to apply frontier shift to unmodelled costs because these were outside management control.⁵⁰⁰

4.381 Yorkshire said that in principle the application of frontier shift to unmodelled costs made sense but that Ofwat's decision rested on the assumption that uncontrollable costs formed a similar proportion of expenditure in wholesale activities as they did in comparator sectors.⁵⁰¹

Enhancement costs

4.382 Ofwat stated that it applied frontier shift to some enhancement spend, including the wastewater WINEP and metering costs. Ofwat said that the potential gains from productivity improvements were likely to be more substantial for these large, relatively homogenous programmes of work. Ofwat stated that it had reviewed company forecasts of frontier shift on enhancement costs. It had found, in general, that the frontier shift assumptions applied to enhancement expenditure in the water companies' business plans tended to be limited and were often offset by real price increases.⁵⁰²

4.383 Anglian stated that it disagreed with the application of frontier shift adjustments to cost allowances which already included such adjustments. It said that applying a further adjustment constituted a clear double count.⁵⁰³

4.384 Northumbrian stated that it already included a 1% per year adjustment to enhancement cases and therefore Ofwat's approach was double counting this challenge. In addition, where the adjustments were set relative to upper quartile companies' forecasts, consideration should be given to the level of adjustments made by the upper quartile firms.⁵⁰⁴

⁴⁹⁹ [Anglian SoC](#), p96, and Yorkshire (2020), [Response to Ofwat Reply](#), pp86–87

⁵⁰⁰ [Northumbrian SoC](#), p108 and [Bristol SoC](#), p6

⁵⁰¹ [Yorkshire SoC](#), p67

⁵⁰² Ofwat (2019), [Securing cost efficiency technical appendix](#), p189

⁵⁰³ [Anglian SoC](#), p163

⁵⁰⁴ [Northumbrian SoC](#), p94

4.385 Yorkshire stated that Ofwat's use of a forward-looking benchmark for the WINEP enhancement programme would double-count the impact of frontier shift on the companies' cost allowances.⁵⁰⁵

Our provisional decision on the application of frontier shift

4.386 Our provisional decision is that it is most appropriate to apply the frontier shift to the whole of the wholesale cost base including unmodelled and enhancement costs. This is because our frontier shift estimate is based on the total cost base of comparator sectors which will include capital expenditure and some cost items outside of management control.

4.387 However, we only apply frontier shift 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. The extent of any possible double counting is discussed in the enhancement efficiencies section in paragraphs 5.506 to 5.520.

True-up and link to real price effects (RPEs)

Parties views on true-up and link to RPES

4.388 Anglian said there should not be a true-up for labour costs as there was no true-up for frontier shift (productivity gains).⁵⁰⁶ It said that a true-up for RPEs would undermine the theoretical link between labour RPEs and frontier shift unless the frontier shift also had a true-up.⁵⁰⁷

4.389 Ofwat stated that Europe Economics had found no theoretical reason why high productivity growth in the water sector necessarily had to be associated with high input price growth for water companies.⁵⁰⁸ It said that a true-up for productivity growth was not required because the price review offered other mechanisms to manage the risks around productivity growth and efficiency, including the substantial effects clause, interim determinations and cost sharing.⁵⁰⁹ The frontier shift estimate was an efficiency challenge, based on historical evidence of efficiency improvements, and should not depend on productivity in the economy as a whole.

⁵⁰⁵ [Yorkshire SoC](#), p67

⁵⁰⁶ See paragraph 4.397 for an explanation of true-up mechanisms.

⁵⁰⁷ [Anglian Reply to Ofwat's Response to Anglian Statement of Case](#), Part G, p61

⁵⁰⁸ Ofwat (2019), PR19 Final Determination [Securing cost efficiency: Technical Appendix](#), p185

⁵⁰⁹ Ofwat (2019), PR19 Final Determination [Securing cost efficiency: Technical Appendix](#), p186

Our assessment of true-up and link between RPEs and frontier shift

- 4.390 Our considerations as to whether to apply RPEs for any cost items are considered in more detail in the RPE section (see paragraphs 4.394 to 4.453).
- 4.391 We have considered whether having a true-up for labour (as discussed in paragraph 4.425) necessitates having a true-up for productivity gains and whether a frontier shift true-up is feasible. We did not think that future changes in labour costs in the wider economy would necessarily be a driver of productivity growth changes for water companies. We considered it was plausible for labour costs in the water sector to fall, driven by wider economic factors, but for productivity improvements in the water sector to continue to be driven by sector specific investments. We do not therefore have concerns about not applying a true-up to frontier shift whilst applying one to RPEs and consider that doing so would not be practical.

Summary of our provisional decision on frontier shift

- 4.392 Having considered the evidence, we provisionally decide to apply a frontier shift of 1% per year. This is slightly lower than the frontier shift estimate Ofwat applied and leads to higher cost allowances for the Disputing Companies. The resulting changes to modelled base cost allowances for the four companies are summarised in Table 4-15 below.

Table 4-15: Difference in frontier shift impact on PR19 modelled base cost allowances CMA approach compared to Ofwat determination (water and wastewater)

	£m
<i>Impact of frontier shift changing from 1.1% to 1%</i>	
Anglian	13
Bristol	1
Northumbrian	8
Yorkshire	12

Source: CMA analysis.

- 4.393 We provisionally decide to apply this to the whole of the wholesale cost base, including unmodelled costs and enhancement costs where it has not already been applied. The impact of the application of our frontier shift to other cost areas is discussed in the relevant sections (see paragraph 5.521, 12.17, 13.18, 14.16 and 15.17).

Real price effects

- 4.394 In this section we discuss our consideration of real price effects (RPEs). The RPEs adjust companies' allowed revenues to account for expected changes

in the price of inputs above or below the level of CPIH,⁵¹⁰ the indexation which is applied to all allowed revenues. RPEs may be applied to cost items such as labour, energy, and chemicals. There may then also be a true-up mechanism to reconcile expected changes allowed for in RPEs with out-turn changes in input prices. The section is structured as follows.

- We first summarise the assessment of potential RPEs Ofwat carried out in PR19.
- We discuss the Disputing Companies' criticisms of Ofwat's assessment and provide our own analysis.
- We summarise our approach to RPEs.

Ofwat's PR19 approach to RPEs

4.395 Ofwat commissioned Europe Economics to identify whether there was a need to introduce RPEs to account for expected changes in the price of inputs. As part of this work Europe Economics considered the water companies' evidence in their responses to its assessment.

4.396 Ofwat, based on Europe Economics' analysis, made an RPE adjustment to account for the changes in labour costs above the CPIH but did not make an adjustment for any other costs. The labour RPE adjustment calculates the proportion of the cost base arising from labour across the industry (39%) and adds an uplift to companies' cost allowances based on this proportion and the expected average yearly wedge (1.2%) between the Office of Budget Responsibility (OBR) forecasts of labour costs and CPIH.⁵¹¹ Ofwat applied RPEs to all wholesale base costs (modelled and unmodelled), to metering and WINEP enhancement costs, but not to retail and other enhancement costs – consistent with its approach to the application of frontier shift.⁵¹²

4.397 Ofwat also introduced an end-of-period true-up mechanism for labour RPEs to capture any differences between the actual labour costs and the forecast that was made during the price determination.⁵¹³ This mechanism will increase or decrease companies' revenue during the next price control period to offset any differences during this price control period.

⁵¹⁰ Consumer Prices Index including owner occupiers' housing costs.

⁵¹¹ Ofwat (2019), PR19 Final Determination [Securing cost efficiency: Technical Appendix](#), p212, Table A3.10

⁵¹² Ofwat (2019), PR19 Final Determination [Securing cost efficiency: Technical Appendix](#), p122

⁵¹³ Ofwat (2019), PR19 Final Determination [Securing cost efficiency: Technical Appendix](#), p121

Issues raised

4.398 Our analysis focused on answering two questions.

- What are the correct criteria to determine whether an RPE should be implemented?
- For which cost items should we implement RPEs?

What are the correct criteria to determine whether an RPE should be implemented?

4.399 In order to assess the eligibility for RPEs in PR19, Europe Economics used the criteria below.⁵¹⁴ For Criterion 1 to be passed, only one of the 1A or 1B sub-criteria needed to be passed.⁵¹⁵

- Criterion 1A – Is the expected value of the wedge between the input price and CPIH significantly different from zero? Europe Economics assessed the statistical significance of the wedge based on historical values, as well as considering forecast data where it was available.
- Criterion 1B – Does the wedge exhibit high volatility over time? This criterion may also justify RPEs, particularly true-ups to address cost volatility. To determine whether volatility was high, Europe Economics considered the effect of the volatility relative to overall totex. Europe Economics used a threshold of 1% of totex.
- Criterion 2 – Are there sufficient and convincing reasons to think that CPIH does not adequately capture the input price? To determine this Europe Economics compared the share of the input cost in the companies' totex to the share of the input in the CPIH basket.
- Criterion 3 – Is the input price and exposure to that input price outside management control for the duration of the price control? For example, can management reduce the volume of the input or reduce exposure by signing long-term contracts?

4.400 Anglian and Northumbrian disagreed with this assessment framework.^{516, 517}

⁵¹⁴ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), p11

⁵¹⁵ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), p22

⁵¹⁶ [Anglian SoC](#), Chapter E.4: Frontier shift p206 paragraph 845

⁵¹⁷ [Northumbrian SoC](#), Section 5.5, p74, paragraph 347

- 4.401 Anglian and Northumbrian referred to John Earwaker's report which questioned the need for the criteria and favoured the line by line approach used in other price controls where all input prices were automatically considered for an RPE adjustment.⁵¹⁸ Earwaker said that CPIH indexation was not a reasonable proxy for non-labour water industry input price inflation and that Europe Economics' new approach was complicated.
- 4.402 Earwaker questioned Criterion 2. He said that it was not clear how comparable shares would ensure that companies were accurately compensated for their efficiently incurred costs without an RPE adjustment. He said it was unlikely that input price inflation across the remainder of companies' costs exactly matched inflation in the rest of the CPIH basket.
- 4.403 Ofwat said that the logic of Criterion 2 was that if the share of a cost item in companies' totex was comparable to the share of that cost item in CPIH, then CPIH indexation should already capture those cost changes and therefore no RPE adjustment was required.⁵¹⁹ Europe Economics said that it was true that input price inflation across the remainder of companies' costs might not exactly match inflation in the rest of the CPIH basket, however any difference between the two might be in either direction.⁵²⁰
- 4.404 Earwaker said that it was not satisfactory to justify an erroneous methodology by assuming that the error was no more likely to be in one direction than another.
- 4.405 Earwaker said that it was not appropriate to consider management control (Criterion 3) because it was impossible to envisage how input price increases or reductions could not impact water companies' costs over the price control period.
- 4.406 Ofwat said that management control could mitigate the impact of the changes in real input prices by several ways. Management could reduce:⁵²¹
- input prices by leveraging buyer power, and volatility through long-term contracts with fixed prices; and

⁵¹⁸ [Anglian's reply to Ofwat's response to Anglian's SoC](#), Part G, p59, paragraph 213; [Northumbrian SoC](#), Section 5.5, p74, paragraph 348

⁵¹⁹ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p112, paragraph 8.17

⁵²⁰ Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), p17.

⁵²¹ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), pp113–114, paragraph 8.23

- the volume of inputs through greater efficiency and substituting alternatives.

4.407 In its work Europe Economics also considered, but rejected, using the materiality of cost items as an additional criterion in the assessment of RPEs.⁵²² This additional criterion would have led to Europe Economics not using RPEs for cost items that accounted for less than 10% of companies' totex. Europe Economics decided to remove this additional criterion in response to the companies' concerns:⁵²³

- John Earwaker, Economic Insight on behalf of Yorkshire, and NERA on behalf of Bristol, said that the 10% threshold was arbitrary, prohibitively high, sensitive to the choice of aggregation used and limited the analysis to only two categories i) labour and ii) materials, plant and equipment (MPE).⁵²⁴
- Economic Insight, on behalf of Yorkshire, said it was an incorrect test of materiality as a small cost item with a large wedge could have the same effect as large cost item with small wedge.⁵²⁵

4.408 Ofgem's consultant, CEPA, used a materiality criterion in its assessment of RPEs in Ofgem's forthcoming price control, in the RIIO-2 draft determination. CEPA used a two-stage materiality test.⁵²⁶ Stage 1 identified cost items that represented more than 10% of totex. Stage 2 identified cost items where the effect of volatility (ie the cost share times the wedge) was greater than 0.5% of totex. An RPE was used if a cost category passed Stage 1. If a cost category fell between 10% and 5% of totex it was assessed in Stage 2.

Provisional decision

4.409 In our view, there are clear reasons and merits behind Europe Economics' approach of using criteria to assess eligibility for RPEs:

- The companies have an information advantage and they are more likely to highlight examples that show that costs will go up rather than down.

⁵²² Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), pp10–11

⁵²³ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), p105

⁵²⁴ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), p105

⁵²⁵ Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), p105

⁵²⁶ CEPA (2020), [RIIO-GD2 and T2: Cost Assessment – Frontier shift methodology paper – Technical Annexes – 2](#), pp42–43

- This approach helps to keep the RPEs simpler as line by line adjustments would involve potentially several RPE adjustments based on forecasts and related true-ups.
- It helps to preserve management incentives to control costs.

4.410 Europe Economics' criteria captured the cost items where there were sufficient and convincing reasons to think that an RPE adjustment was necessary while reducing the risk of overcompensating companies. More specifically:

- Criterion 1A captured any significant difference in the expected value of the wedge between the input price and CPIH.
- Criterion 1B captured any substantial uncertainty around the level of input prices.
- Criteria 2 and 3 were necessary as CPIH and management control could mitigate the need for RPEs by providing protection against input cost changes.

4.411 We provisionally decide that Europe Economics' approach provides a reasonable balance between using RPEs when the evidence clearly demonstrates that it is necessary without over complicating the assessment, and therefore we use the same approach in our redetermination. We discuss below whether we can further improve this approach.

4.412 We considered whether we should use materiality as an additional criterion as a possible improvement on the Europe Economics approach. If a cost item is judged to be immaterial because it is below a certain percentage of totex, the companies arguably should bear this limited risk. This criterion could simplify the assessment of RPEs as determining materiality is a relatively straightforward task and once an item is deemed immaterial no further RPE assessment is required.

4.413 CEPA's materiality assessment appeared to be able to address companies' concerns discussed in paragraph 4.408 related to this criterion. CEPA's Stage 2 criterion was similar to Europe Economics' 1B criterion because both were based on volatility. However, Europe Economics used a 1% of totex threshold while CEPA used 0.5%. In Table 4-16 we apply the CEPA criteria to labour, energy, chemicals and MPE.

Table 4-16: Materiality criterion assessment

	<i>Labour</i>	<i>Energy</i>	<i>Chemicals</i>	<i>MPE</i>
Stage 1: Share of totex (10% of totex)	Pass. (39% of totex)	Sensitive to threshold (9% of totex)	Fail. (2%)	Pass. (20% of totex)
Stage 2: Volatility (0.5% of totex)	Not assessed in Stage 2.	Depends on whether weight is placed on pre-2011 data.	Not assessed in Stage 2.	Not assessed in Stage 2.
Overall	Pass.	Depends on whether weight placed on pre-2011 data	Fail.	Pass.

Source: Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), pp25-50.

4.414 Labour and MPE passed the materiality criterion in Stage 1. As energy fell between 10% and 5% of totex it was assessed in Stage 2. Whether it passed the materiality criterion depended on whether weight was placed on pre-2011 data.

4.415 We provisionally decide not to use materiality as an additional criterion in this redetermination because it would not change our decisions. This is because (i) labour is in any event already considered for RPE, (ii) the materiality criterion is not decisive for energy and (iii) we provisionally decide in any event not to use RPEs for chemicals, MPE and other costs because of our consideration of the other criteria.

For which cost items should we implement RPEs?

4.416 In this section we assess whether RPEs should be used for labour, energy, chemicals, MPE, and ‘other costs’ categories.

Labour

4.417 We reviewed Europe Economics’ assessment for labour:⁵²⁷

- Criterion 1A – Pass or failure on the size of cost gap depended on whether reliance was placed on the OBR forecasts for wage inflation over the period of the price control. Europe Economics’ analysis showed that the OBR had systematically overestimated average earnings growth.^{528, 529}
- Criterion 1B – Labour failed this criterion on volatility. Due to the lack of volatility the overall wedge was below 1% of wholesale totex.

⁵²⁷ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), pp25–32

⁵²⁸ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), p29

⁵²⁹ Ofwat (2019), PR19 Final Determination [Securing cost efficiency: Technical Appendix](#), p196

- Criterion 2 – On alignment with CPIH, labour passed this criterion as there was no separate item for labour costs in the CPIH basket.
- Criterion 3 – On management control, was deemed a partial pass. While there was no evidence that water companies have buyer power in labour markets, there are some ways they can reduce their exposure to labour costs. For example, installing telemetry can reduce the need for workers to be present at a site.⁵³⁰

4.418 Europe Economics recommended that Ofwat should decide how much weight to put on the OBR forecasts and then decide whether to implement an RPE for labour.⁵³¹ Ofwat decided to use an RPE adjustment based on an OBR forecast for labour.⁵³² In addition, given the uncertainty around wage growth forecasts, Ofwat introduced a true-up mechanism to capture any differences between the actual labour price index and the forecasts that were used in PR19.⁵³³

4.419 Ofwat decided to use an index for out-turn manufacturing wages in the labour cost true-up mechanism in order not to weaken management incentive since manufacturing wages are outside management control.⁵³⁴ Europe Economics said that manufacturing was an appropriate benchmark sector for the true-up as manufacturing and water sector labour markets were similar and often involved similar skills and expertise.⁵³⁵ Europe Economics said manufacturing wages also showed a close correlation to water sector wage growth and so should reflect similar cost pressure.

4.420 Europe Economics also discussed the links between the labour RPE and the assumed frontier shift. Europe Economics said that there was a theoretical linkage between wages and labour productivity. This raised the issue of consistency between the labour RPE and the frontier shift, because the frontier shift was based on productivity increases, including labour productivity increases.⁵³⁶ It could be inconsistent to assume zero real wage growth in the water sector but 1.1% productivity growth. Europe Economics said that across

⁵³⁰ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), p31

⁵³¹ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), p32

⁵³² Ofwat (2019), PR19 Final Determination [Securing cost efficiency: Technical Appendix](#), p196

⁵³³ Ofwat (2019), PR19 Final Determination [Securing cost efficiency: Technical Appendix](#), p121

⁵³⁴ Ofwat (2019), PR19 Final Determination [Securing cost efficiency: Technical Appendix](#), p209

⁵³⁵ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), pp91–92

⁵³⁶ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), p40

the economy as a whole, real wages would be expected to reflect changes in labour productivity, but this may not hold for any specific sector.⁵³⁷

4.421 The Disputing Companies did not disagree with Ofwat’s decision to allow labour RPEs.^{538, 539, 540, 541} In a later submission, Northumbrian said that COVID-19 had impacted wages and it was concerned that the index used by Ofwat was no longer fit for purpose. It said that the relationship between wage pressures in the water sector and the manufacturing index used in the true-up had, at least temporarily, broken down.

4.422 In addition to the information provided by the Main Parties and their advisers, we looked at the most recent OBR forecasts published in March 2020. Table 4-17 compares the 2019 data used by Europe Economics and the March 2020 forecasts.

Table 4-17: Real wage growth forecasts from OBR

Forecast Year	%	
	Forecast date of OBR 2019	2020
2019-20	1.0	1.3
2020-21	1.1	2.3
2021-22	1.1	1.3
2022-23	1.2	1.5
2023-24	1.3	1.1
2024-25	1.4	1.2
Average	1.2	1.4

Source: Ofwat (2019), PR19 FD [Securing cost efficiency: Technical Appendix](#), p212. OBR (2020), [Economics and fiscal outlook – March 2020](#), downloaded on 23 July 2020.

4.423 The difference between the 2020 forecasts and the 2019 forecasts was driven by i) an increase in the wage growth forecasts; and ii) a decrease in OBR inflation forecasts. The March 2020 figures show a considerable wedge between the OBR forecasts and CPIH. We note that the updated OBR forecasts were published in March 2020, and as such do not reflect the impact of COVID-19 crisis.

Provisional decision

4.424 Based on the evidence above, we provisionally decide to use a labour RPE adjustment for the following reasons.

⁵³⁷ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), p103

⁵³⁸ [Anglian SoC](#), Chapter E.4: Frontier shift, p206

⁵³⁹ [Bristol SoC](#), 14. Input price error p113

⁵⁴⁰ [Northumbrian SoC](#), Section 5.5 pp73–75

⁵⁴¹ [Yorkshire SoC](#), p67 paragraph 202

- The most recent OBR forecasts show a considerable wedge between wage growth and the CPIH.
- Criterion 2 and 3 show that wages are not captured in CPIH, although they are partially under management control.
- The theoretical link between wages and labour productivity means including a labour RPE is consistent with requiring a frontier shift in cost efficiency.

4.425 We also provisionally decide to use a true-up mechanism for labour costs for the following reasons.

- First, there is considerable forecasting uncertainty due to macroeconomic factors, including Brexit and COVID-19.
- Second, the OBR has tended to overestimate wage growth and the implementation of a true-up mechanism will protect customers in case of any overestimation and companies against any underestimation.

4.426 We provisionally decide that manufacturing wages are the most appropriate index to use in the true-up mechanism. We recognise the concerns expressed by Northumbrian, but any short-term fluctuations do not invalidate the use of this index.

Energy

4.427 We reviewed Europe Economics' assessment for energy:⁵⁴²

- Criterion 1A – Pass or failure on the size of cost gap depended on whether reliance was placed on the Department for Business, Energy & Industrial Strategy (BEIS) forecasts and whether weight was placed on pre-2010 data. Europe Economics found that energy prices have had a significant historical wedge over CPIH in various time periods (pre-2011 and in 2018/19).⁵⁴³ In addition, BEIS forecasts showed a material wedge (0.7% per annum) for 2020-2025. However, Europe Economics' analysis showed that historical BEIS forecasts have often failed to estimate energy prices accurately.

⁵⁴² Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), pp33–39

⁵⁴³ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), pp34–35. Ofwat (2019), PR19 Final Determination [Securing cost efficiency: Technical Appendix](#), p205

- Criterion 1B – Pass or failure on volatility depended on whether weight was placed on the pre-2011 data. The wedge was above 1% of totex based on pre-2011 data but below 1% based on post-2011 data.
- Criterion 2 – On alignment with CPIH, was deemed a partial pass. Electricity costs, which account for most of the companies' energy use, is 1.3% of CPIH. Energy costs, including other fuels, are 5.2% of CPIH. Energy costs are 9% of water companies' costs. Therefore, CPIH partially captures changes in energy input prices.
- Criterion 3 – On management control, was deemed a partial pass. There are a few mechanisms for companies to reduce exposure to changes in energy costs, including hedging strategies. Although a material element remains outside management control.

4.428 Europe Economics recommended Ofwat should decide how much weight to put on the BEIS forecasts and the pre-2011 data and then decide whether to implement an RPE for energy costs.⁵⁴⁴

4.429 Ofwat decided not to use an energy RPE. Ofwat acknowledged that there was some evidence to suggest that it should allow RPEs for energy, however, on balance, no adjustment was required.⁵⁴⁵ Ofwat's said the reasons for this were:⁵⁴⁶

- There was mixed evidence of a historical wedge between energy prices and CPIH.
- Energy costs were partially within management control. Companies could use fixed energy tariffs to minimise their exposure to price fluctuations. Companies could also reduce their energy costs through increased energy generation, production of biofuels, using energy during off-peak times and improving efficiency.
- BEIS had often failed to provide accurate forecasts of energy costs in the past.
- Some energy costs were reflected in CPIH.
- There was no clear theoretical link between energy costs and productivity growth, unlike with labour costs.

⁵⁴⁴ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), pp40–41

⁵⁴⁵ Ofwat's response to common issues in companies' statements of case: Cost efficiency, p117

⁵⁴⁶ Ofwat's response to common issues in companies' statements of case: Cost efficiency, pp118–119

- Some water companies did not assume an RPE adjustment for energy in their Business Plan.
- There were several measures within the price control such as cost sharing which provided additional protections to companies.
- The potential wedge was much smaller than labour, equivalent to less than 0.1% of costs over the period based on BEIS's forecasts.
- Companies were moving towards targets of net zero carbon emissions which could have a substantial impact on energy usage in the sector and therefore mitigate real price effects.

4.430 All the Disputing Companies said that there was a need for an energy RPE.^{547, 548, 549, 550}

4.431 Bristol said that there were multiple reasons which justified an energy RPE.

- BEIS forecasts showed a positive, statistically significant wedge for the duration of the price control period between energy and CPIH.⁵⁵¹ There were historical wedges between energy prices and the CPIH.⁵⁵²
- Electricity accounted for only 1.3% of the CPIH basket, compared to 9.4% of companies' totex and therefore the PR19 indexation insufficiently accounted for energy prices.⁵⁵³
- While management had possibilities to protect against short-term fluctuations, companies were not protected against the long-term trend of rising energy prices.⁵⁵⁴
- Ofwat's energy RPE assessment was inconsistent with its labour RPE as both featured in the CPIH index.⁵⁵⁵

⁵⁴⁷ [Anglian SoC](#), Chapter E.4: Frontier shift p203, paragraph 822

⁵⁴⁸ [Bristol SoC](#), 14. Input price error p113

⁵⁴⁹ [Northumbrian SoC](#), Section 5.5, p73, paragraph 339

⁵⁵⁰ [Bristol SoC](#), p67, paragraph 202

⁵⁵¹ [Bristol SoC](#), 14. Input price error p113, paragraph 460

⁵⁵² [Bristol SoC](#), 14. Input price error p116, paragraph 470

⁵⁵³ [Bristol SoC](#), 14. Input price error p114, paragraph 463

⁵⁵⁴ [Bristol SoC](#), 14. Input price error p114, paragraph 462

⁵⁵⁵ [Bristol SoC](#), 14. Input price error p114, paragraph 463

- Ofwat's claim that some water companies assumed a small or non-existent energy RPE was incorrect as on average companies proposed positive RPEs for energy costs of between 0.4% and 3.9% per year.⁵⁵⁶

4.432 Northumbrian said that there were multiple reasons which justified an energy RPE.

- BEIS forecasts showed a positive, statistically significant wedge for the duration of the price control period between energy and CPIH.⁵⁵⁷ There were historical wedges between energy prices and the CPIH.⁵⁵⁸
- Electricity accounted for only 1.3% of the CPIH basket, compared to 9.4% of companies' totex and therefore the PR19 indexation insufficiently accounted for energy prices.
- Recent data from BEIS showed industrial energy prices had increased 8.6% in real terms from 2018 to 2019. These rising prices were consistent with falling renewable costs.
- Regulators had previously used RPEs for energy.⁵⁵⁹
- It had the industry leading approach to demand flexibility, energy production from sludge and procurement of energy so it had less scope for further improvements.⁵⁶⁰
- The extension of RPEs to other costs items than labour would not change its incentives.

4.433 Yorkshire said that there were multiple reasons which justified an energy RPE.

- An energy RPE did not weaken management incentives to minimise costs.⁵⁶¹
- The adjustment should be based on evidence and Ofwat should not assume energy RPEs away 'on principle'.⁵⁶²

⁵⁵⁶ Bristol SoC, 14. Input price error p115, paragraph 466

⁵⁵⁷ Northumbrian SoC, Section 5.5, p74, paragraph 349

⁵⁵⁸ Northumbrian SoC, Section 5.5, p76

⁵⁵⁹ Northumbrian SoC, Section 5.5, p75, paragraph 354

⁵⁶⁰ Northumbrian's reply to Ofwat's response to Northumbrian's SoC, pp60–61, paragraphs 266, 269–270

⁵⁶¹ Yorkshire's reply to Ofwat's response to Yorkshire's SoC, p90, paragraph 3.51.1 (a)

⁵⁶² Yorkshire's reply to Ofwat's response to Yorkshire's SoC, p90, paragraph 3.51.1 (b)

- Ofwat should base its adjustment on the highest quality available evidence.⁵⁶³
- Yorkshire's evidence was based on an Economic Insight report, which used credible BEIS energy projections.⁵⁶⁴

4.434 The CCWater response to Bristol's statement of case said that no RPE adjustment should be used for energy unless it was well evidenced.⁵⁶⁵

4.435 Europe Economics said that energy prices would likely be negatively affected by the COVID-19 crisis.⁵⁶⁶ Ofwat said that the falling oil prices was likely to feed through into other energy prices as well.⁵⁶⁷

4.436 Northumbrian said that there was no clear basis to assume that falling oil prices would affect the energy prices that it had to pay and there was weak correlation between oil and electricity prices.⁵⁶⁸

Provisional decision

4.437 Based on the evidence above, we provisionally decide to implement neither an energy RPE adjustment nor a true-up for the following reasons.

- Criteria 2 and 3 show that energy costs are partially under management control and partially captured in CPIH.
- There is no theoretical link between energy prices and productivity to provide a rationale for including an energy RPE adjustment.

Chemicals

4.438 We reviewed Europe Economics' assessment for chemicals:⁵⁶⁹

- Criterion 1A – On wedge value, was failed as an assessment of the ONS 'Chemicals and Chemical Products' Producer Price Inflation (PPI) showed there was no historical statistically significant wedge. In addition, there was a wide variation in company forecasts with estimates of the wedge

⁵⁶³ [Yorkshire's reply to Ofwat's response to Yorkshire's SoC](#), p90, paragraph 3.51.1 (c)

⁵⁶⁴ [Yorkshire's reply to Ofwat's response to Yorkshire's SoC](#), p90, paragraph 3.51.1 (d)

⁵⁶⁵ [CCW's response to Bristol SoC](#), paragraph 5.6

⁵⁶⁶ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p127

⁵⁶⁷ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p127

⁵⁶⁸ [Northumbrian reply to Ofwat's response to Northumbrian's SoC](#), pp61–62; [Northumbrian's reply to Ofwat's further submission](#), pp5–6

⁵⁶⁹ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), pp41–44

ranging between -1.2% and +1.2%. Europe Economics said that companies did not specifically report chemicals costs.⁵⁷⁰

- Criterion 1B – On wedge volatility, was failed due to the lack of volatility. The overall wedge ranged from -0.1% to +0.1% of wholesale totex, which was less than the 1% criterion.
- Criterion 2 – On alignment with CPIH, was passed as there is no explicit category for chemicals in the CPIH basket. The closest categories that are included (cleaning equipment and cleaning and maintenance products) bear little resemblance to the chemicals purchased by water companies.
- Criterion 3 – On management control, was passed as chemical pricing is largely outside management control and there is little ability to substitute specific chemicals with other products.

4.439 Based on this assessment, Europe Economics recommended Ofwat should not adopt an RPE for chemicals.⁵⁷¹

4.440 Anglian, Northumbrian and Yorkshire said that there should be a chemical RPE.^{572, 573, 574} For chemicals, Anglian used the chemical and chemical products component of the ONS producer input prices index. Anglian's choice of sources was based on the advice of First Economics.⁵⁷⁵

4.441 Northumbrian and Yorkshire said that the chemicals price index used in the Europe Economics report did not adequately capture the relevant changes in chemical costs.⁵⁷⁶ Northumbrian's consultant, Economic Insight, carried out analysis covering 63% of Northumbria's chemical expenditure and this analysis showed historic price increases.⁵⁷⁷

⁵⁷⁰ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), p43

⁵⁷¹ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), p44

⁵⁷² [Anglian SoC](#), Chapter E.4: Frontier shift, p203, paragraph 822

⁵⁷³ [Northumbrian SoC](#), Section 5.5 p79 paragraph 376

⁵⁷⁴ [Yorkshire SoC](#), p67, paragraph 202

⁵⁷⁵ [Anglian SoC](#), Chapter E.4: Frontier shift p203, paragraph 823

⁵⁷⁶ Northumbrian said that 63% of their chemical expenditure was focused on the following chemicals – aluminium and ferric sulphate, phosphoric acid, lime and polyelectrolyte. Source: [Northumbrian SoC](#), Section 5.5 p80 paragraph 381. [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p125.

⁵⁷⁷ [Northumbrian SoC](#), Section 5.5 pp80–81

4.442 Northumbrian said that COVID-19 had put some upward price pressure on some of the chemicals that it purchased due to supply-side shocks.⁵⁷⁸

4.443 Responding to the disputing companies, Europe Economics said that a key drawback of forecasting prices from historical data could be the significant rise in crude oil prices in 2017/18.⁵⁷⁹ Europe Economics also said that the COVID-19 crisis would likely reduce input prices for chemical costs.⁵⁸⁰

Provisional decision

4.444 Having considered the arguments and information above, we provisionally decide to implement neither an RPE adjustment nor a true-up for chemicals. We consider that the expected value of the wedge is not materially different from zero. We placed little weight on the results of Northumbrian's analysis of their own historical procurement data as this was likely distorted by the significant rise in crude oil prices in 2017/18. We placed more weight on Europe Economics' analysis of the historical ONS index, as an independent source, which showed that it was unlikely that the value of the wedge between the chemicals input price and CPIH would differ substantially from zero over the period of the price control. Finally, using companies' own historical procurement data to set RPE adjustments could distort management incentives in future price reviews.

Materials, plant and equipment

4.445 We reviewed Europe Economics' assessment for materials, plant and equipment (MPE):⁵⁸¹

- Criterion 1A – wedge value. This was failed as, while some indices showed a positive real price effect, others showed no evidence of a statistically significant wedge. Some water sector input costs showed a negative wedge and some companies proposed a zero or negative wedge for this cost item.
- Criterion 1B – wedge volatility. This was failed as the most volatile price index was construction, which had a volatility below 1%.

⁵⁷⁸ Northumbrian [Reply to Ofwat's response](#), p63, paragraph 280

⁵⁷⁹ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), p18

⁵⁸⁰ Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), p19

⁵⁸¹ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), pp45–48

- Criterion 2 – alignment with CPIH. This was partially passed as CPIH included categories such as housing and DIY equipment, purchase of vehicles, relevant spare parts and the maintenance and repair of those vehicles. These items have a CPIH basket weight of 16%. However, the products bought by consumers are unlikely to be close matches for the products purchased by the water companies.
- Criterion 3 – management control. This was partially passed because companies can sign long-term contracts that cover multiple regulatory control periods and therefore insulate themselves from price volatility within the price control period. In addition, there is limited evidence that companies can respond to an increase in the prices of MPE by substituting between different materials and equipment.

4.446 Based on this assessment, Europe Economics recommended Ofwat should not adopt an RPE for MPE.⁵⁸²

4.447 Anglian and Yorkshire said that there was a need for an RPE for MPE.^{583, 584}

4.448 Europe Economics said that the net effect of COVID-19 on MPE was indeterminate because this sector was likely to be facing both reduced demand and restrictions in supply.⁵⁸⁵

Provisional decision

4.449 We provisionally decide to implement neither an RPE adjustment nor a true-up for MPE. This is primarily because the results from the assessment of Criterion 1A and Criterion 1B show that there is not a substantial likelihood that the value of the wedge between the costs of MPE and CPIH will differ significantly from zero over 2020-2025. In addition, MPE are partially under management control and partially captured in CPIH.

Other costs

4.450 Other costs covered 31% of the companies' totex.⁵⁸⁶ Europe Economics in its assessment did not analyse these costs in detail and Ofwat did not make any RPE adjustments for them. However, at PR19 final determination the

⁵⁸² Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), p48

⁵⁸³ [Anglian SoC](#), Chapter E.4: Frontier shift, p203, paragraphs 822–823

⁵⁸⁴ [Yorkshire SoC](#), p67 paragraph 202

⁵⁸⁵ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p127

⁵⁸⁶ Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), p14, Table 2.1

companies received some protection against input price pressure for other costs as Ofwat had a partial true-up mechanism for abstraction charges (2% share of totex) and business rates (6% share of totex).⁵⁸⁷

4.451 Anglian said that there was a need for RPE for other costs.⁵⁸⁸ Anglian referred to its analysis in its September 2018 plan, which showed that it forecast other costs to increase at a nominal rate of 2% per year.⁵⁸⁹

Provisional decision

4.452 Anglian forecast that costs in the other category would increase at 2% per year, which is the same as the Bank of England inflation target. The evidence we have reviewed does not support the view that companies should receive protection against this price increase. For this reason, we provisionally decide not to include an RPE adjustment for the other cost category.

Our provisional decision on RPEs

4.453 We provisionally decide to provide an RPE adjustment based on OBR forecasts for labour, but not for energy, chemicals, MPE nor other costs. We provisionally decide to use a true-up for labour costs based on a manufacturing wages out-turn index, but not use a true-up for energy, chemicals, MPE nor other costs. This approach does not result in any changes to the cost allowances calculated by Ofwat.

Growth

4.454 Growth expenditures are the costs driven by population growth such as connecting newly constructed houses to the network or increasing the capacity of the existing network. In this section we:

- summarise Ofwat's PR19 approach to growth;
- discuss the methodological issues raised and the Disputing Companies' criticisms; and

⁵⁸⁷ The uncertainty mechanism allows companies to recover 75% of any costs in excess of its PR19 cost allowance or allows customers to recover 75% of the amount by which its costs are lower than PR19 allowances at the end of the price control period. Source: Ofwat (2019), PR19 Final Determination [Securing cost efficiency: Technical Appendix](#), pp44–46.

⁵⁸⁸ [Anglian SoC](#), Chapter E.4: Frontier shift p203 paragraphs 822–823

⁵⁸⁹ Anglian (2018), [Our plan 2020-2025](#), p102, Table 10

- summarise the CMA approach to growth and the implications this has for the companies' base cost allowances.

Ofwat PR19 approach to growth

4.455 Ofwat estimated growth expenditure in four steps.⁵⁹⁰

- Step A – Ofwat allowed for growth expenditure in its base models by not separating growth costs from other modelled base costs. These base models fund the costs of an efficient company serving the average historical number of new connections.
- Step B – Ofwat used the growth unit rate adjustment to account for the growth costs not captured by the base models if there was a difference between the forecast new connections and the average historical number of new connections in the sector.
- Step C – Ofwat undertook deep dive assessments to address growth related atypical factors which affected individual companies and were not captured by steps A and B.
- Step D – Ofwat decided to apply a true-up mechanism to adjust companies' allowed revenue at the end of the regulatory period. This will correct for differences between the out-turn and forecasted number of connections.

Methodological issues raised

4.456 When analysing growth and considering the Disputing Companies' criticisms we focused on answering five questions.

- Are integrated or stand-alone growth models more appropriate?
- Is the growth unit rate adjustment set correctly?
- Which are the most appropriate forecasts for the number of properties?
- Should a growth true-up mechanism be used?
- Should Anglian's growth cost adjustment be accepted?

⁵⁹⁰ Ofwat (2019), [PR19 Final Determination Securing cost efficiency: Technical Appendix](#), pp19–22

Are integrated or stand-alone growth models more appropriate?

4.457 In this section we review the arguments about integrated and stand-alone growth modelling approaches. At the end of the section we provide our provisional decision.

Integrated growth models

4.458 Ofwat allowed for growth expenditure in its base models; it modelled growth expenditure as part of the modelled base costs together with opex and capital maintenance expenditure. Ofwat said that its integrated base models were appropriate for three reasons.⁵⁹¹ First, growth expenditure is a routine part of business as companies experience these costs on a year-on-year basis. Second, growth expenditure can be explained by similar cost drivers to Opex and capital maintenance. Third, the integrated approach mitigates reporting inconsistencies across companies by modelling growth together with Opex and capital maintenance. Examples of the reporting inconsistencies are that some companies reported zero costs under historical new connections Capex because they reported the costs as Opex instead. In addition, Regulatory Accounting Guidelines (RAGs) allow companies to apply a level of discretion when proportioning costs between growth related expenditure and capital maintenance.⁵⁹²

4.459 Anglian and Bristol had concerns over the inclusion of growth expenditure in the base models.^{593, 594} Northumbrian and Yorkshire supported Ofwat's approach of including growth expenditure in the base models.^{595, 596}

4.460 Anglian said the following.

- Ofwat did not properly consult on its integrated approach.⁵⁹⁷
- The drivers of growth expenditure were not similar to those of opex and capital maintenance and the relationship was more complex than the Ofwat models suggested.^{598, 599}

⁵⁹¹ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p28, paragraph 4.2

⁵⁹² [Ofwat's response to Anglian's 27 May submission to the CMA](#), p12, paragraph 2.18

⁵⁹³ [Anglian SoC](#), Chapter E.2: Growth, pp160–165

⁵⁹⁴ [Bristol SoC](#), 15. Growth and developer services error, pp119–120

⁵⁹⁵ [Northumbrian's reply to Ofwat's response to Northumbrian's SoC](#), pp63–64

⁵⁹⁶ [Yorkshire's reply to Ofwat's response to Yorkshire's SoC](#), pp92–94

⁵⁹⁷ [Anglian's reply to Ofwat's response to Anglian's SoC Part A: Review of Cost arguments](#), pp32–33.

⁵⁹⁸ [Anglian SoC](#), Chapter E.2: Growth, pp160–161

⁵⁹⁹ [Anglian's reply to Ofwat's response to Anglian's SoC](#) Part G: Reply to Ofwat's Response on cost issues, p37 paragraphs 130–131

- The integrated approach failed to recognise the ‘lumpy’ nature of parts of the growth expenditure (such as growth at sewage treatment works).^{600, 601}
- The base models were inflexible and did not adjust allowances in response to changes in forecasts of the number of connections.⁶⁰²
- Not only growth expenditure, but also the costs of reducing sewer flooding risk and addressing low pressure should be assessed separately from base models. Sewer flooding risk expenditure was driven by cost drivers which differed from those in the base models.⁶⁰³
- Step A led to wide variations between the growth cost allowances companies requested and the cost allowances received.⁶⁰⁴

4.461 Anglian’s adviser, Vivid Economics said that the Step A growth cost allowances could be calculated in a robust manner by making opex adjustments and reasonable assumptions based on engineering knowledge.

4.462 Bristol said that the £722 growth unit rate implied in Step A was well below its own estimate of £1,014.⁶⁰⁵

4.463 Ofwat said the following.

- It complemented its Step A approach with Step B and Step C to estimate the growth costs and these should be viewed together.⁶⁰⁶
- It was appropriate to include cost allowances for reducing sewer flooding risk and addressing low pressure in the base models. The costs of reducing sewer flooding risk were largely driven by population growth. As new properties connected to the network, the risk of sewer flooding increased unless companies invested more.⁶⁰⁷
- Its estimation of Step A growth allowance unit rates was only indicative as there were multiple estimation approaches. Any estimate was likely to be imprecise due to historical differences between companies when reporting growth expenditure.⁶⁰⁸ Nevertheless, Ofwat noted that its estimated unit

⁶⁰⁰ [Anglian SoC](#), Chapter E.2: Growth, p161 paragraph 675

⁶⁰¹ [Anglian’s reply to Ofwat’s response to Anglian’s SoC](#), Part G: Reply to Ofwat’s Response on cost issues, p37 paragraph 129

⁶⁰² [Anglian SoC](#), Chapter E.2: Growth, p163

⁶⁰³ [Anglian SoC](#), Chapter E.2: Growth, pp164–165

⁶⁰⁴ [Anglian SoC](#), Chapter E.2: Growth, pp162–163

⁶⁰⁵ [Bristol SoC](#), 15. Growth and developer services error, p120, paragraph 486

⁶⁰⁶ [Ofwat’s response to common issues in companies’ statements of case: Cost efficiency](#), p32, paragraph 4.22

⁶⁰⁷ [Ofwat’s response to Anglian’s SoC](#), p77, paragraph 3.124

⁶⁰⁸ [Ofwat’s response to Bristol’s SoC](#), p53, paragraph 3.114–115

rates in both water and wastewater were above the historical unit rates for most companies.⁶⁰⁹ Bristol's growth allowance unit rate from Step A combined with the additional allowance from Step B was in line with the company requested unit rate.⁶¹⁰

4.464 Third parties also made submissions on this topic.

- Severn Trent supported integrating growth into the base models.⁶¹¹
- South East Water said the base models did not capture the real drivers of growth such as the capacity of the existing network and the size of the developments being built.⁶¹² It said that the quality of historic data collected for historical growth expenditure was weak and inconsistent.⁶¹³ It said Ofwat should use the growth investment proposed by the company and then apply the base efficiency challenge.⁶¹⁴

Stand-alone growth models

4.465 Anglian's consultant, Vivid Economics estimated stand-alone growth models. Anglian said that the reporting inconsistencies could be addressed without compromising the robustness of standalone models.⁶¹⁵ Anglian said that Vivid's models performed well in terms of statistical and engineering logic.⁶¹⁶ The efficiency score ranges also tended to be narrower than Ofwat's models. Vivid Economics said that Ofwat's variables did not account for growth intensity and remoteness (see paragraph 4.523 and 4.527).

4.466 Disagreeing with Anglian, Northumbrian said that the intensity variable in Vivid's preferred water model was insignificant which suggested that this variable was not a good predictor of growth expenditure.

4.467 Ofwat said that Vivid Economics did not accept the significance of the cost allocation issues. It said that other companies accepted that these issues were likely to distort model results if growth is modelled separately from opex and capital maintenance.⁶¹⁷ Ofwat said that Steps A, B and C took account of the variables in Vivid's preferred models.⁶¹⁸

⁶⁰⁹ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p37, paragraph 4.45

⁶¹⁰ [Ofwat's response to Bristol's SoC](#), p53, paragraph 3.114–115

⁶¹¹ [Severn Trent submission](#), p5

⁶¹² [South East Water submission](#), p12–17

⁶¹³ [South East Water submission](#), p18

⁶¹⁴ [South East Water submission](#), p7

⁶¹⁵ [Anglian's Reply to Ofwat's Response](#), Part A: Review of Cost arguments, pp39–40

⁶¹⁶ [Anglian SoC](#), Chapter E.2: Growth, p169, paragraph 731

⁶¹⁷ [Ofwat's Further Submission](#), pp11–12

⁶¹⁸ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p36, paragraph 4.39

Provisional decision

- 4.468 We agree with Vivid's analysis that Ofwat's integrated approach (Step A) is imperfect. However, we provisionally decide that the data inconsistencies invalidate the use of stand-alone models and in consequence Vivid's models should not be used to replace Ofwat's approach. In particular, we are concerned about inconsistencies in the reporting of growth costs between Opex and Capex expenditure, and the allocation of costs between growth expenditure and capital maintenance. These reporting inconsistencies can distort the results of stand-alone growth models.
- 4.469 We provisionally decide to use Ofwat's base cost models which are integrated with growth costs and the four steps described above, because no superior approaches were suggested to us and we have not found any better alternatives. In our view, the integrated models and the four steps are a sensible and pragmatic approach to estimate growth expenditure. Growth costs are a routine cost incurred by the companies and growth costs will be related to the cost drivers included in the base cost models. We recognise this approach has some limitations, for example the treatment of differing growth rates between companies. However, the additional steps implemented by Ofwat - the growth unit rate adjustment, the deep dive assessments and the true-up mechanism – adequately address these limitations.

Is the growth unit rate adjustment set correctly?

- 4.470 In this section we discuss Step B, the growth unit rate adjustment that adjusts for differing growth rates between the areas served by different water companies.
- 4.471 Ofwat introduced the growth unit rate adjustment at final determination in response to the companies' representations that the base models would not adequately fund different growth rates.⁶¹⁹ To calculate the adjustment for each company, Ofwat looked at how the number of total connections was expected to grow compared to the average historical growth in the number of total connections in the sector. Ofwat applied positive adjustments to companies in higher growth areas (Anglian and Bristol) and negative adjustments to companies in lower growth areas (Northumbrian and Yorkshire).
- 4.472 To decide on the value of the adjustment, Ofwat multiplied the positive or negative number of connections by the upper quartile historical growth unit rates (£783 per connection for water and £1,715 per connection for

⁶¹⁹ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p45, paragraph 4.63

wastewater). For example, if in a company's area there are expected to be 50 more new connections than the historical average, the company would be allowed the unit rate per connection for each of the 50 new connections. For downwards adjustments, Ofwat took a 'conservative' approach and halved the amount obtained by multiplying the negative number of connections by the upper quartile historical growth unit rates.⁶²⁰ In the main party hearing Ofwat said that a full negative adjustment, rather than a halving, may be appropriate.

- 4.473 Anglian said that the historical upper quartile unit rates applied in the growth unit rate adjustment were too low and left it underfunded.⁶²¹
- 4.474 Bristol said that the growth unit rate adjustment was introduced at final determination and this reinforced its position that the modelling approach had not resulted in appropriate allowances.⁶²²
- 4.475 Northumbrian said that there was no need for the growth unit rate adjustment because the base models captured growth costs adequately.⁶²³ It said that the adjustment undermined the use of the base models. In addition, it said that growth in the number of connected properties in its area was not forecast to be below historical levels.⁶²⁴
- 4.476 Ofwat said there were two reasons for applying a lower downward adjustment. First, Ofwat recognised this was a top down approach and therefore probably inaccurate, and second, it was applied late in the process, so companies had fewer opportunities to make representations. Yorkshire said that if its own growth forecast had been used in the growth unit rate adjustment, it would have been entitled to additional allowance.^{625, 626} Yorkshire said that Ofwat halved the downward adjustment because its models did not contain growth-rate cost drivers and because of the uncertainty inherent in the approach.
- 4.477 South East Water said that the growth unit adjustment was too small and left the companies with ongoing growth underfunded.⁶²⁷

⁶²⁰ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p46, paragraph 4.65

⁶²¹ [Anglian SoC Chapter E.2: Growth](#), p164, paragraph 689

⁶²² [Bristol's reply to Ofwat's Response to Bristol's SoC](#), p61, paragraph 289

⁶²³ [Northumbrian SoC](#), 5.6 Ofwat's approach to setting allowance for growth, pp85–86

⁶²⁴ [Northumbrian SoC](#), 5.6 Ofwat's approach to setting allowance for growth, p86

⁶²⁵ [Yorkshire SoC](#), pp65–66, paragraph 198

⁶²⁶ [Yorkshire's reply to Ofwat's Response to Yorkshire's SoC](#), p93, paragraph 3.56.2

⁶²⁷ [South East Water submission](#), p11

Provisional decision

- 4.478 The base models only fund the costs of an efficient company serving the average historical growth rate. If the growth unit rate adjustment was removed it would risk underfunding companies in high growth areas and overfunding companies in low growth areas. Therefore, we provisionally decide to use a growth unit rate adjustment. Applying the historical upper quartile unit rates to the growth unit rate adjustment provides an appropriate efficiency challenge for the companies, balancing the need to set an appropriate efficiency challenge while acknowledging the limitations of the modelling. We note that no alternative unit rates were suggested to us in place of the historical upper quartile unit rates and we have not received evidence which would indicate that the upper quartile rates would be materially distorted by reporting inconsistencies.
- 4.479 We expect companies to be able to make productivity improvements in this area as they do with other base costs. Therefore, in addition to the efficiency challenge, we provisionally decide to add a frontier shift and a RPE to the growth unit rate adjustment. This makes the approach more consistent with the overall approach to base costs.⁶²⁸ In itself this changes the companies' allowances by -£0.9 million for Anglian, -£0.1 million for Bristol, +£0.6 million for Northumbrian and +£0.8 million for Yorkshire.
- 4.480 We provisionally decide not to halve the downward growth unit rate adjustment, but rather apply this in full. This is for two main reasons. First, applying the unit rate asymmetrically risks customers overpaying. Second, Ofwat's argument that this adjustment could be inaccurate was insufficient, as the companies will be protected by the growth true-up and the totex cost sharing mechanism. In itself this change would decrease the allowances of two companies in relatively low growth areas, Northumbrian (-£26.4 million) and Yorkshire (-£34.7 million).

Which are the most appropriate forecasts for the number of properties?

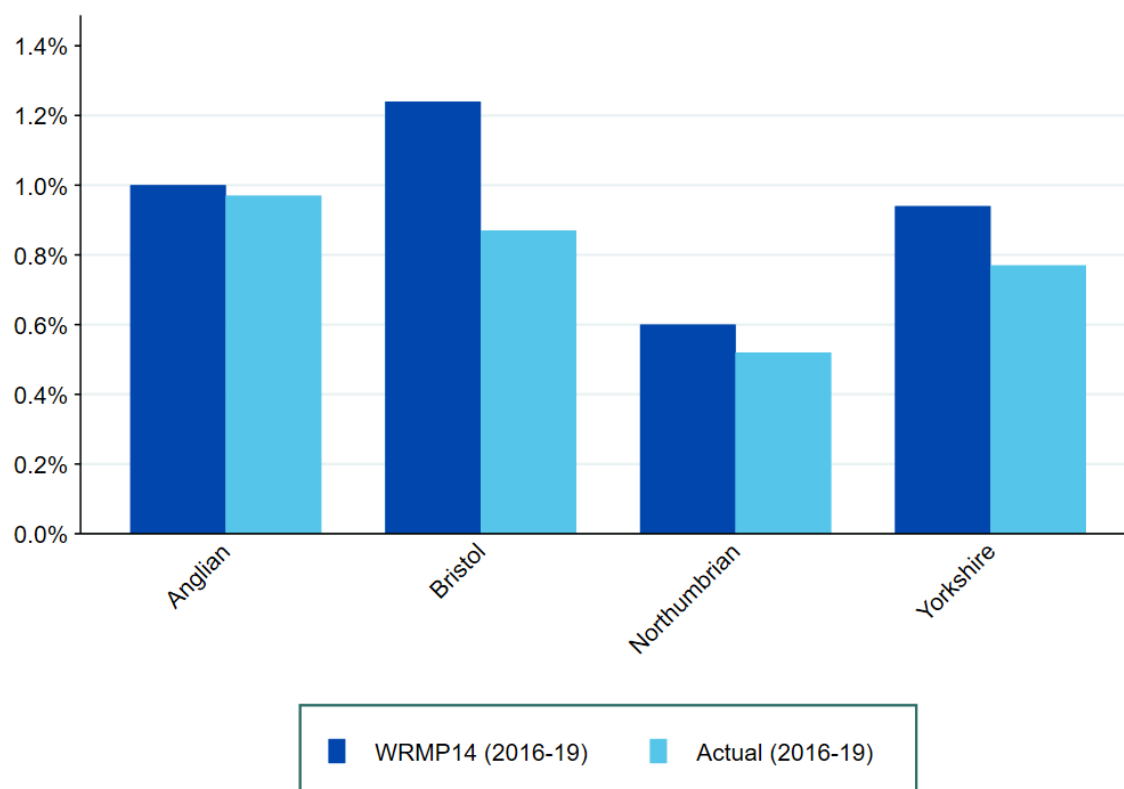
- 4.481 In this section we discuss the forecasts for the number of total connected properties. The companies are given allowances based on the forecast for their area.
- 4.482 Ofwat based its growth allowance on forecasts of the number of total connected properties, derived from ONS household growth projections based on 2016 data. Ofwat said that ONS was an independent source and the ONS

⁶²⁸ See paragraph 4.386

projections protected customers from the risk of over-forecasting and did not expose companies to undue risk over the regulatory period. It adopted the 2016-based dataset to reflect the latest information available on demographic trends.⁶²⁹

4.483 Ofwat said that forecasts based on local authority data had historically over-estimated households' growth.⁶³⁰ Figure 4-4 shows the Disputing Companies' most recent WRMP forecasts and the actual household growth rates.

Figure 4-4: Comparison of forecast (WRMP14) and actual household growth rates



Source: [Ofwat's Further Submission](#), p13.

4.484 Anglian, Bristol and Yorkshire challenged the use of the ONS household growth projections and said that the CMA should use the companies' forecasts, which were based on local authority data.^{631, 632, 633, 634}

⁶²⁹ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p38

⁶³⁰ [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p38

⁶³¹ [Anglian SoC](#), Chapter E.2: Growth, pp158–160

⁶³² [Bristol SoC](#), 15. Growth and developer services error, pp117–119

⁶³³ [Bristol Further submission](#), section 3

⁶³⁴ [Yorkshire SoC](#), pp65–66, paragraph 198

- 4.485 Anglian said that Ofwat used ONS projections which were based on 2016 data, while the only version sanctioned for use by the Government was based on 2014 data and produced by Ministry of Housing, Communities and Local Government (MHCLG).⁶³⁵ Anglian said that in its own region the 2019-20 outturn growth data was inconsistent with ONS projections, and the ONS figures were too low.^{636, 637} Anglian said that it employed Edge Analytics and Jacobs to update and review its growth forecast⁶³⁸ and that Ofwat should review the growth costs using improved models or deep dives.⁶³⁹
- 4.486 Dame Kate Barker, who was the lead author of the Review of UK Housing Supply, 2004, said that methodological changes made the ONS projections less suitable for use in local authority plans. For example, the ONS projections were not adjusted for affordability. As house prices increase, local authorities may allow more house building to improve affordability. Anglian was a relatively high price area, which tended to increase house building and thus the number of connections.⁶⁴⁰
- 4.487 United Utilities said that the ONS projection was a net figure as it included both the new developments and reductions due to demolitions. Therefore, it underestimated the costs of connection (including laying down connecting mains) in areas where significant redevelopment and demolitions occurred. United Utilities recommended the CMA to consider local authority forecasts sense-checked by alternative source of data.⁶⁴¹
- 4.488 WA Consultancy and TDS said that the use of ONS household projections was inappropriate and it would create a considerable shortfall in infrastructure funding.⁶⁴² For example, the projections did not account for government policy to deliver 300,000 new homes each year and the impact of the HS2 and Northern Powerhouse decisions. It suggested that MHCLG projections based on 2014 data was more reliable and representative than ONS projections to estimate growth expenditure.

⁶³⁵ [Anglian SoC](#), Chapter E.2: Growth, p158, paragraph 661

⁶³⁶ [Anglian's reply to Ofwat's response to Anglian's SoC](#), p30, paragraph 1.2

⁶³⁷ [Anglian SoC](#), p159, paragraph 663

⁶³⁸ [Anglian SoC](#), p83

⁶³⁹ [Anglian SoC](#), p165 paragraph 701

⁶⁴⁰ [Dame Kate Barker submission](#), p2

⁶⁴¹ [United Utilities submission](#), p12

⁶⁴² [WA Consultancy Ltd, & TDS Ltd. submission](#), pp4–6

4.489 Anglian (Great Ouse) RFCC,⁶⁴³ the East of England Local Government Association in Anglian's area⁶⁴⁴ and South East Water⁶⁴⁵ also criticised the use of ONS projections.

4.490 Some of the submissions discussed the potential impact of COVID-19 on growth.

- Ofwat said that COVID-19 may have a negative impact on housing demand and supply across the UK which increased the likelihood that out-turn total connections might be below the ONS projections.⁶⁴⁶
- Anglian said that COVID-19 would have a short-term impact on growth, but construction activity had already begun to pick up.⁶⁴⁷
- Bristol said that COVID-19 had created uncertainty but its forecast was still the best forecast.⁶⁴⁸
- Northumbrian said that the ONS 2018 projections showed slightly higher growth in its regions, but the medium term impact of COVID-19 was unclear.
- Dame Kate Barker and the East of England Local Government Association said that COVID-19 had created uncertainty around growth forecasts.^{649, 650}
- WA Consultancy and TDS said that house builders have already re-opened sites and the Government remained committed to its housing objectives.

4.491 After the Ofwat FD, on 29 June 2020, the ONS released its 2018-based household projections.⁶⁵¹ These showed a household growth rate closely in line with its 2016-based projections.

4.492 We compared the different forecasts; Figure 4-5 below contains a comparison of (i) company forecasts for 2020-25 (ii) historical trends using data from 2011 to 2019 (iii) 2016-based ONS projections for 2020-25, and (iv) 2018-based ONS projections for 2020–25.

⁶⁴³ [Anglian \(Great Ouse RFCC submission, p1](#)

⁶⁴⁴ [East of England Local Government Association submission, pp1–2](#)

⁶⁴⁵ [South East Water submission, p17](#)

⁶⁴⁶ [Ofwat's response to common issues in companies' statements of case: Cost efficiency, p45, paragraph 4.62](#)

⁶⁴⁷ [Anglian's reply to Ofwat's response to Anglian's SoC, p15](#)

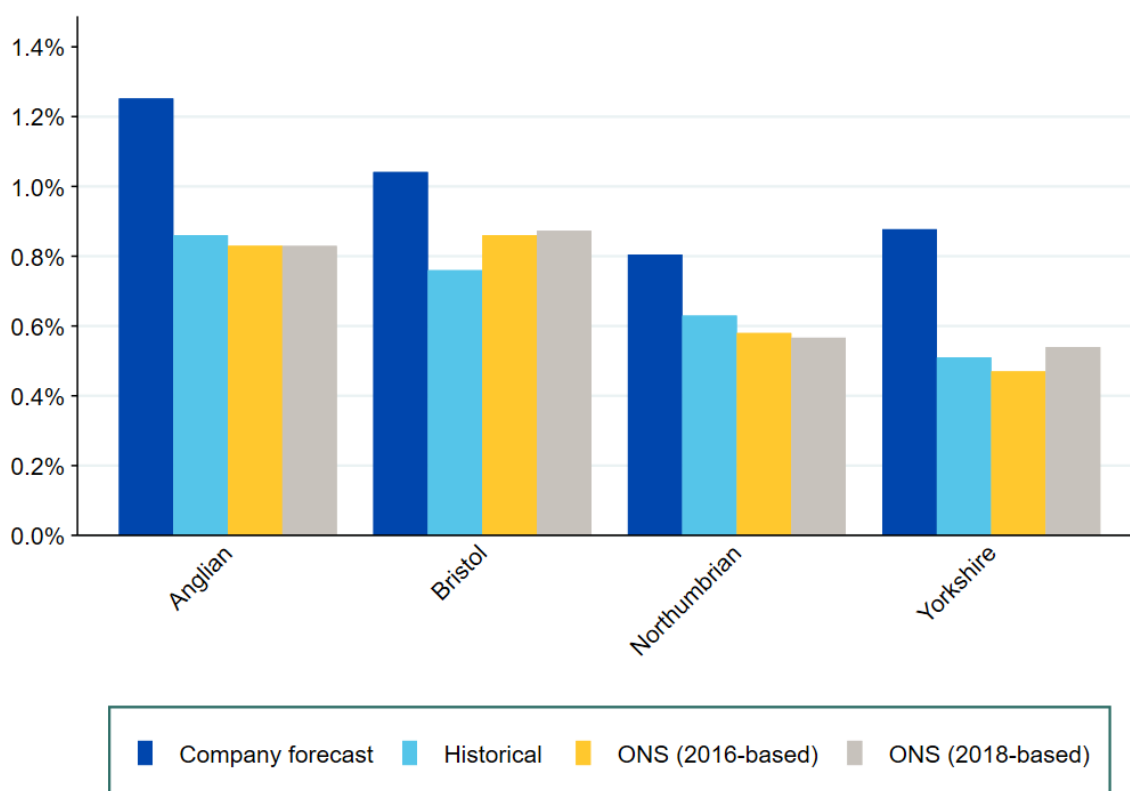
⁶⁴⁸ [Bristol's reply to Ofwat's response to Bristol's SoC, p61, paragraph 293](#)

⁶⁴⁹ [Dame Kate Barker submission, p2](#)

⁶⁵⁰ [East of England Local Government Association submission, pp1–2](#)

⁶⁵¹ ONS (2020), [Household projections for England: 2018-based](#), downloaded on 2 July 2020

Figure 4-5: Comparison of company forecasts, ONS household projections, and historical growth rates for wholesale water



Source: Ofwat (2019), FD models – [Base adjustment model & Feeder model 3](#), downloaded on 14 July 2020. Ofwat (2020), RFI 008 [Q5 response](#), p2. [Ofwat’s response to common issues in companies’ statements of case: Cost efficiency](#), pp40-41.

Provisional decision

4.493 We provisionally decide that we should use the ONS 2018-based projection for three main reasons:

- First, the comparison in Figure 4-4 of the companies’ forecasts and the actual outcomes shows the companies’ forecasts overestimated growth rates.
- Second, Figure 4-5 shows that the ONS 2016-based and 2018-based projections are relatively in line with the actual historical figures for all the Disputing Companies.⁶⁵² This increases our confidence that the ONS household growth projections are a practical and suitable source for growth forecast.

⁶⁵² The 2016-based ONS household projections were published too recently to allow us to carry out a comprehensive comparison of the ONS projections with the actual growth rates.

- Third, the CMA is not in a position to do a detailed review of the companies' forecasts and their adjustments to the local authority data. Any deep dives into companies' growth forecast would be impractical due to the degree of information asymmetry and unjustified when a suitable independent forecast is available and a true-up mechanism is used.

Should a growth true-up mechanism be used?

- 4.494 At PR19, Ofwat introduced the DSRA (Step D) true-up mechanism for the number of total connections.⁶⁵³ The DSRA adjusts companies' allowed revenues to reflect the difference between the forecasted and actual number of total connections.
- 4.495 Anglian said that the DSRA was inadequate as it did not capture broader related growth costs (eg enhancing sewage treatment works), only closely related growth costs (eg connecting the houses to the network).^{654, 655} Anglian said that this would risk underfunding growth.⁶⁵⁶
- 4.496 Anglian proposed a separate uncertainty mechanism to capture sewage treatment costs as they were not covered by the DSRA. Anglian said that the proposed mechanism ensured that if additional capacity was needed and delivered, Anglian could recover the funding for it. Anglian said that its proposed mechanism could be paired with third party assurance requirements (similar to those proposed by Ofwat for the Internal Interconnector Programme ODI) where investment decisions are assured as being in relation to a specific need and that the best value option for the customer has been selected.⁶⁵⁷
- 4.497 Anglian said that the company specific efficiency challenges applied on the DSRA unit rates were not based on sound evidence.⁶⁵⁸ Anglian said that the DSRA left cash flow risk with the companies.⁶⁵⁹

⁶⁵³ Developer Services Reconciliation Adjustment

⁶⁵⁴ [Anglian SoC](#), Chapter E.2: Growth, pp167–169

⁶⁵⁵ [Anglian's reply to Ofwat's response to Anglian's SoC](#), Part G: Reply to Ofwat's Response on Cost Issues, p38, paragraph 138

⁶⁵⁶ [Anglian's reply to Ofwat's response to Anglian's SoC](#), Part G: Reply to Ofwat's Response on Cost issues, p39, paragraph 142

⁶⁵⁷ [Anglian's reply to Ofwat's response to Anglian's SoC Part A: Review of Cost arguments](#), p43

⁶⁵⁸ [Anglian SoC](#), Chapter E.2: Growth, p168 paragraph 723

⁶⁵⁹ [Anglian's reply to Ofwat's response to Anglian's SoC Part A: Review of Cost arguments](#), pp42–43

4.498 Bristol said that the DSRA left cash flow risk with the companies and that the company specific efficiency challenge applied on the DSRA unit rates was outdated and Ofwat should have updated it.⁶⁶⁰

4.499 Yorkshire did not agree with the DSRA as the DSRA could result in significant bill fluctuation for future customers.⁶⁶¹

4.500 Ofwat said the following.

- Broadening the scope of the DSRA to include broader related growth costs would not better encourage timely and high-quality new connections as the mechanism already captured the closely related growth costs.⁶⁶²
- Costs related to enhancing sewage treatment works did not vary one-to-one with changes in the number of new connections.⁶⁶³
- The risk of incurring additional sewage treatment enhancement costs as a result of unexpected growth was lower than the risk of incurring closely related growth costs and could be mitigated by effective long-term planning.⁶⁶⁴
- Anglian's proposed uncertainty mechanism would lead to distortive incentives for the company and lead to sewage treatment capacity increases taking place during PR19 that were not originally planned.⁶⁶⁵
- The uncertainty mechanism could be challenging to implement effectively as determining the baseline level of capacity may be difficult.⁶⁶⁶
- It was appropriate to apply the base cost efficiency challenge to the DSRA unit rates as these were component of base costs.⁶⁶⁷
- All the companies' efficiency factors were based on their April 2019 business plans and it was clear that data submitted at later stage would not be used for modelling purposes.⁶⁶⁸

⁶⁶⁰ [Bristol's reply to Ofwat's response to Bristol's SoC](#), pp61–62, paragraphs 295 and 298

⁶⁶¹ [Yorkshire's reply to Ofwat's response to Yorkshire's SoC](#), pp92–94

⁶⁶² [Ofwat's response to Anglian's SoC](#), p81, paragraph 3.145

⁶⁶³ [Ofwat's response to Anglian's SoC](#), p82, paragraph 3.153

⁶⁶⁴ [Ofwat's response to Anglian's SoC](#), p82, paragraph 3.153

⁶⁶⁵ [Ofwat's response to Anglian's SoC](#), p83, paragraph 3.154

⁶⁶⁶ [Ofwat's response to Anglian's SoC](#), p83, paragraph 3.155

⁶⁶⁷ [Ofwat's response to Anglian's SoC](#), p81, paragraph 3.147

⁶⁶⁸ [Ofwat's response to Bristol's 27 May submission to the CMA](#), p17, paragraph 3.19

- 4.501 The Consumer Council for Water (Anglian) said the CMA should view the company's growth claim in the light of the reconciliation mechanism.⁶⁶⁹
- 4.502 We analysed the size of the costs not covered by the DSRA compared to the total growth costs. Based on all the 17 company business plans, growth at sewage treatment works are 25% of companies' requested growth totex.⁶⁷⁰ In addition, reducing properties' flooding risks are not covered by the DSRA. This expenditure is 19% of all the 17 companies' requested growth totex.⁶⁷¹

Provisional decision

- 4.503 The degree of forecasting uncertainty and the level of management control are important factors when determining whether the use of true-up mechanisms is justified.
- Forecasting uncertainty - there are greater advantages from a true-up when there is substantial forecasting uncertainty. In the case of growth expenditure, there are concerns over the use of ONS household projections. These concerns are further amplified by the forecasting uncertainty created by Brexit and COVID-19.
 - Management control - we should refrain from employing out-turn indices which are largely under management control as this could create incentive problems. The growth true-up mechanism can be applied without distorting incentives as the number of total connected properties is outside management control.
- 4.504 Given the forecasting uncertainty and low degree of management control over the number of new connection we provisionally decide that it is appropriate to use a true-up mechanism for growth.
- 4.505 Given the materiality of the growth costs at sewage treatment works (around 25% of growth expenditure) we provisionally decide that the scope of the true-up mechanism for growth should be expanded to cover total growth costs. We reject Anglian's proposal for an additional mechanism because it could distort management incentives and increase implementation complexity. We considered the merits of changing the unit rates using historical unit rates.

⁶⁶⁹ The Consumer Council for Water (Anglian) (2020), [Third Party submission](#), p15, paragraph 8.6

⁶⁷⁰ Calculation is based on the sum of total totex requested (£4,551m) for the five growth expenditure items and growth at sewage treatment works (£1,150m) for all the 17 companies. Ofwat (2019), [PR19 Draft Determination Securing cost efficiency: Technical Appendix](#), p15, table 2 and 3

⁶⁷¹ Reduce flooding risk for properties is £869m for all the 17 companies. Ofwat (2019), [PR19 Draft Determination Securing cost efficiency: Technical Appendix](#), p15, table 2 and 3

4.506 Table 4-18 shows the historical upper quartile unit rates used in the growth unit rate adjustment (Step B) and the forward-looking (business plan) unit rates used in the DSRA true-up mechanism (Step D).

Table 4-18: Historical upper quartile unit rates and forward-looking unit rates

	<i>Unit rates</i>	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
Water	Historical upper quartile	783	783	783	783
	Forward-looking	1,005	1,110	1,050	487
Wastewater	Historical upper quartile	1,715	-	1,715	1,715
	Forward-looking	841	-	360	354
Total	Historical upper quartile	2,498	783	2,498	2,498
	Forward-looking	1,846	1,110	1,410	841
	% difference	35%	-29%	77%	197%

Source: Ofwat (2019), Final adjustment models – [Base adjustment model](#), downloaded on 6 July 2020. Ofwat (2019), [Our approach to regulating developer services](#), pages 38 to 41. CMA analysis.

Note: The forward-looking unit rates are averages.

4.507 The historical upper quartile unit rates include closely related costs (eg connecting houses to the network) and broader related costs (eg enhancing treatment works) while the forward-looking unit rates capture only closely related growth costs. The broader related growth costs are less material in water as opposed to wastewater.⁶⁷²

4.508 For water, the historical upper quartile unit rate is lower than the forward-looking unit rates for Anglian, Bristol and Northumbrian. The difference between them is mainly due to the differences in the level of stretch and the fact that historical upper quartile unit rate is based on historical data while the forward-looking unit rates are based on business plans. In our view, the historical water upper quartile unit rate, derived from company data and including an appropriate efficiency challenge, provides adequate protection to the companies if there are more water connections than forecasted. As discussed in paragraph 4.478 the historical upper quartile unit rate provides an appropriate efficiency challenge.

4.509 For wastewater, the historical figures include considerable broader related growth costs (such as growth at sewage treatment works) while the forward looking figures do not include broader related growth costs. This explains why the historical upper quartile unit rate is substantially larger than the forward-looking rates for wastewater. In our view, the historical wastewater upper quartile unit rate provides adequate protection to the companies by funding

⁶⁷² Ofwat (2019), [PR19 Draft Determination Securing cost efficiency: Technical Appendix](#), p15, table 2 and 3

the total wastewater growth costs if there are more wastewater connections than forecasted.

4.510 Based on the evidence above, we provisionally decide that historical upper quartile growth rates, which cover total growth costs, are more appropriate.

4.511 To take account of future productivity gains and to keep the growth costs approach consistent with other base costs, we provisionally decide to apply a frontier shift and RPEs to the historical growth costs. This decreased the unit rates and the figures are in Table 4-19 below.

Table 4-19: Historical upper quartile unit rates with frontier shift and RPEs

Sector	Year				
	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025
Water	773	769	765	761	757
Wastewater	1695	1685	1676	1668	1660
Total	2468	2454	2441	2429	2417

Source: CMA analysis.

4.512 We are considering applying an asymmetric true-up mechanism. Asymmetry would mean that lower unit rates would apply to negative than to positive true-up adjustments. This asymmetry would be on the basis that the majority of growth costs at sewage treatment work is not avoided when growth falls below forecast due to longer-term planning commitments. At this stage we are consulting main and third parties and seeking further information to understand whether we can implement it without overfunding companies.

Should Anglian's growth cost adjustment be accepted?

4.513 As part of its work assessing growth costs, Ofwat considered whether it should allow Anglian additional funding because there were atypical cost factors which were not captured by Ofwat's modelling approach.

4.514 Anglian said there were three factors which justified an additional growth allowance: (i) length of communication pipe, (ii) growth intensity and (iii) growth remoteness.⁶⁷³ Anglian submitted case studies to support its claim.

⁶⁷³ Anglian (2019), [DD Deep dive on growth expenditure](#), pp10–17. Length of communication pipe is related to onsite growth costs while the other two are related to offsite growth costs. We note that for onsite costs Anglian mentioned development site ground surface types and self-lay penetration as other factors that drive costs. For development site ground surface type, Anglian said that there is no information that this cost driver varies significantly between companies, so it did not provide further information on it in its deep dive document. For self-lay penetration, Anglian said that the nature of causation as a cost driver was unclear, so it did not provide further information on it in its deep dive document.

Length of communication pipe

- 4.515 Anglian said that detached houses required longer communication pipes (ie the pipe between the house and the main), which increased the cost of connection relative to flats which required shorter length pipes to connect.
- 4.516 Anglian said that it had a high proportion of detached housing and a low proportion of flats. Anglian's share of detached houses relative to other companies was third highest out of 18 for water and fourth highest out of ten for wastewater.⁶⁷⁴ For water its share of detached houses was 36%, compared to the industry average of 26%.⁶⁷⁵ For wastewater, its share of detached houses was 35% compared to the industry average of 29%. Anglian's share of flats relative to other companies was the lowest from 18 for water and ninth lowest from ten for wastewater.⁶⁷⁶
- 4.517 Anglian estimated it was 36% more expensive to connect a detached house than a flat.⁶⁷⁷ Overall, around 10% of Anglian's growth expenditure (around £60 million) is related to site-specific mains and 30% of its expenditure is related to onsite costs.⁶⁷⁸
- 4.518 Anglian's consultant, Vivid Economics, did not use property type in its preferred stand-alone growth models.
- 4.519 Ofwat said that it was not convinced that a relatively high proportion of detached houses as a percentage of total new connections, was a material factor that required an adjustment.⁶⁷⁹ Ofwat said that Anglian did not provide quantitative evidence to show its modelled allowance did not capture this specific factor.

Provisional decision

- 4.520 There is some evidence that Anglian has a higher proportion of detached houses. However, in our view it is not a material factor because:
- The length of communication pipe is partly captured by the base models, for example, through the population density variable. Based on Anglian's

⁶⁷⁴ Anglian (2019), [DD Deep dive on growth expenditure](#), pp12–13

⁶⁷⁵ Anglian (2019), [DD Deep dive on growth expenditure](#), pp12–13

⁶⁷⁶ Anglian (2019), [DD Deep dive on growth expenditure](#), pp12–13

⁶⁷⁷ Anglian (2019), [DD Deep dive on growth expenditure](#), p26

⁶⁷⁸ Site-specific mains. [Anglian's reply to Ofwat's response to Anglian's SoC](#), Part G: Reply on Cost arguments, p36, Table 7, Site-specific mains costs is £60 million, total costs is £624 million. Anglian (2019), [DD Deep dive on growth expenditure](#), p23. £168.9m DD response costs and £179.6m bottom up approach.

⁶⁷⁹ Ofwat (2019), [Anglian Water – Cost efficiency additional information appendix](#), pp21–22

figures, companies operating in less densely populated areas have a higher proportion of detached houses.⁶⁸⁰

- Anglian is not a clear outlier in its rankings – other regulated companies have a higher proportion of detached houses, although they do not have lower proportion of flats.
- These costs only relate to a subset of the growth expenditure.

4.521 Therefore, we provisionally decide not to provide an additional allowance to Anglian for the length of its communication pipes.

Growth intensity

4.522 Growth intensity refers to the quantity of growth relative to the pre-existing asset base. Intense growth is more likely to cause the design capacity of existing assets to be exceeded. Anglian said that its ranking relative to other water companies in growth intensity was fourth highest out of 18 for water and third highest out of ten for wastewater.⁶⁸¹

4.523 Anglian's adviser, Vivid said that growth intensity and growth unit rate adjustment captured different factors. Vivid said that growth intensity referred to the quantity of growth relative to the pre-existing local asset base and not simply to the volume of growth.

4.524 Ofwat said that it made an upward adjustment at final determination to address this issue and compensated companies with a high forecast of population growth.⁶⁸² Ofwat said that the DSRA true-up mechanism significantly reduced Anglian's risk exposure by allowing it to recover additional revenues if its out-turn growth was higher than forecast.

Provisional decision

4.525 Our view is that growth intensity will be captured by the growth unit rate adjustment (Step B) and the DSRA true-up mechanism (Step D) that we provisionally decide to use. We provisionally decide that Anglian should receive additional allowance in Step B (see paragraph 4.478). We also provisionally decide to expand the DSRA true-up mechanism to adjust companies' allowed revenues for growth costs including growth at sewage

⁶⁸⁰ Anglian (2019), [DD Deep dive on growth expenditure](#), pp12–13

⁶⁸¹ Anglian (2019), [DD Deep dive on growth expenditure](#), p16–17

⁶⁸² Ofwat (2019), [Anglian Water – Cost efficiency additional information appendix](#), pp21–22

treatment works. Therefore, we provisionally decide not to provide an additional allowance for growth intensity.

Growth remoteness

- 4.526 Anglian said that its growth was occurring in more remote areas, increasing offsite reinforcement costs, including pumping stations, water mains and water treatment. Anglian's remoteness variable showed the average distance between growth sites and the nearest towns and its relative ranking in growth remoteness compared to other water companies was highest out of 18 for water and highest out of ten for wastewater.⁶⁸³
- 4.527 Vivid said that Ofwat's models did not capture growth remoteness and Ofwat's density variables were only weakly correlated with Vivid's remoteness variable. Vivid used a sparsity variable (concentration of growth in sparsely populated areas) in its preferred wastewater model. Vivid said that this variable captured the effect of remoteness.
- 4.528 Ofwat said that Anglian failed to consider whether this factor was already captured in the econometric base models.⁶⁸⁴ It said that Anglian did not test its remoteness variable in its base model to assess whether these factors were already captured.⁶⁸⁵ Ofwat said that Anglian failed to quantify the economies of scale associated with working on large developments, which might mitigate any increase in costs for distance from existing assets.⁶⁸⁶

Provisional decision

- 4.529 Our view is that the range of density variables in the base models adequately capture the fact that Anglian operates predominantly in rural and agricultural areas and compensate Anglian for higher growth expenditure. We are not convinced that we should consider either sparsity or distance from towns as additional factors that capture remoteness on top of what is already captured by Ofwat's density variables. Therefore, we provisionally decide not to provide an additional allowance for growth remoteness.

⁶⁸³ Anglian (2019), [DD Deep dive on growth expenditure](#), p15

⁶⁸⁴ Ofwat (2019), [Anglian Water – Cost efficiency additional information appendix](#), pp21–22.

⁶⁸⁵ [Ofwat's response to Anglian's 27 May submission to the CMA](#), p12, paragraph 2.23

⁶⁸⁶ Ofwat (2019), [Anglian Water – Cost efficiency additional information appendix](#), p22

CMA approach to growth

4.530 We provisionally decide to take a similar approach to that adopted by Ofwat as no superior approaches have been suggested to us and we have not found any better alternatives.

- We use similar integrated growth models with the same four steps as Ofwat.
- We use ONS household growth rate projections, but use the updated 2018 release, rather than the 2016 data Ofwat used. The growth unit rate adjustment is based on the difference between the ONS projections used and the average historical growth rate in the sector. Therefore, using the updated ONS projections affected this adjustment. In itself this changes the companies allowances by -£3.3 million for Anglian, +£0.2 million for Bristol, +£4.7 million for Northumbrian and +£9.3 million for Yorkshire.
- We reject Anglian's request for a cost adjustment.

4.531 We provisionally decide to take an approach that differs in the following ways from Ofwat's approach:

- We calculate the downward growth unit rate adjustment (Step B) in the same way as the upward growth unit rate adjustment. This contrasts with Ofwat's approach, which was to halve this figure. In itself this changes the Northumbrian and Yorkshire allowance by -£26.4 million and -£34.7 million, respectively.
- We expand the DRSA true-up mechanism (Step D) to capture total growth costs.
- We apply a frontier shift and RPEs to the growth unit adjustment and the expanded DSRA mechanism. Applying the frontier shift and RPEs to the growth unit rate adjustment by itself changes the companies' allowances by -£0.9 million for Anglian, -£0.1 million for Bristol, +£0.6 million for Northumbrian and +£0.8 million for Yorkshire.

4.532 These changes result in different cost allowances for the four companies which are summarised in Table 4-20 below.

Table 4-20: Changes in base cost allowances for growth (water and wastewater)

	£m			
	<i>Updating ONS projection in the growth unit rate adjustment</i>	<i>Full downward growth unit rate adjustment</i>	<i>Frontier shift and RPEs on growth unit rate adjustment</i>	<i>Combined changes in growth allowance</i>
Anglian	-3.3	0	-0.9	-4.1
Bristol	0.2	0	-0.1	0.1
Northumbrian	4.7	-26.4	0.6	-16.0
Yorkshire	9.3	-34.7	0.8	-14.9

Source: CMA analysis.

Note: The combined change is not the sum of the separate changes as these are interdependent parts.

Adjustment for enhancement opex

Introduction

4.533 Ofwat's approach to setting prices for the water industry in PR19 relied on appropriately setting a total expenditure (totex) allowance for companies for the period 2020–2025.⁶⁸⁷ In assessing the totex allowance Ofwat sought to assess enhancement cost allowances and base cost allowances separately.

4.534 Ofwat's historical data collection approach contained no distinction between base operating expenditure (opex) and enhancement opex.⁶⁸⁸ This meant that the opex included in historical costs, which Ofwat used to model base costs, included both base opex and enhancement opex. Ofwat's allowance for modelled base costs therefore implicitly included an allowance for enhancement opex, taking it beyond base costs.⁶⁸⁹ Since Ofwat set separate allowances for base costs and enhancement activities, Ofwat's cost allowance could double count the enhancement opex if an adjustment was not applied.

4.535 In reaching our provisional decision on the approach to the opex enhancement adjustment we have assessed Ofwat's approach to making an adjustment to the implicit opex enhancement allowance, and concerns with this approach raised by Bristol. The other disputing companies did not raise this as an issue.

Ofwat PR19 approach to enhancement opex

4.536 With a view to avoid double counting enhancement opex, Ofwat estimated the implicit enhancement opex allowance in its base models and subtracted this

⁶⁸⁷ See Ofwat (2019), [Securing Cost Efficiency Technical appendix](#), p11 for details of overall approach.

⁶⁸⁸ Ofwat (2019), [Securing Cost Efficiency Technical appendix](#), p38

⁶⁸⁹ Base costs include Opex and Capex as well as some enhancements which can be modelled appropriately.

estimate from companies' base allowance.⁶⁹⁰ In this section we summarise Ofwat's approach.

- 4.537 Ofwat relied on an estimate for its adjustment rather than using actual historical costs for each company because of limitations in the available cost data. Ofwat did not collect data for opex enhancements before 2017–2018 and it also stated that it did not have fully comparable data from all companies even for the period it did collect data. Ofwat stated that the responses it received from companies confirmed its concerns regarding data comparability for some companies.
- 4.538 To calculate its estimate, Ofwat took a top down approach by using six companies' data (five WASCs and one WOC) that it said reported enhancement opex on the same clear and comprehensive basis for 2017–18.⁶⁹¹
- 4.539 Ofwat stated that it was reasonable to use 2017–18 as an 'average' year for enhancement opex because it was halfway through the 2015–20 period and therefore a reasonable proxy for the average of the period. Ofwat stated that this was because enhancement opex would typically increase year on year after the base year at the beginning of the period and data for the full period was not available.⁶⁹²
- 4.540 Ofwat estimated the enhancement opex allowance separately for water and wastewater by taking the enhancement opex reported by six (five for wastewater) companies.⁶⁹³
- 4.541 Ofwat aggregated the relevant historical enhancement opex cost categories for 2017–2018 for the companies in its sample.⁶⁹⁴ Ofwat then added the 2017–18 costs for the same six companies for all categories of totex that went into the base models. Using these figures, it calculated the proportion of enhancement opex in modelled base costs. This is therefore a weighted average of the six companies' costs.
- 4.542 Ofwat broke down the enhancement opex further by looking at data for the spend for the sub-categories in both water and wastewater. For example,

⁶⁹⁰ Ofwat (2019), [Securing cost efficiency technical appendix](#), p42, and for full details of Ofwat's calculations see [Enhancement opex implicit allowance feeder model](#).

⁶⁹¹ Ofwat (2019), [Securing cost efficiency technical appendix](#), p38

⁶⁹² Ofwat (2019), [Securing cost efficiency technical appendix](#), p38

⁶⁹³ Ofwat (2019), [Securing cost efficiency technical appendix](#), p42

⁶⁹⁴ Ofwat (2019), [Securing cost efficiency technical appendix](#), p39 - Ofwat excluded some cost categories which were included in the base modelling such as 'new connections'.

calculating the percentage of wholesale water enhancement opex attributable to water resources. These final proportions are shown in Table 4-21 below.

Table 4-21 - Final AMP7 assumptions of enhancement opex implicit allowance as % of wholesale modelled base costs (plus growth)

					%
<i>Company</i>	<i>Water Resources</i>	<i>Water network plus</i>	<i>Bioresources</i>	<i>Waste N+</i>	
Estimated implicit allowance	0.3	0.8	0.0	0.3	

Source: Ofwat: [Enhancement Opex implicit allowance Feeder Model](#) (rounded to 1dp)

4.543 Ofwat calculated the enhancement opex implicit allowance by applying the historical opex proportion calculated for each of the water and wastewater controls to each company's 2020-25 base allowances for each control, and subtracted this from each company's base cost allowances.⁶⁹⁵

Methodological issues raised

4.544 In this section we set out the concerns raised by Bristol in relation to the enhancement opex adjustment, Ofwat's response to the concerns and then discuss our own review and assessment of the issue.

Bristol's Concerns

4.545 Bristol raised concerns with Ofwat's approach to the opex enhancement adjustment. Bristol said that Ofwat deducted more enhancement opex from its base cost allowance than it proposed in its business plan and that Ofwat's approach gave rise to a material reduction in its base cost allowance. It stated that this was not a reasonable outcome.⁶⁹⁶

4.546 Bristol also stated that a possible reason Ofwat had deducted more enhancement opex from its base allowance than was in its business plan was because Ofwat's approach only considered gross enhancement opex. Bristol stated that some investments gave rise to opex costs, while others reduced opex costs. It said that by only considering the cost increases, Ofwat overstated the extent that base cost allowances should be reduced.⁶⁹⁷

⁶⁹⁵ See Feeder model 4, https://www.ofwat.gov.uk/wp-content/uploads/2019/12/FM_WW4_FD.xlsx and https://www.ofwat.gov.uk/wp-content/uploads/2019/12/FM_WWW4_FD.xlsx

⁶⁹⁶ Bristol SoC, p133–134

⁶⁹⁷ Bristol SoC, p133

4.547 Bristol suggested that to resolve this issue the adjustment should be capped at the level of enhancement opex included in its business plan for PR19.⁶⁹⁸

Ofwat response

4.548 Ofwat said that the value of the enhancement opex implicit allowance was a reflection of the proportion of enhancement opex included in the historical period of its wholesale base models.⁶⁹⁹ Ofwat said that it did not represent an assessment of the enhancement opex the company included in its 2020–25 plan (which it assesses separately). It stated that it would therefore be inappropriate to apply such a cap.⁷⁰⁰

CMA Assessment

4.549 We have provisionally decided that the adjustment should not be linked to PR19 business plans and capping on this basis would be inappropriate. This is in line with our wider approach on base costs, where we have provisionally decided to rely on benchmarking costs against other companies rather than conducting a bottom up assessment of each companies' business plans.

4.550 Having provisionally decided to rely on benchmarking via econometric modelling to set base costs we do not think making an adjustment based on forward looking costs would be appropriate. This is because the adjustment is unrelated to the forward assessment of enhancement costs.⁷⁰¹ The adjustment is designed to remove from the modelled allowance the impact of historical enhancement expenditure. This impact leads to firms' modelled cost allowances being greater than they would if only base costs were used as data inputs.

4.551 We investigated whether a cap using each company's historical enhancement spend would be appropriate. We have provisionally decided this would not be appropriate as the modelled cost allowance is based on averages across all companies. Examining individual historical expenditure and applying this level as an adjustment would not capture the impact of other companies' historical expenditure in the model. For example, even if a company itself historically had low or zero enhancement expenditure its cost allowance will likely be increased by the historical enhancement opex of other companies included in the base cost modelling.

⁶⁹⁸ Bristol SoC, p133–136

⁶⁹⁹ Ofwat's response to Bristol's SoC, p13, p28 and p62

⁷⁰⁰ Ofwat's response to Bristol's SoC, p13, p28 and p62

⁷⁰¹ See Section 5 for further discussion of enhancement costs.

- 4.552 In relation to Bristol's point on net/gross opex we have reviewed Ofwat's methodology queries and responses document, and the underlying clarification responses from the six water companies used in the historical cost allowances. Having reviewed this evidence we have concluded that company submissions used by Ofwat were submitted on a net basis in line with the approach requested by Bristol.⁷⁰² Therefore it does not appear that the issue raised by Bristol occurs in practice.
- 4.553 As part of our assessment we also explored whether using an alternative estimate based on the data available would be appropriate and considered whether:
- it would be more appropriate to use the data submitted by all companies;
 - it would be more appropriate to include a further year of data in the calculation of the estimate covering 2018-2019; and
 - it would be more appropriate to uplift Ofwat's estimate based on the data Ofwat put forward in its final determination for the period 2005–10 (for which data was available).
- 4.554 Given the relatively small scale of this adjustment we decided it would not be proportionate to require new historical cost data to be produced to ensure consistency. We have provisionally decided that Ofwat's approach of using only the six companies with fully comparable data including is appropriate due to the inconsistency of the data in the other submissions.
- 4.555 We have also provisionally decided that it is appropriate to retain 2017/2018 as the benchmark year, given that the central year in the period is more likely to provide an unbiased estimate. This is because the evidence suggests that enhancement opex increases in a relatively linear way over the control period. We do not have data showing how enhancement opex changed over AMP6, however Ofwat provided a chart which showed water companies' forecasts for enhancement opex over AMP7. This showed that across almost all the 12 companies there was a relatively constant increase over the duration of the control period.
- 4.556 Ofwat also stated that the available data for 2005–2010 suggested an estimate for enhancement opex between 1.5% and 2.3% for the period.⁷⁰³ This could suggest that the implicit opex enhancement could be substantially higher than the estimates Ofwat used in PR19.⁷⁰⁴ We have provisionally

⁷⁰² Ofwat (2018), [PR19 methodology queries and answers](#) – ref 206

⁷⁰³ Ofwat (2019) – [Final determination securing cost efficiency technical appendix](#), p42

⁷⁰⁴ Ofwat (2019) – [Final determination securing cost efficiency technical appendix](#), p42

decided not to uplift the adjustment based on this evidence. This is because there is uncertainty as to the extent to which enhancement opex varies between control periods and there may be some enhancement opex which continues at the end of the period.

Our provisional decision on opex enhancement adjustment

- 4.557 Our provisional decision is to apply an adjustment to cost allowances using the same approach as that used by Ofwat in its PR19 final determination.
- 4.558 We acknowledge that given the data limitations for our determination the estimate of the adjustment is imprecise and due to the different correlations in the model there might be Disputing Companies which benefit or are worse off due to the adjustment. However, given the relatively small scale of the adjustment,⁷⁰⁵ the gains or losses are likely to be relatively small and further mitigated by the cost sharing mechanism.
- 4.559 Our provisional view is that collecting the full data across all water companies retrospectively for our determination would not be proportionate as it would impose substantial burden on the water companies. We encourage Ofwat to collect data for its next determination which allows it to separate base costs from enhancement costs and remove the need for any such adjustment in future reviews.

Anglian cost adjustment claims

- 4.560 In this section we discuss two of Anglian's cost adjustment claims: capital maintenance and sludge transport. We discuss Anglian's other cost adjustment claims in paragraphs 4.513 to 4.521, 5.367 to 5.424 and Section 8.

Capital maintenance

- 4.561 In its submissions to the CMA, Anglian made various arguments on capital maintenance and base cost modelling, with some arguments focused on Anglian's specific circumstances.⁷⁰⁶ Anglian said that it should receive additional base funding to, amongst other things, reflect drivers of increased expenditure, such as new service obligations and higher capital maintenance

⁷⁰⁵ Impact is less than 1% of totex for all disputing companies.

⁷⁰⁶ This section focuses on arguments in relation to the Anglian specific arguments on capital maintenance. Arguments relating to the econometric modelling are dealt with in paragraphs 4.150 to 4.181.

needs.⁷⁰⁷ We have interpreted this to include a request that the CMA consider whether Anglian should receive a cost adjustment to account for higher capital maintenance costs.

4.562 Anglian submitted a cost adjustment claim of £187 million to Ofwat based on its business plan forecasts.⁷⁰⁸ It said that it needed to maintain service levels while assets deteriorated, operate and maintain a larger asset base and maintain and raise service standards. Anglian said that these costs were not addressed by the backward-looking econometric model.

4.563 Ofwat said it rejected Anglian's capital maintenance cost adjustment claim for the following reasons.

- Ofwat said that it was appropriate to focus on forward looking risk assessments to account for the long-term nature of maintenance investments and if the evidence suggested a material increase in capital costs this could be addressed through a cost adjustment claim. If not, Ofwat's econometric model accounted for future cost drivers (eg through increases in the length of mains).⁷⁰⁹
- Ofwat said that Anglian's claim referred to relatively young assets, eg plastic pipes installed in the 1960s and 1970s.⁷¹⁰
- Ofwat said that Anglian's claim that changes to accounting standards, specifically relating to IT equipment moving from Capex to Opex, led to it being underfunded, were not substantiated.⁷¹¹
- Ofwat said that Anglian's claim of increased capital maintenance costs to maintain high performance levels was unfounded. Ofwat said that the evidence suggested that companies were able to achieve good performance on outcomes and costs efficiency and therefore Ofwat did not provide an extra cost allowance.⁷¹²

4.564 Anglian said that its capital maintenance costs had increased during AMP6 and would increase further going forward. In 2011 Anglian was required by the Water Industry Regulations 2011 to take over 1,200 wastewater pumping

⁷⁰⁷ Specifically, Anglian states that there is a gap in its base funding and that the CMA should adjust Ofwat's base models to include drivers of base including capital maintenance. [Anglian SoC](#), p126.

⁷⁰⁸ Ofwat (2019), [PR19 final determinations Anglian Water - Cost efficiency additional information appendix](#), p5.

⁷⁰⁹ Ofwat (2019), [PR19 final determinations Anglian Water - Cost efficiency additional information appendix](#), p22.

⁷¹⁰ In the CMA's Bristol PR14 Determination the CMA decided not use an age of main cost-drive because of uncertainty around the argument (older sewers may be higher quality) and concerns about the quality of the data (see [Bristol Redetermination Appendices 1.1–4.3](#)).

⁷¹¹ Ofwat (2020), [PR19 Final Determinations - Anglian Water Cost efficiency additional information appendix](#), p7

⁷¹² Ofwat (2020), [PR19 Final Determinations - Anglian Water Cost efficiency additional information appendix](#) p7

stations as well as 31,200km of private sewers. This led to an increase in base and enhancement Capex in the first four years of AMP6.⁷¹³ In addition, Anglian planned £19 million of capital maintenance, which it included in base Capex.

- 4.565 Ofwat said that Anglian's cost-adjustment claim was insufficiently evidenced and that Anglian had sufficient allowance to maintain and secure the resilience of its assets.⁷¹⁴ Ofwat also said that Anglian forecasted it would reduce its capital maintenance spend for the 2015-2020 period.⁷¹⁵
- 4.566 Ofwat said it recognised there had been recent changes in accounting rules. Ofwat said that Anglian had not provided convincing evidence that the requested increase in cost allowance could be attributed to increasing capital maintenance needs.⁷¹⁶ Ofwat said that its approach provided an allowance for the adoption of private sewers and pumping stations because those assets were included in the base cost model.⁷¹⁷
- 4.567 Anglian said that, in contrast to Ofwat's statement, Anglian had forecast higher capital expenditure than historical levels, with base forecast to increase by 1.9%.⁷¹⁸ Anglian also said that Ofwat's rejection of this evidence was based on a misunderstanding of two particular lines within its capital maintenance expenditure business plan. Taking those two lines into account, the planned capital maintenance expenditure would increase by £86 million between AMP6 and AMP7.⁷¹⁹
- 4.568 Anglian said that companies' long-term capital maintenance requirements were not constant over time.⁷²⁰
- Statutory standards had increased and Ofwat did not include quality of service in its base modelling, which meant it failed to account for future spend.⁷²¹

⁷¹³ [Anglian SoC](#), p72

⁷¹⁴ [Ofwat's response to Anglian's SoC](#), paragraph 1.28

⁷¹⁵ [Ofwat's response to Anglian's SoC](#), paragraph 1.30

⁷¹⁶ [Ofwat's response to Anglian's SoC](#), paragraph 1.31

⁷¹⁷ [Ofwat's response to Anglian's SoC](#), p43.

⁷¹⁸ [Anglian's reply to Ofwat's response to Anglian's SoC](#), Part G, p16

⁷¹⁹ The first cost line was shifting costs from Capex to Opex solutions, however the maintenance of the activity is the same. The second was Anglian moving IT costs from Capex to Opex. In the past Anglian had owned its IT infrastructure. However, with the move to cloud computing this was no longer the case.

[Anglian's reply to Ofwat's response to Anglian's SoC](#), Part G, p16–17

⁷²⁰ Anglian also made arguments relating to growing asset age and health, which we covered in the previous section. See paragraphs 4.150 to 4.181.

⁷²¹ [Anglian's reply to Ofwat's response to Anglian's SoC](#), Part G, p21

- Increased investment, including service reliance and flood barriers, meant higher maintenance costs.⁷²²

4.569 Anglian said that due to past enhancement spending capital maintenance requirements were increasing.

- The industry asset base was growing over time, and therefore its capital maintenance costs were growing. It provided evidence that there was an upward trend in capital maintenance spend.⁷²³
- There was an increasing reliance on high-tech short-lived assets, which had higher maintenance costs. For example, Anglian had replaced a concrete water tank-based water treatment system with an ultrafiltration membrane system. The new system increased water quality but needed more frequent maintenance.⁷²⁴
- Its modelling work showed capital maintenance spend would increase.⁷²⁵

4.570 Anglian said that it was reasonable to conclude that historical levels of capital maintenance would not be sufficient in future AMPs to ensure the continued serviceability of Anglian's asset base.⁷²⁶ In addition, Anglian said that Ofwat failed to engage with Anglian's evidence provided on the impact of resilience.⁷²⁷

4.571 In response Ofwat said that Anglian was not uniquely affected by technological change relative to other companies.⁷²⁸ On the move to shorter asset life, Ofwat said that this indicator was under management control and was also driven by other factors, including the smaller site footprints.⁷²⁹ Ofwat said that it had engaged with the evidence provided by Anglian on capital maintenance requirements and concluded that the evidence provided was insufficient.

Provisional decision

4.572 We provisionally find that the majority of Anglian's capital maintenance arguments relate to industry-wide considerations. For example, Anglian

⁷²² Anglian's reply to Ofwat's response to Anglian's SoC, Part G, p22

⁷²³ Anglian's reply to Ofwat's response to Anglian's SoC, Part G, p21

⁷²⁴ Anglian's reply to Ofwat's response to Anglian's SoC, Part G, p23

⁷²⁵ Anglian's reply to Ofwat's response to Anglian's SoC, Part G, p24–26

⁷²⁶ Anglian's reply to Ofwat's response to Anglian's SoC, Part G, paragraph 102

⁷²⁷ Anglian's Reply to Ofwat's Response, paragraph 114

⁷²⁸ Ofwat also said that the approach to capital maintenance had improved compared to historical approaches.

⁷²⁹ Ofwat's Further Submission, p16

provided evidence of increasing industry capital maintenance spend. We have addressed these issues in paragraphs 4.150 to 4.181.

- 4.573 We considered Anglian's argument that its asset base had increased, partly due to taking over additional assets. We found that this will be reflected in an increase in the scale variables in the econometric model and therefore Anglian's cost allowances would increase as its asset base increased.
- 4.574 Anglian may have a different capital maintenance profile to other companies and its evidence suggests an increase in capital maintenance costs since AMP6. However, this does not necessitate an increase in Anglian's base totex. For instance, Anglian's IT platform example demonstrates that the level of capital maintenance is closely linked to other aspects of expenditure, such as opex. While levels of capital maintenance may increase, there could also be a corresponding decrease in base opex. This is what we would expect if a company is seeking to reduce their overall costs. In fact, we would expect that, if companies are seeking to operate efficiently, the overall effect would be a reduction in whole life totex from the use of these shorter-life assets, and so there would be no justification for making an adjustment for higher capital maintenance.
- 4.575 For the reasons describe above we provisionally decide not to allow Anglian a cost adjustment for capital maintenance. In our provisional view Anglian's projected increase in its capital maintenance costs are allowed for by the base cost model.

Sludge transport

- 4.576 Anglian requested that the CMA adjust Ofwat's base models to reflect factors such as quality and topography or overlay cost adjustments to account for these factors.⁷³⁰ We therefore considered whether Anglian's cost adjustment for sludge transport should be allowed.
- 4.577 Anglian said that this investment was needed because it cost Anglian more than other companies to move raw sludge because it covered a large, sparsely populated area and it needed to move sludge to advanced anaerobic digestion sites.⁷³¹ Anglian requested £41.6 million at Ofwat's draft determination.⁷³²
- 4.578 At draft determination, Ofwat rejected this claim for three reasons.

⁷³⁰ [Anglian SoC](#), p108, paragraph vii

⁷³¹ Anglian (2019), [PR19 Draft determination sludge transport cost adjustment claim](#), table 1

⁷³² Ofwat (2019), [Cost adjustment claims feeder model](#), sheet BIO_sludge

- First, since the initial assessment of plans, Ofwat had reviewed the bioresources models and included a new variable: the proportion of load treated in size bands one to three. This variable controlled for the size of the treatment works and higher sludge transport costs were associated with smaller treatment works.
- Second, Anglian had easier access than all other companies to arable land because of its geography. Ofwat did not find any evidence that Anglian had accounted for the benefits of its geography to offset its claim.
- Third, Anglian's business plan demonstrated a lack of engagement with trading bioresources. Bioresource trading had the capacity to reduce sludge transport costs, and Ofwat did not see evidence that Anglian had taken any initiatives to maximise efficiency savings in this area.⁷³³

4.579 Following this, Anglian reduced the request to £17.6 million to reflect improved efficiency and allowances included in the base models. At final determination, Ofwat rejected the Anglian claim of £17.6 million because it now fell below Ofwat's materiality thresholds.⁷³⁴

Provisional decision

4.580 Anglian did not submit additional information to support its case on sludge transport. The application of materiality thresholds here is sensible and pragmatic, given the need to prioritise resources and that companies are only likely to raise complaints about cost allowances and not report where they benefit from cost allowances. Furthermore, any deep dive into Anglian's cost adjustment claim would be impractical due to the degree of information asymmetry between the companies and the CMA. Therefore, we provisionally decide to reject the Anglian claim.

Unmodelled costs

4.581 In this section we discuss our consideration of costs that were not covered in Ofwat's base models which it refers to as 'unmodelled costs'. Despite the fact that some of these costs were to some extent modelled, just not in the base costs model, we adopt the term for the purposes of the analysis. The section is structured as follows:

⁷³³ Ofwat (2019), [Cost adjustment claims feeder model](#), sheet BIO_sludge

⁷³⁴ Ofwat (2019), [Technical Appendix 2: Securing cost efficiency](#), p23 and Ofwat (2019), [Cost adjustment claims feeder model](#), sheet BIO_sludge

- (a) We summarise Ofwat's general approach in PR19.
- (b) We discuss cross-cutting issues which apply across the range of these cost categories and set some general principles we will apply.
- (c) We explore the approach taken to specific categories of unmodelled costs, set out the arguments of parties and explain the CMA's provisional determination on the issue.

Ofwat's PR19 approach

4.582 Ofwat's base cost modelling approach covers most but not all of the costs a WOC or WASC may incur as part of its general operations under base expenditure. As set out above, the costs which are not included in the base cost models are referred to as 'unmodelled costs'. Ofwat described these as 'a small number of items whose particular characteristics make them more suitable for a separate assessment'.⁷³⁵

4.583 For PR19, Ofwat considered that unmodelled costs included, inter alia, abstraction and discharge service charges (water service only), business rates; costs associated with the Traffic Management Act 2004 (TMA) and wastewater Industrial Emissions Directive costs (wastewater service only). On most of these items, Ofwat scrutinised the costs water companies submitted by reference to historic costs, before applying a frontier shift efficiency factor⁷³⁶. On business rates, Ofwat then provided a reconciliation mechanism to allow a company to recover 75% of any costs in excess of its PR19 cost allowance, or allow customers to recover 75% of the amount by which its costs are lower than PR19 allowances⁷³⁷.

Disputing Companies

4.584 The Disputing Companies raised a series of concerns, both general and company-specific, about how unmodelled costs had been treated. They asked CMA to look again at these costs and ensure they were they were adequately reflected in the determination.

⁷³⁵ Ofwat [PR19 Final Determinations, securing cost efficiency technical appendix](#), p13

⁷³⁶ Ofwat [PR19 Final Determinations, securing cost efficiency technical appendix](#), p43

⁷³⁷ Ofwat [PR19 Final Determinations, securing cost efficiency technical appendix](#), p46

Part A: Cross-cutting issues

Application of frontier shift to unmodelled costs

4.585 All four Disputing Companies objected to the application of the frontier shift productivity challenge to unmodelled costs. This issue was addressed at paragraphs 4.378-4.387.

Risk exposure

4.586 Where a company exceeds its unmodelled costs allowances in AMP7, Ofwat's FD included a 75/25 cost-sharing approach for the recovery of these costs – that is, 25% of the overrun to be funded by the company, 75% of the cost to be passed through to customers. Conversely, if the company underspends, it passes 75% of the savings to customers, but shareholders capture a benefit of 25% of the underspend. Ofwat's rationale for this approach was that this leaves relatively small exposures to risk of variation in charges, while keeping companies incentivised to manage costs and ensure they are efficient.

4.587 Both Northumbrian and Yorkshire submitted that this arrangement exposed them to unjustified downside risk and was not a fair approach, since management was not able to influence the level of unmodelled costs.

4.588 Both companies submitted that the 75/25 cost sharing reconciliation mechanism was unjust and inappropriate because:

- (a) management has either limited or no control over unmodelled costs so incentivisation is not required;
- (b) there was no need for a built-in incentive for them to reduce these costs, since keeping customer bills low was already sufficient incentive; and
- (c) A cost-sharing mechanism would be appropriate where costs could either rise or fall, giving management the prospect of commensurate upside to balance the risk exposure, but in these instances costs were much more likely to rise than fall (for example in relation to business rates and abstraction costs). As a result, the uncertainty mechanism was asymmetric and represented an inefficient approach because it placed risks on the companies which they could not control.⁷³⁸

⁷³⁸ [Northumbrian Water SoC](#), paragraph 461-467

- 4.589 The CMA recognises the importance of looking at subsets of unmodelled costs (where sufficiently material) individually, since the merits of the above arguments will vary depending on the nature of the cost drivers (for example, the degree of management control may differ). However, as a general approach, the CMA observes that management will almost always have some level of influence over costs in the longer term and therefore it is appropriate to maintain some financial incentivisation to reduce those costs for customers.
- 4.590 The degree of management influence over cost items like business rates and road excavation will vary not just between cost categories but also between individual items, so any cost-sharing split will necessarily be generous to water companies in some cases and less generous in others. As a general approach, the CMA regard 75/25 as a reasonable default cost split for unmodelled costs. We agree with Ofwat this leaves a relatively small exposure to the risk of variation in charges, while keeping companies incentivised to manage and negotiate their rates effectively.⁷³⁹ Exceptions can be made in our determinations where there is evidence that management has no (or virtually no) ability to influence cost levels and where the item is material to the overall determination.
- 4.591 Bristol was content with the 75/25 (customer/company) sharing rate (but submitted a cost adjustment claim for abstraction), whilst Anglian did not raise the issue.

Part B: Specific issues

Abstraction costs

- 4.592 The largest and most frequently raised issue on unmodelled costs related to the cost of abstraction – namely the costs related to taking or extracting water from a natural source (rivers, lakes, groundwater aquifers, etc).
- 4.593 In terms of how abstraction charges were handled by Ofwat at PR19, it provided:
- (a) Cost allowances which had been challenged by reference to companies' historical costs, with an efficiency challenge applied where Ofwat did not consider companies' explanations of material increases adequate;⁷⁴⁰

⁷³⁹ Ofwat's response to Northumbrian's SoC, paragraph 1.47, p12

⁷⁴⁰ Ofwat PR19 Final Determinations, securing cost efficiency technical appendix, p44

- (b) An end of AMP true-up mechanism (75/25 sharing rate) for abstraction charges, due to the uncertainty around rates given the Environment Agency's consultation, and the lower controllability; and
- (c) An additional provision that companies could, on a case by case basis claim for an additional adjustment, if they can demonstrate material changes outside of prudent management control.

Bristol abstraction from Gloucester and Sharpness canal

4.594 Bristol abstracts 46% of its raw water from the G&S Canal. The G&S canal is owned and operated by the Canals and River Trust (CRT), and supplied by the River Severn, the Cam, and the Frome. Bristol makes annual payments to the CRT, pursuant to a long-term bulk supply agreement, which covers supply of water, maintenance of the canal system to facilitate abstraction, and the costs of any emergency situations preventing abstraction.

4.595 Before Ofwat's FD, Bristol submitted a cost adjustment claim for £8.6 million in relation to payments to CRT. This was lower than its claim at draft determination for £9.42 million for payments to the CRT, as Bristol made a £0.8 million reduction to reflect a 5% reduction (£0.4 million) for water sales not in the price control and a 5% reduction (£0.4 million) for its estimate of the implicit cost allowance already in Ofwat's base cost modelling. From this, Ofwat deducted a further £2.7 million to reflect potential savings it argued Bristol made from using the G&S Canal – these are costs associated with capture, storage and transportation of water which are reflected in the base cost models, but which Ofwat stated that Bristol did not incur.

4.596 In its SoC and at its hearing, Bristol submitted that:⁷⁴¹

- (a) it has atypically high costs and is an outlier in the water sector in England and Wales in terms of the proportion of raw water that is provided by a third party;
- (b) the payments to the CRT (a charge over and above its payments to the Environment Agency) increase its costs relative to other water companies that can obtain water from their own 'areas of appointment' (i.e. within their own operating geographies);

⁷⁴¹ Bristol SoC, paragraphs 497-507

- (c) because of its reliance on the G&S Canal, it has a higher proportion of water treated at higher levels of complexity (level 5) compared with the rest of the industry, also increasing costs;
- (d) the complexity and costs of treating the water at Purton and Littleton are much higher than for a typical level 5 treatment works due to the condition of the water; and
- (e) it has no alternative source of supply: it cannot mitigate any costs arising from its supply arrangement with the CRT by obtaining water from alternative sources of supply, because all of these potential alternative sources were not financially viable.

4.597 In its response, Ofwat submitted that:⁷⁴²

- (a) Bristol's costs were not atypical due to savings elsewhere in operations: as other water companies have higher costs associated with capture, storage and transportation of water and these costs are reflected in the econometric models that produce base cost allocations, Bristol's base cost allowances in effect already compensate them for some of their abstraction costs;
- (b) two measures of treatment complexity are used as cost drivers in the PR19 methodology, hence higher costs for treatment are already factored into base allowances; and
- (c) the company's costs claim is highly sensitive to assumptions made on the allocation of overheads, which Ofwat considers to be made on an unusual basis; and costs may be inefficient and are hard to verify because the company does not have a good understanding of its maintenance and asset operational costs.⁷⁴³

Our assessment

4.598 While we acknowledge that two factors relating to water treatment complexity have been added to Ofwat's base cost models since we considered this issue in 2015, we are not persuaded that Ofwat's totex models are a robust way to estimate Bristol's efficient costs for sourcing water from the G&S Canal.

4.599 We consider that Bristol's costs are atypical. Bristol has limited influence over the charges it must pay to CRT and has a structurally embedded heavy reliance on it. It submitted satisfactory evidence that it does not have viable

⁷⁴²Ofwat's Response to Bristol's SoC, paragraphs 3.128-3.143

⁷⁴³Ofwat's Response to Bristol's SoC, paragraphs 3.121-3.146

alternative sources: a second Cheddar reservoir or a transfer from Wessex Water would, it estimates, deliver only half the daily volume or a third of the maximum volume required to replace the G&S Canal source. Furthermore, both these alternatives would require significant capital investment (estimated by Bristol at £122 million) to deliver.

4.600 Set against this reliance and lack of management control over costs, the CMA was not persuaded that Bristol can make compensatory savings compared with another notional water company which is less reliant on this form of agreement for its abstraction. It is not clear where in the supply chain these savings would arise as Bristol would still need to abstract, store and transport the water it has otherwise abstracted from the G&S Canal, similar to other potential water sources which a notional company may rely on. As in 2015, the CMA have not identified significant factors that are likely to offset the additional costs relating to CRT payments.

4.601 Our provisional decision is therefore to allow Bristol a cost adjustment claim of £8.6 million to reflect its higher abstraction charges.

Northumbrian abstraction at Kielder

4.602 Northumbrian submitted that it had an atypical exposure to abstraction costs compared with the sector average,⁷⁴⁴ in particular because of its agreement with the Environment Agency to manage the Kielder transfer scheme. It argued these costs were set to rise, that management could not mitigate these costs and hence that Ofwat's FD was skewed in this regard toward downside risks.

4.603 Pursuant to an agreement which dates from privatisation, , Northumbrian operates the Kielder Transfer Scheme ('KTS ') on behalf of the Environment Agency. The KTS is a regional water grid constructed in the late 1970s which transfers water across Tyneside, Wearside, and Teeside. The Kielder Operating Agreement, which sets out the Environment Agency's obligations for the grid, require it to deliver a return on the original investment and the costs of operating, maintaining, and repairing the KTS. The Environment Agency consequently recovers these costs through abstraction charges levied on the water extracted from the grid, which Northumbrian is required to pay, creating a circular flow of money (in other words, the abstraction charges paid by Northumbrian include Northumbrian's costs of operating the scheme, as well as the charges to provide for a return on the original investment).

⁷⁴⁴ [Northumbrian's reply to Ofwat's Response to its SoC](#), paragraph 44

- 4.604 In January 2020, the Environment Agency undertook a consultation on abstraction charges for the KTS, proposing to increase charges to prevent over-abstraction and secure a higher return on the investment. Because of the timing, this proposed increase in abstraction charges was not known to Northumbrian at the time of Ofwat's FD and so was not taken into account by Ofwat in setting the allowance.
- 4.605 In its SoC, Northumbrian raised two main increases in abstraction charges relating to the KTS, costing a total of £60.88 million:
- (a) a £28.31 million (corrected from £33 million in earlier submissions) one-off charge to be paid in 2020-21 for backdated business rate charges for Kielder transfer scheme and for costs of capital for works to the Riding Mill pumping station; and
 - (b) an increase to annual charges of £8.14 million from April 2021 onwards to reflect higher business rate charges.
- 4.606 Northumbrian also reported an additional increase to their abstraction charges of £2.5 million (£0.5 million per annum) as a result of their bulk supply agreement with Thames Water.
- 4.607 Northumbrian propose a direct pass-through for these costs or, if the uncertainty mechanism is to remain unchanged, that the frontier shift efficiency factor should not be applied to these costs and that it should receive compensation through a capital buffer or adjustment in WACC.
- 4.608 In support of this proposed remedy, Northumbrian argued that its circumstances are unique because:
- (a) its exposure is atypically high (as stated previously, their abstraction costs are 8% of base totex, compared to an industry average of 3%);⁷⁴⁵ and
 - (b) It is unable to control the risk associated with a change in abstraction charges, or to drive reductions in these costs through efficiency, because these costs are outside their control: it argues the Kielder costs are not volume related and hence charges cannot be reduced by encouraging customers to reduce consumption or by increasing supply from other sources.

⁷⁴⁵ [Northumbrian reply to Ofwat's Response](#), paragraph 44

4.609 Northumbrian further stated that Ofwat had assumed abstraction charges would remain constant in real terms at draft determination, before the application of a frontier shift efficiency factor at PR19.⁷⁴⁶

Provisional decision

4.610 Due to the timing of the Ofwat's FD (December 2019) and the proposals from the Environment Agency for changes to the KTS arrangements (January 2020) the information on the proposed increases in costs was not available to Ofwat at the time of issuing PR19.

4.611 However, the CMA is able to take this information into account in setting its provisional determination. Having reviewed the KTS arrangements, we consider there is a justification for treating this specific case differently from other unmodelled costs. The arrangements place Northumbrian in a situation in which it has a significant and known cost rise and limited scope to reduce costs or mitigate any increase in the costs during AMP7.

4.612 The CMA therefore provisionally determines that a full allowance be made to Northumbrian to cover the increase in the KTS abstraction costs. Any over or underspend at the end of AMP7 should be trued up at the end via a PR24 reconciliation mechanism, such that customers only pay the costs incurred.

Northumbrian abstraction from Thames Water

4.613 Northumbrian also submitted that an increase in costs to the Thames Water supply was not reflected in Ofwat's FD because Thames Water raised the additional liability in November 2019.

Provisional decision

4.614 Increases in these costs are subject to a 75/25 (customer/company) split. The CMA considers that there is a degree of management influence over these costs and hence considers that Ofwat's approach to cost sharing is appropriate.

Traffic Management Act costs

4.615 The TMA requires utility companies either to issue a notice or apply for a permit when conducting street works. Permits require a fee to be paid by the water company, whereas notices do not. The decision whether to use notices

⁷⁴⁶ [Northumbrian SoC](#), paragraph 20

or permits lies with the relevant highway authority (ie Highways England of the local authority for the jurisdiction).

4.616 Yorkshire submitted that the costs associated with permits under the TMA are not adequately covered in the modelled allowance provided in Ofwat's FD and give rise to a £21.6 million gap. It observed that these costs are likely to rise sharply in AMP7 due to the widespread changeover from notice to permit systems in Yorkshire's region. It noted that a 20% challenge was usually applied to unmodelled costs and considered that Ofwat was unjust in applying a 50% efficiency challenge to the costs it presented. Further, it submitted that because the use and cost of permits are decided by the relevant highway authority, it is difficult for Yorkshire to reduce costs for this area. It estimated 29% of the TMA costs could be influenced by the company. It also stated that Ofwat had been unclear what costs to include in estimates.⁷⁴⁷

4.617 Ofwat did not include TMA costs in its econometric cost models because it considered that they were not well correlated with cost drivers in PR19.⁷⁴⁸ Instead, it treated them as unmodelled costs, taking the costs included in company business plans, scrutinising them with reference to historic costs and applying an efficiency challenge to them.⁷⁴⁹

4.618 In the case of Yorkshire, Ofwat considered that Yorkshire's estimates were high and not well evidenced and hence it applied a 50% efficiency challenge to those costs. Ofwat submitted that:

- (a) Yorkshire's forecast was high mainly due to its inclusion of implementation costs, the majority of which Ofwat considered were already included in Yorkshire's base cost allowances. For example, the implementation costs claimed included the cost of activities such as implementing manned traffic lights and out-of-hours working, which Ofwat considered were already substantially included in the base allowance as these costs would be incurred for roadworks whether or not there was a permit scheme in place;
- (b) implementation costs cannot be assumed for all roadworks and that Yorkshire's forecast was significantly higher than historical and current costs and significantly higher than other comparable companies; and

⁷⁴⁷ Cost efficiency – Yorkshire Water Draft Determination Representation REDACTED, p61

⁷⁴⁸ Ofwat's Response to Yorkshire's SoC, p65

⁷⁴⁹ Ofwat PR19 Final Determinations, securing cost efficiency technical appendix, p48

- (c) even after challenge, the determined TMA allowance for Yorkshire is the second highest in the sector, and significantly higher than other comparable companies.

Provisional decision

- 4.619 In considering this issue, the CMA observes that while management has limited control over the direct costs of each permit (this being set by the relevant highway authority), management has substantial control over implementation costs. Even where a highway authority has specified requirements, these are not fixed and are subject to some management control; we anticipate efficiency gains are possible. The CMA also agrees with Ofwat that many implementation costs are already included in the modelled base allowance, as Yorkshire (and other water companies) will have been experiencing these already when conducting road works, regardless of the permit/notice status.
- 4.620 Water companies also have a degree of management control over the volume of work, as they can choose to invest in approaches which would reduce the need to dig up roads, or to plan and execute works in a way which would speed up or simplify the process. We also note that Yorkshire had assumed that all highway authorities would implement permit schemes quickly – it estimated by April 2020 due to Department for Transport requirements around the introduction of the new StreetManager IT system - but we have not seen evidence this has actually occurred.
- 4.621 Table 4-22 shows the amounts incurred by all water companies in AMP6, and the amounts requested for AMP7. Given that Yorkshire's costs provide for a four-fold increase in costs since AMP6 and are the second highest in the sector, we agree with Ofwat that a 20% efficiency challenge would be insufficient. As Yorkshire's costs are substantially higher than for any company other than Thames (which has a largely urban geography and so much higher than average costs might be expected), we provisionally decide that a 50% reduction to Yorkshire's estimated costs is reasonable, resulting in an allowance of £21.6 million.

Table 4-22 TMA Funding Requested by Company and Actually Incurred in AMP6

	AMP6	AMP7 BP
Thames Water Utilities Ltd	64.8	76.3
Yorkshire Water	11.1	43.2
United Utilities Water	16.6	20.9
Severn Trent England	3.4	18.5
Southern Water	8.9	11.1
South East Water	7.2	10.8
Affinity Water	9.5	9.7
Anglian Water	5.3	6.4
Northumbrian Water	1.5	6.0
Bristol Water	0.0	4.1
South Staffordshire	0.6	3.6
Cambridge		
Portsmouth Water	0.7	1.8
Sutton & East Surrey Water	0.8	1.6
Hafren Dyfrdwy	0.0	0.2
Dŵr Cymru	0.1	0.1
South West Bournemouth	0.0	0.0
Wessex Water	0.0	0.0
	130.5	214.4

Source: Ofwat [Calculation of efficient view of Traffic Management Act \(TMA\) costs](#) (excluded from wholesale base models)

Business rates

- 4.622 Business rates are based on a property's 'rateable value' which is its open market rental value based on an estimate by the Valuation Office Agency (VOA). The rateable value is then multiplied by the relevant 'multiplier' set by central government. The rateable values of properties in England and Wales are revalued periodically and revaluations come into effect 2 years later. The most recent one occurred on 1 April 2015 and came into effect in 1 April 2017. Multipliers are revised at the same time. The next two revaluations are due during AMP7, in 2021 and 2024.⁷⁵⁰
- 4.623 It is possible to request changes to property valuations if businesses think they are wrong, to view the valuation details of other properties, and to challenge the rateable value.
- 4.624 Business rates were treated as unmodelled costs and not set using Ofwat's econometric models. Ofwat's forecast of expected rates incurred does not reflect any changes as a result of revaluations which are expected to take place during AMP7.⁷⁵¹
- 4.625 Ofwat's approach in PR19 included a 75/25 (customer/company) sharing rate on business rates. The rationale for this was that this leaves a relatively small exposure to the risk of variation in charges, while keeping companies incentivised to manage and negotiate their business rates costs effectively.

⁷⁵⁰ Business rates, [Business rates: how your rates are calculated](#)

⁷⁵¹ [Northumbrian's SoC](#), paragraphs. 453 and 460

4.626 Ofwat's proposed approach at PR19 has been disputed by Northumbrian and Yorkshire.

- (a) Northumbrian stated that the 75/25 cost sharing rate is inappropriate because business rate levels are not within management control. It argued there should be full pass-through.⁷⁵²
- (b) Yorkshire raised concerns with Ofwat's calculation of the rateable base, which does not take into account that revaluations of rateable assets will occur in the period.⁷⁵³

4.627 Northumbrian stated that business rates may increase during the AMP7 period, as the VOA determinations are strongly influenced by central government policy. Ofwat had stated that the 75% sharing rate will incentivise the water companies to engage with the VOA during the rate setting process. However, there is only a small opportunity for companies to influence revaluation proceedings, mostly focused on amending errors or misunderstandings in the derivation of charges. The main policy is set externally and cannot be influenced.

4.628 Northumbrian also cites the regulatory approaches in sectors other than water which have generally been to allow a 100% pass-through of business rates, including Ofgem in its RIIO-T1 price determination, the Office of Rail and Road and the Civil Aviation Authority. Northumbrian has outlined regulatory precedent concerning cost pass-throughs in Table 4-23.⁷⁵⁴

Table 4-23 Northumbrian claimed precedent on treatment of business rates in regulated sectors

Price control	Approach to cost pass through
<i>Energy sector</i>	
Ofgem RIIO-GD1	An uncertainty mechanism was included to pass through costs for business rates. Other pass through costs were licence fees, pension deficit costs and other sector specific charges.
Ofgem RIIO-T1	An uncertainty mechanism was included to pass through costs for business rates, licence fees and other sector specific charges.
Ofgem RIIO-ED1	An uncertainty mechanism was included to pass through costs for business rates, Ofgem licence fees and Smart DCC fixed costs.
<i>Transport sector</i>	
Office of Rail Regulation (ORR) – CP5	An uncertainty mechanism was included to pass through business rates (with the requirement that Network Rail can satisfy the regulator it negotiated them efficiently). Licence fees and other industry levies were also included as pass through.
ORR – HS1 PR19	An uncertainty mechanism was included to pass through business rates, insurance and electricity network service costs.
Civil Aviation Authority (CAA) – Q6 Heathrow	Business rates had cost pass through with an 80% sharing mechanism.

Source: [Northumbrian's SoC](#), table 29, page 97.

⁷⁵² [Northumbrian's SoC](#), paragraphs 453-455 and 460-461

⁷⁵³ [Yorkshire's SoC](#), paragraph 197(d)

⁷⁵⁴ [Northumbrian's SoC](#), table 29

- 4.629 Northumbrian also submitted that a cost sharing incentive is not necessary to ensure it reduces its costs because it already has an incentive to keep customer bills low. It said that, given the limited degree of control it has over business rates costs, the real effect of the uncertainty mechanism is to expose Northumbrian to an uncontrollable risk of a windfall loss arising from a significant increase in business rates costs.⁷⁵⁵
- 4.630 Yorkshire stated that Ofwat's modelling of business rates underestimated the asset base on which business rates are applied and ignored the impact of asset revaluations. This resulted in a £34.3 million reduction for Yorkshire with a further £7.4 million reduction attributable to the frontier shift challenge Ofwat had applied.⁷⁵⁶ In its April 2019 revised business plan, Yorkshire Water stated that the existing estimate for asset extensions equated to a business rates liability of £3.2 million per year. The company had included that liability from 2021-2025.
- 4.631 Yorkshire stated that due to Ofwat's choice of data source, Ofwat had underestimated the rateable values of its water and wastewater assets. It also argued that Ofwat has assumed business rates are within management control, placing all the revaluation risk on companies.
- 4.632 Yorkshire also referred to regulatory precedent, submitting that Ofwat deviates from its own precedent at PR14 where it noted that business rates are largely outside companies' control and the material risks associated with revaluation are placed on companies.⁷⁵⁷
- 4.633 Ofwat calculated the companies' expected 2017-2018 business rates using the 2017 values provided by the companies and the 2017 multiplier set by central government. For wholesale water, Ofwat based its calculations on the 2017 rateable values provided by the VOA and the 2017 multiplier set by central government.⁷⁵⁸
- 4.634 Ofwat said it did not take the revaluations due in 2021 and 2024 into account in its allowances, nor did it take into account increases in business rates due to changes in wastewater asset stock in the period 2020-2021.
- 4.635 Ofwat laid out its approach in its response to Yorkshire's SoC. It considered both the impacts of revaluations and the liability arising from asset additions

⁷⁵⁵ [Northumbrian's SoC](#), paragraphs 481 and 485

⁷⁵⁶ [Yorkshire's SoC](#), page 38, paragraph 120(d)

⁷⁵⁷ Ofwat (2014), [Final price control determination notice: company-specific appendix](#) – Bristol, p35

⁷⁵⁸ [Ofwat's response to Yorkshire's SoC](#), p41

had a degree of uncertainty, and that this is the reason behind its 75/25 cost uncertainty sharing mechanism.

- 4.636 Ofwat further cited Yorkshire's response to the draft determinations where Yorkshire stated that a full pass-through to customers would not create an incentive for companies to manage business rates effectively, but that since business rates are a form of taxation, a true-up based on 50/50 sharing would suffice as long as the baseline were corrected.⁷⁵⁹ Ofwat considered that both impacts of revaluations and the liability arising from asset additions had a degree of uncertainty. It therefore provided a symmetrical uncertainty mechanism to reconcile business rates based on 75/25 (customer/company) sharing rates.⁷⁶⁰
- 4.637 Ofwat cited Northumbrian's outperformance of its cost allowances in three out of four control periods as a basis for considering it able to continue to deliver its commitments and obligations to customers within the allowances set if it is efficient. Ofwat also cited Northumbrian's successful challenge of the rateable value set by the VOA in 2017,⁷⁶¹ when its rateable value was reduced from £85 million to £77.5 million.⁷⁶² Ofwat therefore submitted that the 75/25 mechanism provides companies with appropriate protection in respect of business rates while retaining some incentive for companies to fully engage with the VOA to minimise the change in business rates.⁷⁶³

Provisional decision

- 4.638 In considering our approach, the CMA looked at the treatment of business rates in other regulated sectors. Both Ofgem and the Office of Rail and Road have previously concluded that management has little or no influence over the rates set. Hence business rates were treated as full pass-through in various price controls in those sectors, sometimes with a condition that companies must demonstrate that they had taken reasonable actions to minimise costs. The CMA also noted that telecoms is regulated in a slightly different way (and hence not a good comparator), whereas with Heathrow Airport, the Civil Aviation Authority's Q6 control noted that the business had 'relatively little control' over business rate costs, but did have some ability to influence rates revaluation, hence an 80% pass through was set.⁷⁶⁴

⁷⁵⁹ [Ofwat's Response to Yorkshire's SoC](#), paragraphs 3.59-3.60

⁷⁶⁰ [Ofwat's Response to Yorkshire's SoC](#) paragraphs 3.56-3.57

⁷⁶¹ [Ofwat's Response to Northumbrian's SoC](#), paragraphs 1.29, 1.52 and 3.151

⁷⁶² [Northumbrian's SoC](#), paragraph 937

⁷⁶³ [Ofwat Response to Northumbrians SoC](#), paragraph 3.155

⁷⁶⁴ Civil Aviation Authority(2014), [Economic regulation at Heathrow from April 2014: Notice granting the licence](#) , paragraphs A45 and E85

4.639 The CMA further observes that whereas water companies might not be able to do much to change the business rates they pay on network assets, they may have some ability to make decisions in relation to administrative buildings if business rates represent a significant cost consideration. We believe (and were presented with some evidence) that submissions to the VOA can be effective,

4.640 Having reviewed all the arguments above, the CMA therefore provisionally determines that a 90/10 (customer/company) cost sharing arrangement on business rates is appropriate.

Business rates overstatement

4.641 Northumbrian stated that Ofwat made an over allowance of £11.74 million per year for business rates. This was taken following the 2017 revaluations however Northumbrian did not alter its business rates forecast following its implementation. Ofwat agree that the CMA should use the revised amount in its provisional determination, resulting in a lower allowance.⁷⁶⁵

Provisional decision

4.642 The CMA agrees with this and provisionally determines that the allowance should be reduced accordingly.

Industrial Emissions Act compliance costs

4.643 The Industrial Emissions Directive (IED) is an EU instrument which regulates pollutant emissions from industrial installations, with the aim of preventing or reducing them. The requirements of the IED are implemented through the Environmental Permitting (England and Wales) Regulations 2016,⁷⁶⁶ which are enforced by the Environment Agency. These provisions are to continue to remain in force following the end of the EU Exit transition period (subject to any further change in legislation).

4.644 The IED requires permits to be held for in-scope operations. These are designed to achieve a high level of protection for the environment, based on the use of best available technologies (BAT). The requirement to adopt BAT may mean that existing systems which were installed relatively recently require upgrade or replacement.

⁷⁶⁵ Ofwat [Response to Northumbrian's SoC](#), paragraph 3.165

⁷⁶⁶ [The Environmental Permitting \(England and Wales\) Regulations 2016](#)

- 4.645 Northumbrian and Yorkshire both submitted they will incur costs complying with the IED which were not considered at PR19. They are seeking:
- (a) Northumbrian: a totex uplift of £33 million (later reduced to £20 million) and an uncertainty mechanism to correct any over or under recovery through an adjustment to the RCV;⁷⁶⁷
 - (b) Yorkshire: an uncertainty mechanism that would allow recovery of actual costs at the end of AMP7 through an adjustment to the Bioresource RCV.⁷⁶⁸
- 4.646 In July 2019, the Environment Agency confirmed to WASCs that the biological treatment of non-hazardous waste with a capacity exceeding 75 tonnes per day was an activity falling within the IED's scope. This activity was previously assumed to be covered by the Urban Wastewater Treatment Directive.
- 4.647 We have confirmed with the Environment Agency that IED permits will be required for sites carrying out the following activities:
- (a) The biological treatment of sewage sludge;
 - (b) The operation of biogas engines; and
 - (c) The injection of biomethane gas into the grid.
- 4.648 There is a requirement for operators to secure these permits by August 2022 and the Environment Agency will require companies to apply for permits between April 2021 and January 2022. Therefore, costs associated with IED compliance are likely to fall in AMP7. Both Northumbrian and Yorkshire stated that, due to the timing of this confirmation, it was not feasible for them to include a suitably robust estimate of their costs for complying with the IED in PR19.
- 4.649 Both Northumbrian and Yorkshire are seeking a specific mechanism for recovery of their compliance costs. Anglian has not raised IED compliance as an issue, although the Environment Agency indicates it has 10 affected sites (see Table 4-24). Bristol, as a water-only company, is unaffected.
- 4.650 The Environment Agency considers that Northumbrian and Yorkshire's IED compliance costs will be comparable with other water and sewerage companies. Table 4-24 shows, in the 'Total IED Sites' column, the number of sites operated by each company. A number of these already have an IED

⁷⁶⁷ [Northumbrian's SoC](#), section 9.4, paragraph 932

⁷⁶⁸ [Yorkshire's reply to Ofwat's Response](#), paragraph 12.1.27

permit and this is shown in the 'existing waste installations' column. The Environment Agency's view is that sites with an existing installation permit will experience the smallest step-up in regulation.

Table 4-24: IED sites by company

	<i>Total IED Sites</i>	<i>Existing Waste Installations</i>
Anglian	10	0
Dwr Cymru	1	0
Northumbrian	1	1
Severn Trent	27	9
Southern	16	1
South West	5	0
Thames	25	0
United Utilities	31	24
Wessex	5	0
Yorkshire	14	1
Total	136	37

Source: Environment Agency

4.651 In its SoC, Northumbrian included an IED compliance estimate of £99 million in capital costs across 16 sites⁷⁶⁹ and a £0.9 million per year opex increase, or £102.6 million in total.⁷⁷⁰ However, its SoC acknowledged this estimate requires further refinement and seeks a much lower totex uplift of £33 million, based on just two sites (Howdon and Bran Sands).⁷⁷¹ It has subsequently been confirmed that work at the other 14 sites is not required.

4.652 In its response to Northumbrian's SoC, Ofwat stated that it considers the company has 'exaggerated its potential costs significantly',⁷⁷² based on an Environment Agency estimate of around £5 million for the re-permitting requirements at Howdon and Bran Sands.

4.653 Ofwat also noted that Northumbrian had indicated that much of its costs would be associated with acquiring, developing and securing permits for biosolid storage sites, for use as contingency storage when agricultural land is unavailable for sludge spreading. The Environment Agency has confirmed it considers the provision of contingency storage to be a long-term ongoing requirement rather than a cost that can be attributed solely to IED compliance.

⁷⁶⁹ [Northumbrian's SoC](#), section 9.4, paragraph 925

⁷⁷⁰ [Northumbrian's SoC](#), section 9.4, paragraph 926

⁷⁷¹ [Northumbrian's SoC](#), section 9.4, paragraph 932

⁷⁷² [Ofwat's Response to Northumbrian's SoC](#), paragraph 3.157

- 4.654 Northumbrian provided a more detailed compliance cost estimate (£31 million)⁷⁷³ for Howdon and Bran Sands. However, it acknowledged this is based on a scope which represents the 'highest foreseeable level of intervention'. It stated that engagement with the Environment Agency had indicated there may be opportunities to make cost savings. On this basis, it reduced its requested totex uplift to £20 million.⁷⁷⁴
- 4.655 The Environment Agency has confirmed that, following discussions with the company, the range of its assessed possible costs could be broadened to between £12 million and £20 million. It stated that the upper limit of £20 million is for the worst-case scenario and could reduce substantially if works are shown by risk-assessment to be unnecessary or if aspects are already compliant.
- 4.656 Yorkshire did not mention IED compliance in its SoC. However, in its reply to Ofwat's Response to its SoC,⁷⁷⁵ Yorkshire stated that delivering compliance at 11 facilities⁷⁷⁶ would have a totex impact of around £150 million in AMP7, although it did not seek a totex uplift. This compliance estimate included £119 million in capital costs and a c.£34 million impact on opex. It stated a 25% efficiency reduction had been applied.
- 4.657 Ofwat noted that these costs seemed high but did not provide any explanation for this view.⁷⁷⁷
- 4.658 Yorkshire acknowledged that there was uncertainty around the cost of IED compliance, that the cost was likely to be highly site specific and would depend on a variety of factors.⁷⁷⁸
- 4.659 Given the disparity between the compliance cost estimates provided by Northumbrian and Yorkshire and the Environment Agency's assessment of the likely costs, the CMA asked its engineering consultants, WRc, to review the scope, methodology and costs.
- 4.660 WRc has confirmed that the scope of the works proposed are generally consistent with IED requirements however some elements require additional refinement and/or clarification.

⁷⁷³ [Northumbrian's reply to Ofwat's Response](#), paragraph 607

⁷⁷⁴ [Northumbrian's reply to Ofwat's Response](#), paragraph 611

⁷⁷⁵ [Yorkshire's reply to Ofwat's Response](#), paragraph 3.70.5

⁷⁷⁶ The EA information at Table 1 shows Yorkshire Water as having 14 IED sites. The company has costed compliance at 11, stating that of the remaining three, one is too small to be covered by the IED, one will close during AMP7 and the other is being constructed to IED standards.

⁷⁷⁷ [Ofwat's Response on cross-cutting issues in the SoCs](#), paragraph 2.36

⁷⁷⁸ [Yorkshire's reply to Ofwat's further submission](#), Annex A, pages 1-2

- (a) Secondary containment – it is not clear how the companies’ assessment of the IED requirements has been affected by their existing provision; there is a possibility that risk assessment may show it is not required or partially mitigated by the previous standard.
- (b) Contingency storage (Northumbrian only) – there is a conflict between Northumbrian’s understanding of the requirement for on-site contingency storage within the Environment Agency’s rules and a statement by the Environment Agency that such storage may be off-site.
- (c) Individual items (Yorkshire only) – there is a possibility that some items, while consistent with the IED, may not be required solely due to IED compliance.

4.661 WRc has confirmed that both companies approach to estimating capital costs seems reasonable, noting that Yorkshire provides only a limited level of detail.

Provisional decision

4.662 WRc reviewed the costs for the types of work proposed. It stated that Northumbrian’s estimates for secondary containment appeared reasonable, but WRc identified some cost categories where the estimates could be over- or under-stated depending on the site-specific circumstances. Yorkshire’s estimates did not provide enough detail for a similar analysis of equipment capacity to be carried out but a comparison with the Northumbrian estimates for similar size works found Yorkshire’s estimates to be higher.

4.663 In general, the CMA observes that IED compliance costs appear highly sensitive to the assessment of detailed requirements at specific sites. This accords with the Environment Agency’s view that ‘accurate estimates of the costs attributable to IED will only be available once all the site and company specific factors have been assessed and the review or issue of permits has been completed.’ In addition, there are also some issues associated with judging whether particular items are required solely due to IED compliance or might in fact be implemented to fulfil other ongoing requirements, as the Environment Agency noted. The uncertainty around IED compliance cost assessment is acknowledged by both Northumbrian and Yorkshire.

4.664 There is a high level of uncertainty around the cost of IED compliance, arising from potential differences in needs, scope, and efficient costs for a large number of activities. This makes setting ex-ante allowances particularly problematic. Based on the evidence available, we provisionally conclude that:

- (a) since Northumbrian provided a detailed evidence base, supported by views from the Environment Agency, we provide a cost allowance of £12

million (equal to Environment Agency best estimate) for Northumbrian's IED compliance costs. This will be subject to clawback at the end of the AMP if actual costs are less. To mitigate the risk that costs exceed this level, but to keep management motivated to reduce them where possible, we further provide a 75/25 (customer/business) cost-sharing mechanism for IED compliance costs that exceed £12 million; and

- (b) Yorkshire has claimed IED compliance will result in a material increase to costs, but supplied limited evidence. We are concerned that the level of detail Yorkshire supplied was insufficient for the CMA to assess likely costs robustly. For Yorkshire, we propose a cost sharing mechanism on a 75/25 (customer/business) basis for it to recover costs incurred complying with the IED requirements at the end of the AMP.

Licence fees costs

- 4.665 Ofwat is funded through licence fees paid by all water companies, which are calculated as a proportion of revenue. In December 2019, after Ofwat's FD was published, Ofwat notified water companies of its plan to consult on increasing the licence fee cap. While licence fees are not explicitly part of the price control (they are not specifically identified in the list of included activities funded), they are absorbed in companies' operating overheads and so form part of overall ongoing costs.
- 4.666 Bristol sought a cost adjustment of £0.4 million to cover the projected increase in costs from an expected increase in the licence fee. Bristol stated that Ofwat made an error in setting the cost allowance in relation to licence fees and that the CMA should take this into consideration as new information in the redetermination.⁷⁷⁹ It further stated that as the licence fee cap is outside the control of management (Bristol is required to pay the fees determined by condition N of its licence),⁷⁸⁰ the full amount of this expected increase should be added to its allowance.
- 4.667 Ofwat responded that the proposal to increase the licence fee cap does not mean an automatic increase in the licence fee, because the cap is a limit and is not a target Ofwat aims for in agreeing its budget with government.⁷⁸¹ Further, it stated that, since the consultation on the proposed licence fee cap is due to take place in the second half of 2020, it is not appropriate for the CMA to address this issue in the PR19 redetermination process.⁷⁸²

⁷⁷⁹ Bristol's SoC, paragraph 586

⁷⁸⁰ Bristol's SoC paragraph 586

⁷⁸¹ Ofwat's Response to Bristol's SoC, paragraph 1.55

⁷⁸² Ofwat's Response to Bristol's SoC, paragraphs 1.55 and 3.159

Provisional decision

4.668 The CMA observes that:

- (a) there is no decision yet on whether the licence fee cap and licence charges will increase;
- (b) Ofwat already plans to consult on this on an industry wide basis; and
- (c) Any resulting increase in costs for Bristol is likely to be modest.

4.669 In the circumstances, the CMA provisionally concludes to not award the projected increased costs to Bristol.

Overall effect on unmodelled base costs

4.670 As a general approach, the CMA concludes that in most instances applying a 75/25 (customer/business) cost split for variations in the actual outturn of unmodelled costs relative to the allowances provided is reasonable. This leaves customers with a relatively small exposure to the risk of variation in charges, while keeping companies incentivised to manage and negotiate their rates effectively. We consider making exceptions to this approach where there is evidence that management has no (or virtually no) ability to influence cost levels and where the item is material to the overall determination.

4.671 The areas where the CMA provisional determination differs from the Ofwat's FD approach are as follows:

- (a) On the basis that the evidence does not show that Bristol makes operational savings which counterbalance its higher abstraction costs, to allow Bristol the full £8.6 million cost adjustment claim it made for Gloucester and Sharpness canal higher abstraction charges.
- (b) Observing that there is new information to consider and a clear rise in charges which management cannot mitigate, to make a full base allowance to Northumbrian to cover the increase in the Kielder abstraction costs. Any over or underspend at the end of AMP7 should be trued up at the end, such that customers pay only the costs incurred.
- (c) To provide a 90/10 (customer/company) cost-sharing arrangement for business rates, on the basis that while we agree with the disputing companies that management influence over costs is limited, equally we have seen evidence that representations to the VOA can be effective.
- (d) Reflecting a downward revaluation of Northumbrian's business rates, to reduce its allowance by £11.74 million per year.

(e) With regard to IED compliance costs:

- (i) reflecting detailed evidence from the company and substantiation from the Environment Agency, to provide Northumbrian with an upfront allowance of £12 million and then a reconciliation mechanism – on a 75/25 (customer/business) cost-sharing basis – for costs that exceed the allowance; and
- (ii) in the case of Yorkshire, to provide a reconciliation mechanism on a 75/25 (customer/business) cost-sharing basis to recover IED-related compliance costs at the end of the AMP.

4.672 In all other regards, the CMA's provisional determination on unmodelled base costs is similar to the position at Ofwat's FD.

4.673 The application of the frontier shift productivity challenge to unmodelled base costs is dealt with earlier in this section at paragraphs 4.378-4.387.

Summary of provisional decisions on base totex allowances

Modelled base costs

4.674 The overall effect of our approach on modelled base costs is shown in Table 4-25.

Table 4-25: Summary of modelled base costs

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
				£m
Raw base models	3,518	357	2,099	3,070
Catch-up	-74	-14	-56	-72
Frontier shift + RPEs	-78	-8	-46	-67
Growth unit rate adjustment	36	4	-42	-50
Enhancement Opex	-14	-2	-11	-14
Cost adjustment claims	26	6	5	16
Total modelled base costs	3,414	343	1,949	2,883

Source: CMA analysis

4.675 The comparison between Ofwat's FD and our provisional findings on modelled base costs is shown in Table 4-26.

Table 4-26: Implication of provisional determination on Disputing Companies' base cost allowances, including variations from Ofwat's FD

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	£m <i>Yorkshire</i>
Ofwat FD allowance	3,368	340	1,955	2,896
Raw base models	+31	-1	-17	-37
Catch-up	+31	+3	+18	+28
Frontier shift + RPEs	+12	+1	+8	+12
Alternative model specifications	-50	0	0	0
Growth unit rate adjustment	-4	0	-16	-15
Enhancement opex	0	0	0	0
Cost adjustment claims	+26	+1	0	0
Total base cost allowance	3,414	343	1,949	2,883
<i>Change vs Ofwat FD</i>	<i>+46</i>	<i>+4</i>	<i>-7</i>	<i>-12</i>

Source: CMA analysis

Note: numbers may not sum due to rounding.

Unmodelled base costs

4.676 The overall effect of our approach on unmodelled base costs is shown in Table 4-27.

Table 4-27: Implication of provisional determination on Disputing Companies' unmodelled base costs

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	£m <i>Yorkshire</i>
Abstraction	49	17	193	26
Traffic management	6	4	6	21
Business rates	304	23	181	273
IED compliance	0	0	12	0
Total unmodelled base costs	359	44	391	320

Source: CMA analysis.

Note: Numbers may not sum due to rounding.

4.677 The comparison between Ofwat's FD and our provisional findings on unmodelled base costs is shown in Table 4-28.

Table 4-28: Implication of provisional determination on Disputing Companies' unmodelled base costs

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	£m <i>Yorkshire</i>
Ofwat FD allowance	357	42	376	319
Difference in abstraction	0	+3	+60	0
Difference in traffic management	0	0	0	0
Difference in business rates	+1	0	-56	+1
Difference in IED compliance	0	0	+12	0
Total unmodelled base allowance	359	44	391	320
<i>Change vs Ofwat FD</i>	<i>+1</i>	<i>+3</i>	<i>+15</i>	<i>+1</i>

Source: CMA analysis.

Note: Numbers may not sum due to rounding.

5. Enhancement costs

Introduction

- 5.1 In this section, we discuss our approach to assessing enhancement allowances for the Disputing Companies.
- 5.2 In doing so we set out:
- (a) How enhancement spend fits into the broader framework;
 - (b) Ofwat's overall approach to enhancement assessment in PR19;
 - (c) Our approach to enhancement assessment;
 - (d) Benchmark models for enhancement;
 - (e) Wastewater WINEP cost efficiency challenges;
 - (f) Deep and shallow dive efficiency challenges;
 - (g) The assessment of specific projects ('deep dives');
 - (h) Anglian metaldehyde costs: treatment of uncertainty; and
 - (i) The application of frontier shift on enhancement allowances.
- 5.3 We then provide a summary of how our provisional determination would affect the Disputing Companies' Totex allowances, and other associated changes (for example, on associated outputs).
- 5.4 As stated in our approach to the redeterminations, our review of the above covers the majority of enhancement spend. We have focused on areas where the Main Parties provided conflicting views and where we have needed to resolve these in coming to our determination.⁷⁸³

How enhancement spend fits into the broader framework

- 5.5 Enhancement expenditure is one of the building blocks of Ofwat's methodology to reach a view of each company's Totex allowance. Broadly speaking, enhancement expenditure relates to investment for the purpose of enhancing the capacity or quality of service beyond a base level. It may be

⁷⁸³ [CMAs Approach Document](#), paragraph 42

driven by a number of factors including new statutory obligations and strategic priorities. Examples include building a new reservoir or treatment works, building strategic interconnectors to connect up parts of the network, and introducing new measures to protect wildlife.⁷⁸⁴

5.6 Enhancement costs are more irregular in nature than base costs, and may reflect many possible solutions to the requirements driving the underlying need, which are sometimes new. As a result, there is less opportunity to compare the cost of required enhancement solutions between companies.⁷⁸⁵

5.7 Enhancement costs in AMP7 have many different drivers, which vary widely from company to company depending on the company's specific circumstances, aims, and their customers' support for different priorities. However, the largest of these drivers were generally:

- (a) **Environmental improvements:** Water companies have proposed numerous environmental projects whilst also facing increasing obligations to improve their environmental outcomes, including from the increased scope of the water industry national environment programme (WINEP) which is a set of statutory requirements overseen by the Environment Agency.
- (b) **Supply-demand balance:** One of the responsibilities of a water company is to secure a balance of supply and demand including in light of ongoing trends such as climate change and population growth. Water companies have a statutory requirement to develop a WRMP every five years, setting out how they intend to balance supply and demand over at least the next 25 years. Supply-demand balance can be influenced by investment in major new infrastructure (e.g. reservoirs) but also by measures to reduce leakage or reduce consumption.
- (c) **Resilience:** Enhancement funding aims to provide improved operational resilience by funding schemes which address the risk of low-probability high-consequence events, such as ensuring properties are not reliant on a single source of supply or adding in additional support / back-up for critical infrastructure. These types of project are not generally well reflected in other aspects of the regime (eg the outcomes incentives may not be sufficient to ensure this type of work is undertaken as companies may

⁷⁸⁴ Ofwat (2019) [PR19 Final determinations Securing cost efficiency technical appendix](#), p52

⁷⁸⁵ Ofwat (2019) [PR19 Final determinations Securing cost efficiency technical appendix](#), p57

simply rely on these low-probability events not occurring, at least during the current shareholders'/management tenure).

- 5.8 We note that some of the Disputing Companies have submitted that customer growth should be treated as part of enhancement expenditure rather than a part of base costs.⁷⁸⁶ We do not consider that the distinction of whether growth should be considered as base or enhancement has particular significance to our assessment, as we are focused on setting the appropriate allowances for all activities, and the implications this has on companies and customers during AMP7. We have considered the allowances for growth in paragraphs 4.455 to 4.533 above.

Ofwat's overall approach to enhancement assessment in PR19

- 5.9 Ofwat divided enhancement cost claims into 40 different categories, which it then used to conduct its assessment. Most of these categories were assessed separately, although Ofwat combined some together where there was a potential for costs to be apportioned differently by companies and where there was some synergy between them.⁷⁸⁷ In particular, Ofwat made a judgement on the cost categories associated with delivery of the companies' WINEP 'in the round'. For these costs, Ofwat set its final allowance for each company based on an aggregated assessment. Ofwat stated that this was because there were interactions between many of the different categories of cost and its approach therefore took into account any differences in cost allocation in companies' proposals.⁷⁸⁸
- 5.10 Ofwat's preferred method of assessment for enhancement was a benchmarking analysis of forecast costs. For other categories, Ofwat followed a 'risk-based process' of having a lighter touch ('shallow dive') assessment for low-materiality costs and a more thorough assessment of the evidence ('deep dive') for high-materiality costs, each based on the company's business plans.⁷⁸⁹
- 5.11 This resulted in Ofwat's starting point being one of two approaches:
- (a) **Comparative benchmarking:** For categories where Ofwat considered it was able to identify appropriate cost drivers to support cross-company comparisons, it used the median figures from these models; or

⁷⁸⁶ For example, [Anglian SoC](#), p125

⁷⁸⁷ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p53

⁷⁸⁸ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p57

⁷⁸⁹ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p53

- (b) **Own business plan:** For categories of spend for which Ofwat considered the investment area does not lend itself to statistical modelling, it relied more on the evidence provided by companies in their business plans.

5.12 Having established the starting point as described above, Ofwat generally applied challenges to areas where it was concerned about the costs and the quality of the supporting evidence provided to it. Broadly, these took the form of:⁷⁹⁰

- (a) **WINEP ‘in the round’:** For categories associated with wastewater WINEP, Ofwat conducted a programme-level assessment. This consisted of aggregating these allowances together, and then applying an upper quartile efficiency challenge across the entire programme. Ofwat also applied a net frontier shift (as it did for base costs) to these allowances.⁷⁹¹
- (b) **Deep dives:** For other cost categories which were more material (worth around 0.5% of a company’s water or wastewater Totex, or more), Ofwat undertook a ‘deep dive’, assessing the specific evidence provided by the company on the need for investment; options appraisal; robustness and efficiency of costs, and customer protection where appropriate (as well as affordability and board assurance for very material cases). Where Ofwat was concerned about aspects of the proposed scheme it adjusted its allowances accordingly (eg through applying a cost challenge).
- (c) **Shallow dives:** For other cost categories which were less material and did not qualify for a deep dive, Ofwat instead conducted a light-touch ‘shallow dive’ review. For non-wastewater WINEP categories, this generally consisted of applying a company-specific efficiency factor based on Ofwat’s estimated efficiency of the company’s base cost plan.

5.13 The details of the efficiency challenges which Ofwat applied are discussed more in paragraphs 5.123 to 5.168 below, and Appendix B includes a full list of the methodologies which Ofwat used to assess each enhancement cost category.

5.14 One category of enhancement cost which attracted particular attention in PR19 was labelled ‘resilience’. Ofwat stated that it included a resilience category in its enhancement assessment which aimed to improve service resilience in the face of low-probability high-consequence events that are currently beyond management control. However, it stated that the resilience enhancement lines in business plan cost tables were not intended to cover all

⁷⁹⁰ Ofwat (2019) *PR19 final determinations Securing cost efficiency technical appendix*, Table 11, and pp 54-58

⁷⁹¹ We note that Ofwat also applied its net frontier shift to one element of metering costs.

investment that contributes to furthering the resilience objective and it covered only a small part of such investment. For example, much of the funding to provide resilient systems and services is included in normal business ('base') operating costs.⁷⁹² Where the primary driver of a resilience investment addressed a need covered by another enhancement line, it reallocated the expenditure to maintain consistency of scope across the different areas.⁷⁹³

- 5.15 Ofwat's final determination included an enhancement allowance of £8.8 billion across the industry, which it estimated as being c.35% higher than the actual spend in years 1-4 of AMP6. For the four Disputing Companies, as set out in Table 5-1, Ofwat's allowance comprised £2.7 billion, which it estimated as being around a 130% increase on actual spend in years 1-4 of AMP6, but around 16% lower than that included in the companies' response to draft determinations.

Table 5-1: Comparison of enhancement allowances (£ million)

	<i>AMP6 actuals (years 1 to 4)</i>	<i>Company DD reps</i>	<i>Ofwat FD</i>
Anglian	514	1,644	1,425
Bristol	71	35	30
Northumbrian	172	440	352
Yorkshire	427	1,119	905
Total of Disputing Companies	1,184	3,238	2,712

Source: Ofwat

Our approach to enhancement assessments

- 5.16 We have adopted the same broad overall approach as Ofwat to assess enhancement allowances, including a combination of benchmarking, deep dives and shallow dives. We have applied these approaches to categories of spend for the Disputing Companies, and considered any efficiency challenges which should be applied to these allowances. We have made use of comparative data (including econometric modelling, engineering comparisons and cost benchmarking comparisons) where available to develop our best estimate for efficient enhancement costs. Where a comparative approach was not appropriate, we are more reliant on evidence provided by the company proposing the enhancement. In these cases, we have, with the assistance of our independent engineering advisors where appropriate, reviewed the evidence provided by the companies about the need for and costs of the more

⁷⁹² Ofwat (2019) [PR19 final determinations Policy summary](#), p20

⁷⁹³ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p64

material schemes to assure ourselves that the proposed investment is both appropriate and efficiently delivered.

- 5.17 As stated in our approach document,⁷⁹⁴ our review has covered the majority of enhancement spend. For those parts of the assessment of company-specific projects where we have not been provided with any evidence that a further review is appropriate (including major schemes which met Ofwat's evidential threshold to receive additional enhancement funding), we have not currently conducted any further assessment and have provisionally adopted the same position as Ofwat's final determination.
- 5.18 For some proposed schemes we have more information or evidence than was available to Ofwat when it made its final determination, for example where there is greater clarity due to the schemes being further progressed, or where companies have submitted additional documentation. Where this is the case, we use this additional evidence in order to reach our provisional determination.
- 5.19 When assessing enhancement proposals, we take account of the context and implications of our decisions, in particular:
- (a) **Information availability:** Enhancement is an area of spend where both the water companies and the regulator generally face higher levels of uncertainty over likely costs. However, the limited sources of specific evidence from anywhere other than the water company concerned makes this an area of particularly acute information asymmetry. Furthermore, the nature of this expenditure reduces the effectiveness of some aspects of an incentive-based regime, since any efficiency information revealed by outcomes achieved is of only limited application for future circumstances. It is therefore harder to incentivise continuous improvement across the industry in the same way as for base costs where future cost allowances can be determined having regard to benchmarking of historical achieved costs.⁷⁹⁵
 - (b) **Discrete vs integrated schemes:** Some enhancement schemes are relatively discrete from other activities or involve specific identifiable assets (such as building a new reservoir or laying additional pipes). These types of scheme can be more easily tracked and audited both in terms of the activities being undertaken and the associated spend. Other enhancement schemes involve incremental additions or upgrades to

⁷⁹⁴ [CMA's Approach Document](#), paragraph 42

⁷⁹⁵ See paragraph 2.10

existing work or assets (such as installing new equipment in existing water treatment plants to remove phosphorous). This latter type of project poses greater difficulties for the regulatory regime, since: (i) ex-ante allocations between base costs⁷⁹⁶ and enhancement costs⁷⁹⁷ are important but difficult to conduct, and (ii) ex-post tracking of such costs is harder than for discrete schemes.

- (c) **Challenges in scope vs challenges on efficiency:** When determining the appropriate allowance for enhancement schemes, the type of regulatory intervention is relevant. For example, applying an efficiency challenge to the cost of a project typically results in a more challenging determination for the company, while reducing allowances due to scaling back the scope of a scheme would have less of an effect. Similarly, these distinctions are important when considering the implications for customers – where inefficiency is identifiable, this always represents a detriment for customers; on the other hand, alterations to the scope of an enhancement project may or may not be beneficial depending on the benefits lost compared with the associated reduction in costs.
- (d) **Customer protection:** When providing companies with specific funding to undertake additional activities, there is a risk that the company subsequently chooses not to proceed with the scheme. If the company was nevertheless to retain the allowance, this may represent a serious regulatory failure, since it may result in a transfer of money from customers to shareholders without any corresponding activities or benefits. Therefore, when providing additional enhancement funding, like Ofwat, we have sought to include strong protections for customers, usually in the form of scheme-specific ODIs which ‘claw back’ allowances if the companies do not deliver the relevant work.

5.20 We note that arguments about the extent to which certain activities are already funded through base allowances compared with where they should attract additional funds have occurred a number of times in our determinations. Often these decisions require detailed assessment, and the application of substantial levels of judgement particularly for schemes which are integrated with existing assets or activities. We make judgements on each of these cases where necessary. To the extent that similar circumstances arise in future Price Reviews, there may be benefit in Ofwat providing greater clarity upfront around the criteria for deciding that additional funding is appropriate. Similarly, the treatment of whole-life cost options, as discussed in

⁷⁹⁶ Comprising, for example, the direct replacement of existing assets as part of capital maintenance.

⁷⁹⁷ Comprising, for example, the cost of the incremental improvements.

section 6, requires the application of further regulatory judgement in the current assessment framework.

- 5.21 We also note the effect which enhancement allowances have on bills. In some circumstances, the Disputing Companies have referred to the bill impact of certain schemes.⁷⁹⁸ While the immediate impact on bills is a relevant consideration for customers, in particular in terms of affordability, we also need to take account of the long-term impact of increased allowances which result in elevated bills for future customers over numerous AMPs.⁷⁹⁹
- 5.22 It also follows that if a regulator was seeking to reduce short-term bills, then reducing Capex-heavy enhancement projects is unlikely to be particularly effective since the impact on current bills would be muted as a result of costs being spread across future generations of customers.

Benchmark models for enhancement

- 5.23 Almost all Ofwat's benchmark modelling for enhancement was based only on company forecasts of required Totex levels.⁸⁰⁰ While this raises some inevitable questions over the reliability of model results for the areas in which it was used, we did not identify a preferable alternative assessment method for determining AMP7 enhancement allowances, among those we considered, to the benchmarking of forecast costs (supplemented by cross-checks of the kind undertaken by Ofwat, where feasible). In line with this, our assessment focuses primarily on the extent to which Ofwat's benchmark modelling is likely to have given insufficient weight to material factors, and whether alternative approaches can be identified that are likely to provide a better means of taking such factors into account.
- 5.24 Given this approach, we have considered how limitations over the reliability of model results should be taken into account when determining modelled allowances, and the case for applying an upper quartile (or other form of) efficiency adjustment. As described below, the Disputing Companies often pointed to model reliability issues as implying that an upper quartile benchmark was not appropriate, and resulted in allowances that were unduly low. However, when assessing how model results (and their reliability) should be interpreted we consider it important to recognise underlying data reliability

⁷⁹⁸ For example, [Northumbrian's Reply to Ofwat's Response](#), paragraph 11 stated 'In our case two resilience schemes are rejected which together would increase bills by no more than £2.18 a year for customers (or an increase in bills of less than 1%)'.

⁷⁹⁹ This is particularly true for enhancement projects as these often involve a large element of Capex which would generally be treated as 'slow money' and recovered through RCV run-off. This is explained in more detail in section 10.

⁸⁰⁰ Ofwat's 'first time sewerage' modelling also used actual cost data from AMP6.

issues in a context where models are being calibrated on the basis of company forecasts, rather than historical actual costs (as is the case with base models). In particular, it is important to consider that companies can face weak incentives to identify and reveal efficiencies in their forecasts; as such revelation can result in lower allowances than may otherwise apply.

- 5.25 The following sets out our assessment of modelled allowances for water and wastewater enhancement benchmark models. Our assessment of the case for the application of an upper quartile adjustment is set out in paragraphs 5.123 to 5.133.

Wastewater models

- 5.26 Our assessment of wastewater enhancement modelling focused primarily on P-removal. Phosphorus is an essential nutrient for plant life, but high levels can lead to excessive growth of algae and other plants, and this can lead to a corresponding depletion of oxygen levels in water and a loss of biodiversity. Ofwat's final determination included allowances for P-removal that totalled around £2.3 billion across all WASCs, and accounted for around 51% of overall wastewater enhancement Totex allowances across all WASCs. For Yorkshire, P-removal accounted for a significantly higher share of the wastewater enhancement Totex allowed for in Ofwat's final determination; around 71%.
- 5.27 We took a proportionate approach to assessing other wastewater enhancement modelling and focused on the next three largest drivers of overall final determination Totex allowances: schemes to increase storm tank storage capacity at sewage treatment works (STWs); schemes to increase Flow to Full Treatment at STWs; and schemes to increase storage in the wastewater network. When considered together with P-removal, this accounts for around 93% of the final determination wastewater enhancement allowances (across all companies) that Ofwat determined using benchmark models.

Ofwat's Final Determination

P-removal

- 5.28 For all WASCs except Yorkshire, Ofwat set the modelled allowance equal to the (unweighted) average of the results of applying two benchmarking models: Model 1 and Model 2. The explanatory variables used in these models are described in Table 5-2. Model coefficients were estimated using linear regressions of company forecast levels of P-removal costs, and the other relevant variables, in AMP7.

- 5.29 Population equivalent was used in both models as a measure of the overall capacity of treatment works being enhanced. Model 1 included the number of enhanced sites as a means of reflecting economies of scale.⁸⁰¹ Model 2 included a variable to reflect the stringency of the new P-removal consents to be applied: the number of enhanced sites with a P consent less than or equal to 0.5 mg/L. Ofwat said that companies had provided evidence that P-removal costs increased significantly when this threshold is passed.⁸⁰²

Table 5-2: Summary description of Ofwat’s final determination P-removal models

	<i>Explanatory variable 1</i>	<i>Explanatory variable 2</i>
Model 1	Population Equivalent of enhanced sites	Number of enhanced sites
Model 2	Population Equivalent of enhanced sites	Number of enhanced sites with P-consent <=0.5mg/L
Model 3 (Yorkshire only)	Population Equivalent of enhanced sites for which consent is driven by a Water Framework Directive ‘no deterioration’ obligation	Population Equivalent of enhanced sites for which consent is not driven by a Water Framework Directive ‘no deterioration’ obligation

Source: Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p93; Ofwat (2019) PR19 final determination, [Wholesale wastewater enhancement feeder model: P-removal](#), Further Analysis sheet.

- 5.30 Ofwat introduced a third P-removal model (Model 3) at the final determination stage that it applied only in its calculation of Yorkshire’s modelled allowance, with that allowance set at the unweighted average of the results of Models 1, 2 and 3. Ofwat’s Model 3 took account of the fact that P consents can be required because of provisions in (one or both) of two different Directives - the Water Framework Directive (WFD) and the Urban Wastewater Treatment Directive (UWWTD) – and that WFD requirements may require an improvement with respect to P concentrations, or may be less onerous and require ‘no deterioration’.⁸⁰³
- 5.31 Ofwat said that its analysis had revealed that overall companies whose programme was driven more by WFD no deterioration drivers may appear more efficient, and that this supported the representation of Yorkshire in that it had a lower proportion of its programme in this area.⁸⁰⁴ Ofwat said that it had not applied this third P-removal model when determining the modelled allowances for other companies, because it was not fully confident in the quality of the model.⁸⁰⁵
- 5.32 The Totex levels implied by each model, and the resulting modelled allowances for P-removal used by Ofwat in its final determination, are shown in Table 5-3 below, compared to the company forecast levels of Totex that Ofwat used in its final determination modelling. For Anglian, the table also

⁸⁰¹ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p93

⁸⁰² Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p93

⁸⁰³ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p104

⁸⁰⁴ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p104

⁸⁰⁵ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), pp104-105

shows the revised Totex forecast that Anglian presented in its representation on Ofwat's Draft Determination, and on which it based its SoC.

Table 5-3: Final determination modelled allowances (before efficiency adjustment) compared with company requested allowances for P-removal (£m)

	<i>Anglian</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
Requested Totex (post-reallocations):			
Data used in FD modelling	451	91	652
Revised Anglian forecast	435		
Model 1	430	69	578
Model 2	433	67	583
Model 3			629
FD Modelled Allowance	431	68	597
Difference from requested Totex:			
Data used in FD modelling	-19	-23	-56
Revised Anglian view	-4		

Source: Ofwat (2019) PR19 final determination, [Wholesale wastewater enhancement feeder model: P-removal](#), Analysis sheet; Anglian (2019) [PR19 Draft Determination representation](#), Sections 8.3.9; CMA Analysis.

Other modelled wastewater enhancement allowances

5.33 Ofwat used benchmark modelling in seven wastewater enhancement areas in addition to P-removal:⁸⁰⁶

- Schemes to increase flow to full treatment
- Schemes to increase storage at sewage treatment works
- Schemes to increase storage in the sewerage network
- Chemical removal schemes
- Event duration monitors
- Flow monitors at sewage treatment works
- First time sewerage

5.34 As was described above, we adopted a proportionate approach to considering these other areas in a context where submissions from the disputing WASCs on Ofwat's approach focused primarily on P-removal models, and on the application of a 'WINEP in the round' upper quartile adjustment (which we consider in paragraphs 5.123 to 5.133 below). In line with this, we focus our attention here on the first three areas on the above list (paragraph 5.33),

⁸⁰⁶ These areas all form part of the AMP7 WINEP wastewater programme except 'First time sewerage'.

which – together with P-removal – account for around 93% of the wastewater enhancement modelled allowances Ofwat set in its final determination, and around 82% of wastewater ‘WINEP in the round’ modelled allowances.

- *Schemes to increase flow to full treatment (FTFT)*

5.35 This WINEP area includes schemes that increase the hydraulic capacity of a works or ‘flow to full treatment’ in order to reduce the risk of an untreated discharge resulting from a period of intense and/or persistent rainfall. Ofwat set modelled allowances by taking the average from log and linear regression models that predict Totex using the number of schemes included in business plans and the shortfall in flow to treatment in litres per second as the cost drivers, subject to specific adjustments that were made to Wessex’s costs to reflect two schemes that were shown to be atypical.⁸⁰⁷

- *Increased storage at STWs*

5.36 This WINEP area includes schemes that increase the capacity of storm tanks at STWs in order to reduce the frequency of discharges of wastewater to receiving waters. Ofwat set modelled costs equal to the weighted average of the results of two log models.⁸⁰⁸ The first model predicted required Totex based only on the volume of storage to be commissioned, and the results from this model were given a 25% weighting. The second model included the number of schemes as an additional variable, and was given a 75% weighting.

- *Increased storage in the network*

5.37 This WINEP area includes actions aimed to reduce the risk of combined sewer overflows during high rainfall periods. For all WASCs except Anglian, Ofwat used a linear regression model which estimated expected Totex based on the volume of storage each company is planning to construct or – for catchment management schemes – ‘effective storage’ they are planning to provide (ie the volume that would otherwise be provided should a conventional storage scheme be constructed).⁸⁰⁹ Ofwat included the costs and cost drivers for some ‘effective storage’ schemes in the modelling for Southern and Welsh following deep dives.⁸¹⁰ In response to representations

⁸⁰⁷ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p94

⁸⁰⁸ Ofwat (2019) PR19 FD [Wholesale wastewater enhancement feeder model: Storm tank capacity](#)

⁸⁰⁹ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p95, and Ofwat (2019) [Wholesale wastewater enhancement feeder model: Spill frequency](#)

⁸¹⁰ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p95, and Ofwat (2019) [Wholesale wastewater enhancement feeder model: Spill frequency](#).

showing results under different modelling approaches, Ofwat set Anglian's modelled allowance using a log model which predicted required Totex based on the planned volume of storage capacity and the number of sites.⁸¹¹

- *Final determination modelled allowances*

5.38 The modelled allowances determined by Ofwat for the above three WINEP areas are shown in Table 5-4 below, compared to the company forecast levels of Totex that Ofwat used in its final determination modelling. For Anglian, the table also shows the revised Totex forecasts that Anglian presented in its representation on Ofwat's Draft Determination, and on which it based its Statement of Case, for the two areas shown in which Anglian revised its view (schemes to increase FTFT and to increase storage at STWs).⁸¹²

Table 5-4: Final determination modelled allowances (before efficiency adjustment) compared with company requested allowances for selected WINEP areas (£m)

	Anglian	Northumbrian	Yorkshire
<i>Schemes to increase flow to full treatment (FTFT)</i>			
Requested Totex (post reallocations):			
Data used in FD modelling	76	37	42
Revised Anglian view	67		
FD Modelled allowance	85	37	22
Difference from requested Totex:			
Data used in FD modelling	+9	-0.6	-19
Revised Anglian view	+18		
<i>Increased storage at STWs</i>			
Requested Totex - post reallocations:			
Data used in FD modelling	145	1	46
Revised Anglian view	127		
FD Modelled allowance	130	1	46
Difference from requested Totex:			
Data used in FD modelling	-15	-0.1	-0.1
Revised Anglian view	+3		
<i>Increased storage in the network</i>			
Requested Totex (post reallocations)	12	13	61
FD Modelled allowance	9	16	62
Difference from requested Totex	-3	+4	+1

Source: Ofwat (2019) [PR19 FD Feeder model: Enhancement aggregator](#), 'WINEP in-the-round' sheet; Anglian (2019) [PR19 Draft Determination representation](#), Sections 8.3.8 and 8.3.11; CMA Analysis.

⁸¹¹ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p95, and Ofwat (2019) [Wholesale wastewater enhancement feeder model: Spill frequency](#)

⁸¹² Anglian (2019) [Anglian PR19 Draft Determination representation](#), Sections 8.3.8 and 8.3.11

Anglian

- 5.39 Anglian said that Ofwat's enhancement modelling failed to appropriately recognise the idiosyncratic nature of enhancement.⁸¹³ It said that Ofwat's models were very simple (with only one or two cost drivers) and that there was bound to be omitted variable bias and a tendency for the models to over-estimate inefficiency.⁸¹⁴ Anglian said that Ofwat had not cross-checked its simple benchmarking models with other evidence such that reasonable differences in costs had been incorrectly attributed to relative efficiency levels.⁸¹⁵
- 5.40 Anglian said that Ofwat's view that Anglian's forecast P-removal spend was inefficient was heavily reliant on the threshold it had used to take account of treatment complexity: sites with a P consent less than or equal to 0.5 mg/L.⁸¹⁶ Anglian said that higher cost approaches were needed when consents were less than 1 mg/L, and that it had provided assessments from Vivid Economics at the IAP and DD stages that demonstrated improved model fit from using that threshold.⁸¹⁷ Anglian said that Ofwat had not undertaken any sensitivity analysis on this issue (or at least had not shared such analysis with Anglian).⁸¹⁸
- 5.41 Anglian said that Ofwat did not appear to have considered the different approaches adopted by WASCs and had failed to take into account long-term costs (as opposed to AMP7 costs). Anglian identified its proposed approach to P-removal as an example where whole life costs are lower than a more traditional alternative (chemical dosing) approach, and said that Ofwat incorrectly treated enhancement Opex in the same way regardless of whether it was one-off or recurring expenditure.⁸¹⁹

Northumbrian

- 5.42 Northumbrian said that the usefulness of regression models in this context was severely limited given the small sample size of 10 data points, that Ofwat's models were simplistic, and that the confidence intervals of model

⁸¹³ [Anglian SoC](#), pp193-195

⁸¹⁴ [Anglian SoC](#), pp193-195

⁸¹⁵ [Anglian SoC](#), pp193-195

⁸¹⁶ [Anglian's Reply to Ofwat's Response](#), Part G (REP08), paragraph 161

⁸¹⁷ [Anglian's Reply to Ofwat's Response](#), Part A.3 (REP02), No. 3.6

⁸¹⁸ [Anglian's Reply to Ofwat's Response](#), Part G (REP08), paragraph 161

⁸¹⁹ [Anglian SoC](#), pp 193-197

coefficients implied a wide range of possible values.⁸²⁰ It said that Ofwat had been inconsistent in its approach to determining modelled allowances for P-removal, and that Ofwat's third P-removal model should also be applied when calculating the P-removal modelled allowance for Northumbrian, as only a small proportion of its programme was driven by WFD no deterioration obligations.⁸²¹

- 5.43 Northumbrian said that there are number of factors that strongly affect P-removal costs, and that whilst Ofwat sought to take two of these into account (scale and treatment complexity), the legislative driver (and sub-driver), the new consent level, and whether the site has had previous investment for P-removal are significant considerations that influence costs. Northumbrian said that historically P-removal had been focused on larger sites, and that as the scope of the P-removal programme was widened permits are now required at smaller sites where scope for the use of different technologies can be limited, and costs can increase because additional activity is required at each site.

Yorkshire

- 5.44 Yorkshire said that Ofwat's enhancement models were relatively simple, and were highly likely to omit important cost drivers.⁸²² It said that Ofwat's models were based on forecast data, which is inherently uncertain, and that a number of the models (including P-removal) are based on only 10 observations.⁸²³ Yorkshire said that Ofwat's estimated efficient cost predictions were inaccurate and had an implausibly large range of efficiency scores.⁸²⁴
- 5.45 Yorkshire said that the key drivers of P-removal costs are: number and size of sites; consent level; change in consent level; and type of obligation. Yorkshire said it has the industry's largest set of P-removal requirements for AMP7, and has not had significant P-removal requirements previously. As a result, the level of improvement required at its sites is greater than companies that already have consents in place, where improvements may be achievable by minor modifications, optimising existing approaches or through catchment management.
- 5.46 Yorkshire said that it is significantly more affected by new UWWTD-driven P-removal requirements than other companies, and that this requires the introduction of tertiary treatment at STWs which is significantly more

⁸²⁰ [Northumbrian SoC](#) Section 5.7.3

⁸²¹ [Northumbrian SoC](#) Section 5.7.3

⁸²² [Yorkshire SoC](#), paragraphs 195-196

⁸²³ [Yorkshire SoC](#), paragraphs 195-196

⁸²⁴ [Yorkshire SoC](#), paragraphs 195-196

expensive than catchment management solutions that prevent phosphorus entering water at all.⁸²⁵ Yorkshire said that, whilst Ofwat had introduced a third P-removal model that took some account of this, it then averaged the outcome with that of its original two flawed models.⁸²⁶ Yorkshire said that one way to better account for the UWWTD impact would have been to use only Ofwat's third P-removal model.⁸²⁷ In its Reply, Yorkshire pointed to a different modelling approach that Oxera had developed (which adapted Ofwat's Model 3 in order to seek to take more direct account of UWWTD drivers) and presented results showing that Ofwat had underestimated Yorkshire's predicted P-removal costs by £45 million in its final determination.

- 5.47 Yorkshire said that its proposed P-removal programme involved the use of a biological approach to P-reduction (at some sites) that was more sustainable, and had lower whole-life costs than adopting a chemical dosing approach.⁸²⁸ It said that Ofwat's final determination would require it to adopt solutions that had worse environmental impact and would cost customers more in the long-term.⁸²⁹

Ofwat's views

- 5.48 Ofwat said it was aware of the potential limitations of econometric models in this area and that, where feasible, it triangulated results from multiple models to arrive at a more considered view.⁸³⁰ Ofwat said it used benchmarking models for enhancement costs only where it considered that they were robust, and that where it was not satisfied with a model's reliability, adjustments were made that were frequently company-specific, or costs were allowed in full.⁸³¹ By way of example, Ofwat noted that in setting the allowance for WINEP flow to full treatment schemes, it had made a specific adjustment to the modelled allowance for Wessex Water's individual circumstances based on the company's compelling evidence.⁸³²
- 5.49 Ofwat said that its use of 0.5mg/L threshold in its P-removal modelling was appropriate because meeting lower than a 0.5mg/L consent threshold requires a new process to be introduced, whereas consents of 0.5mg/L and above can be met with two-stage chemical dosing. Ofwat said that it does not mandate particular solutions that companies should implement, and that it did

⁸²⁵ Yorkshire SoC, paragraph 197(c)

⁸²⁶ Yorkshire SoC, paragraph 197(c)

⁸²⁷ Yorkshire SoC, paragraph 197(c)

⁸²⁸ Yorkshire SoC, paragraph 303-304

⁸²⁹ Yorkshire SoC, paragraph 30

⁸³⁰ For example: Ofwat's response to Anglian SoC, paragraph 3.172

⁸³¹ For example: Ofwat's response to Anglian SoC, paragraph 3.170

⁸³² For example: Ofwat's response to Anglian SoC, paragraph 3.170

not accept that its efficiency challenge results in companies having to implement inappropriate solutions.⁸³³ Ofwat said that companies remain responsible for choice of correct treatment and compliance with quality requirements, and are free to innovate, manage the resulting risks and take advantage of the rewards.⁸³⁴

- 5.50 Ofwat said that Northumbrian had not raised concerns regarding the low level of WFD no deterioration obligations it faces in its representations on draft determinations.⁸³⁵ Ofwat said it had revisited the evidence on WFD no deterioration schemes being more likely to involve low or no cost solutions, and found none, casting significant doubt on the premise for the perceived need for the third model it had used for Yorkshire at final determination.⁸³⁶ Ofwat also said it had found Northumbrian's P-removal programme to include three low/no cost schemes that have the WFD 'Improvement' driver.⁸³⁷
- 5.51 Ofwat said that sites with a new consent that had no existing consent might be expected to require higher levels of investment than those with an existing consent that was being tightened. However, Ofwat said that it had found a strong linear relationship between the total number of sites and the number of sites with existing consents. As a result, it had concluded that the small proportion of STWs in the AMP7 programme with an existing phosphorus consent, and the small differences in this proportion between companies, meant that no company would be substantially disadvantaged by taking no account of whether or not there was an existing consent.
- 5.52 Ofwat said that it had found no evidence to support the contention that the UWWTD drives higher efficient P-removal costs than other legislative drivers, and that this was not surprising since WFD consent levels are usually significantly tighter than those required by the UWWTD.⁸³⁸ Ofwat said that Oxera's finding (on behalf of Yorkshire) that meeting UWWTD consents is more expensive lacked intuition, and that, prior to any statistical results, it is modelling best practice that a model's cost drivers should be supported by engineering and operational understanding.
- 5.53 Ofwat said that, in its representations on its draft determination, Yorkshire had not highlighted its intention to use biological nutrient removal approaches rather than chemical dosing as an issue it wanted Ofwat to address in the final determination. Ofwat said it considered there would be considerable

⁸³³ [Ofwat's response to Anglian SoC](#), paragraph 3.176

⁸³⁴ [Ofwat's response to Anglian SoC](#), paragraph 3.176

⁸³⁵ [Ofwat's response to Northumbrian SoC](#), paragraphs 3.80-3.93

⁸³⁶ [Ofwat's response to Northumbrian SoC](#), paragraphs 3.80-3.93

⁸³⁷ [Ofwat's response to Northumbrian SoC](#), paragraphs 3.80-3.93

⁸³⁸ [Ofwat's response to Yorkshire SoC](#), paragraph 3.135

sensitivity regarding Opex assumptions (in particular the amount of chemical consumption), and that there was a risk that Yorkshire's cost benefit analysis, which did not consider the real value of options (in a context where consents may change in the future), may not provide the appropriate information.

- 5.54 Ofwat said that the March 2020 WINEP release required Yorkshire to deliver a significantly smaller P-removal programme in 2020-25 than Ofwat assumed in its final determination, because the EA has shifted the completion dates for 26 schemes to early in AMP8. Ofwat said that this may imply that some reduction in the AMP7 Totex allowance is appropriate, although it said that the alternative option of ignoring this re-phasing (on the basis that Yorkshire was already aware that it had the Environment Agency's consent to re-phase but had chosen not to) also had advantages.

Our approach

The scope for using other assessment methods

- 5.55 We explored the use that might be made of approaches other than the benchmarking of company-level forecasts of enhancement costs in the setting of allowances and, in particular, considered:
- (a) Evidence on the actual costs of providing for similar enhancements in AMP6;
 - (b) More disaggregated assessments of costs that used STW-level data; and
 - (c) Bottom-up assessments of relevant enhancement costs.
- 5.56 In practice, however, we found there to be material constraints and limitations associated with the use of each of these approaches.
- 5.57 There are some significant differences between the wastewater enhancements that had been undertaken in AMP6 (and prior to that), and those that companies are required to deliver in AMP7. For P-removal, Ofwat highlighted that the consents companies had to meet in AMP7 could be significantly tighter than those that had to be met in AMP6, following a reduction in the assumed technically achievable level. Given this, Ofwat said it recognised it was modelling different activity and costs for AMP7 as compared with AMP6.
- 5.58 Ofwat's final determination approach involved modelling aggregate Totex requirements for each company. Using STW site-level, rather than company-level, data could potentially provide a useful additional or alternative basis for cost assessment, and could allow some account to be taken of AMP6 actual

cost data when assessing forecast costs for those sites in the AMP7 programme where the new P-removal requirements were broadly comparable to those that applied in AMP6.

- 5.59 In its response to Northumbrian's SoC, Ofwat provided a comparison between Northumbrian's forecast AMP6 P-removal costs (as submitted at PR14), and its forecast AMP7 costs, for those sites at which it considered the stringency of the P-consent requirements to overlap.⁸³⁹ Ofwat also said that Northumbrian's actual AMP6 P-removal costs were on course to be significantly (12%) lower than its PR14 allowance.⁸⁴⁰ We note that in Northumbrian's view its actual 2019-20 spend is higher than assumed by Ofwat and implies that it was able to deliver its AMP6 plan around 5% (rather than 12%) lower than it had forecast at the PR14 DD stage (the basis upon which Ofwat's assessment was presented).⁸⁴¹
- 5.60 We asked for data that might allow this kind of comparison to be undertaken across all companies, however Ofwat told us that it does not hold comprehensive site-level forecast cost data for P-removal, or any other WINEP area, for AMP7 or AMP6. Ofwat said that, to limit the burden on companies, it had requested data in business plan enhancement cost data tables only at programme level, and that Northumbrian was the only company for which it held sufficient data to allow the analysis referred to above to be undertaken. While we considered STW site-level data that we requested from the Disputing Companies (only relevant to the WASCs), we were not satisfied that this provided a reliable basis for making systematic assessments across companies in a context where there has been limited regulatory attention at this level of disaggregation at PR14 and PR19, and there appeared to be significant scope for consistency issues to arise.
- 5.61 We considered whether bottom-up assessments of relevant enhancement costs might be appropriate, in particular for P-removal given the scale of proposed AMP7 spend. However, in the absence of robust STW site-level cost data that could be used as cross-check on any particular bottom-up assessments that were undertaken, we considered this unlikely to provide a better basis for seeking to determine P-removal allowances than high-level benchmarking of forecast costs of the kind undertaken by Ofwat. We note, in particular, the extent to which company forecasts of P-removal costs rely on a range of cost allocation decisions. This was evident from Yorkshire's

⁸³⁹ Ofwat's response to Northumbrian's SoC, paragraph 3.93 and Table 3.3.

⁸⁴⁰ Ofwat. Note: In its Response to Northumbrian's SoC, Ofwat had presented this figure as 18%, but it was corrected to 12% in this RFI response.

⁸⁴¹ Ofwat. Note: Northumbrian's view is that its AMP6 data shows that its costs were higher than it had forecast, but this view relies on using its AMP6 business plan forecast, and by DD in AMP6 Northumbrian had increased its forecast.

reallocation of £134 million from capital maintenance base costs to P-removal enhancement costs that Ofwat allowed following Yorkshire's representations on its Draft Determination. We consider benchmarking to provide an important safeguard in a context where the adoption of different allocation approaches can have such a material impact on identified forecasts.

Our assessment criteria

5.62 Given the absence of a preferable alternative assessment method among those we considered, we have based our determination of modelled allowances on benchmarking models of forecast Totex of the kind used by Ofwat. The Disputing Companies all pointed to the simplistic nature of Ofwat's wastewater enhancement models, but we consider this to be an inevitable feature of adopting this kind of benchmarking approach when using forecast costs and only 10 observations.⁸⁴² Given this context, we consider it appropriate to use Ofwat's assessment as a starting point and then to apply the following two criteria:

- (a) Is there evidence of insufficient weight having been given to a material factor?
- (b) Has an alternative approach been identified that can be expected to perform better?

5.63 This approach recognises that there is unlikely to be a single 'best' approach to modelling that should be applied – without adjustment – across all companies, and is consistent with other parts of the determination where a range of company-specific adjustments in modelled allowances are included. In line with this, we have considered what different model results, and other relevant considerations, imply for the modelled allowances that should be determined for each of the disputing WASCs.

Anglian's updated Totex forecasts

5.64 As was noted above, Anglian presented revised Totex forecasts for P-removal and some other WINEP areas in its representation on Ofwat's Draft Determination, and it based its Statement of Case on these revised (lower) Totex figures. We take account of this revised view in our assessment of Anglian's modelled allowances below, but did not consider it appropriate to use an updated forecast only for Anglian when assessing modelled allowances for other companies. In line with that, the model results shown

⁸⁴² Or 11 where HD is treated as separate from Severn Trent

below are based on the Totex forecasts used in Ofwat's final determination modelling other than where alternative data assumptions are identified.

The case for additional safeguards

- 5.65 Given the limitations of determining allowances on the basis of benchmarking forecast costs, we considered whether the introduction of any additional safeguards may be merited. As we set out in paragraphs 5.84 to 5.86, we consider the materiality of P-removal spend and the scope for uncertainty over its assessment to justify the introduction of a complementary reputational incentive mechanism that would provide for enhanced ex post reporting of performance as compared to forecast costs and the determined allowance level.

Our assessment and provisional decision

P-removal

- 5.66 The following sets out our approach to taking account of key cost drivers in the P-removal modelling, before setting out our assessment of modelled P-removal costs for each of the disputing WASCs.

- *Key cost drivers and model selection*

- 5.67 Ofwat's first two P-removal models sought to directly take account of the following key drivers of P-removal costs:
- The volume of load to be treated: taken into account through the inclusion of a population equivalent (PE) variable in both Models 1 and 2.
 - The extent to which economies of scale are likely to be achievable: through the inclusion of the number of enhanced sites in Model 1.
 - The tightness of the new consent level to be met through Ofwat's Model 2 including the number of sites with proposed consents at $\leq 0.5\text{mg/L}$.
- 5.68 As was noted above, Anglian has said that a tightness of consent threshold of 1mg/L or less is more appropriate from an engineering perspective, and also provides for a better model fit.⁸⁴³ We consider Ofwat to have provided compelling evidence on why it is relevant to model costs using a $\leq 0.5\text{mg/L}$ consent threshold, including because of the additional and/or more complex treatment processes that were likely to be required to meet requirements at or

⁸⁴³ For example, [Anglian's Reply to Ofwat's Response](#), Part A: Review of Costs Arguments, No. 5.4-5.6 pp 19-20

below this level. However, we consider Anglian's evidence on how its costs varied with consent level, and Ofwat's own assessment of this issue, to suggest that $\leq 1\text{mg/L}$ is also a relevant consent threshold for cost assessment. We have taken this into account by reviewing the results of using a model that is equivalent to Ofwat's Model 2, but that includes $\leq 1\text{mg/L}$ (rather than $\leq 0.5\text{mg/L}$) threshold. We refer to this below as Model 4.

5.69 Northumbrian and Yorkshire pointed to the following as key drivers of P-removal costs in addition to those shown above as reflected directly in Models 1 and 2:

- (a) Change in consent level: the costs of meeting a new consent of a given stringency can depend on the starting point, that is, the stringency of the existing P-removal consent (if any) that applies.
- (b) Whether the enhanced sites have had previous investment for P-removal: the costs of providing for P-removal can be affected by the extent to which infrastructure required to deliver the enhancement is already in place.
- (c) The type of P-removal obligation: the costs of meeting a new consent can be affected by whether that obligations arises because of the UWWTD, a WFD no deterioration requirement, or a WFD improvement requirement.

5.70 In practice, points (a) and (b) are closely related, as whether or not there has been previous P-removal investment at a site will depend on whether there has been a previous P-removal consent. We note that Ofwat's approach was consistent with this being considered a relevant factor (albeit one that was not directly included in Ofwat's modelling). We have taken this into account by reviewing the results of a variant on Ofwat's Model 1 that includes the number of enhanced sites at which there was no previous P-removal consent as a variable (in addition to the PE of enhanced sites). We refer to this below as Model 5.

5.71 The relevance of the type of P-removal obligation ((c) above) has been presented in two main ways:

- Northumbrian said that the extent of WFD no deterioration driven requirements can affect costs, because such requirements may be relatively inexpensive to address.⁸⁴⁴ This line of reasoning underpinned

⁸⁴⁴ Northumbrian SoC, Section 5.7.3

Ofwat's use of its third P-removal model at final determination that was used only for Yorkshire.

- Yorkshire said that UWWTD requirements can be higher cost to meet because they specify that consent levels must be achieved by treating wastewater before it is discharged, whereas WFD requirements do not apply this restriction. Yorkshire said this means that less costly approaches (for example, catchment-based solutions) can be used to meet WFD obligations relative to UWWTD requirements.

5.72 We are not persuaded of the case for including a measure of the extent of either of these types of legislative-driven requirements within the P-removal modelling:

- We note Ofwat's revised assessment with respect to the relevance of including the extent of WFD no deterioration requirements in its Model 3,⁸⁴⁵ and that this measure focuses attention on the condition of the receiving watercourse (to which the no deterioration term relates) rather than on the discharge consent that the WASC will have to comply with. We would expect the costs of meeting a WFD no deterioration obligation to be heavily dependent on the stringency of the P-consent that is being put in place, and the extent to which that consent threshold is new/has increased. We consider it appropriate to seek to assess these factors more directly, and have considered them through our review of the results of Models 2, 4 and 5. We therefore place no weight on Model 3 in our assessment.
- We were not persuaded that including a variable in the modelling that reflected the extent to which companies were subject to UWWTD driven consents would provide a reliable basis for assessment, in a context where UWWTD driven consents are typically materially less stringent than WFD improvement driven consents. We consider Yorkshire's comments on the cost implications of the extent to which it faces UWWTD driven obligations further by considering below the implications on model results of removing a number of UU sites from dataset (where the use of catchment management approaches has been identified as underpinning relatively low unit P-removal costs).

5.73 The P-removal models we use in our assessment are summarised in Table 5-5 in line with the above comments. All of these models are relatively simple, and have clear limitations, but considering them together aims to provide a

⁸⁴⁵ [Ofwat's response to Northumbrian SoC](#), paragraphs 3.80-3.93

reasonable means of taking some account of the key factors that have been identified as likely to affect P-removal costs.

Table 5-5: Summary description of the P-removal models used in our assessments

	<i>Explanatory variable 1</i>	<i>Explanatory variable 2</i>
Model 1	Population Equivalent of enhanced sites	Number of enhanced sites
Model 2	Population Equivalent of enhanced sites	Number of enhanced sites with P-consent <=0.5mg/L
Model 4	Population Equivalent of enhanced sites	Number of enhanced sites with P-consent <=1mg/L
Model 5	Population Equivalent of enhanced sites	Number of enhanced sites with no previous P-removal consent

Source: CMA Analysis; Ofwat (2019) PR19 final determination, [Wholesale wastewater enhancement feeder model: P-removal](#).

- *Anglian*

5.74 Table 5-6 shows that the unweighted average of the allowances implied for Anglian by Models 1, 2, 4 and 5 was around £8 million higher than the allowance Ofwat set in its final determination (which was based only on the results of Models 1 and 2). However, that result arises when the models have been calibrated using the forecast of its P-removal costs that Anglian had included in its initial business plan. In its representations on Ofwat's Draft Determination, Anglian presented a revised view of its P-removal Totex requirements that was around £16 million lower than its initial forecast. Table 5-6 shows that if the models are recalibrated using this more up-to-date, lower Anglian forecast (and leaving all else equal), then the average implied allowance is £4 million lower than determined by Ofwat in its final determination.

Table 5-6: implied allowances for Anglian under different modelling assumptions (£m)

	<i>Data used in FD</i>	<i>Using updated Anglian forecast</i>
Requested Totex	451	435
Ofwat modelled allowance	431	
Model 1 (PE, No. of sites)	430	418*
Model 2 (PE, sites <=0.5mg/L)	433	422
Model 4 (PE, sites <=1mg/L)	449	435
Model 5 (PE, sites - no current consent)	446	432
Unweighted average	439	427
Difference from Ofwat's modelled allowance	+8	-4
%	+1.8%	-0.9%

Source: CMA Analysis

* 'Number of sites' variable not significant at 95% level.

5.75 Our provisional view is that Anglian's modelled P-removal allowance should be at a similar level as Ofwat's final determination (£431 million): we are not persuaded that Ofwat's assessment involved insufficient weight being given to a material factor, or that an alternative approach has been identified that

would be expected to perform better. We consider Anglian's revised forecast to cast material doubt on the case for increasing Anglian's allowance above the final determination level (to reflect the higher allowance levels implied by Models 4 and 5 when calibrated using Anglian's initial business plan data). Whilst Anglian's reduction in requested Totex could be regarded as implying that a lower allowance is appropriate, we note that it formed part of an effort to close the gap between Anglian's and Ofwat's views following draft determinations. Overall, we consider the modelled allowance in the final determination to provide an appropriate assessment.

- 5.76 We have not found Anglian's comments with respect to whole-life costs to have a material bearing on how AMP7 modelled allowances should be set. We understand Anglian's comments to relate primarily to the fact that tertiary filtration systems – such as its planned use of a Mecana disk – involve higher up-front Capex, and lower ongoing Opex than more traditional chemical dosing approaches. We note, however, that this difference in cost structure looks likely to be closely related to the stringency of consent levels (already captured in the models), as the tightest consents are likely to require tertiary filtration to be provided for in addition to some chemical dosing. A broader issue here concerns the incentives companies face to adopt lower whole-life cost approaches given the Totex allowance that is ultimately set. We consider this kind of broader incentive issue in our assessment of cost sharing rates in section 6.

- *Northumbrian*

- 5.77 The model results shown in Table 5-7 support the view that Ofwat's assessment of Northumbrian's allowance gave insufficient weight to a material factor, and we have not identified material countervailing factors that suggest otherwise. We consider that applying equal weight to the results of Models 1, 2, 4 and 5 can be expected to perform better than Ofwat's final determination approach by reflecting additional factors that have been identified as likely to be material. In line with this, our provisional view is that Northumbrian's modelled allowance for P-removal should be set equal to £72 million.

Table 5-7: implied allowances for Northumbrian under different modelling assumptions (£m)

	<i>Using FD data</i>
Requested Totex	91
Ofwat modelled allowance	68
Model 1 (PE, No. of sites)	69
Model 2 (PE, sites <=0.5mg/L)	67
Model 4 (PE, sites <=1mg/L)	74
Model 5 (PE, sites - no current consent)	77
Unweighted average	72
Difference from Ofwat's modelled allowance	+4
%	5.8%

Source: CMA Analysis

- **Yorkshire**

5.78 Table 5-8 shows that using an average of Models 1, 2, 4 and 5, instead of Models 1, 2 and 3 (as used by Ofwat at final determination) would, given the same dataset, imply a modelled allowance of £583 million, which is £13 million less than Yorkshire's final determination modelled allowance. Table 5-8 also shows the implications of calibrating Models 1, 2, 4 and 5 when 6 United Utilities sites are removed from the data. These are sites which together account for a large Population Equivalent across which relatively low unit P-reduction costs were identified as resulting from the use of catchment management options.⁸⁴⁶ The average implied allowance for Yorkshire across Models 1, 2, 4 and 5 when these sites are removed is £629 million, £33 million higher than the modelled allowance provided for by Ofwat's final determination. We consider that both of these estimates have some relevance to the assessment of Yorkshire's modelled allowance.

⁸⁴⁶ The 6 sites (and their relevant characteristics) were identified from a spreadsheet provided by Ofwat in which they are all shown as having a 'N/A' future consent level.

Table 5-8: Implied P-removal allowances for Yorkshire under different modelling assumptions (£m)

	<i>Using FD data</i>	<i>Excl 6 UU sites</i>
Requested Totex	652	
Ofwat modelled allowance	597	
Model 1 (PE, No. of sites)	578	628*
Model 2 (PE, sites <=0.5mg/L)	583	626
Model 4 (PE, sites <=1mg/L)	580	627
Model 5 (PE, sites - no current consent)	593	636*
Unweighted average	583	629
Difference from Ofwat's modelled allowance	-13	+33
%	-2.2%	+5.5%

Source: CMA Analysis

* 'Number of sites' variable not significant at 95% level

5.79 Ofwat told us it acknowledged that the UWWTD requires on-site treatment, and precludes the adoption of potentially cheaper, more flexible catchment solutions, but said that schemes with sole WFD driver are also, more often than not, delivered using the same on-site solution (generally chemical dosing) as an UWWTD driven scheme.⁸⁴⁷ Ofwat said that, other than closing three sewage treatment works and transferring their flows to neighbouring sites, Yorkshire had not provided evidence it is planning catchment solutions for any of the 32 schemes in its 2020-25 P-removal programme that do not have a UWWTD driver.⁸⁴⁸

5.80 In response to these Ofwat comments, Yorkshire said that, in 2018, it had not met the qualifying criteria imposed by the Environment Agency to deliver catchment solutions, and that its business plan reflected that position.⁸⁴⁹ Yorkshire said that it has subsequently received agreement from the Environment Agency that it may deploy catchment solutions at 8 WFD-only sites.⁸⁵⁰ Yorkshire said that its broader point was that it is wrong to benchmark its costs against those of companies that can employ such solutions at a greater proportion of their sites (because those companies lack the same proportion of UWWTD drivers), or whose catchment management options may have a significant effect on Ofwat's cost models, as with the United Utilities solution at its Davyhulme STW.⁸⁵¹

5.81 We consider this issue to be one of degree, with some merit to both positions. The United Utilities sites can be regarded as providing important information

⁸⁴⁷ [Ofwat's Further Submission to Yorkshire's Reply](#), Paragraph 3.17.

⁸⁴⁸ [Ofwat's Further Submission to Yorkshire's Reply](#), Paragraph 3.17

⁸⁴⁹ [Yorkshire's Reply to Ofwat's Further Submission](#), p11

⁸⁵⁰ [Yorkshire's Reply to Ofwat's Further Submission](#), p11. Yorkshire noted that the delivery date for these schemes extended beyond AMP7.

⁸⁵¹ [Yorkshire's Reply to Ofwat's Further Submission](#), p11. Yorkshire noted that the delivery date for these schemes extended beyond AMP7.

on the scope for potentially very large cost savings associated with developing alternative catchment management approaches, where feasible. That information looks likely to be materially less relevant to Yorkshire's AMP7 P-removal plans, than for those of other companies, given the extent of its UWWTD obligations. However, Yorkshire's comments indicate that there is at least some scope for its plans to evolve in order to include catchment management approaches, in a context where none had been included in its business plan.

- 5.82 We consider that an approach that gives equal weight to the model results with and without the 6 United Utilities sites is likely to strike a reasonable balance. In line with this, our provisional view is that Yorkshire's modelled allowance of P-removal should be £606 million, £9 million higher than that provided for in Ofwat's final determination.
- 5.83 We did not identify Yorkshire's comments with respect to its planned use of Biological Nutrient Reduction (BNR) approaches as raising material additional issues that affected cost assessment. We note Ofwat's comment that whilst Yorkshire raised a number of concerns with respect to its modelling at the DD stage, it did not highlight its use of BNR approaches as raising particular issues to be addressed at that time. We also note that the forecast cost per PE at the STWs where Yorkshire is proposing to introduce BNR is similar to that for other sites involving chemical dosing approaches.⁸⁵² We consider broader issues concerned with the incentives companies face to adopt lower whole-life cost approaches in our assessment of cost sharing rates in section 6.

- *A reputational incentive for P-removal spend*

- 5.84 While we do not consider there to be a preferable alternative assessment method to the benchmark modelling of forecast P-removal costs among those we considered for determining P-removal allowances for AMP7, we nevertheless consider the approach to have material limitations. As we note below, when assessing the use of an upper quartile adjustment, companies can face weak incentives to identify and reveal efficiencies in their forecasts, as such revelation can result in lower allowances than may otherwise apply. Our consideration of how modelled P-removal costs are affected by different assumed levels of company forecast highlighted the extent of this sensitivity.
- 5.85 Given these limitations, and the materiality of P-removal spend in AMP7 and potentially in future AMPs, our provisional view is that Ofwat should consider

⁸⁵² CMA analysis based on information from Yorkshire

introducing a mechanism to provide a more effective basis for ex-post reporting on how actual P-removal costs compare to the levels companies had forecast and to the allowances that are set, and what underpins the identified differences. We would expect a strengthening of accountability in relation to P-removal to provide a reputational incentive in relation to an important, and high cost, area of environmental improvement. This could also provide an improved information base for determining future allowance levels.

- 5.86 Accountability with respect to P-removal spend could be strengthened in a number of different ways. The disputing WASCs could be required to provide an ex post report on the relationship between their actual P-removal spend, forecast and allowed levels, on an STW site-level basis, that is then subject to independent review. A less onerous approach could involve detailed independent ex post assessment of spend at a sample of sites being undertaken. Our provisional view is that this sample-based approach may provide a proportionate way of strengthening accountability and improving information conditions. We invite submissions on how such an approach could be most effectively implemented.

Other modelled wastewater enhancement allowances

- 5.87 Our provisional view is that other modelled wastewater enhancement allowances should be the same as the levels set by Ofwat in its final determination. As was noted above, we adopted a proportionate approach to assessing these allowances, and focused our attention on the three next largest areas for which modelled allowances were set (in terms of overall Totex) after P-removal: increased storage at STWs; schemes to increase FTFT; and increased storage in the network to reduce the risk of combined sewer overflows. The evidence persuaded us that in its setting of modelled allowances set for each of these areas Ofwat had given sufficient weight to all material factors.
- 5.88 The disputing WASCs raised limited concerns with the determination of these modelled allowances, and those concerns were presented primarily in response to our questioning (rather than in statements of case). We note that:
- Anglian considered the fit of Ofwat's FTFT models was good and that it did not suggest further changes in that area.
 - Northumbrian said that its approach to developing its cost forecasts in these areas was comparable to Ofwat's modelled approach in that it fundamentally focused on drivers of volume and number of sites. Northumbrian said that there were no other material cost drivers that

should be included, or where industry wide comparable data was available to its knowledge.

- Yorkshire said that Ofwat's modelling of storage at STWs captured the relevant drivers, and whilst Yorkshire did not consider Ofwat's FTFT modelling to capture all relevant drivers, it said that it had not identified any other major drivers of FTFT costs.

5.89 Anglian and Yorkshire submitted that they had used non-storage solutions to address risks that would otherwise be addressed by solutions that provided more storage in the network. Both WASCs pointed to Ofwat's inclusion of a measure of effective storage capacity when assessing the allowance for Welsh Water at final determination, and submitted that a similar approach should be taken in relation to their non-storage solutions. In our view, the evidence presented by Anglian and Yorkshire was not sufficient to imply that any adjustment to the final determination assessment was appropriate.

Water models

5.90 Ofwat used a benchmark model for at least some allowances in four of its cost categories in water, namely:

- (a) Meter rollout;
- (b) Meeting lead standards;
- (c) Supply/Demand Balance; and
- (d) Security.

5.91 While the Disputing Companies made comments on the reliability of Ofwat's enhancement models in general (as discussed in more detail in paragraphs 5.39 to 5.47), Anglian also raised specific concerns about two of these water benchmark models, (i) meter rollout and (ii) meeting lead standards. We discuss each of these in more detail below.

5.92 For the other two water enhancement categories where Ofwat used benchmark models, we received no specific evidence or arguments on the approach. We provisionally decide that Ofwat's modelling approach on these elements of the two cost categories is appropriate and adopt the same approach for our provisional determination.

Meter rollout

- 5.93 These allowances reflect the cost of installing of new water meters in properties which have not previously had one, including optants (where the customer has requested a meter), selective (where the company chooses to install a meter), and meters for business.

Ofwat's Final Determination

- 5.94 In its final determination, Ofwat set meter allowances using two single-variable models based on data from 2017/18 to 2024/25.⁸⁵³
- (a) A linear model, where forecast costs are regressed on the number of meters to be installed; and
 - (b) A log/log model, where the log of forecast costs are regressed on the log of the number of meters to be installed.
- 5.95 The former of these effectively reflects a unit cost estimate of meters (albeit allowing for a potential fixed cost element), while the latter aims to account for non-linear changes in costs resulting from economies or diseconomies of scale in meter rollout.
- 5.96 Ofwat made two adjustments to the data in these benchmark models before running them:
- (a) **Removing Thames Water:** Thames Water appeared to be an outlier, with unit costs substantially higher than the next highest company,⁸⁵⁴ and
 - (b) **Reallocating smart meter costs:** For Anglian and Northumbrian, Ofwat reallocated expenditure associated with replacing basic meters to smart, in order to ensure better comparability and consistency. Ofwat then assessed these other costs separately.⁸⁵⁵
- 5.97 The R^2 of these models is extremely high (0.93 for the unit cost model, and 0.96 for the log/log model).⁸⁵⁶

⁸⁵³ Ofwat (2019) [Wholesale water enhancement feeder model: metering](#).

⁸⁵⁴ Thames Water submitted a cost adjustment claim which sought to explain its higher estimated unit costs being a result of company-specific factors. This is discussed in more detail in Ofwat (2019) [PR19 FD Thames Water cost efficiency additional information appendix](#), chapter 3

⁸⁵⁵ We discuss Anglian's proposed smart meter expenditure in more detail in paragraphs 5.367 to 5.424.

⁸⁵⁶ Ofwat (2019) [Wholesale water enhancement feeder model: metering](#)

- 5.98 Ofwat then took an unweighted average of these two models in order to develop its estimated costs for metering.⁸⁵⁷

Water companies' views

- 5.99 Anglian is the only Disputing Company which raised specific concerns with Ofwat's approach described above.
- 5.100 Anglian stated that Ofwat's benchmark models did not take into account the increasing marginal cost of meter installations. Anglian submitted that, for areas with high meter penetration, installing new meters would be more costly since a greater proportion of meters to be installed under these programmes would be difficult and costly to install.⁸⁵⁸
- 5.101 To support its point, Anglian submitted analysis by its external adviser Vivid Economics which included a meter penetration variable in the model specifications. Anglian stated that 'In order to improve the models to account for this cost driver, Vivid Economics suggest meter penetration should be taken into account'.⁸⁵⁹

Ofwat's views

- 5.102 Ofwat stated that, during the PR19 process, it had tested for inclusion of metering penetration data but found that this had had no material impact on the model fit or outputs but had added uncertainty in terms of data confidence. Ofwat therefore chose not to incorporate this variable.⁸⁶⁰

Our assessment and provisional decision

- 5.103 Meter replacement appears to be a category which is suitable to benchmark comparisons for like-for-like activities (excluding smart meter upgrades). Given the very high R^2 figures in Ofwat's models, these appear to have a high degree of predictive power, and while no econometric models are perfect, we consider this approach better than the alternatives available.
- 5.104 Furthermore, Vivid Economics' own analysis showed that in an alternative model specification which included meter penetration, this variable was not

⁸⁵⁷ Ofwat (2019) [Wholesale water enhancement feeder model: metering](#)

⁸⁵⁸ [Anglian SoC](#), footnote 451, p173

⁸⁵⁹ [Anglian SoC](#), footnote 451, p173

⁸⁶⁰ [Ofwat's response to Anglian SoC](#), paragraph 3.164

found to be statistically significant, and none of the other coefficients changed materially.⁸⁶¹ Therefore, we do not include this in our model specifications.

- 5.105 Our provisional decision is to use a modelling approach based on numbers of meters, without a meter penetration variable, as Ofwat did. This results in no change to the Disputing Companies' allowances compared to Ofwat's final determination.

Meeting lead standards

- 5.106 Water companies have an obligation to manage customer exposure to levels of lead, and keep this below the statutory limit. To achieve that, companies replace lead communication pipes and may treat the drinking water to reduce the level of exposure.⁸⁶² The allowances for meeting lead standards reflect the costs required to meet these obligations.

Ofwat's Final Determination

- 5.107 In its final determination, Ofwat set allowances for meeting lead standards by using two models:⁸⁶³
- (a) A random effects model using a log/log functional form, analysing forecast costs against the number of communication pipes being replaced; and
 - (b) A unit cost model, where forecast costs are regressed on the number of communication pipes being replaced.
- 5.108 For some water companies, including Anglian, Ofwat undertook a deep dive to assess additional arguments and evidence.⁸⁶⁴
- 5.109 Ofwat then took an unweighted average of these two models and reflected any additional allowance from its deep dives in order to develop its estimated costs for meeting lead standards.⁸⁶⁵

⁸⁶¹ [Vivid Economics: Enhancement cost assessment modelling for the PR19 Initial Assessment of Plans](#), p 30

⁸⁶² Ofwat (2019) [PR19 FD Securing cost efficiency technical appendix](#), p 109

⁸⁶³ Ofwat (2019) [Wholesale water enhancement feeder model: lead standards](#).

⁸⁶⁴ Anglian was the only one of the Disputing Companies for which Ofwat undertook a deep dive, allowing an uplift to reflect the cost of treating water to reduce the level of lead exposure and for the replacement of supply pipes; [Wholesale water enhancement feeder model: lead standards](#).

⁸⁶⁵ (Ofwat 2019) [Wholesale water enhancement feeder model: lead standards](#).

Water companies' views

- 5.110 Anglian is the only Disputing Company which raised specific concerns with Ofwat's approach described above.
- 5.111 Anglian stated that Ofwat had based its benchmarking on the number of pipes being replaced, rather than the length of pipes. Since, Anglian had proposed to replace longer sections of pipe (including supply pipes on the customer's side of the boundary), its costs look anomalously high under Ofwat's benchmarking, not as a result of any inefficiency but due to 'Ofwat's flawed model selection'.⁸⁶⁶
- 5.112 Anglian stated that its historical unit costs to replace the communication pipe only (the company's responsibility) broadly aligns with Ofwat's median costs, and it is only the increase in average pipe length which results in the claimed inefficiency.⁸⁶⁷
- 5.113 Anglian stated that an econometric model with the length of pipes as a cost driver would control for economies of scale, just as Ofwat has done with its econometric model using number of pipes.⁸⁶⁸
- 5.114 Anglian also raised concerns that, as noted by Vivid Economics, Ofwat's model at IAP stage was 'highly unstable and produces [an] implausible efficiency score range',⁸⁶⁹ and subsequently on Ofwat's DD model Vivid Economics highlighted a '[b]roader recommendation to justify model choice and triangulation weights remains, as unclear how median unit cost model arrived at'.⁸⁷⁰

Ofwat's views

- 5.115 Ofwat stated that its approach to modelling the costs of meeting lead standards is theoretically sound, with high explanatory power (R^2 of 0.8), and received substantial support from companies.⁸⁷¹
- 5.116 Ofwat stated that Anglian did not provide any convincing evidence that its plan involved longer pipes than other companies, nor that a cost-per-metre model

⁸⁶⁶ [Anglian SoC](#), page 198.

⁸⁶⁷ [Anglian's Reply to Ofwat's Response](#), REP02, Part A.3, No.3.8, p.50

⁸⁶⁸ [Anglian's Reply to Ofwat's Response](#), REP02, Part A.3, No.3.8, p.50

⁸⁶⁹ [Anglian SoC](#), page 198

⁸⁷⁰ [Anglian's Reply to Ofwat's Response](#), REP02, Part A.3, No.3.8, p.50

⁸⁷¹ [Ofwat's response to Anglian's SoC](#), paragraph 3.181

would be better. It also stated that other companies had included the replacement of customers' pipes in their 2020-25 plans.⁸⁷²

- 5.117 Ofwat also stated that the replacement of a lead pipe has a dominant fixed cost element, related to the job setup and reinstatement work. This cost can then vary depending on the type of surface (e.g. paved, unpaved), the length of the pipe and the suitable pipe replacement methodology.

Our assessment and provisional decision

- 5.118 In order to test Anglian's arguments about the length of pipe being replaced we sought data on industry-wide historical and forecast figures on this from Ofwat. However, Ofwat stated that it did not have data on the length of lead pipe replaced by companies as this was not submitted by companies, and it had not considered it proportionate to collect it.
- 5.119 With regard to the use of econometric modelling, we consider that lead pipe replacement appears to be a reasonable activity to benchmark since, although individual replacements are likely to differ in cost, the overall programme represents a large and repeatable set of activities which should be similar between companies. The number of communication pipes would therefore appear to be a reasonable explanatory variable to use, resulting in a relatively high predictive power, as demonstrated through the R^2 value. We also note that Ofwat refined its models during the PR19 process, including adopting Vivid Economics' main recommendation after IAP.⁸⁷³
- 5.120 We recognise that the length of pipe being replaced is likely to be a factor in determining the cost of meeting lead standards. However, we understand this is just one of a number of additional factors (for example type of surface and methodology required) and it is not clear that this would represent a better approach or require specific adjustments. There would also appear to be a high fixed cost of replacing a pipe which would not be well reflected in a model which relied solely on length of pipe. Finally, we would also expect that length of pipe being replaced would generally correlate with number of communication pipes being replaced, albeit we are not able to test this empirically.
- 5.121 In the absence of any data which: (i) demonstrates that the length of pipe replaced is a better variable to use than number of pipes; (ii) demonstrates that Anglian is planning to replace longer pipes than other companies resulting in higher costs; or (iii) would allow us to create an alternative model

⁸⁷² Ofwat's response to Anglian's SoC, paragraph 3.181

⁸⁷³ Ofwat's response to Anglian's SoC, paragraph 3.184

based on length of pipe, we consider that an econometric modelling approach using the number of communication pipes replaced represents the most appropriate method available.

- 5.122 Our provisional decision is to use a modelling approach based on number of communication pipes replaced, as Ofwat did in its final determination. This results in no change to the Disputing Companies' allowances compared to Ofwat's final determination.

Wastewater WINEP cost efficiency challenges

Ofwat's Final Determination

- 5.123 Ofwat applied an upper quartile efficiency adjustment on a 'WINEP in the round' basis. Ofwat identified an overall level of WINEP wastewater modelled allowance by summing the modelled allowances it had determined for each WINEP area (including P-removal). An upper quartile adjustment was then applied based on the relationship between the requested and modelled allowance at this 'WINEP in the round' level. This resulted in a 6.94% downward adjustment to modelled allowances.⁸⁷⁴

Water companies' views

- 5.124 Anglian said that the confidence intervals around Ofwat's enhancement cost predictions, and the range of estimated inefficiency were much higher than from Ofwat's base models.⁸⁷⁵ It said that the size of this range resulted from the failings in Ofwat's approach and did not imply large inefficiency gaps.⁸⁷⁶ Anglian said that Ofwat's approach risked its expenditure allowances being driven by unrealistically optimistic forecasts by some companies, rather than efficiency.⁸⁷⁷ Anglian said that, given these issues, an average, rather than upper quartile, benchmark would be appropriate for the WINEP 'in the round' approach.⁸⁷⁸ Anglian said this would be consistent with past Ofwat statements linking the choice of cost benchmark to the confidence Ofwat had in the accuracy of its modelling.⁸⁷⁹

⁸⁷⁴ Ofwat (2019) [PR19 FD Securing cost efficiency technical appendix](#), p 90

⁸⁷⁵ [Anglian SoC](#), paragraph 800

⁸⁷⁶ [Anglian SoC](#), paragraph 800

⁸⁷⁷ [Anglian SoC](#), paragraph 798

⁸⁷⁸ [Anglian SoC](#), paragraph 800

⁸⁷⁹ [Anglian SoC](#), paragraph 798

- 5.125 Northumbrian said that the application of a programme-wide upper quartile efficiency challenge for WINEP wastewater spend was not appropriate.⁸⁸⁰ It said that the usefulness of regression models in this context was severely limited given the small sample size of ten data points, and that Ofwat's models were simplistic.⁸⁸¹ Northumbrian said that the WINEP upper quartile benchmark was driven by, and highly sensitive to the inclusion of, two companies - Severn Trent and Southwest Bournemouth – and that modelled costs for these companies were heavily driven by Ofwat's P-removal modelling, which estimated significantly higher costs than those companies included in their business plans.⁸⁸² Northumbrian said that the forecast costs used in Ofwat's modelling were not as reliable as historical costs, and that – given asymmetric Totex cost sharing rates – companies were likely to propose costs that were lower than their allowance in order to reduce their downside risks.⁸⁸³ Northumbrian said that the confidence intervals of model coefficients implied a wide range of possible values, and made it difficult to identify the value that constituted efficient cost.⁸⁸⁴ Northumbrian said this meant that the application of a catch-up challenge to modelled costs based on company forecast data may result in unachievable allowances.⁸⁸⁵
- 5.126 Yorkshire said that Ofwat's choice of a upper quartile benchmark was clearly flawed given the low accuracy of its WINEP cost predictions.⁸⁸⁶ Yorkshire said Ofwat's WINEP models were highly likely to omit important cost drivers, were based on forecast data which is inherently uncertain, and in some cases (as with P-removal) were based on only ten observations.⁸⁸⁷ Yorkshire said that Ofwat's efficient cost predictions had an implausibly large range of efficiency scores.⁸⁸⁸

Ofwat's views

- 5.127 Ofwat said that the forecast upper quartile was only used as a benchmark in enhancement areas where the accuracy of modelling was considered sufficient, including for WINEP, where it was applied at a programme level.⁸⁸⁹ Ofwat said it considered that significant differences between its cost predictions and the amounts requested by companies were not unexpected in a context where - for enhancement schemes - companies had to determine

⁸⁸⁰ [Northumbrian SoC](#), Section 5.7.3

⁸⁸¹ [Northumbrian SoC](#), Section 5.7.3

⁸⁸² [Northumbrian SoC](#), paragraph 423

⁸⁸³ [Northumbrian SoC](#), paragraph 428

⁸⁸⁴ [Northumbrian SoC](#), paragraph 430-431

⁸⁸⁵ [Northumbrian SoC](#), Section 5.7.3

⁸⁸⁶ [Yorkshire SoC](#), paragraphs 195-196

⁸⁸⁷ [Yorkshire SoC](#), paragraphs 195-196

⁸⁸⁸ [Yorkshire SoC](#), paragraphs 195-196

⁸⁸⁹ [Ofwat's response to Anglian SoC](#), paragraphs 3.168-3.173

both the scope of the required works and the efficient cost of providing that scope. Ofwat pointed to differences in the extent of detailed site investigations underpinning forecasts, different assumed technology choices, and differences in the level of non-compliance risk companies were willing to bear as examples of factors within management control that could materially affect company forecasts.

- 5.128 Ofwat said that there was a greater risk that companies overstated their enhancement costs than their base costs, as there were not robust historical benchmarks and therefore cost assessment was more dependent on company forecast information.⁸⁹⁰ Ofwat said that it was not aware of any evidence that showed the WINEP upper quartile benchmark was driven by unrealistically optimistic forecasts by some companies.⁸⁹¹ Ofwat said that its 'WINEP in the round' approach meant that if a company was considered inefficient in one model and efficient in another, the outcomes would balance to a degree.⁸⁹² Ofwat said that adopting this programme-level approach took better account of the accuracy of individual models and the potentially different approaches to cost allocations different companies may take.⁸⁹³

Our provisional assessment

- 5.129 As was noted above, the disputing WASCs challenged Ofwat's use of a WINEP upper quartile adjustment on the basis that the underlying models were not sufficiently reliable, and pointed to the confidence intervals and range of implied efficiency scores in support of this. While these are relevant considerations, we consider it important to recognise that Ofwat's WINEP modelling was based on company Totex forecasts. This makes the question of the reliability of the underlying data – as providing a basis for determining efficient costs – also important to consider. In particular, unlike with base modelling, the WINEP models have not been developed and calibrated using historical actuals. This raises questions over the reliability of the median as a guide to efficient costs that do not arise in the same way for base cost assessments.
- 5.130 Using only forecast data for enhancement benchmarking creates inevitable tensions and difficulties when questions of model reliability stand to be assessed. The usefulness of measures of statistical fit may be subject to particular limitations in this context, as their relevance may be heavily dependent on the extent to which forecast costs can be regarded as 'efficient',

⁸⁹⁰ [Ofwat response to Yorkshire SoC](#), paragraph 3.113

⁸⁹¹ [Ofwat's response to Anglian SoC](#), paragraph 3.173

⁸⁹² [Ofwat's response to Anglian SoC](#), paragraph 3.172

⁸⁹³ [Ofwat's response to Anglian SoC](#), paragraph 3.172

in a context where assessing that question of efficiency is the primary purpose of constructing the models in the first place.

- 5.131 This data reliability concern, from the use of company forecasts, is important to consider as companies can face weak incentives to identify and reveal efficiencies in their forecasts, as such revelation can result in lower allowances than may otherwise apply. In line with Ofwat's comments, we note that this can affect assessments of the scope and form (such as technology choice) of what is identified as required in order to provide for a given enhancement, as well as the costs identified as necessary in order to deliver that.
- 5.132 Ofwat's application of an upper quartile efficiency challenge in relation to WINEP spend can be understood as providing a means to help guard against the risk that company cost forecasts overstate a reasonable level of funding, by putting more weight on those forecasts that have been identified as 'low' relative to modelled allowances. We consider Ofwat's use of fast-tracking to be an important means through which it has sought to counter tendencies for business plan forecasts to be unduly high, and a notable feature of Ofwat's WINEP assessment is that it identifies the fast track companies as most efficient in this area (the WINEP 'in the round' level assessment). We do not consider there to be a material risk that Ofwat's upper quartile benchmark was driven by unrealistically optimistic forecasts by some companies, and note that modelled allowances were set at the lower of the company's forecast and Ofwat's view. In line with this, our provisional view is that it is appropriate to apply an upper quartile adjustment at the WINEP in the round level.
- 5.133 In line with our assessment in paragraphs 5.66 to 5.86, our provisional view is that the modelled WINEP allowance should remain unchanged from Ofwat's final determination for Anglian, and be increased by £4 million for Northumbrian and by £9 million for Yorkshire (as a result of increased modelled P-removal allowances). These changes to modelled allowances leave Ofwat's upper quartile calculation unaffected. Our provisional view is that an upper quartile adjustment of 6.94% should be applied to modelled WINEP allowances as in Ofwat's final determination.

Deep and shallow dive efficiency challenges

- 5.134 Having set out our views on benchmarking, we now assess the approaches to applying efficiency challenges on shallow dives and deep dives.
- 5.135 As described in paragraph 5.12 above, Ofwat applied a number of efficiency challenges to certain cost categories. These can be considered on either a company-specific basis or a scheme-specific basis.

- (a) **Company-specific challenge (shallow dive):** Ofwat applied these shallow dive company-specific efficiency factors as a challenge on enhancement categories which were less material (less than 0.5% of a company's water or wastewater Totex) and were not subject to a wastewater WINEP 'in-the-round' challenge (as discussed in paragraphs 5.123 to 5.133).
- (b) **Company-specific challenge (deep dive):** When conducting a deep dive assessment, Ofwat applied these company-specific efficiency factors as a challenge where there was insufficient evidence that the proposed costs were efficient.
- (c) **Scheme-specific challenge:** Ofwat applied these factors when conducting a deep dive assessment, and a company had provided some evidence that costs associated with the particular scheme were efficient, but residual uncertainty remained which supported some degree of challenge different to the company-specific challenge discussed above.

5.136 The rest of this section assesses each of these three approaches in turn, with the shallow dive challenge discussed in paragraphs 5.137 to 5.156, the deep dive challenge in paragraphs 5.157 to 5.166, and the scheme-specific challenge in paragraphs 5.167 to 5.168.

Company-specific efficiency factor (shallow dive)

Ofwat approach in PR19

5.137 Ofwat calculated company-specific efficiency figures by taking the ratio of its view of efficient modelled **base** costs to the company's view of modelled **base** costs.⁸⁹⁴

5.138 The outputs of these calculations for the Disputing Companies is shown in Table 5-9 below:

Table 5-9: Ofwat's final determination raw company-specific efficiency factor estimates

	<i>Water</i>	<i>Wastewater</i>
Anglian	16.5%	15.5%
Bristol	12.0%	n/a
Northumbrian	0.4%	6.1%
Yorkshire	-1.4%	14.2%

Source: Ofwat (2019) [Ofwat FD Company efficiency factor model](#)

⁸⁹⁴ For this calculation, Ofwat removed enhancement Opex from the company's view of modelled base costs; Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p55

5.139 In order to convert these raw figures into company-specific efficiency factors to be used in its enhancement assessment, Ofwat constrained them within set ranges.⁸⁹⁵ For its shallow dives, this range was specified as being between 0% and 10%. Ofwat stated that capping the range at 10% represented a trade-off between allowing for inefficiency and recognising that the company-specific efficiency factor is an imperfect indicator of the inefficiency of proposed enhancement costs.⁸⁹⁶ The floor of 0% would appear to reflect Ofwat's principle in enhancement of not providing a company with more funding than it specified in its business plan.⁸⁹⁷

5.140 Applying these ranges resulted in company-specific efficiency factors for shallow dives as shown in Table 5-10 below:

Table 5-10: Ofwat's final determination shallow dive company-specific efficiency factors

	<i>Water</i>	<i>Wastewater</i>
Anglian	10.0%	10.0%
Bristol	10.0%	n/a
Northumbrian	0.4%	6.1%
Yorkshire	0.0%	10.0%

Source: Ofwat (2019) [Ofwat FD19: securing cost efficiency technical appendix](#), Table 12.

Water companies' views

5.141 Two of the Disputing Companies disagreed with Ofwat's approach to shallow dive company-specific efficiency challenges.

5.142 Anglian stated that:⁸⁹⁸

- (a) Ofwat's approach to the company-specific efficiency factors was *ad hoc* and inappropriate. In particular, it submitted that there was no reason to consider that a company's efficiency on base expenditure was a good indicator of a company's efficiency on enhancement expenditure. Anglian stated that this was supported by analysis it had conducted on its strategic interconnector project which showed that its plan was efficient (and this was verified by a third party, KPMG) and there was no evidence to indicate its planned enhancement expenditure was inefficient.⁸⁹⁹

⁸⁹⁵ We note that there may be other elements of the determination where Ofwat applied these raw figures, eg in the DSRA.

⁸⁹⁶ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), pp55-56

⁸⁹⁷ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p57

⁸⁹⁸ We note that Anglian's concerns stated here also relate to deep dive company-specific efficiency factors, discussed later in this section.

⁸⁹⁹ [Anglian SoC](#), paragraphs 803-804

- (b) Furthermore, Ofwat did not sense-check these estimates in any way to test their reliability, and the approach was not supported by regulatory precedent.⁹⁰⁰

5.143 Bristol stated that:

- (a) Although the company-specific efficiency challenges applied to individual categories may be small, applying them to a large number of categories results in a cumulative effect which adds to the materiality of the overall cost challenge in Ofwat's final determination.⁹⁰¹
- (b) Ofwat was wrong to impose a further efficiency challenge absent an efficiency assessment, particularly because more detailed assessment of enhancement costs generally supported Bristol as being efficient.⁹⁰²
- (c) Ofwat's decision to derive a company-specific efficiency factor using base costs was unjustified, particularly due to errors in its approach to base, and because Bristol applied different efficiency challenges to base and enhancement in its business plan (due to a different mix of Opex and Capex in these parts of its plan).⁹⁰³
- (d) Ofwat was not justified in applying the maximum 10% efficiency challenge, particularly as Ofwat had the choice to apply any figure between zero and ten percent, and the final difference in base costs between Bristol and Ofwat's final determination was only 6.9% (with Ofwat's calculation of 12% representing the difference versus Bristol's plan at IAP).⁹⁰⁴

Ofwat's views

5.144 Ofwat stated that it had adopted a risk-based approach to assessing enhancement and, when assessing company business plans, this involved relying on a lighter touch ('shallow dive') assessment for low materiality costs and a more thorough assessment of the evidence ('deep dive') for high materiality costs.⁹⁰⁵

5.145 Ofwat stated that the application of the company efficiency factor is a proportionate approach for low materiality areas, where it does not require

⁹⁰⁰ [Anglian SoC](#), paragraphs 804-805

⁹⁰¹ [Bristol SoC](#), paragraph 559

⁹⁰² [Bristol SoC](#), paragraphs 561-567

⁹⁰³ [Bristol SoC](#), paragraphs 568-571

⁹⁰⁴ [Bristol SoC](#), paragraphs 572-576; [Bristol's Reply to Ofwat's Response](#), paragraph 302

⁹⁰⁵ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), 53.

companies to support the proposed investments with substantial evidence as it does for more material areas.⁹⁰⁶

5.146 In response to the points raised by the Disputing Companies listed above, Ofwat defended its approach, and stated that:

- (a) The approach was risk-based and proportionate, and it carried out additional assessment where planned expenditure was material (as set out in paragraph 5.12).⁹⁰⁷
- (b) It would expect companies to apply the same level of efficiency to all costing elements of their plans, and so the company's efficiency on modelled base expenditure was a reasonable proxy.⁹⁰⁸
- (c) For Anglian in particular, Ofwat found the company to be inefficient in all areas of enhancement which it assessed using a modelling approach, often by more than Anglian's company-specific factor of 10%.⁹⁰⁹
- (d) For Bristol in particular, Ofwat explained that it did not apply any discretion when setting the company-specific challenge to 10%, this simply reflected the mechanical output of its described approach.⁹¹⁰

5.147 Ofwat stated that by capping its company-specific efficiency factor at 10%, it was potentially generous to both Anglian and Bristol which had raw figures higher than this.⁹¹¹

Our assessment and provisional decision

5.148 We consider that detailed investigation of every small element of enhancement cost is likely to be disproportionate to the benefits provided. Requiring the companies to provide evidence on all aspects of their enhancement plans would require substantial time and resources, placing a large burden on both the regulator and all water companies involved.

5.149 Therefore, we have taken a more 'light touch' approach. We recognise that this may result in a less precise answer than a detailed assessment might produce but we consider it justified by the need to minimise the risk of the regulatory regime becoming too burdensome and intrusive.

⁹⁰⁶ [Ofwat's Response to Anglian](#), paragraph 3.186; [Ofwat's Response to Bristol](#), paragraph 3.154.

⁹⁰⁷ [Ofwat's Response to Anglian](#), paragraph 3.187; [Ofwat's Response to Bristol](#), paragraph 3.154.

⁹⁰⁸ [Ofwat's Response to Bristol](#), paragraph 3.154

⁹⁰⁹ [Ofwat's Response to Anglian](#), paragraph 3.188

⁹¹⁰ [Ofwat's Response to Bristol](#), paragraph 3.155

⁹¹¹ [Ofwat's Response to Anglian](#), paragraph 3.188; [Ofwat's Response to Bristol](#), paragraph 3.155

- 5.150 In this context, we consider that applying a proxy for efficiency is the best approach. We would be concerned about a blanket approach of applying no challenge on less material enhancement costs, particularly in the context of evidence of inefficiency in other parts of a company's business plan. This is likely to result in customers overpaying for company inefficiency in these aspects of enhancement costs.
- 5.151 We consider that applying a percentage-based challenge across numerous small areas of cost is a reasonable approach given that the alternative of a more detailed assessment would require gathering detailed information on each of these small areas.
- 5.152 In principle, the closest proxy that might be used in such a challenge would appear to be other enhancement costs which have been assessed in more detail. However, we note that using other enhancement costs as the proxy raises serious challenges:
- (a) Some companies did not have many of their costs assessed via deep dives or models, and so there is a relatively small evidence base to use;
 - (b) This approach places even more weight on the enhancement models (which have intrinsic limitations as discussed previously), and is often very sensitive to a small number of cost category allowances; and
 - (c) Enhancement costs are sensitive to any changes in the scope of projects (for example, if a major project is disallowed then it could have a disproportionate effect on the estimate, even if this is unrelated to inefficiency of costs), and any potential adjustments for this would likely require an element of subjectivity (for example, whether the company's inclusion of a disallowed scheme should be treated as demonstrating unnecessary work and hence inefficiency).
- 5.153 We note that the cost categories for the Disputing Companies which Ofwat assessed via its more detailed assessments (with benchmarking and/or deep dives) do not appear to support a view that the Disputing Companies which raised this concern are clearly more efficient than Ofwat's use of a base proxy allowed for. For example, most of the models and deep dive assessments which Ofwat conducted resulted in substantially reduced allowances.⁹¹²

⁹¹² For Anglian, of the 16 enhancement categories where Ofwat conducted a model and/or deep dive which resulted in an efficiency challenge, only 2 resulted in a cost challenge below 10%; for Northumbrian it was 3 cost categories out of 14; for Yorkshire it was 5 cost categories out of 17. For Bristol all 3 of its modelled cost categories resulted in no challenge, but its 2 deep dived categories resulted in 32% and 80% challenges.

5.154 Accordingly, we consider that the best approach available to achieve the light-touch, proportionate approach to assessing these costs is to adopt a proxy for efficiency using an assessment of base costs as Ofwat did. We also constrain our figure within a range of 0% to 10% to avoid overcompensating companies while minimising the risk of potentially disproportionate interventions. We recognise the limitations in this approach but consider that it represents a proportionate approach to dealing with these lower materiality enhancement costs.

5.155 Our provisional decision is to adopt the same approach of using a base cost proxy for calculating a shallow dive company-specific efficiency factor. In order to avoid undermining the incentive to submit efficient business plans we maintain the figures from companies' business plans used by Ofwat, but update the calculation to reflect our provisional view on each Disputing Company's efficient modelled base costs. We use this to calculate new company-specific efficiency factors for water and wastewater, which we will then constrain within a range of 0-10% for use in our shallow dive assessment.

5.156 This results in calculations and resulting efficiency factors as shown in Table 5-11 and Table 5-12 below:

Table 5-11: Updated calculation of company-specific raw efficiency factors

	<i>Company business plan (from Ofwat feeder), £m</i>	<i>Our provisional view on efficient modelled base costs, £m</i>	<i>Raw efficiency figure</i>
Anglian – water	1,575	1,310	16.8%
Anglian – wastewater	2,430	2,104	13.4%
Bristol – water	386	343	11.1%
Bristol – wastewater	n/a	n/a	n/a
Northumbrian – water	1,127	1,125	0.2%
Northumbrian - wastewater	887	824	7.1%
Yorkshire – water	1,306	1,338	-2.5%
Yorkshire – wastewater	1,833	1,545	15.7%

Source: [Ofwat company efficiency factor model](#); CMA calculations

Table 5-12: Provisional decision on shallow dive company-specific efficiency factors

	<i>Water</i>	<i>Wastewater</i>
Anglian	10.0%	10.0%
Bristol	10.0%	n/a
Northumbrian	0.2%	7.1%
Yorkshire	0.0%	10.0%

Source: CMA calculations

Company-specific efficiency factor (deep dive)

Ofwat approach in PR19

5.157 To calculate deep dive company-specific efficiency factors, Ofwat adopted the same general approach as it did for shallow dives, as described in paragraphs 5.137 to 5.140 above. However, having calculated its raw figures, Ofwat constrained them within a narrower range of between 5% and 10%. Ofwat stated that the reason for applying a higher floor compared with shallow dives (where this was set at 0%) was that this efficiency factor was only applied when there was insufficient evidence that proposed costs were efficient.⁹¹³

5.158 Applying these ranges resulted in company-specific efficiency factors for deep dives as shown in Table 5-13 below:

Table 5-13: Deep dive company-specific efficiency factors

	<i>Water</i>	<i>Wastewater</i>
Anglian	10.0%	10.0%
Bristol	10.0%	n/a
Northumbrian	5.0%	6.1%
Yorkshire	5.0%	10.0%

Source: Ofwat (2019) [FD19: securing cost efficiency technical appendix](#), Table 12.

Water companies' views

5.159 One Disputing Company (Anglian) raised concerns about Ofwat's approach to applying a deep dive company-specific efficiency factor, albeit these concerns were explained in combination with issues around shallow dive company-specific efficiency factors.

5.160 As explained in paragraph 5.142 above, Anglian stated that Ofwat's approach is *ad hoc*, inappropriate, and is unlikely to be a good indicator of a company's efficiency on enhancement. In addition, Anglian stated that Ofwat should have sense-checked these estimates.⁹¹⁴

Ofwat's views

5.161 Ofwat provided limited comments on the deep dive company-specific efficiency factor specifically, instead combining its response with its response on shallow dive company-specific efficiency factors as explained above.

⁹¹³ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p 56

⁹¹⁴ We note that Anglian's concerns stated here also relate to deep dive company-specific efficiency factors, discussed later in this section.

Our assessment and provisional decision

5.162 We are concerned about the risk of customers overpaying for enhancement schemes from (i) poorly developed business plans, and/or (ii) information asymmetry inhibiting effective regulatory scrutiny. It is important that companies have strong incentives to develop business plans which are robust and efficient and be able to demonstrate they have these qualities to the regulator, particularly where there is no comparative assessment possible. Companies should have undertaken this evidence-gathering as part of their business plan development, and so it should be relatively straightforward to provide this to the regulator.

5.163 Accordingly, the application of a deep dive company-specific efficiency factor needs to strike a balance between providing a sufficiently strong incentive on the water companies to conduct a robust costing exercise and reveal this to Ofwat, while not risking disproportionate interventions which could cause wider concerns to the delivery of desirable enhancements or introducing potential financeability issues by underfunding these activities.

5.164 When intervening on a deep dive in this way, there are two steps:

- (a) Determining whether the company has provided sufficient evidence that its costs are robust and efficient; and
- (b) Where this is not the case, determining the level of efficiency challenge to apply.

5.165 The first of these steps will be undertaken on the specific facts of the case. If the company has failed to demonstrate its costs are efficient, it should be open to Ofwat to set a challenge figure based on its own judgement.⁹¹⁵ Ofwat should ensure that the challenging figure is high enough that companies could not benefit by obfuscating their true efficient costs, and ‘taking the penalty’, but it should also not be disproportionate. It is not clear to us that a broader estimate for the efficiency of the company (such as using its base cost efficiency) would represent a better approach.

5.166 Our judgement in this case, and our provisional decision, is that a figure of 10% for deep dive company-specific efficiency factors appears appropriate, and will generally properly balance the objectives discussed above.

⁹¹⁵ We note that this is consistent with Ofwat’s approach to ‘optioneering’ where it would apply a standard 20% challenge to schemes where it considered that a company had not provided evidence that the selected option was optimal; [Ofwat \(2019\) Technical appendix 2 Securing cost efficiency](#), pp 54-55, as well as the decision to cap this figure within a range of 5-10%.

Scheme-specific efficiency challenge

- 5.167 In paragraphs 5.157 to 5.166 above, we discussed the general approach to deep dive efficiency challenges. However, there will be times where the default figure above is not appropriate, as it does not reflect the level of evidence provided or the potential risk to customers. For example, where a company has largely justified its allowances, but a small amount of uncertainty remains, an efficiency challenge of below 10% may be preferable. Equally, in other circumstances, an efficiency challenge that is greater than 10% may be appropriate.
- 5.168 On this basis, depending on the specific circumstances and the evidence provided, we may decide that an alternative challenge to some or all elements of cost in a deep dive is more appropriate. These individual decisions require the application of judgement and will be explained where they occur.

The assessment of specific projects ('deep dives')

- 5.169 In this section we provide our provisional assessment and decisions for the deep dives we have conducted on specific schemes which the Main Parties have highlighted:
- (a) Yorkshire – Living with Water Partnership in Hull and Haltemprice;
 - (b) Northumbrian – Essex Resilience Scheme;
 - (c) Northumbrian – Sewer Flooding Resilience Scheme;
 - (d) Anglian – Strategic Interconnector Programme;
 - (e) Anglian – Smart Metering Scheme;
 - (f) Anglian – Water Resilience Scheme;
 - (g) Anglian – SEMD/non-SEMD; and
 - (h) Anglian – Bioresources Scheme.
- 5.170 These schemes represent more material claims which we consider are best assessed through a detailed assessment of the bottom-up evidence available.
- 5.171 When conducting these assessments, we adopt a proportionate approach such that a greater level of supporting evidence is required for larger investment proposals. However, we note the context of these assessments is one of significant information asymmetry between ourselves and the relevant

Disputing Company, and so consider it appropriate to require the company to provide robust evidence to support its claims.

5.172 We note that the above list does not represent all material enhancement schemes proposed by the companies. However, in line with our approach stated in paragraphs 5.4 and 5.17 above, we have focused on areas where the Main Parties provided conflicting views and where we have needed to resolve these in coming to our determination. For other major schemes which met Ofwat's evidential threshold to receive additional enhancement funding, we provisionally adopt the same approach as Ofwat did in its Final Determination.

5.173 Ofwat set out a series of 'gates' which it used when conducting its deep dives. These can be summarised as follows:⁹¹⁶

- (a) **Need for investment:** is this investment required and what would it deliver?
- (b) **Need for cost adjustment:** is this already funded elsewhere in the determination?
- (c) **Management control:** is this driven by factors beyond management's control?
- (d) **Best option for customers:** does this approach represent the most beneficial route to delivering the intended improvement for customers?
- (e) **Robustness and efficiency of costs:** has the company demonstrated that its proposed costs are efficient?
- (f) **Customer protection:** are customers protected if the investment is cancelled, delayed, or reduced in scope?
- (g) **Affordability (for highly material claims):** has the company considered the impact on customer affordability?
- (h) **Board assurance (for highly material claims):** has the company's board provided explicit assurance over the elements discussed above?

5.174 In the context of this determination, we do not consider it necessary to apply these criteria rigidly to every scheme but use them as a helpful assessment

⁹¹⁶ Ofwat (2019) [Technical appendix 2 Securing cost efficiency](#), Annex 6

framework when reviewing the evidence available. We refer to these gates at various times throughout this section.

5.175 We make our assessment of each of these proposals in order to meet our legal duties and, recognising where tensions may occur, using our judgement where necessary to do so.

5.176 For each deep dive we:

- (a) explain the decision in Ofwat's final determination;
- (b) present the evidence provided by the Main Parties (where appropriate, highlighting the relevant gate on which the dispute is focused);
- (c) highlight views of third parties where available; and
- (d) provide our provisional assessment and decision.

Deep dive 1: Yorkshire - Living with Water Partnership in Hull and Haltemprice

5.177 In its PR19 business plan, Yorkshire referenced a proposal for an around £50 million programme to strengthen the resilience of Hull and Haltemprice against extreme flooding events. Yorkshire said that it sought £28.7 million for this scheme in allowed costs and that the balance was to be achieved through partnership funding.

5.178 In its final determination, Ofwat allowed £16.4 million for the proposed projects (a reduction of £12.3 million from Yorkshire's request).

5.179 Ofwat calculated this figure based on the 'implicit allowance' which Yorkshire received in its base allowance for reducing sewer flooding and scaled this up to reflect the increased risk of this occurring in Hull and Haltemprice. This process involved Ofwat:⁹¹⁷

- (a) Using its base models to estimate an implicit allowance for sewer flooding across the whole Yorkshire region;
- (b) Pro-rating this based on the length of sewers in order to estimate an implicit allowance for Hull and Haltemprice specifically (£3.97 million);
- (c) Multiplying this by 5.14, because customers in Hull and Haltemprice are 5.14 times more likely to experience sewer flooding in comparison to

⁹¹⁷ Ofwat (2019) [Cost adjustment claims feeder model Yorkshire Water](#), sheet Hull resilience.

customers in Leeds and Sheffield (other large cities in the Yorkshire area), to give a total required allowance of £20.4 million; and

- (d) Finally, removing the implicit funding already provided in the base models for Hull and Haltemprice (ie £3.97 million) to produce a final adjustment of £16.4 million.

Yorkshire's views

Background and need for the scheme

- 5.180 Hull is unusually situated as a port city within a basin and suffers from fluvial, pluvial, tidal and ground water flooding.⁹¹⁸ Yorkshire highlighted that Hull is the city second most vulnerable to flooding in the UK, after London. The magnitude of the problem was highlighted in 2007 when the city and the surrounding areas experienced significant flooding when over 9,000 homes, 90 schools and 100 businesses were flooded.
- 5.181 The company stated that the city is unique in that it relies on the sewer system to remove all rainwater as well as sewerage. The issue is exacerbated by the fact that the Hull sewers are reliant on pumping rather than gravity, with the sewer tunnel system used to drain the city using two large Yorkshire pumping stations. Due to these challenges, Hull remains disproportionately at risk of suffering further flooding to properties.⁹¹⁹
- 5.182 Yorkshire estimated that a 1-in-30 year rainfall event would be likely to impact over 7% of the population (c.22,000 properties), compared with around 1% in other major cities in the Yorkshire region.⁹²⁰
- 5.183 In 2017, Yorkshire formed a partnership with the Environment Agency, Hull City Council and East Riding of Yorkshire Council, called the 'Living with Water Partnership'. The aim of this was to work on a more integrated catchment basis to develop innovative solutions to combat flooding events faster.

⁹¹⁸ Fluvial flooding occurs when rivers burst their banks as a result of sustained or intense rainfall. Pluvial flooding occurs when an extremely heavy downpour of rain saturates drainage systems and the excess water cannot be absorbed. Tidal flooding is the temporary inundation of low-lying areas, especially streets, during exceptionally high tide events, such as full moons. Ground water flooding is caused when the water table rises up from rocks or soils to above ground level, causing flooding to occur at the surface.

⁹¹⁹ [Yorkshire SoC](#), paragraph 309, p90

⁹²⁰ [Yorkshire response to securing long term resilience \(relating to Ofwat's IAP YKY.L2.A2 and draft determination\)](#), p. 36

Design and costing of the proposed scheme

- 5.184 Yorkshire asked Arup to explore potential solutions to the flooding problems at Hull and Haltemprice. Arup identified that an infrastructure solution to expanding the pumping capacity of Hull's sewer system would cost around £1.8 billion.
- 5.185 However, Arup and Yorkshire identified that an alternative solution was to attenuate the water before slowly releasing it back into the sewers. While traditional approaches could be used (eg holding the excess water in tanks), Yorkshire and Arup also identified that it was also possible to use 'blue-green', environmentally-friendly approaches to attenuation such as: permeable paving, swale, detention basins, verge planters, street planters and geocellular storage.
- 5.186 Yorkshire said that an 'optimized Hotspot' GIS tool was used to determine clusters of at-risk properties. This approach identified an initial list of 47 'Hot Spots'. In collaboration with its Living with Water partners, Yorkshire then prioritised four of these Hot Spot locations to undergo further development.
- 5.187 The estimated cost for the four prioritised Hot Spots is shown in Table 5-14 below:

Table 5-14: Estimated cost of delivery for blue-green vs traditional approaches

<i>Hot Spot Number</i>	<i>Blue-green (£ million)</i>	<i>Traditional (£ million)</i>
2	33.2	35.7
4	2.5	4.9
13	11.3	25.7
27	3.5	5.7
Total	50.5	72.1

Source: Yorkshire

- 5.188 Although the purpose of the report by Arup was not to detail the specific benefits of blue-green solutions, it did explain various additional advantages over traditional methods. These included:
- (a) improved water quality reaching sewers and works (e.g. removal of hydrocarbons and suspended solids);
 - (b) savings on treatment costs and other environmental benefits; and
 - (c) improved biodiversity and amenity values to the city.
- 5.189 The expected impact of the scheme would be to reduce the number of properties exposed to sewer flooding in rainfall events as shown in Table 5-15 below:

Table 5-15: Impact of blue-green Hot Spot solutions

	<i>1 in 5 year event (including climate change)</i>	<i>1 in 30 year event (including climate change)</i>	<i>1 in 75 year event (including climate change)</i>
Reduction in number of properties flooded during events of stated scale	494	808	644

Source: Yorkshire

5.190 Yorkshire said the total cost of delivering the plans at these four Hot Spots was just over £50 million and that it was only requesting £28.7 million of this.⁹²¹ The company explained that through innovation, collaboration and working to secure matched funding it could deliver the associated benefits with this lower allowance. Yorkshire said that it was seeking funding from additional sources, including the Environment Agency's Medium Term Plan for Flood Defence Grant in Aid.

5.191 Yorkshire disagreed with the methodology and calculated allowance which Ofwat used in its final determination. In particular, it stated that Ofwat's calculation (which relied on base cost allowances) was opaque, disconnected from the resilience aims of the programme and had no sound analytical basis.⁹²²

Customer views and customer protection

5.192 Yorkshire said it engaged with various customers and stakeholders to collaboratively design a vision for future flood alleviation schemes in Hull. Yorkshire stated that feedback from its customers and other stakeholders emphasised that it must deliver its core services differently, focusing on a holistic and sustainable approaches.⁹²³

5.193 Yorkshire stated that it was open to a scheme-specific ODI to protect customers from non-delivery of this scheme. The company said that it would be able to demonstrate the output resulting from this spending.

Ofwat's views

5.194 Ofwat stated that a detailed bottom up analysis in the final determination was not possible for the proposed enhancement, as it did not receive Yorkshire's details on costing and its Hot Spot analysis until very late in the process. It also submitted that:

⁹²¹ [Yorkshire SoC](#), paragraph 317, p91

⁹²² [Yorkshire's Reply to Ofwat's Response](#), pp95–96, paragraphs 3.60.3 and 3.60.5

⁹²³ Yorkshire (2018), [Yorkshire Water's long term strategy August 2018](#)

- (a) The evidence provided by Yorkshire was not sufficiently detailed to allow Ofwat to identify the components of the proposal that mitigate the conditions specific to the area versus those that mitigate broader effects, such as those arising from climate change.⁹²⁴ Ofwat said the sector has been mitigating the effects of climate change in previous periods, and that Yorkshire's base allowance was sufficient to cover the necessary costs in this area.
- (b) It needed evidence of where the allowance would be efficiently invested. Ofwat said that, in particular, Yorkshire did not itemise what its customers could expect to receive from the proposed investment. Ofwat said that as a result of this it was unable to assess the scope of the costs using bottom up analysis.⁹²⁵

5.195 Ofwat stated that ordinarily where there was such a lack of evidence, it would reject the claim outright. However, it stated that in this case it was supportive of the innovation and partnership approach and understood the drainage issues that are unique to Hull. Therefore, Ofwat included an allowance in its final determination. Ofwat said due to the lack of evidence available, it made a top-down calculated allowance.⁹²⁶

5.196 Ofwat also said that it expected Yorkshire to use its wider base allowance to reduce internal sewer flooding across its operating region by 47% and therefore meet its performance commitment. It explained that if the company delivered a higher sewer flooding performance, it would be able to earn outperformance payments under the outcome delivery incentive framework.⁹²⁷

Third party views

5.197 We received submissions from a number of third parties, the large majority of which voiced support for the principles and aims of the Living with Water Partnership.

5.198 Some of the other members of the Living with Water Partnership voiced explicit support for the scheme:

- (a) Hull City Council stated that Yorkshire's requested funding was essential to delivering the necessary physical and societal change across the city of Hull. It said that as Hull is a flood-prone city it requires innovative green

⁹²⁴ Ofwat (2019) [Cost adjustment claims feeder model Yorkshire Water](#), sheet Hull resilience

⁹²⁵ [Ofwat's response to Yorkshire's SoC](#), p54, paragraph 3.104

⁹²⁶ [Ofwat's response to Yorkshire's SoC](#), p54, paragraph 3.105

⁹²⁷ [Ofwat's response to Yorkshire's SoC](#), p54, paragraph 3.106

solutions in order to make the city more resilient. It said that a reduction in funding would substantially threaten the ability to implement these vitally important and innovative schemes, and risks undermining the good work completed to date;⁹²⁸ and

- (b) East Riding of Yorkshire Council stated that the full funding of the proposals and continued collaboration between all the Living with Water partners is the only way that the area of East Riding and Hull can become more resilient to extreme weather events, and any reduction in this funding would be a major loss to local residents.⁹²⁹

5.199 Other third parties voiced general support for the principles of the Living with Water Partnership aims, albeit without specific reference to this scheme:

- (a) Blueprint for Water highlighted a significant increase in customer preferences reflecting a shift in environmental awareness and concern across society as a whole;⁹³⁰
- (b) City of Bradford Council stated that customers indicated overwhelming support of 97% for delivering Yorkshire's environmental plans, and 88% of customers supported Yorkshire's business plan more generally;⁹³¹ and
- (c) The National Flood Forum stated that it strongly supports greater partnership working and collaboration, and that now is not the time to prioritise short term price savings over the trauma that many communities have to suffer.⁹³²

5.200 CCWater stated that it expects the CMA to ensure that the assessment of costs required to deliver sewer flooding solutions to the people of Hull is correct. It said that customers would expect Yorkshire to deliver an efficient solution that will address the extreme risk of flooding faced by the people of Hull and its surrounding areas. CCWater particularly highlighted that Ofwat's final determination did not make clear why it reduced the allowance provided to Yorkshire from its request.⁹³³

⁹²⁸ [Hull City Council submission](#)

⁹²⁹ [East Riding of Yorkshire Council submission](#)

⁹³⁰ [Blueprint for Water submission](#)

⁹³¹ [City of Bradford Council submission](#)

⁹³² [The National Flood Forum submission](#)

⁹³³ [Consumer Council for Water response to Yorkshire's SoC](#)

Our provisional assessment and decision

Our view on allowance for the scheme

- 5.201 We consider that there is evidence demonstrating the unique conditions in Hull and Haltemprice which results in customers being at greater risk of sewer flooding compared to other cities in England and Wales. This appears consistent with the views of both Ofwat and Yorkshire. Considering this, we are of the opinion that there should be an allowance beyond Yorkshire's base costs for this programme.
- 5.202 We also welcome the innovative Living with Water partnership approach in promoting new ways of collaboration to address these challenges, particularly since the responsibility for mitigating the risks of flooding in Hull and Haltemprice would appear to be split across multiple organisations. We consider that this approach is likely to provide valuable lessons for other companies in the sector.
- 5.203 We have additional evidence, which was not available to Ofwat, that we can use to test Yorkshire's business plan on more of a bottom-up basis. In general, we consider that Yorkshire appears to have demonstrated the need, and some engineering justification for the design of its scheme.
- 5.204 However, we are concerned that the level of evidence on certain aspects of the scheme is still relatively limited, in particular:
- (a) We have seen no justification for the allocation of the £50 million estimated total costs between scheme partners, for example whether this reflects the actual responsibility for the delivery of improvements in sewer flooding. This could result in Yorkshire's customers having to provide a greater proportion of this than is reasonable compared to other potential sources;
 - (b) The activities which would be covered by the scheme are generally poorly specified. While some of this is likely due to the partnership model, this characteristic does not justify a 'blank cheque' for additional funds, and instead companies should ensure that the need for evidence to support their plans is built into the partnership model. This is particularly important if this approach is likely to be more prevalent in the future; and
 - (c) Although Arup considered the difference between blue-green and traditional methods of delivering improved protection against flooding,

there is limited evidence of broader optioneering (for example around the types of blue-green interventions used).⁹³⁴

5.205 Overall, we consider that it is appropriate to assess the allowance on the basis of the Yorkshire business plan proposal (ie starting with the £28.7 million), as is the usual approach taken for other enhancement projects (see paragraph 5.11 above). However, we believe that Yorkshire has not fully demonstrated that the level of costs it has included represent an efficient and robust estimate, for the reasons given above. This would therefore support applying a challenge to Yorkshire's proposal.

5.206 We consider that the level of cost challenge to apply requires an exercise in judgement. In this case, we have applied a 20% challenge to the £28.7 million figure requested by Yorkshire, equivalent to a reduction of £5.7 million. In applying our judgement, we note that:

- (a) This is consistent with Ofwat's general approach to schemes which it considered had not demonstrated sufficient optioneering; and
- (b) Whilst Ofwat's implicit allowance calculation is only indicative, it suggests that Yorkshire has already received funding of around £4 million to address flooding in Hull and Haltemprice through its base allowances. If we were to apply an efficiency challenge of less than this, it risks Yorkshire being double-funded for these activities.

5.207 We therefore provisionally decide that the price control should include an allowance of £23 million to enable Yorkshire to deliver the proposed scheme. This is equivalent to an increase of £6.6 million over the Ofwat final determination.

Customer protection

5.208 We believe that customer protection is an important consideration for this scheme, particularly given the risk of partner funding not ultimately materialising and the impact this would have on the scheme. Our current view is that it is necessary to include a scheme-specific ODI to ensure that if the proposed scheme does not proceed, Yorkshire will return the provided allowance to customers.

5.209 Yorkshire has proposed a performance commitment and penalty-only ODI for this scheme and has provided letters of support for the ODI from its three

⁹³⁴ For example, the Welsh Water Rainscape scheme uses solutions such as filter strips and grass channels.

Living with Water partners. The approach which Yorkshire has proposed involves a dual test of (i) Yorkshire's expenditure on this scheme compared with the allowance provided (protected with a financial ODI), and (ii) a 'gateway' condition of providing the stated benefit of reducing the number of properties at risk, as set out in Table 5-15 above (protected with a reputational ODI).

5.210 Yorkshire has proposed that this functions as:

- (a) An end-of-period test, with annual reporting;
- (b) If Yorkshire has spent less than the allowance provided in the CMA determination at the end of the AMP, this shortfall would be returned to customers (equivalent to a 'log-down' system).
- (c) If the service improvement in terms of numbers of households was not delivered, it would be incumbent on Yorkshire to undertake further work without further funding, and this would be supported by a reputational ODI.

5.211 Yorkshire stated that this approach protects customers from underperformance in either financial or service terms while providing the partnership with the necessary flexibility to undertake its plans efficiently, for example, if new Hot Spots are identified where it is more efficient to spend on flood mitigation measures than those initially specified.

5.212 We recognise Yorkshire's aims of protecting customers while not restricting the company's activities if more efficient approaches are identified in the future, and we recognise that this is particularly important in the context of a partnership approach.

5.213 With multiple interested third party partners also being involved in the design, delivery and results of the scheme, as well as its high-profile nature, we provisionally decide that Yorkshire's proposed dual-test ODI provides customers with the appropriate protection against non-delivery of the scheme.

Deep dive 2: Northumbrian - Essex Resilience Scheme

5.214 In its PR19 business plan, Northumbrian proposed a £20.4 million⁹³⁵ enhancement investment for a 20km⁹³⁶ Abberton to Hanningfield raw water transfer main (also referred to as the Essex Resilience Scheme). The scheme

⁹³⁵ Northumbrian, Essex and Suffolk Water (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), p17

⁹³⁶ Northumbrian (2019), [Northumbrian: Ensuring long term resilience](#), p8

aims to address potable (treated) water demand issues and improve water resilience in the company's Essex region.

- 5.215 Ofwat rejected the entirety of Northumbrian's proposal on the basis of undemonstrated need, particularly given other enhancement programmes for which additional funding had already been allowed.⁹³⁷

Northumbrian's views

Background and need for the scheme

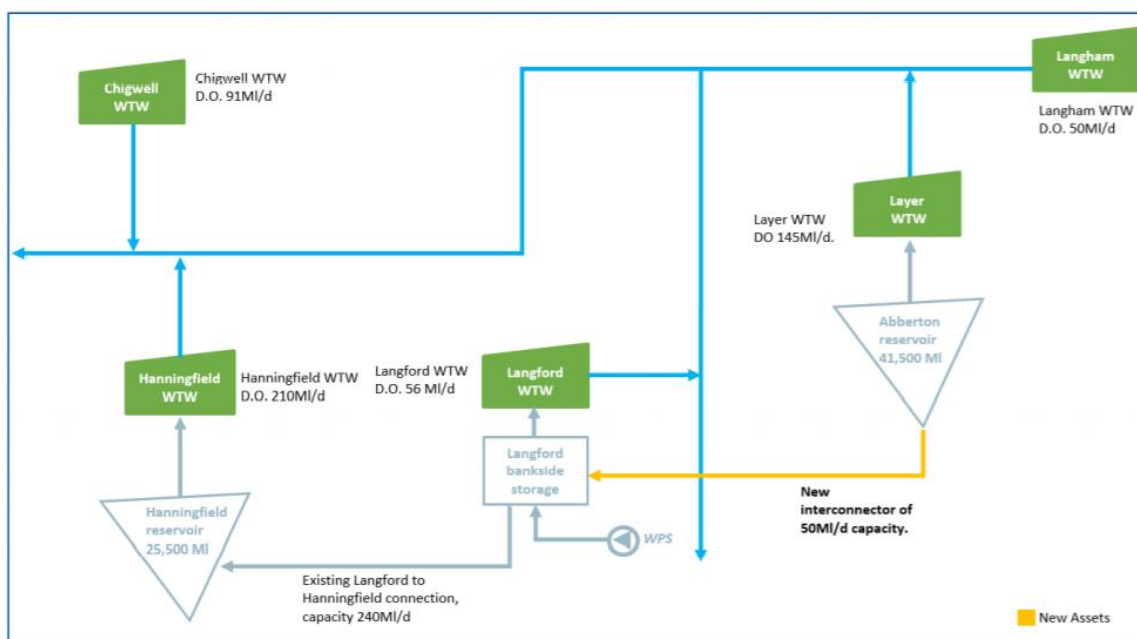
- 5.216 Northumbrian stated that, since the Abberton reservoir was expanded (this was completed in 2014), Essex now has surplus total raw water supplies, with enough to meet a 1 in 200 year drought. However, this raw water needs still to be treated and distributed to customers.
- 5.217 Northumbrian explained that the proposed transfer scheme is designed to improve the resilience of the raw water system and enable the Hanningfield water treatment works to respond efficiently to outages and demand peaks within its network.⁹³⁸
- 5.218 Northumbrian said the treated water supply network in Essex is integrated and there is a high degree of flexibility for moving potable water around the region to where it is required. However, the company highlighted that there is limited scope to transfer surplus raw water to align with the availability of surplus treatment capacity, and that this could result in a situation where one area was experiencing restrictions in supply whilst a neighbouring part holds ample raw water supplies which could not be used. Northumbrian stated that this represented the main resilience risk in the region.⁹³⁹
- 5.219 Therefore, Northumbrian proposed an enhancement scheme to address this risk. The proposed enhancement involves building an interconnector pipe which would allow the company to transfer raw water directly from its larger Abberton reservoir to its Langford water treatment works, via its bankside storage reservoir. The company proposes to use the existing Langford to Hanningfield connection to further transfer the raw water to its higher capacity water treatment works at Hanningfield as shown in Figure 5-1 below:

⁹³⁷ Ofwat (2019), [PR19 Northumbrian Water final determination](#), pp41–42

⁹³⁸ Northumbrian, Essex and Suffolk Water (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), p5

⁹³⁹ [Northumbrian SoC](#), p15, paragraph 61

Figure 5-1: Schematic showing raw water and treated water assets in the Water Resource Zone⁹⁴⁰ (WRZ); yellow line depicts the proposed interconnector⁹⁴¹



Source: Northumbrian

5.220 Northumbrian highlighted its concerns regarding the likelihood of failure which this scheme was designed to address. It stated that in both 2016 and 2018⁹⁴² raw water levels in the Hanningfield reservoir were at historical low levels due to restricted raw water transfer capability within its systems. In both cases, the company said, it came very close to having a major impact on customers, and if there had been any other shocks at the time (eg COVID-19) then it is likely it would have run out of supply in the Hanningfield region. Northumbrian submitted that as a result of its restricted raw water transfer capability, it could result in localised water shortages, and this represented a significant and immediate threat to supplies.

5.221 Northumbrian highlighted five factors which it stated would increasingly impact its ability to balance water demand, resulting in increasing need for this scheme in the future:⁹⁴³

- (a) **Algal blooms:** The company said that algal blooms are increasing in frequency and length and are more widespread due to warmer summers. These can result in outages at water treatment works which rely on slow

⁹⁴⁰ A water resource zone is an area within which the abstraction and distribution of supply to meet demand is largely self-contained; [Final Water Resources Planning Guideline](#), p10

⁹⁴¹ Northumbrian, Essex and Suffolk Water (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), p18

⁹⁴² Northumbrian, Essex and Suffolk Water (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), pp8–12

⁹⁴³ Northumbrian, Essex and Suffolk Water (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), pp4–6

sand filters (all of the water treatment works in the area other than Hanningfield), and so would increase the demand on the Hanningfield water treatment works which is better able to treat raw water impacted by algal blooms.

- (b) **Reducing rainfall:** The company stated that climate change is affecting its region and increasing the likelihood and severity of droughts and this could result in supply issues because of a lack of integration of the raw water network.
- (c) **Population growth:** The company said it expects to see a significant change in demand over the planning period with growth in population of almost 20% by 2045.
- (d) **Peak demand periods:** Northumbrian said that extreme weather events in recent years has resulted in more frequent peaks in demand, particularly in Essex during the summer. It stated that the technology at Hanningfield water treatment works allowed it to ramp capacity up and down more quickly to meet these changes, placing increased demand on the Hanningfield reservoir.
- (e) **Ely-Ouse transfer:** The Ely-Ouse to Essex Transfer Scheme is an Environment Agency-run scheme which transfers water from the Ely Ouse in Norfolk into the Essex rivers to aid in refilling Abberton and Hanningfield reservoirs. Northumbrian stated that this means that its ability to deploy the full output of Hanningfield water treatment works is in the hands of a third party and outside its own control.

5.222 Northumbrian explained that it had not conducted any quantitative analysis to assess the impact that this scheme would have on reducing the risk of running out of water in Hanningfield. However, in response to a query from the CMA, Northumbrian was able to provide a scenario analysis which demonstrated hypothetical drivers of reduced local supply-demand and the impact on water availability both with and without the proposed scheme.

Option appraisal

5.223 As part of its option appraisal process to address the identified risks, Northumbrian considered three options:⁹⁴⁴

⁹⁴⁴ Northumbrian, Essex and Suffolk Water (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), pp16-18

- (a) **Do nothing:** Northumbrian stated that the risk of doing nothing is that a longer repeat event of the problems in 2016 and 2018 could result in an impact on supply to at least 365,323 properties. The company stated that this was not considered a viable option.
- (b) **Increase Layer water treatment works capacity to 165 MI/d and triplicate mains (£58.8 million in 2006 prices):** Northumbrian said that, at the time of the Abberton reservoir enlargement scheme, its engineering consultancy (MWH) considered the option of expanding Layer water treatment works.
- (c) Link Abberton and Hanningfield reservoirs via a raw water pipeline capable of transferring up to 50 MI/d (£20.4 million in 2017/18 prices): The proposed approach. The company stated that this option makes full use of existing assets and treatment capacity to address current risks in a way that defers the need for more costly expansion of Layer water treatment works until at least 2045.

5.224 Northumbrian stated that there are no alternative options available to address this risk as there are no other water resources that it can turn to for additional raw water. Therefore, it said that it can either move the raw water to treat it (option c above) or treat it where it is (option b above).

Sources of risk

5.225 Northumbrian stated that the aim of the scheme is to reduce the risk of catastrophic supply failure arising from insufficient potable water supply in the Essex region, regardless of the specific causes. Northumbrian pointed to COVID-19 as an example of a risk factor which was not specifically identifiable in advance, but which has contributed to resilience issues, and if this had coincided with other events such as those in 2016 or 2018 could have resulted in a loss of supply to households.

5.226 The Ofwat final determination included funding for a Northumbrian proposal to add Dissolved Air Flotation (DAF) to the existing treatment process at the Layer water treatment works.⁹⁴⁵ The company said that the aim of this additional treatment process was to restore the deployable output of Layer water treatment works to pre-2016 levels. The company highlighted that the Layer scheme is focused on a single issue, meeting deployable output during algal blooms, and would not increase resilience against other potential risk factors. Northumbrian stated that while the needs case for the Essex

⁹⁴⁵ Ofwat provided an allowance of £22 million for this project.

Resilience Scheme and the Layer water treatments works scheme were related, they were separate and both investments were needed.

5.227 Northumbrian stated that it was unhelpful to focus on individual potential causes which occurred during the 2016 and 2018 events (such as algal blooms or a failure in pumping stations which made up the Ely-Ouse to Essex Transfer Scheme). Northumbrian submitted that although some of the specific concerns discussed in paragraph 5.221 above may be less likely to occur in the future due to other changes, this scheme was still necessary to mitigate the identified risk.

5.228 Northumbrian said that it was also misleading of Ofwat to state that the drivers of the proposed enhancement were already factored into the WRMP process. Northumbrian explained that it was clear that this was not a supply-demand scheme under WMRP. It said that the factors of population growth, reduced rainfall and demand fluctuations were relevant to the overall consideration of risk from a resilience perspective.⁹⁴⁶

Customer support and protection

5.229 Northumbrian said that the Essex Resilience Scheme was one of three schemes collectively tested with customers which achieved 89% acceptance.⁹⁴⁷ Northumbrian explained that, to protect customers, it is proposing a cost adjustment mechanism. This would work by ensuring that if delivery was late or did not occur, a penalty would be calculated based on the net present value of the difference in cash flows compared to on time delivery.⁹⁴⁸

5.230 Northumbrian said that Ofwat's PR19 Outcomes Performance Commitment appendix⁹⁴⁹ sets out the customer protection ODI that incentivises the delivery of its water resilience enhancement programme. Northumbrian proposes to extend this ODI to also include the Essex Resilience Scheme.

⁹⁴⁶ Northumbrian, Essex and Suffolk Water (2019), [Northumbrian's Reply to Ofwat's Further Submission](#), p14

⁹⁴⁷ Northumbrian, Essex and Suffolk Water (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), p2

⁹⁴⁸ Northumbrian, Essex and Suffolk Water (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), p23

⁹⁴⁹ Ofwat (2019), [Outcomes Performance Commitment Appendix](#), Section 1.2.26, p120

Ofwat's views

- 5.231 Ofwat rejected the Essex Resilience Scheme business case in full in its final determination on the basis that the 'Need' test had not been met.⁹⁵⁰
- 5.232 Ofwat said that Northumbrian emphasised in its own WRMP that the supply network in Essex is highly integrated and flexible. Ofwat stated that the scheme is therefore not necessary to enhance resilience in the Essex water resource zones.⁹⁵¹
- 5.233 Ofwat said that Northumbrian had not sufficiently demonstrated the existence of a significant drawdown risk to the Hanningfield reservoir or a significant risk to potable supplies in the Essex area.⁹⁵²
- 5.234 Ofwat also raised broad concerns with potential inconsistencies in Northumbrian's reasoning and drivers of risk around the proposed scheme. It stated that many of these were already funded through allowances as part of the base models and other approved schemes.
- 5.235 Ofwat submitted that Northumbrian's reasoning for this scheme was inconsistent and had changed during its PR19 process:
- (a) At IAP, Northumbrian included the scheme in its supply-demand balance plans. Ofwat rejected the proposal due to insufficient evidence that the interconnector would provide any benefit to customers (e.g. whether an imbalance in reservoir levels would impact the system's deployable output).
 - (b) At DD, Northumbrian moved the scheme to the resilience category. Ofwat assessed it on this basis and decided that this scheme would mitigate the same risks as the Layer water treatment works proposal to accommodate deteriorating raw water quality (for which Ofwat made an allowance of £22.2 million).⁹⁵³

⁹⁵⁰ Ofwat (2019) [Wholesale Water Enhancement feeder model: Resilience](#), SOC509, Cell 'D15' on tab 'Deep dive NES'.

⁹⁵¹ [Ofwat's Response to Northumbrian](#) p9, paragraph 1.36

⁹⁵² [Ofwat's Response to Northumbrian](#), p63, paragraph 3.147

⁹⁵³ Ofwat (2019), [Wholesale Water Raw water deterioration – feeder model](#), Deep dive_NES (cell F34).

Sources of risk

- 5.236 Ofwat said that the drawing down risk of Hanningfield reservoir is closely linked to algal and turbidity outages at Layer water treatment works, or to treatment works maintenance activities within management control.⁹⁵⁴
- 5.237 Ofwat said that, as part of its assessment of costs to address deterioration in raw water quality, it made an allowance to mitigate the risk of algal and turbidity outages through the DAF treatment at Layer investment. Ofwat acknowledged that while this may not address the full extent of the issues that the Essex Resilience Scheme aims to address, it considered it to be a major factor in reducing the residual risk to the reliability of water supply across the Essex supply zones. Ofwat stated that, since this scheme primarily mitigates the same risk as the investment for DAF treatment at Layer water treatment works, it considers the resilience risks this scheme seeks to mitigate are addressed through already funded schemes.^{955 956}
- 5.238 Ofwat said that Northumbrian failed to set out the extent to which the baseline risk for the Essex Resilience Scheme is addressed by the Layer treatment scheme. Ofwat said that by not doing so the company would appear to be asking for two schemes that mitigate a similar risk.⁹⁵⁷
- 5.239 Ofwat stated that the secondary risks are not quantified or assessed in the context of the Layer water treatment works having a DAF treatment process in place.⁹⁵⁸ Ofwat stated that many of the secondary risks such as population growth, low rainfall and peak demands relate to issues outside the scope of resilience enhancements (as they are reflected in the base models).⁹⁵⁹
- 5.240 Furthermore, Ofwat argues that Northumbrian fails to adequately account for existing, built in resilience already in the Essex system which the company uses when local supplies are interrupted (such as supply from other water treatment works and more raw water provided through the Ely-Ouse to Essex transfer).⁹⁶⁰

⁹⁵⁴ [Ofwat's response to Northumbrian's SoC](#), p58, paragraph 3.128

⁹⁵⁵ Ofwat (2019) [Wholesale Water Enhancement feeder model: Resilience](#), SOC509, Cell 'D15' on tab 'Deep dive NES'

⁹⁵⁶ [Ofwat's response to Northumbrian's SoC](#), p58, paragraph 3.127

⁹⁵⁷ [Ofwat's response to Northumbrian's SoC](#), p61, paragraph 3.139

⁹⁵⁸ [Ofwat's response to Northumbrian's SoC](#), p58, paragraph 3.127

⁹⁵⁹ Ofwat (2019) [Wholesale Water Enhancement feeder model: Resilience](#), SOC509, Cell 'D15' on tab 'Deep dive NES'.

⁹⁶⁰ [Ofwat's Response to Northumbrian](#), paragraph 3.148

Third party views

5.241 We received submissions from a number of third parties, the large majority of which voiced support for this scheme, in particular:

- (a) Blueprint for Water stated that the scheme was developed with long-term resilience in mind, and reduced risk from weather, pollution events and other threats to the security of supply. It also highlighted the strong customer support for the scheme.⁹⁶¹
- (b) DWI stated that this scheme was an example of approaches which could improve raw water quality and mitigate contamination risk. However, the scheme was not submitted to the DWI for PR19 review and therefore it had not completed a technical evaluation of the scheme.⁹⁶²
- (c) Essex Chambers of Commerce stated that it was supportive of this scheme and the resilience it will deliver for water supplies across the county. It submitted that failure to deliver the proposal would have ramifications for future growth of the Essex economy and would be a missed opportunity for businesses and residents.⁹⁶³
- (d) Northumbrian and Essex and Suffolk Water Forums stated that the scheme would address risks beyond those that the Layer water treatment works investment addresses. It said that that the security of water supply is necessary because of the effects of climate change already being seen in the UK.⁹⁶⁴

5.242 CCWater stated that customers appeared to support this scheme, but it was unclear whether the improvements to Layer treatment works offer the level of protection from risks of supply interruption and water quality that the transfer main scheme offers.⁹⁶⁵

5.243 Water Resources East stated that this scheme would enhance the operability and resilience of the two crucial strategic reservoirs (at Abberton and Hanningfield) and potentially take pressure off water resources in the South East and London, which the work on the National Framework⁹⁶⁶ shows to have the largest challenge of any region. It stated that proposed scheme

⁹⁶¹ Blueprint for Water (2020), [submission](#)

⁹⁶² DWI (2020), [submission](#)

⁹⁶³ Essex Chambers of Commerce submission (2020), [submission](#)

⁹⁶⁴ Northumbrian and Essex and Suffolk Water Forum (2020), [submission](#)

⁹⁶⁵ CCWater (Northumbrian) (2020), [submission](#), p13, paragraph 8.7

⁹⁶⁶ The [national framework](#) was published by the Environment Agency and sets the strategic direction for long term regional water resources planning.

would appear to be a well-supported, technically appropriate, relatively low cost, 'no regret' option for the county of Essex and beyond. It also highlighted the high level of customer support for Northumbrian's plans to increase resilience in Essex.⁹⁶⁷

Our provisional assessment and decision

Our view on allowance for the scheme

- 5.244 This is a finely balanced decision. On the one hand, we consider that there is an inherent logic in Northumbrian's submissions on aligning its raw water storage capacity with its treatment capacity, and that this could result in increased levels of resilience in ensuring that it is able to continue to supply customers.
- 5.245 However, Northumbrian's submissions make it difficult for us to perform any form of cost benefit analysis. In particular, Northumbrian does not primarily argue for the scheme on the basis of an assessment of potential risk factors and the likelihood of these occurring, but instead on the basis of observing a number of recent 'near misses' in 2016 and 2018. This does not appear to fit well with the wider regulatory regime which is based on quantified risk-based approach planning (as in the WRMP) even for long-term, uncertain events. Alongside this, it appears that Northumbrian has done minimal optioneering; it does not even appear to have updated the 2006 figures around expanding Layer water treatment works.
- 5.246 In this context, we understand and appreciate Ofwat's position that, once it had provided funding for addressing the key outstanding risk factor identified by the company, Ofwat decided that any residual risk was manageable by the company.
- 5.247 We also considered whether there are any reasons that, even if this scheme needed to be completed, then it may not be appropriate to provide additional funding, for example:
- (a) It is possible that Northumbrian's historical decisions have contributed to the current situation (for example, it chose to expand its Abberton reservoir in 2014 resulting in this disconnect between its raw water storage and water treatment capacities), and if it has made inefficient or suboptimal decisions in the past then customers should not pay to correct this; or

⁹⁶⁷ [Water Resource East submission](#)

- (b) If there is a risk that the company has already been funded to undertake improvement activities either through base allowances or through the outcomes framework, particularly in the context of the enhancement allowance for DAF treatment at Layer.

- 5.248 We have not seen convincing evidence of either of the above points. Furthermore, we are concerned that a decision to disallow this expenditure based on the narrow application of a specific assessment framework may miss wider implications. Our interpretation of Northumbrian's arguments is that it is seeking to mitigate against the impact of several low-probability events occurring simultaneously (such as drought, high demand, outage at all water treatment works except Layer), which would result in serious water restrictions across hundreds of thousands of households. While the specific identification of these potential events and inputs may be helpful in designing a resilient system, this is not the only approach possible, for example a broader viewpoint looking at redundancy levels may be more appropriate for certain schemes. This appears similar to the outcomes-based approach adopted elsewhere in the determinations.⁹⁶⁸
- 5.249 Another reason to seek to identify specific risk factors is to ensure that a company is not funded twice for undertaking the same activities. However, while Northumbrian has received funding to address certain specific risk factors, we consider that the nature of these low-probability high-consequence events is not well captured in other parts of the regime, and do not consider that there is a high risk of double-funding.
- 5.250 For these types of decision, we are required to make a judgement about the overall likelihood of a potential event (or combination of events) occurring, compared to the impact of such an event, and whether the cost to customers of reducing this residual risk is justified. This reflects the overall balancing of our legal duties, in particular in relation to the requirement to further both the consumer and resilience objectives.
- 5.251 In these circumstances, we consider that the evidence supports a view that the residual risk that would be addressed by this scheme is material (especially given that Northumbrian customers in Essex experienced two near-misses within a recent three year period), while the cost of addressing the issue is relatively modest particularly given the number of households potentially affected and the long-life nature of the solution which would provide ongoing benefits over many years. Therefore, while certain risk

⁹⁶⁸ One example of an alternative approach to considering operational resilience is redundancy levels such as those reflected in Transmission System Security in England and Wales: National Grid Transco (2004), [Written Evidence before the Select Committee on Trade and Industry](#), paragraph 20

factors have already been addressed or reduced, without further actions there remains a residual risk of serious disruption to customer supplies.

5.252 We consider that this decision remains finely balanced and recognise that there may be other similar circumstances in which the residual risk identified by the water company would not justify additional funding of enhancement activities. However, in this instance and having carried out our own assessment, we consider that there is sufficient evidence to support this proposal and provisionally decide to allow Northumbrian an additional £20.4 million⁹⁶⁹ for the delivery of this scheme, subject to appropriate customer protection measures (see below).

Customer protection

5.253 As discussed in paragraphs 5.229 to 5.230 above, Ofwat's final determination included customer protection ODIs that incentivise the delivery of Northumbrian's water resilience enhancement programme. This ensures that customers are refunded if Northumbrian fails to complete the relevant work.

5.254 Northumbrian has proposed that this ODI is extended to incorporate the Essex Resilience Scheme. Northumbrian stated that to achieve this the incentive rate would need to be increased from -£0.294 million per unit (%) of delivery to -£0.388 million per unit in order to reflect the increased value of the programme.

5.255 Our provisional decision is that the above approach represents a reasonable approach to protecting customers, albeit we may need to consider the exact calibration of the final figures to ensure that the allowance provided is fully reflected.

Deep dive 3: Northumbrian - Sewer Flooding Resilience Scheme

5.256 In its PR19 business plan, Northumbrian included a £86 million enhancement programme to reduce the risk of sewer flooding in its North East region, alongside a bespoke PC and ODI.

5.257 Ofwat rejected Northumbrian's resilience investment case in full. Ofwat stated that Northumbrian had received sufficient allowances within its base costs to fund its sewer flooding reduction activities.⁹⁷⁰

⁹⁶⁹ Northumbrian, Essex and Suffolk Water (2019) [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), p. 17.

⁹⁷⁰ [Ofwat's response to Northumbrian's SoC](#), paragraph 1.35.

Background and need for the scheme

5.258 Northumbrian submitted that historically it had undertaken activities to address internal sewer flooding which were focused on properties which had flooded in the past ('reactive programme'). This new programme of work was targeted at properties which had not flooded previously, but are at higher risk of sewer flooding in the future as a result of the layout of the existing sewer network and ongoing trends around climate change^{971, 972} and urban creep⁹⁷³ ('proactive programme').⁹⁷⁴

5.259 To design its proactive programme, Northumbrian developed a geographic information system (GIS) tool and hydraulic models to assesses how the performance of the sewerage network would impact sewer flooding. It used this to develop a red/amber/green assessment for its catchments and highlight areas of greatest risk. It then overlaid estimates of future climate change and urban creep to produce the figures shown in Table 5-16.⁹⁷⁵

Table 5-16: Increase in at risk properties due to urban creep and climate change

	Property Impact - depth of flooding relative to ground level in m (No of properties affected)				
Rainfall Probability	<-0.5 Category 1	-0.5 to -0.2 Category 2	-0.2 to 0 Category 3	0 to 0.2 Category 4	>0.2 Category 5
1 in 20 year	464,663 (-17,409)	48,981 (-1,809)	32,077 (2,916)	129,899 (11,809)	49,668 (4,515)

Source: Northumbrian Water.

5.260 Northumbrian stated that this illustrates that the impact of climate change and urban creep would increase the number of at-risk properties (categories 4 and 5) by 16,324.⁹⁷⁶ The company's enhancement proposal is to reduce the flood risk to 7,400 of the 16,324 properties during AMP7. Northumbrian explained that this number is derived from all the properties in category 5 and a proportion of the properties in category 4.

⁹⁷¹ Northumbrian (undated) [3.3.1 reducing property flooding risk](#), p10

⁹⁷² [Met Office \(2019\) UKCP18 Science Overview Report](#) p3-4

⁹⁷³ Miller, J.D., Scholefield, P. and Rowland, C. (2017), 'The impacts of urbanisation and climate change on urban flooding and urban water quality: A review of the evidence concerning the United Kingdom.', *Journal of Hydrology: Regional studies*, pp345-362.

⁹⁷⁴ [Northumbrian SoC](#), paragraphs 154 and 622

⁹⁷⁵ Northumbrian (undated) [3.3.1 reducing property flooding risk](#), p8

⁹⁷⁶ Properties that are assigned red (category 5) are typically those properties that Northumbrian would expect to flood internally, either from sewer surcharge affecting internal connections, or via surcharging manholes causing overland flows to breach property threshold levels. Those properties that are assigned to category 4, the higher 'amber' category, are typically those properties for which Northumbrian would expect curtilage flooding to occur, for example because the overland flow depth is not sufficient to breach the property threshold.

5.261 Northumbrian provided an example of the quantified change in risk at a subset of individual properties which it believes it will achieve from proactively addressing sewer flooding risk.

Need for additional funding

5.262 From 2011 to 2019, Northumbrian stated that it had invested £178 million in schemes and activities to mitigate sewer flooding risk and that £65 million of this was spent during AMP6 as part of the company's £240 million investment in its sewer network.⁹⁷⁷

5.263 Northumbrian stated that the proposed proactive scheme was different from, and incremental to, its general internal sewer flooding programme. It estimated that its AMP7 cost to reduce sewer flooding consisted of £82 million of reactive expenditure. Meanwhile, this enhancement programme, requiring an additional £86 million of proactive expenditure, aimed to improve resilience by reducing the risk of households flooding. Specifically, it submitted that:⁹⁷⁸

- (a) the reactive expenditure represented historical activities and would be covered by base cost in its business plan (and implicitly covered by Ofwat's modelling).⁹⁷⁹ This funding would cover the activities necessary to meet the common sewer flooding performance commitment; and
- (b) the proactive expenditure represents new activities going beyond the base level, improving resilience to sewer flooding, and so should attract additional enhancement funding.

5.264 Northumbrian clarified the potential overlap between base funding and its enhancement request for this scheme. Northumbrian said that it took a conservative approach as to what might constitute an overlap in terms of both activity and outcomes and valued the potential overlap at a maximum of £7.2 million. This was based on looking at the number of properties that would be covered by both its reactive and proactive approaches (that is, properties which had flooded previously but were also identified as high risk in its hydraulic models). Therefore, the company said that to eliminate the risk of overlap it proposed reducing its enhancement proposal by £7.2 million to £78.8 million with the 'overlap' activity being absorbed in its base allowance.

⁹⁷⁷ [Northumbrian SoC](#), paragraph 618

⁹⁷⁸ [Northumbrian SoC](#), paragraph 620

⁹⁷⁹ Northumbrian also argues that Ofwat's 'implicit allowance' estimate had material flaws; [Northumbrian SoC](#), paragraphs 638-649

Interactions with performance commitments

- 5.265 As explained above, Northumbrian said that it set a target of reducing future risk of sewer flooding by 7,400 properties. Northumbrian explained that if it failed to successfully deliver the investments, then its proposed ODI would ensure that £100 of Totex allowances were returned to customers for each property out of the 7,400 that did not move into a lower risk category.⁹⁸⁰
- 5.266 Northumbrian said that the ODI associated with the common PC applies a considerably higher penalty to underperformance relative to the bespoke ODI (on Northumbrian's calculations the total potential downside is about £22.9 million versus about £2.2 million respectively).^{981, 982} Northumbrian explained that the ODI for the common PC includes a potential reward for outperformance and its proposed bespoke PC would not.
- 5.267 Northumbrian said that the potential rewards available under the ODI for the common sewer flooding PC are not a viable source of funding for this sewer flooding enhancement proposal. Northumbrian submitted that even if it earned the maximum ODI rewards available in every year this would only provide £4 million of rewards, well short of the £86 million in investment costs.⁹⁸³

Robustness and efficiency of claim's costs

- 5.268 Northumbrian stated that it has carried out a cost assessment for this specific investment and other enhancement claims through a structured and robust approach. This involved benchmarking cost estimates against various alternatives:⁹⁸⁴
- (a) Northumbrian calculated a unit cost rate per property protected using the actual outturn cost for 20 schemes the company had constructed during AMP6 to reduce the risk of flooding. This approach confirmed a unit cost of £16,168 per property.
 - (b) The company undertook an assessment of its performance in 2018 specifically, reviewing benefits received and actual final outturn cost of completed projects. This assessment confirmed a unit cost rate of £12,372.

⁹⁸⁰ Northumbrian SoC, paragraph 663

⁹⁸¹ Northumbrian SoC, paragraph 672

⁹⁸² Northumbrian calculations based on Ofwat (2019) [FD19: Outcomes performance commitment appendix](#), 16 December 2019, pp. 29-33 and pp. 76-78.

⁹⁸³ Northumbrian's Reply to Ofwat's Further Submission, paragraph 5

⁹⁸⁴ 3.3.1 Northumbrian Reducing property flooding risk, pp18–19

(c) Northumbrian compared its unit cost per property to the figure of £30,000 used by the Environment Agency in its partnership funding calculator.

5.269 Northumbrian said that these three cost approaches were based on historical costs for a small sample size, and that it is likely that the cost per property will reduce for the enhancement proposal during AMP7 due to greater efficiencies. In light of this Northumbrian reduced its proposed unit cost per property to £11,650. The company explained that multiplying £11,650 by the estimated number of properties of 7,400 gives a proposed total spend of about £86 million.⁹⁸⁵

5.270 In the first quarter of 2020, Northumbrian commissioned Aqua consultants to undertake benchmarking analysis of the proposed scheme costs based on similar projects. Northumbrian submitted that its consultants suggested the efficient cost was likely to be at the top end of the range estimated in their report of £61 million to £86 million.

Customer views and customer protection

5.271 Northumbrian said that the enhancement proposal was supported by 71% of customers.⁹⁸⁶ To ensure customers are protected against underperformance the company included a bespoke penalty-only ODI.⁹⁸⁷

Ofwat's views

5.272 Ofwat welcomed Northumbrian adopting a proactive approach to reduce sewer flooding risk. However, it rejected the company's enhancement allowance request throughout the PR19 process. Ofwat said that relative to other companies in the sector, Northumbrian was a poor performer in relation to sewer flooding.⁹⁸⁸ It stated that customers should not pay twice for companies to catch up with the level of performance that it expected an efficient company to achieve.⁹⁸⁹

Need for investment and adjustment

5.273 Ofwat challenged whether Northumbrian required additional funding in order to reduce the risk of sewer flooding. Ofwat said it required companies to

⁹⁸⁵ Northumbrian (undated) [3.3.1 reducing property flooding risk](#), pp18-19

⁹⁸⁶ Northumbrian (undated) [3.3.1 reducing property flooding risk](#), p3

⁹⁸⁷ If Northumbrian fails to successfully deliver the investments, then the ODI would ensure that £100 of Totex allowances were returned to customers for each property out of the 7,400 that did not move into a lower risk category.

⁹⁸⁸ [Ofwat's response to Northumbrian's SoC](#), paragraph 3.101

⁹⁸⁹ [Ofwat's response to Northumbrian's SoC](#), paragraph 3.117

report annually on expenditure to ‘reduce flooding risk for properties’. Ofwat highlighted that this expenditure is included in its econometric base models and therefore its base cost allowance included an allowance to address the risk of sewer flooding. It considered that the allowance should enable an efficient company to achieve the common upper quartile performance commitment it set the sector. Ofwat estimated that the implicit allowance included in the base models to reduce sewer flooding risk for properties was £63-115 million.⁹⁹⁰

5.274 Ofwat said that the costs associated with the ongoing effects of long-running trends in the sector would be captured in its base cost models.⁹⁹¹ Therefore, funding an enhancement programme in this area would require additional justification of need, for example that (i) there is a step-change in the expected associated risk, or (ii) a specific company is disproportionately exposed to the changing risks.

5.275 Ofwat stated that:

- (a) the implications of climate change and urban creep are not new⁹⁹² and the sector has been addressing the need to mitigate flooding risk from climate change and urban creep in previous AMPs. Consequently, it said that its base models take account of the costs of these mitigation measures; and
- (b) Northumbrian had failed to provide sufficient or convincing evidence that the company faced additional pressures relative to the rest of the water sector.⁹⁹³

5.276 Ofwat said that the distinction between proactive and reactive activities is not relevant⁹⁹⁴ and overly simplistic, as one aim of the regulatory system is to provide companies with the flexibility to explore different approaches to efficiently conduct the necessary activities to perform its functions, and this distinction was simply one example of a potentially more efficient approach to dealing with the same risk.

5.277 Therefore, Ofwat concluded that there was no justification for providing Northumbrian with additional enhancement expenditure for this scheme.

⁹⁹⁰ To produce this figure, Ofwat used three different approaches, (i) trying to isolate within the growth implicit allowance; (ii) splitting growth in and out of their econometric models; and (iii) a sense check by looking at base plus; [Ofwat's response to Northumbrian's SoC](#), paragraph 3.108

⁹⁹¹ [Ofwat's response to Northumbrian's SoC](#), paragraph 3.102

⁹⁹² Ofwat (2011), [Future Impact on Sewer Systems in England and Wales](#).

⁹⁹³ [Ofwat's response to Northumbrian's SoC](#), paragraph 3.101

⁹⁹⁴ [Ofwat's response to Northumbrian's SoC](#), paragraph 3.115

5.278 Ofwat noted that at PR19 it moved historical enhancement expenditure to reduce sewer flooding risk into its base models. Ofwat explained that this resulted in its total base allowance at PR19 including an allowance for enhancement, on top of what is already included in base costs to maintain risk level of sewer flooding.⁹⁹⁵

Interactions with performance commitments

5.279 Ofwat stated that its overall framework provided funding for upper quartile sewer flooding performance and incentivised companies to achieve a stretching level of performance while prioritising those properties that are most at risk. Ofwat also highlighted that if a company makes investment beyond that, it will receive outperformance payments. Ofwat stated that its initial modelling indicated that the £86 million could be funded through the ODI framework over an appropriate period of time.⁹⁹⁶

Robustness and efficiency of claim's costs

5.280 On the 'Efficient cost' test, Ofwat stated that there is insufficient evidence to conclude that Northumbrian unit cost of £11,650 represented an efficient estimate. Ofwat said that when Aqua Consultants conducted a review after the final determination, it identified several errors in Northumbrian's original cost calculation. It said once these were corrected for, the cost per property figure was £7,900, which is considerably lower than Northumbrian's £11,650 estimate.⁹⁹⁷ Ofwat stated that the company had not provided evidence that the cost has been benchmarked across the industry.⁹⁹⁸

Customer protection

5.281 Ofwat said that Northumbrian had demonstrated that customers and stakeholders considered a reduction in sewer flooding risk as being important, and so it should be incentivised to achieve this. Ofwat stated that in this

⁹⁹⁵ [Ofwat's Further Submission](#), pp8–9, para 2.11

⁹⁹⁶ Ofwat submitted that, given an underperformance cost sharing rate of 65.6%, Northumbrian would bear $(1 - 65.6\%) \times £86 \text{ million} = £56.4 \text{ million}$ of the cost for this scheme. For its calculation, Ofwat assumed that the scheme would reduce Northumbrian's risk of sewer flooding for these properties, on average, from 1-in-15 years to 1-in-40 years. Ofwat used a discount rate of 2.92% (Ofwat's PR19 WACC), a payback period of 20 years (close to the recovery rate of Northumbrian's RCV additions), and an assumption that the ODI framework or equivalent continued into the future. Ofwat stated that under these assumptions Northumbrian would be expected to recover £53.6 million over 20 years, in present value terms, against net effective forecast costs of £56.4 million.

⁹⁹⁷ [Ofwat's response to Northumbrian's SoC](#), paragraph 3.121

⁹⁹⁸ Ofwat (2019) [Cost adjustment claim feeder model Northumbrian Water](#), 16 December 2019, Tab 'WWN_Reducing_sewer_flooding' cell D31.

context it would not be appropriate to remove the bespoke PC, and that this complements the common internal sewer flooding PC.⁹⁹⁹

Third party views

5.282 We received submissions from a number of third parties in support of Northumbrian's proposals to reduce the risk of sewer flooding and increase resilience. They particularly emphasised the importance of:

- (a) planning for the future, and investing against projected changes in population growth, climate change and the potential for more severe weather events.¹⁰⁰⁰
- (b) adopting environmentally friendly solutions.¹⁰⁰¹
- (c) the level of engagement and customer support for the scheme and for Northumbrian's business plan more generally.¹⁰⁰²

5.283 We also note two particularly relevant additional points raised by third parties:

- (a) CCWater stated that while customers supported the principle of 'fast-tracking' investment to avoid sewer flooding, and more proactive actions are required, the additional investment must also be based on clear evidence of both the risk of future flooding and that the proposed 'outputs' offer the best long-term solution.¹⁰⁰³
- (b) Blueprint for Water stated that Northumbrian and Ofwat have a very different understanding of what base funding can and should cover, and that an earlier discussion on the scope of base funding may avoid these differences in future spending reviews.¹⁰⁰⁴

⁹⁹⁹ Ofwat's Response to Northumbrian's SoC, paragraph 4.39

¹⁰⁰⁰ For example, [Northumbrian and Essex and Suffolk Water Forums submission](#); [Newcastle City Council submission](#); [North East England CBI submission](#); [Northumbria RFCC submission](#); [RSPB submission](#); [South Tyneside Council submission](#).

¹⁰⁰¹ For example, [Blueprint for Water submission](#); [RSPB submission](#)

¹⁰⁰² For example, [Northumbrian and Essex and Suffolk Water Forums submission](#); [Newcastle City Council submission](#); [North East England CBI submission](#); [North East England Local Enterprise Partnership submission](#); [South Tyneside Council \(2020\) submission](#)

¹⁰⁰³ [Consumer Council for Water response to Northumbrian's SoC](#)

¹⁰⁰⁴ [Blueprint for Water submission](#)

Our provisional assessment and decision

Our view on allowance for the scheme

- 5.284 When assessing whether to provide an additional allowance for this enhancement scheme, we consider that the key question is whether this scheme represents an enhancement (which should attract additional funding), or whether its activities are already covered by the base cost allowances and outcomes framework.
- 5.285 Northumbrian appears to accept that its base sewer flooding reduction activities are fully funded through base allowances, and that it would expect to meet the common performance commitments on this basis (using its 'reactive' approach). However, it characterises its proposed 'proactive' enhancement scheme as instead addressing sewer flooding resilience by reducing the number of previously unflooded households at risk of future floods.
- 5.286 Northumbrian submitted that the differences in inputs between its two approaches, both in terms of the activities it would undertake and the specific households which would be affected, demonstrated that these schemes do not overlap substantially.
- 5.287 We have serious concerns with this explanation. The outcomes of Northumbrian's proposed enhancement scheme appear to overlap heavily or entirely with the outcomes that it stated it would deliver from base allowances, namely reducing the number of properties suffering from internal sewer flooding in the short to medium-term.
- 5.288 Northumbrian appears to be a poor performer for sewer flooding. We share Ofwat's concern that this enhancement request effectively represents an attempt by the company to gain additional funding to catch up with the performance in the rest of the sector, resulting in double-funding for these activities. We are concerned that Northumbrian appears to be demonstrating exactly the concern which Ofwat's regime was designed to address, namely:
- (a) Companies have chosen to invest in different areas historically, meaning that they will have areas of strengths and weaknesses.
 - (b) Providing additional funding in individual areas risks double-funding activities, either because the company has chosen not to invest in these areas in the past or because these were invested inefficiently.
 - (c) Information asymmetry means that companies are always likely to be able to identify individual areas where they can claim this has occurred but

would not do so for areas where they are benefitting from receiving a higher allowance than is necessary.

- 5.289 We note that Northumbrian has not provided us with an explanation of the expected impact of its proposed scheme in terms of the quantified reduction in risk of sewer flooding (for example, from 1-in-5 year events to 1-in-30 years) across the 7,400 affected properties.
- 5.290 We also agree with Ofwat that, in principle, the regime is designed to be agnostic to the specific approach which the companies choose to take. If a company is able to identify a more efficient delivery method (such as the movement from a reactive approach to including more proactive actions) then it would be expected to adopt this approach as part of its base activities. This would not support providing additional funding to deliver the new method as this would result in double-funding.
- 5.291 The ODI framework would also generally support an approach to efficient investment in reducing sewer flooding risk by prioritising properties which are most at risk in the future regardless of whether they have flooded previously or are identified through alternative methods.
- 5.292 We have not seen any robust evidence that the scheme proposed by Northumbrian represents incremental benefits for customers which should attract additional enhancement funding, rather than simply reflecting an alternative approach to carrying out its base activities. We therefore consider that any additional funding would be likely to result in customers paying twice for the same improvement in outcomes.
- 5.293 In light of the above, our provisional decision is not to allow Northumbrian any additional customer funds, through enhancement allowances, to improve its sewer flooding performance in the North East region.

Customer protection

- 5.294 Ofwat's final determination includes a bespoke performance commitment and ODI associated with this scheme, albeit one which was calibrated to neither the allowances requested by Northumbrian nor the allowance which was included in Ofwat's final determination.
- 5.295 We consider that the common performance commitment provides an appropriate mechanism for incentivising the delivery of activities to reduce internal sewer flooding. Given we have not provided any additional funding for this enhancement scheme, we have provisionally decided to remove the bespoke performance commitment and associated ODI.

Deep dive 4: Anglian – Strategic Interconnectors Programme

5.296 In its PR19 business plan Anglian, included around £344 million¹⁰⁰⁵ to invest in a series of strategic interconnector pipelines, ‘the Strategic Interconnectors Programme’, to allow Anglian to deliver improved security of supply, by moving water from South Humberbank in the north, to South Essex in the south east of its region,¹⁰⁰⁶ especially from areas of surplus to areas of deficit. Anglian regards this as especially important, given acute water scarcity issues in its region.¹⁰⁰⁷

5.297 In its final determination, Ofwat provided an allowance of £305 million, in effect applying a total challenge of £38.9 million to Anglian’s requested expenditure.¹⁰⁰⁸

5.298 Ofwat primarily challenged Anglian’s business plan with respect to the strategic interconnector in three areas:

- (a) the capacity required for the various pipelines, including a reduced allowance as a result of challenging 8 schemes out of the total 21;
- (b) whether Anglian had sufficiently considered engineering options for intra-zonal schemes when developing its plan; and
- (c) the efficient cost of the activities required, particularly by reference to an assessment of the benchmarking data which Anglian provided.

5.299 Ofwat’s challenge focused on requiring the company to explain its decision making and the process followed in selecting its plan, and how the company decided on the sizing, balancing both the business as usual needs and possible future requirements.¹⁰⁰⁹

5.300 Anglian produced a graphic showing its planned interconnectors, and those to which Ofwat’s final determination applied a capacity reduction challenge. This is shown in Figure 5-2 below:

¹⁰⁰⁵ Ofwat (2019) [Ofwat’s Supply demand enhancement feeder model](#), tab ‘Deep dive_ANH’, cell R204

¹⁰⁰⁶ Anglian (2019) [Anglian water resources management plan](#), p12

¹⁰⁰⁷ [Anglian SoC](#), paragraph 757

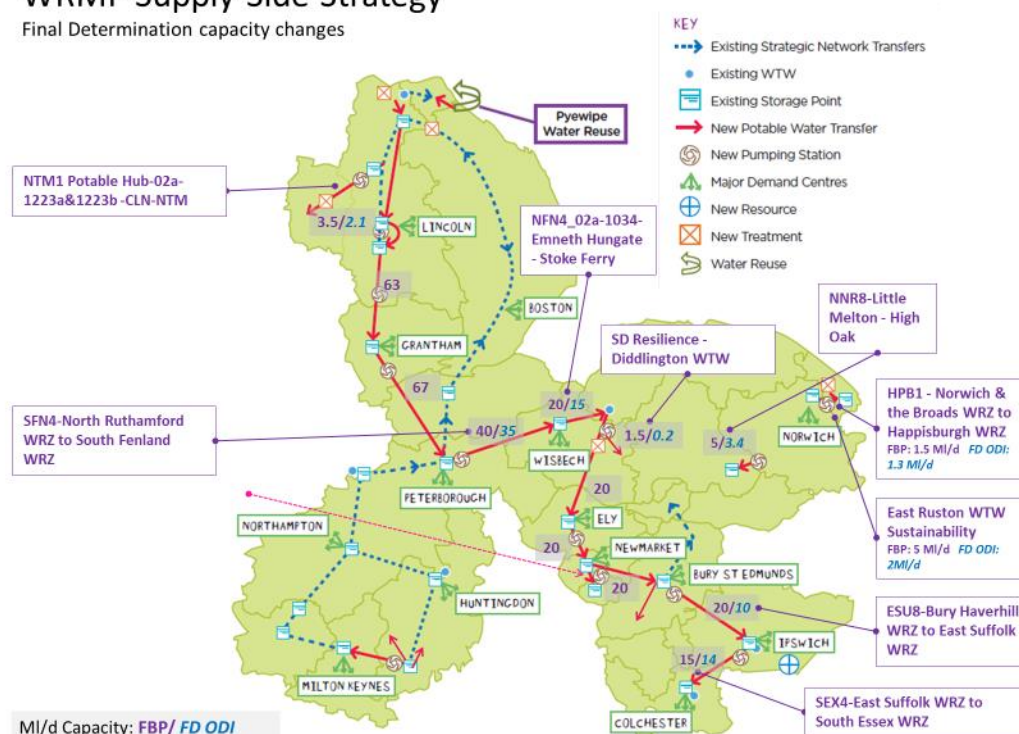
¹⁰⁰⁸ Ofwat (2019) [Ofwat’s Supply demand enhancement feeder model](#), tab ‘Deep dive_ANH’, cell W204

¹⁰⁰⁹ [Ofwat’s Response to Anglian’s SoC](#), p98

Figure 5-2: WRMP interconnector scope reduction and strategy

WRMP Supply-Side Strategy

Final Determination capacity changes



Source: [Anglian SoC](#), paragraph 757, figure 54, page 178. Anglian's MI/d capacity for each relevant interconnector scheme is shown in purple. Ofwat's capacity assessment is shown in blue.

Anglian's views

Development of Anglian's plan

5.301 Anglian told us that it developed its plan following a framework set out in UK Water Industry Research (UKWIR) Guidance on decision making processes and the WRPG.¹⁰¹⁰

5.302 The guidance provides a problem characterisation assessment within the framework. This approach helps to assess various strategic issues, risks and uncertainties, in the development and selection of a decision-making approach.¹⁰¹¹ Anglian told us it developed its problem characterisation before applying its economic balancing of supply and demand ('EBSD') modelling.

5.303 Anglian stated that as part of its planning process, it considered an array of potential supply network options, including where it could jointly deliver supply-demand and resilience (dual source of supply) benefits.

¹⁰¹⁰ Environment Agency; Natural Resources Wales (2018) [EA Interim Water Resources Planning Guideline](#)

¹⁰¹¹ UKWIR

5.304 Anglian started by setting capacity levels to meet the minimum requirements included in its WRMP, the baseline least cost plan through industry-standard EBSD modelling.

5.305 In relation to this EBSD planning, Anglian told us that:

- the methodology is an established approach, which was agreed with the Environment Agency; and
- the model takes data feeds from additional validated models, such as Anglian's cost model, and automatically generates the least cost solution for the scenario presented.

5.306 Anglian subsequently identified an Alternative Least Cost plan, which allows for variations to its baseline assumptions, to consider alternative scenarios that may result in the need for greater water supply to meet supply demand deficits identified for WRMP19, for example if demand management outcomes are less effective than that assumed in the baseline least cost plan.

5.307 Since the Alternative Least Cost plan does not allow for any future uncertainty beyond WRMP19 Anglian considered additional plans to allow for further future uncertainty, before deriving its Best Value Plan (BVP). In doing so, it stated that the BVP caters for flexibility to adapt to 'core scenarios' for WRMP24.¹⁰¹² The incremental cost of the BVP compared to the Alternative Least Cost plan is £22.2 million.¹⁰¹³

5.308 Anglian stated it also became aware of potential abstraction licence changes during the planning process and after preparing its draft WRMP19 and September 2018 Business plans. These would place further restrictions on its ability to abstract water from certain sources, resulting in a greater need for transporting water through its planned interconnectors.

5.309 Anglian told us that, in addition to the above, it also accounted for potential abstraction licence changes through planning intrazonal schemes, where it became aware of the changes too late to be included in the WRMP planning tables.

5.310 In its submissions, Anglian has also referenced a 'least worst regrets' approach which it had applied in its scenario modelling, in effect to balance an

¹⁰¹² [The draft WRMP24 planning guidelines](#) require companies to plan for 1-in-500 year drought events, rather than 1-in-200 year events required in WRMP19.

¹⁰¹³ Anglian

allowance for flexibility to cater for future uncertainty against the incremental whole of life costs.¹⁰¹⁴

5.311 Anglian stated that it applied performance criteria to select its option. Anglian's strategy for selecting its BVP considered the following additional benefits:

- (a) Greater adaptability and flexibility,¹⁰¹⁵ for development and sharing of new resource options beyond 2025, including potential utilisation of a future strategic reservoir scheme which has the potential to be ready for development within AMP8.¹⁰¹⁶
- (b) Catering better for risk and resilience.¹⁰¹⁷ The BVP performs better in stress testing including for dual supply resilience for communities currently on a single source of supply, as well as resilience for a 1-in-500 year drought.
- (c) Providing better alignment with regional planning due to an increase in the capacity of strategic transfers across the region.

5.312 For select schemes, Anglian's planned capacity under its BVP is greater than that profiled under stress-tested scenarios, as illustrated at Table 5-17 for a sample of two schemes.

Table 5-17: Summary of Anglian's profiled capacity of select schemes under several scenarios

Scheme ref	Max capacity in each portfolio (combined scenarios)			Range of maximum utilisation across the stress test scenarios (Ml/d)						Max capacity utilisation across all scenarios
	LCP	BVP	BVP Max	LCP	BVP	BVP-Max	LCP with reservoir	BVP with reservoir	BVP max-with reservoir	
SFN4	32	40	43	15-32	15-35	15-43	23-32	24-33	27-43	43
ESU8	10	20	20	2-10	2-10	2-17	8-10	9-10	12-17	17

Source: Anglian

5.313 For these specific schemes, Anglian told us that:

¹⁰¹⁴ [Anglian SoC](#), p165

¹⁰¹⁵ This is based on quantitative analysis using EBSD model runs

¹⁰¹⁶ [Anglian SoC](#), paragraph 351

¹⁰¹⁷ UK Water Industry Research defines water resilience in the water industry as 'the ability of an asset or asset system to continue to withstand or to recover from the effects of an exceptional event such that acceptable service levels are maintained and/or restored quickly' UKWIR (2013), [Resilience: Making a Business Case for PR14](#)

- (a) in planning the capacity for scheme referenced SFN4, more weight was placed on the 'BVP max, with reservoir scenario', to account for wider regional planning.
- (b) The scheme at ESU8 is sized to also enable dual supply resilience, particularly at Alton.¹⁰¹⁸

5.314 Anglian stated that its BVP strikes a balance between known, firm requirements and potential future ones, considering the whole-life costs of its options, the National Framework and draft WRMP24 guidance consultation in May 2020.¹⁰¹⁹

5.315 Anglian told us it has tested the principle of future proofing the investments with customers, and reports the approach received a strong level of support.¹⁰²⁰

Engineering options

5.316 Anglian told us that, in order to maintain security of supply, and to deliver sustainability-related reductions in the use of water resources resulting from drivers such as the Water Framework Directive in AMP7, the only option available was the transfer of water. It submitted that this applied at the inter-WRZ and intra-WRZ level.¹⁰²¹

Cost estimation

5.317 Anglian explained its approach to cost assessment as follows:¹⁰²²

- (a) All options are entered into the Anglian Asset Investment Planning and Management tool, to estimate the cost.
- (b) The cost estimation module within the tool contains an asset cost model library covering assets from treatment steps (including pumping station and filters) to pipelines and equipment.
- (c) Where cost models do not exist, Anglian develops new ones, using a 'standard robust methodology'.

¹⁰¹⁸ [Anglian's Reply to Ofwat's Response](#), Part A:3, 6.1, page 57

¹⁰¹⁹ [Anglian's Reply to Ofwat's Response](#), Part A.3, 2.1, page 46

¹⁰²⁰ [Anglian SoC](#), section 4.9, paragraph 289, page 64,

¹⁰²¹ [Anglian's Reply to Ofwat's Response](#), Part A.3, 2.1, page 47

¹⁰²² [Anglian, Our plan 2020-25](#) pp99-100, [Anglian water tables commentary](#), pp 2-4, 62, 146

- (d) Anglian allocates cost confidence grades to feasible options. Lower confidence scores reflect limited information or relevant company experience.
- (e) Where cost information is unavailable from within the business, Anglian uses external data.

5.318 Anglian started an OJEU tendering process on its Strategic Interconnectors Programme after the submission of its September 2018 Plan. Anglian stated that it selected the most complex scheme, with the larger diameter and larger booster pumping station to capture economies of scale.¹⁰²³

5.319 The tendering process allowed Anglian to market test its unit rate for pipelines, booster pumping stations and storage reservoirs.

5.320 Anglian appointed KPMG¹⁰²⁴ to provide external assurance as to its cost estimates by reference to results from market testing.

5.321 In connection with Anglian's OJEU tender exercise, KPMG commented that:

- (a) the exercise covered one significant element of the strategic grid, the Central Lincolnshire to South Lincolnshire scheme, which included a pipeline with a diameter of 900mm, a booster station with capacity 2635kw, and a storage reservoir of 25,000m³ capacity.
- (b) in total 63% of the total pipeline Capex of the strategic pipeline related to pipelines with a capacity of 600mm or greater and hence the RFI may represent a good proxy for the wider strategic grid scheme.

5.322 KPMG assessed Anglian's comparative analysis by a review of costs submitted by bidders by line item. Data extracts are provided at Table 5-18.

¹⁰²³ [Anglian's Reply to Ofwat's Response](#), Part G:4, page 48, section 4.3.2, paragraph 172

¹⁰²⁴ Anglian Water Services undertook a market testing procurement exercise to assess and select bidders for the delivery of the strategic grid consisting of pipelines, pumping stations and associated structures, understood to represent a significant element of AWS' Water Resources Management Plan (WRMP) investment for 2020-25 (AMP7). KPMG was asked to consider the results of this market testing exercise against the cost estimates submitted to Ofwat as part of their original business plan (BP) and comment on the robustness of those estimates in light of this evidence.

Table 5-18: Data extracts from market testing for cost comparisons by line item

	<i>Cost Type</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Average</i>	<i>Anglian costs</i>
DI-OC-field NB:900mm Depth:900mm	Unit cost (£/m)	668	1,078	811	773
HPPE – DD complex NB:900mm Depth:1200mm	Unit cost (£/m)	792	6,894	2,458	1,953
Booster Pumping Station 1 (2635kW)	Total adjusted cost (£m)	2.3	12.1	5.5	3.7
Booster Pumping Station 2 (2557kW)	Total adjusted cost (£m)	3.6	11.8	6.8	3.6
Reservoir	Total adjusted cost (£m)	4.1	11.4	6.3	4.1
Total scheme costs (£m)		49.8	86.8	67.2	58.6

Source: Anglian

5.323 KPMG concluded that Anglian's cost estimates were 'well within the range of bids submitted in response to the RFI and below the average for all schedule items'.

5.324 Anglian stated that this demonstrated that its costs for laying water mains are consistent with the upper quartile level of costs, with its costs of £58.6 million comparing to an average of £67.2 million.¹⁰²⁵

5.325 Anglian told us that its water resources planning programme was an ongoing process, and it has already started work on its WRMP24. This will likely result in future adjustments, including to reflect Ofwat's Strategic Resource Options. Anglian stated that, while the planned interconnectors would not constrain these decisions, there will be a relationship with future resource options, for example, new supply resources could increase interconnector capacity utilisation.

5.326 Anglian was concerned that opportunities to adapt in the future are disincentivised by the Interconnector ODI, set as part of Ofwat's final determination, which tightly specifies the source, destination, and capacity level of each interconnector. This could result in Anglian being penalised if it did not precisely match the current proposals, even if subsequent changes would be the best solution for its customers and the environment.

5.327 Anglian therefore proposed amendments to the ODI to:

- (a) Apply a measure of net increase in supply capacity in a WRZ in place of reference to capacity delivered by individual interconnectors; or

¹⁰²⁵ [Anglian's Reply to Ofwat's Response](#), Part G Reply on cost issues, page 48, section 4.3.2, paragraph 172

- (b) Consider a change in timing of measurement, to reflect when the transfer is in operation, in effect meaning that it is contingent on delivery of the Elsham scheme works, which are part of the Direct Procurement for Customers (DPC) process.

Ofwat's views

- 5.328 Ofwat stated that at a high level, an interconnection programme making best use of surplus water in some areas to supply others in a company with many discrete water resource zones is a reasonable strategy.¹⁰²⁶ In its final determination, Ofwat allowed investment to cover the majority of the company's identified scope.
- 5.329 However, Ofwat stated that despite its engagement with Anglian throughout the WRMP and business plan development process, Ofwat was concerned about the transparency and robustness of the company's decision making in identifying its preferred programme.¹⁰²⁷
- 5.330 Ofwat explained that it did not challenge the proportion of capacity included in the programme that was identified in the WRMP as being utilised to balance supply and demand over the next 25 years.¹⁰²⁸ Ofwat's principal challenge focused on requiring Anglian to explain its decision making and the process followed from identifying its least cost plan to selecting its best value plan. This focused on the capacities selected for interconnectors and how the company decided upon the sizing for inclusion in its best value plan, balancing both the business as usual needs and possible future requirements.¹⁰²⁹
- 5.331 To reflect its concerns, Ofwat included an allowance based on capacities greater than those identified in the least cost plan for all schemes, but in places set funding consistent with a lower capacity than Anglian's BVP. Ofwat considered this to be in accordance with customer support for 'investment now' while maintaining its duty as a regulator to challenge proposals to ensure requirements are well evidenced and costs are efficient.¹⁰³⁰
- 5.332 Ofwat was particularly concerned that uncertainty in areas related to WRMP24 development and regional planning, including potential utilisation of

¹⁰²⁶ Ofwat (2020) [Reference of the PR19 FD: Explanation of the final determination for Anglian Water](#), paragraph 2.44

¹⁰²⁷ [Ofwat's response to Anglian's SoC](#), paragraph 3.205, page 97

¹⁰²⁸ Ofwat (2020) [Reference of the PR19 FD: Explanation of the final determination for Anglian Water](#), paragraph 2.45

¹⁰²⁹ [Ofwat's response to Anglian's SoC](#), paragraph 3.206

¹⁰³⁰ [Ofwat's response to Anglian's SoC](#), paragraph 3.209

a strategic reservoir, could lead to a very different set of requirements which would result in a considerably different best value plan.¹⁰³¹

5.333 Ofwat stated that it based its final determination on its assessment of this evidence. The inclusion of the scheme at East Ruston in its final determination is an example of how Ofwat based its decision on the latest evidence. This scheme had not been presented in the previous versions of the WRMP or business plans but was included by the company in its draft determination representation in August 2019, with further supporting information provided in October 2019.¹⁰³²

5.334 Ofwat applied cost efficiency challenges to some of Anglian's spend, as it was concerned that cost benchmarking was presented for only some of the common activities to be completed as part of the programme. Ofwat considered that the remaining activities had very little information presented for them in order to assess efficient costs. For example, the cost uplift for project location costs appeared to be applied for all schemes without a clear explanation of what this represented.¹⁰³³

Third Party views

5.335 Water Resources East¹⁰³⁴ (of which Anglian is a member) has expressed strong support for a 'no regrets approach', as adopted by Anglian. Its representation indicated:¹⁰³⁵

- (a) it supports the principle of allowing for future flexibility and resilience where there is uncertainty;
- (b) it regards Anglian's interconnectors as an essential element of the future strategy for water resources across Eastern England; and
- (c) it considers delaying decisions until more technical information is available creates a significant risk that long term costs will rise because of failure to act early; it is time for some 'no regret' decisions to be made.

¹⁰³¹ [Ofwat's response to Anglian's SoC](#), paragraph 3.211 to 3.213

¹⁰³² [Ofwat's response to Anglian's SoC](#), paragraph 3.207

¹⁰³³ Ofwat (2020) [Reference of the PR19 FD: Explanation of the final determination for Anglian Water](#), paragraph 2.47.

¹⁰³⁴ Water Resources East is an independent group with members including water companies, the agriculture and food sector, local authorities, Local Enterprise Partnerships, environmental organisations, community groups. Power companies and other interested parties.

¹⁰³⁵ [Water Resources East submission](#)

Engineering advice

5.336 We consider engineering expertise important to our assessment of Anglian's plans. We have obtained advice from our independent engineering consultants, WRc, in relation to specific questions and have summarised these below.

Expected economic life of a pipeline

5.337 We consider the useful economic life of a pipeline important for several reasons, including the period relevant to planning for potential future risks as well as the length of time the pipelines will serve customers.

5.338 WRc advised us that the economic life for depreciation purposes may be assumed to be 50-100 years, depending on pipeline material chosen and its operating environment, however useful operational life could be considerably longer (perhaps by a factor between 1.5 and 2).¹⁰³⁶

Planning for uncertainty, scenario modelling and adaptive planning

5.339 We sought engineering advice as to whether scenario modelling and risk profiles would justify allowing for greater capacity than Ofwat took from Anglian's least worst regrets analysis. WRc advised us that:

- (a) If future resources planning at WRMP24 is to require a more extreme scenario of a 1-in-500 year drought event to be considered, then 'in our opinion it does make sense to consider this now, as water resources development options are by their nature long-term options'.
- (b) Developing and extending pipelines is a highly disruptive exercise, and consideration needs to be given to the direct costs, the environment and societal impact of works, which should be quantified and considered as part of the 'whole life' costing exercise and for scheme comparison.
- (c) The balance between current requirements and provision for long-term growth requires careful application of engineering planning and design, as well as financial modelling.
- (d) Stress testing should explore areas of high uncertainty relating to demand or supply side constraints and 'you would expect to see stress testing

¹⁰³⁶ WRc This information was supplied in response to a CMA request in connection with intra-zonal pipelines. However, we interpret this to be similar to that of an inter-zonal pipeline.

possibly relating to population growth; longer, more severe future drought; or more extreme climate change impacts’.

Engineering options, complexity and cost estimation

5.340 In response to questions presented in connection with engineering options, WRc told us that:

- (a) the whole WRMP process (both supply-side and demand-side options), is a process for considering if there are realistic alternative options. The EBSD modelling is part of this process;
- (b) the options outlined were considered typical;
- (c) it is expected these would have been reviewed by the Environment Agency and other stakeholders during the WRMP process; and
- (d) ‘if the EBSD repeatedly selected the transfer of water as a cost-effective option during the optioneering, despite modelling different constraints and echoing customer and regulatory priorities, then we would expect the process to be effective’.

Cost estimation

5.341 WRc advised us engineering complexity can increase with pipe size (diameter), ground conditions and the presence of crossings, by railways and roads. These factors can increase cost and the time to lay pipelines.

5.342 In response to our request to comment on Anglian’s cost estimates in relation to independent benchmarks, for schemes challenged by Ofwat, WRc advised us that for seven schemes Ofwat challenged:

- (a) Anglian’s cost estimates for five schemes appear reasonable based on WRc’s own benchmarking data; and
- (b) Anglian’s cost estimates for two schemes seem substantially greater than WRc’s benchmarks. However, this is expected to be due to imperfect comparators, for example for reasons associated with ground conditions and crossings.

Our provisional assessment and decision

5.343 Anglian’s proposed Strategic Interconnector Programme is a large and complex programme of infrastructure investment, with long-term implications for its customers.

5.344 Ofwat appears to have accepted the need, the approach, and most of Anglian's proposed allowances in its final determination (allowing around 90% of Anglian's requested figure). However, in several areas Ofwat intervened to reduce Anglian's allowances for this scheme, and we have considered these in more detail below.

5.345 We understand and accept the need for resilience of supply, and the importance of this programme in delivering greater resilience to Anglian's region.

Capacity level selection

5.346 Anglian appears to have adopted a low-risk approach to selecting the capacity of its interconnector pipes, increasing its capacity substantially over the level it had previously set out in its WRMP19. These increases came about from considering elements such as:

- (a) reflecting latest information which was not all available at the time of the original WRMP;
- (b) the incremental costs of increasing capacity in the future, compared with incurring additional costs now;
- (c) lower-than-expected efficacy of demand-side solutions;
- (d) improving resilience beyond the minimum level set out in the WRMP19 guidance, and more in line with what is expected for WRMP24; and
- (e) allowing additional flexibility for future elements of the wider water network.

5.347 The key questions at issue appear to be: to what extent Anglian should be seeking to continue to reduce the risk of addressable supply constraints (or costly future works), at an increased cost to its customers; and at what point the additional costs outweigh the associated benefits.

5.348 There are numerous elements in the water industry regulatory framework to encourage longer-term thinking, including the duty to promote the resilience objective, the SPS, the WRMP process, and the proper consideration of the consumer objective (as it applies to future customers). Ofwat explained this well when stating that 'the regulatory framework and incentives must take account of future developments in both the short and longer term because the

timescale for the commissioning, construction and operation of many capital projects stretches much longer than five years'.¹⁰³⁷

- 5.349 We are concerned that making relatively minor interventions on individual pipe capacities, with limited implied cost savings, loses sight of overall strategic objectives particularly in light of the importance of ensuring future operational resilience. In this case, it is likely that climate change, population growth and other similar trends will continue to drive the need for moving water around Eastern England. Including a reasonable element of headroom in these capacities appears a prudent and beneficial approach.
- 5.350 We also place some weight on Anglian's process in its capacity selection, balancing flexibility to respond to uncertainty with whole of life costs for its customers.
- 5.351 Based on our detailed review of the evidence available to us, we consider that Anglian has followed a reasonably robust and transparent process and tried to balance meeting business as usual needs with the need for resilience in the face of future uncertain events. We consider Anglian's selection of headroom is reasonable in the circumstances and seeks to provide a balance between customer costs and affordability, and the future need for resilience, also considering a potentially reduced cost of rework.
- 5.352 We also note that there could be risks associated with building too much capacity if it is not required. For example, if capacity is oversized, we understand this may result in a lower velocity of water flow which in turn can negatively impact water quality. This risk should reduce any incentive on Anglian to over-specify these capacities, since, if they were not ultimately required in the future, the company would bear the associated risks and costs.
- 5.353 We therefore provisionally decide not to include any cost challenges associated with capacity reductions on this scheme. This results in an increased allowance of £21 million compared to Ofwat's final determination.¹⁰³⁸

Cost estimation

- 5.354 We note the process Anglian undertook to develop its cost models, obtain information and assess cost estimates. Whilst Anglian's benchmarking exercise had identified potentially cheaper options for some small areas of

¹⁰³⁷ Ofwat (2015) '[Towards Water 2020 – meeting the challenges for water and wastewater services in England and Wales](#)', p29

¹⁰³⁸ [Anglian SoC](#), Table 19; and [Ofwat's Response](#), Table 3.12

spend, we understand that differences could result from variations in contractor views as to how the work could be done, quality, differences in optimism bias, or risk appetite.

5.355 We understand that Ofwat's cost efficiency challenges have generally arisen as a result of the identification of individual benchmark figures below Anglian's estimated costs. However, given the alternative explanations discussed above, we are concerned that using the extreme ends of ranges is unlikely to provide a fair or informative comparator. This appears to have been supported by our independent engineering advisers who highlighted alternative explanations for higher cost estimates in some cases.

5.356 We particularly note that:

- (a) Anglian's planned costs are well within the range of costs obtained from its market testing exercise for the Central Lincolnshire to South Lincolnshire scheme.
- (b) In respect of reservoir costs (where Anglian has a lesser degree of confidence from its own in-house data), Anglian adopts the lowest cost estimate.
- (c) In the example of drilling costs, Anglian has explained both its approach to considered alternative, cheaper form of open cut drilling where possible in comparison to directional drilling, as well as demonstrating the risks of using imperfect comparators whereby the differences in cost can be large.

5.357 We consider that Anglian has followed a reasonably robust process, testing costs where it can using both internal and external benchmarks, based on an outline design, to establish that costs at this stage seem reasonable.

5.358 We consider it a low risk that Anglian has adopted inefficient cost estimates, and so provisionally decide to apply no cost efficiency challenges to this scheme.

5.359 In addition, we have considered Anglian's approach to optioneering for this programme. Having consulted our engineering advisers and based on our understanding of the process followed, we consider it low risk that Anglian has insufficiently considered engineering options. Accordingly, we provisionally decide to apply no cost efficiency challenges in connection with the development of engineering options.

5.360 Our provisional decisions in relation to cost challenges and optioneering result in an increased allowance of £18 million compared to Ofwat's final determination.¹⁰³⁹

Customer protection

5.361 There are multiple sources of uncertainty and risk to delivery for this scheme.

5.362 For large schemes with intrinsic uncertainty, it appears reasonable to include mechanisms to protect customers, whilst also allowing an element of flexibility if possible, so as not to compromise intended outcomes, given the long lead time and the applied use of adaptive planning.

5.363 We also recognise Anglian's concerns in relation to Elsham, and that the timeline for delivery of the completed scheme may be affected by the DPC process. However, we note Anglian's statement that this should not delay the building of the interconnectors themselves, rather the DPC process impacts the potential connection to certain sources and the operability of connected pipelines.

5.364 The nature of scheme-specific ODIs which are focused on outputs rather than outcomes makes it hard to provide future flexibility with regard to the design and capacity of the schemes without exposing customers to substantial risk of funding a scheme that is never delivered. However, we consider it reasonable to try to mitigate some of the other risks which Anglian raises in relation to circumstances beyond its control. Our provisional decision is therefore to:

(a) adjust the PC to being focused on capacity delivery, rather than the delivery of water. This will ensure that the pipes are not delayed and can start to be used where interdependencies are not disrupted, but Anglian does not suffer penalties for delays to the delivery of water using these interconnectors due circumstances beyond its control. This would be subject to external verification; and

(b) remove intra-period ODI penalties, applying a claw-back on the schemes at the end of year 5 if they are not delivered. As these are primarily long-term investments, the largest risk for customers is associated with non-delivery rather than shorter term delays.

5.365 To the extent that parties suggest alternative potential approaches, we will consider these representations when making our Final Determination.

¹⁰³⁹ [Ofwat's response to Anglian's SoC](#), Table 3.12

Overall provisional decision

5.366 The effect of our provisional determination for the Anglian Strategic Interconnector Programme is to increase Anglian's Totex allowance by £38.9 million above Ofwat's final determination.¹⁰⁴⁰

Deep dive 5: Anglian – Smart Metering Scheme

5.367 In its PR19 business plan, Anglian included £179.2 million of additional allowances for costs associated with metering.¹⁰⁴¹ Of this:

- (a) £20.2 million was associated with installing meters (both smart and 'dumb')¹⁰⁴² in houses which had not previously had a meter installed;
- (b) £42.4 million reflected the increase in the number of meters that Anglian planned to replace in AMP7, over and above the number it would be replacing if it did not deliver its smart metering programme;¹⁰⁴³ and
- (c) The remaining £116.6 million was associated with the cost of the smart meters themselves and associated infrastructure.

5.368 In its final determination, Ofwat accepted the majority of these costs. However, for each of the above categories, it reduced the allowance provided for the following reasons:¹⁰⁴⁴

- (a) Ofwat reduced the £20.2 million request by £3.1 million to reflect its own metering model results;
- (b) Ofwat assessed the £42.4 million as a base cost adjustment claim, and rejected it in its entirety since this was covered by base cost allowances and within the company's control to manage; and
- (c) Ofwat reduced the £116.6 million request by £7.4 million to reflect (i) claimed discrepancies in specific figures provided by Anglian, and (ii) Ofwat's treatment of the costs of smart meters for newly built houses.

5.369 This resulted in Ofwat allowing Anglian £126.3 million for this programme, all in the form of enhancement spend.

¹⁰⁴⁰ The difference between £343.8 million, stated as the company's view and £304.9 million, Ofwat's view, Table 3.11, page 95, [Ofwat's response](#).

¹⁰⁴¹ Ofwat (2019) [metering enhancement feeder model](#)

¹⁰⁴² 'Dumb' or 'traditional' meters are read manually, at most a few times a year while smart meters record meter readings automatically and then relay them to suppliers; House of Commons (2019) [Briefing Paper – Water meters: the rights of customers and water companies](#), section 2.6.

¹⁰⁴³ [Anglian SoC](#), p173

¹⁰⁴⁴ Ofwat (2019) [metering enhancement feeder model](#)

5.370 We note that the costs associated with accelerating existing meter replacement (the £42.2 million claimed by Anglian) reflect an adjustment to base costs, and so would usually be treated as a base cost adjustment claim (as Ofwat did in its final determination). Due to their close association with Anglian's smart meter enhancement programme, we have assessed these proposed costs in this section, but will reflect any necessary adjustments as changes to Anglian's base cost allowances.

Anglian's views

Background and need for the scheme

5.371 Anglian stated that it is in a water stressed area, and so it needed to reduce the demand for water where possible.¹⁰⁴⁵ It therefore proposed a plan to install over 1 million smart water meters in its region in AMP7,¹⁰⁴⁶ with the intention of achieving near-universal roll out by the end of AMP8.¹⁰⁴⁷

5.372 Anglian submitted that smart meters were a core element of its demand management strategy and this was reflected in its WRMP,¹⁰⁴⁸ including as an integral part of its plans to reduce leakage. In particular, smart meters:

- (a) reduce per capita consumption by around 3 percentage points more than traditional dumb meters, with larger savings possible if combined with behaviour change initiatives;¹⁰⁴⁹
- (b) allow for faster identification and fixing of leaks, with the plan expected to result in a total reduction of 7 megalitres of leakage per day;¹⁰⁵⁰ and
- (c) allow Anglian to develop a better understanding of its network¹⁰⁵¹ and customer behaviours.¹⁰⁵²

5.373 Rather than replacing meters on a reactive basis or when they reach the end of their lives, Anglian's proposal consisted of conducting a geographic-based approach, installing smart meters on an area-by-area basis and so replacing some existing dumb meters before the end of their lives. Anglian submitted that this approach was more efficient and would ensure that it would get the

¹⁰⁴⁵ Anglian (2019) [Draft Determination Smart Metering Cost Adjustment Claim](#) (SOC175), p2

¹⁰⁴⁶ [Anglian SoC](#), paragraph 747

¹⁰⁴⁷ [Anglian SoC](#), paragraph 265

¹⁰⁴⁸ [Anglian SoC](#), paragraph 348

¹⁰⁴⁹ [Anglian WRMP19](#) , p51

¹⁰⁵⁰ Anglian.

¹⁰⁵¹ [Anglian SoC](#), p174

¹⁰⁵² Anglian.

best value from its fixed network whilst allowing for a more targeted approach to demand management through behaviour change.¹⁰⁵³

5.374 In addition to the above, Anglian highlighted that smart meters provide additional benefits to customers, in particular:¹⁰⁵⁴

- (a) providing the customer with greater information and control of their water usage; and
- (b) allowing Anglian to notify customers of potential leaks in their supply pipes (which customers are responsible for) or in their properties so that they can organise these to be fixed faster.

Need for an adjustment

5.375 Anglian submitted that it had not undertaken any substantial smart metering in the past,¹⁰⁵⁵ and this would not be reflected in Ofwat's base models. Therefore, any smart uplift costs should be treated as an enhancement expenditure.¹⁰⁵⁶

5.376 In relation to its base cost adjustment claim, Anglian submitted that only around 442,000 of the planned 1.1 million meters would be replaced in AMP7 as a result of reaching their end of life, with the remainder requiring early replacement.¹⁰⁵⁷ Anglian stated that, since the base models would only reflect average run-rate meter replacement, the costs of these additional meter replacements had not been funded.¹⁰⁵⁸

5.377 Anglian submitted that this demonstrated the requirement to accelerate the replacement of its meters and the need for its associated base cost adjustment claim.¹⁰⁵⁹

5.378 Anglian stated that if it only installed a smart meter when the existing dumb meter reached the end of its life this would delay rollout such that it would not be completed until the end of AMP9, with a corresponding impact on its supply-demand balance as well as delaying the customer benefits that smart meters provide.¹⁰⁶⁰

¹⁰⁵³ Anglian SoC, p174; Anglian (2019) [Draft Determination Smart Metering Cost Adjustment Claim \(SOC175\)](#), p4

¹⁰⁵⁴ Anglian's Reply to Ofwat's Response, Part A.1, row 7.4, pp21-22; Anglian other.

¹⁰⁵⁵ Anglian SoC, paragraph 747

¹⁰⁵⁶ Anglian (2019) [DD representation](#), p129

¹⁰⁵⁷ Anglian's Reply to Ofwat's Response, Part A.1, row 7.2, pp20-21.

¹⁰⁵⁸ Anglian (2019) [Draft Determination Smart Metering Cost Adjustment Claim](#), p2

¹⁰⁵⁹ Anglian's Reply to Ofwat's Response, Part A.1, row 7.2, pp20-21

¹⁰⁶⁰ Anglian (2019) [DD representation](#), p129

Robustness and efficiency of claim's costs

5.379 Anglian stated that it had developed a robust and efficient cost estimate for its smart metering programme.

5.380 In order to validate its estimated costs, Anglian conducted an international benchmarking exercise (assisted by KPMG) which it considers demonstrates that its cost estimates are efficient, as shown in Table 5-19:¹⁰⁶¹

Table 5-19: Anglian's international comparisons of smart metering costs

<i>Location</i>	<i>Anglian</i>	<i>Yarra Valley (Australia)</i>	<i>Valencia (Spain)</i>	<i>Austin, Texas (US)</i>
Number of replacements	c.1,000,000	800,000	550,000	250,000
Unit cost per meter (incl base replacement)	£156	£191		£240
Unit cost per meter (incl base replacement, but excl network configuration costs)	£119		£120	

Source: Anglian

5.381 Anglian also submitted that it had compared its cost estimates with Northumbrian's proposed scheme which supported the view that the cost estimates it provided are efficient.¹⁰⁶²

5.382 Finally, KPMG provided external assurance on Anglian's smart meter programme, stating 'we consider that the business case has been prepared following a robust process, utilising both analysis and customer engagement. We consider this to be a challenging programme both in terms of delivery and against the high level cost benchmarks we have been able to obtain.'¹⁰⁶³

5.383 In relation to the areas of metering where Ofwat reduced Anglian's allowances in its final determination (without rejecting in full), Anglian submitted that:

(a) Ofwat's metering benchmarking models do not take into account the increasing marginal cost of installing meters in areas with higher meter penetration, and so underestimate Anglian's costs;¹⁰⁶⁴ and

(b) Ofwat failed to consider the costs associated with different types of meter installations.¹⁰⁶⁵

¹⁰⁶¹ Anglian (2019) [Draft Determination Smart Metering Cost Adjustment Claim](#), p4

¹⁰⁶² Anglian (2019) [Draft Determination Smart Metering Cost Adjustment Claim](#), p4

¹⁰⁶³ Anglian (2019) [Draft Determination Smart Metering Cost Adjustment Claim](#), p5

¹⁰⁶⁴ [Anglian SoC](#), footnote 451

¹⁰⁶⁵ [Anglian SoC](#), Table 20; [Anglian's Reply to Ofwat's Response](#), Part A.3, row 5.2, pp53-54

Customer views

5.384 Anglian stated that its research found that customers feel very positive about smart meters because they enable them to save money, not just through reducing wasteful use but, more importantly, through being able to identify leaks on their own property.¹⁰⁶⁶ In particular, Anglian highlighted that:

- (a) 72% of customers attending Anglian's Water Festival in Norwich stated that they wanted a smart water meter when asked;¹⁰⁶⁷ and
- (b) during AMP6, it conducted trials in two areas involving a total of around 16,000 smart meters, which found a positive customer response and resulted in a reduction in water usage and better identification of leaks on customer property.¹⁰⁶⁸

Ofwat's views

5.385 Ofwat stated that it was supportive of smart metering as this will provide benefits over a basic meter, such as enabling the company to better understand leakage from customer's pipes and support detailed engagement with customers regarding water efficiency.¹⁰⁶⁹

5.386 At draft and final determination, Ofwat assessed Anglian's proposed costs on metering in two parts:

- (a) Enhancement expenditure, which reflected the cost of installing new meters, and the incremental cost associated with upgrading meters to being smart (including the technology to use this functionality).
- (b) A base cost adjustment claim, which reflected the increase in the number of meters the company proposes to replace in AMP7, over and above the number it would replace if it did not need to deliver its smart metering programme.¹⁰⁷⁰

Enhancement expenditure

5.387 Ofwat allowed Anglian £126.3 million for metering enhancement, equivalent to 92% of the requested enhancement amount (that is, excluding the £42 million

¹⁰⁶⁶ [Anglian SoC](#), paragraph 264

¹⁰⁶⁷ [Anglian SoC](#), paragraph 262

¹⁰⁶⁸ [Anglian SoC](#), paragraphs 264 and 265

¹⁰⁶⁹ Ofwat (2020) [PR19: Explanation of Anglian Final Determination](#), paragraph 2.31

¹⁰⁷⁰ [Anglian Water cost adjustment claim feeder model](#), sheet WN_Smart Metering

base cost allowance request).¹⁰⁷¹ It reduced allowances in three areas for the following reasons:

- (a) Effect of meter penetration on metering costs: Ofwat stated that it tested for inclusion of metering penetration data and this had no material impact on the model fit or outputs but added uncertainty in terms of data confidence, and therefore it did not incorporate this variable.¹⁰⁷² The Ofwat enhancement metering model resulted in a £3.1 million lower calculated allowance than requested by Anglian.
- (b) Unit cost figures for smart meter replacement activities: Ofwat stated that it could not reconcile the amount Anglian requested for its smart meter upgrade activities with the unit cost uplift the company proposed and the volume of meters. Ofwat used the calculation of unit rates and volumes which resulted in an allowance £5.5 million lower than Anglian requested.¹⁰⁷³
- (c) New development meter upgrade costs: For new connections Ofwat made no additional allowance for the type of meter installation because the costs for installation were included within the 'new connections' part of the growth allowance. Ofwat stated that its metering enhancement allowance for new connections was therefore the variance in cost between a basic and smart meter unit. This resulted in an allowance £1.9 million lower than Anglian requested.¹⁰⁷⁴

Base cost adjustment

5.388 Ofwat rejected Anglian's smart metering base cost adjustment claim of £42.4 million which reflected the costs of early meter replacement (costed as a 'dumb-for-dumb' replacement) to facilitate its geographic rollout approach.¹⁰⁷⁵

5.389 Ofwat stated that Anglian's approach to rolling out smart metering was discretionary and within management control. It considered that the company had the opportunity to optimise the delivery of this programme efficiently within its base allowance and balance the benefits against the costs.¹⁰⁷⁶

5.390 Ofwat stated that in capital maintenance (of which metering is a part), as in other areas, it makes a long-term average allowance. It believes that it is in

¹⁰⁷¹ [Wholesale Water Enhancement feeder model Metering](#), sheet Deep dive_ANH

¹⁰⁷² [Ofwat's response to Anglian's SoC](#), paragraph 3.164

¹⁰⁷³ [Ofwat's response to Anglian's SoC](#), paragraph 3.166

¹⁰⁷⁴ [Ofwat's response to Anglian's SoC](#), paragraph 3.165

¹⁰⁷⁵ Ofwat (2020) [PR19: Explanation of Anglian Final Determination](#), paragraphs 2.32 to 2.33

¹⁰⁷⁶ Ofwat (2020) [PR19: Explanation of Anglian Final Determination](#), paragraph 2.33

the best interest of customers, and reduces the complexity of the regulatory framework, that the onus is on companies to manage the peaks and troughs in individual elements of their investment portfolio.¹⁰⁷⁷

5.391 Ofwat stated that, in general, it expected large companies to be able to manage long-term investment plans within their base allowance, which allows for an element of lumpy maintenance. It considered this approach to be no different to any company selecting to bring forward asset replacement in order to deliver its chosen strategy.¹⁰⁷⁸

5.392 Ofwat also stated that was not appropriate for Anglian to ask customers to bear the costs when the company will receive the majority of benefits from the early replacement strategy.¹⁰⁷⁹

5.393 Ofwat stated that the company had not presented a compelling argument for why customers should bear the costs of early asset replacement.¹⁰⁸⁰ Ofwat submitted, therefore, that this was not an activity it considered appropriate to provide additional funding for beyond its base model allowance, and this was consistent with the approach it had taken for other companies.¹⁰⁸¹

Our provisional assessment and decision

5.394 Ofwat and Anglian both explained the benefits from smart meters, both to the company itself and to its customers.

5.395 We are also aware of third-party reports which support the wider introduction of smart metering. For example, the National Infrastructure Commission stated that ‘There is a good case for enabling more widespread smart [water] metering by the 2030s’,¹⁰⁸² and the Committee for Climate Change is reported as stating that water meters are the key tool for measuring future demand and facilitating measures to reduce it.¹⁰⁸³

5.396 We recognise that the introduction of smart meters can advance the interests of both company and customers, providing benefits in the form of reduced leakage, reduced consumption, and other improvements. We have therefore focused our assessment on the specific areas where Ofwat intervened in Anglian’s plans.

¹⁰⁷⁷ [Ofwat’s response to Anglian’s 27 May submission](#), p22

¹⁰⁷⁸ Ofwat (2020) [PR19: Explanation of Anglian Final Determination](#), paragraph 2.33

¹⁰⁷⁹ [Ofwat’s response to Anglian’s SoC](#), paragraph 3.162

¹⁰⁸⁰ [Ofwat’s response to Anglian’s SoC](#), page 41

¹⁰⁸¹ Ofwat (2020) [PR19: Explanation of Anglian Final Determination](#), paragraph 2.33

¹⁰⁸² National Infrastructure Commission (April 2018) [Preparing for a drier future: England’s water infrastructure needs](#), p12

¹⁰⁸³ National Audit Office (June 2020) [Water supply and demand management](#), paragraph 3.25

5.397 We have set out a summary of Anglian's proposal and the Ofwat final determination allowance in Table 5-20 below:

Table 5-20: Breakdown of metering programme costs (£ million)

Row #	Description	Anglian proposal	Ofwat FD allowance	Difference
1	Installing meters (smart and dumb) at houses which have not previously had a meter	20.2	17.0	-3.1
2	Dumb exchanged for smart (at end of life or when faulty)	22.4	19.6	-2.8
3	Dumb exchanged for smart (before end of life)	29.4	26.7	-2.7
4	Smart increment - new connections in roll out areas	4.2	2.3	-1.9
5	Fixed data network	40.6	40.6	0.0
6	Demand management programme	20.1	20.1	0.0
	Total Enhancement	136.8	126.3	-10.5
7	Base adjustment claim: Dumb exchanged for dumb (at end of life or when faulty)	42.4	0.0	-42.4
	Total Allowance	179.2	126.3	-52.9

Note: numbers may not sum exactly due to rounding.
Source: Ofwat FD [metering enhancement feeder model](#)

5.398 We conduct our assessment on relevant groupings of cost by reference to the above table, before producing an overall provisional decision. We note that we have received no additional evidence on the fixed data network (row 5) or demand management programme (row 6), on which consensus had previously been reached, and so do not discuss these allowances any further.

General metering costs (row 1 – Anglian proposes £20.2 million)

5.399 These are costs which Ofwat assessed through its enhancement model benchmarking, and on this basis set Anglian a lower allowance than it had requested. This is discussed in more detail in paragraphs 5.93 to 5.105 above.

5.400 Anglian submitted that the benchmark model used does not properly account for differences in meter penetration which drive its higher cost requirements.

5.401 As discussed in paragraphs 5.103 to 5.105 above, we have not found evidence to support Anglian's arguments regarding meter penetration, and so maintain the modelled allowance of £17.0 million.

Accelerated meter replacements, base cost adjustment claim (row 7 – Anglian proposes £42.4 million)

- 5.402 Anglian is proposing to accelerate its rollout of smart meters by replacing existing dumb meters which are not yet at the end of their useful lives. The £42.2 million figure reflects the estimated cost of replacing these meters with another dumb meter, and hence represents the amount which would be considered part of base costs. Other rows (discussed below) capture the incremental enhancement costs of upgrading these meters to provide smart functionality.
- 5.403 This funding request therefore reflects the acceleration of what would otherwise be covered through implicit capital maintenance allowances provided to the company as part of its base costs in future AMPs. Anglian appears to accept this principle, referencing equivalent capital maintenance costs of around £56 million in the current AMP.
- 5.404 However, we are concerned that, by providing additional funding for this element of the scheme now, Anglian would be double-funded for these activities. In essence, it would receive the equivalent of its AMP8 metering costs in AMP7 from this base cost adjustment claim, and the same again as part of its base cost allowances next AMP. Instead, we would expect Anglian to invest in the most efficient manner it can identify, on the basis of recovering its base cost expenditure through base cost allowances. As long as Ofwat continues to provide a level of capital maintenance which reflects average meter replacement rates, Anglian will be able to recover its efficient costs for these activities over the medium term.
- 5.405 We also agree with Ofwat that large companies would be expected to manage a degree of lumpiness in their costs, and that Anglian is able to manage its activities in this area as part of its overall base costs.
- 5.406 We therefore provisionally conclude that it is not appropriate to provide Anglian with a higher allowance to reflect this base cost adjustment claim, and therefore reject this aspect of Anglian's claim.
- 5.407 In making this provisional decision, we note that, to the extent that Anglian's proposed approach to geographic roll-out represents a more efficient form of delivery, it should remain incentivised to adopt this approach. We consider that these incentives remain as long as Anglian can reasonably expect to recover its investment (in this case equivalent to any early replacement cost) over the medium-term. Therefore, we consider that, to the extent that Ofwat continues to evolve its approach in the future, it will be important to ensure a degree of regulatory consistency in this regard. If there is too much

uncertainty around the likelihood of recovering current investments from lower costs in future AMPs, companies will be unwilling to make such investments, and the efficiency of the industry will be reduced as a result. This point is not specific to smart meters but represents a general principle around flexibility over the efficient timing of investments.

Incremental cost of upgrading to smart meters (rows 2 and 3 – Anglian proposes £51.8 million)

- 5.408 These are costs which reflect the incremental cost of upgrading from a dumb meter to a smart meter, both for those meters which would otherwise require direct replacement during AMP7 (due to reaching their end of life or faults arising) and those which Anglian proposed to replace early.
- 5.409 Anglian provided information on these proposals in the form of unit costs and expected numbers of meters. In its final determination, Ofwat noted that the 'use of the figures that the company presents results in a lower allowance than the company's request'. It therefore provided an allowance which reflected this lower figure.
- 5.410 During our determination, Anglian has provided additional information on these cost figures which has allowed us to reconcile its proposal to the full amount of its claim. In particular, the differences between the figures appear to represent incremental installation costs beyond the meters themselves.
- 5.411 Anglian has also provided evidence indicating that its estimated costs are efficient compared to available benchmarks.
- 5.412 We therefore consider that Anglian should be provided with its full requested allowance for these incremental smart meter costs, worth £51.8 million (£5.5 million more than was included in Ofwat's final determination).

Smart meter costs for new properties (row 4 – Anglian proposes £4.2 million)

- 5.413 These costs reflect the activity of installing smart meters in new properties which are built during the AMP.
- 5.414 We understand that the dispute between Ofwat and Anglian is the extent to which the growth allowances already reflect the costs of installing a meter, compared with the increment required to upgrade these to smart meters.
- 5.415 The growth allowances are based on historical actual spend to connect properties. We would expect this to include the costs of installing a standard

dumb meter, and this is consistent with at least one submission from a water company which explicitly states this as an activity which is covered.¹⁰⁸⁴

5.416 Ofwat's enhancement allowance here was based on Anglian's unit costs of upgrading a meter from a basic (dumb) meter to one which provides the smart functionality which it intends to implement. This resulted in an allowance of £2.3 million.¹⁰⁸⁵ Whilst Anglian has said that this approach misses other installation costs for these smart meters, we have not seen convincing evidence that the activities required to install these smart meters in newly built houses differ substantially from those which Anglian and other water companies have undertaken in the past to justify nearly doubling the upgrade costs.

5.417 We therefore provisionally decide to adopt the same approach as Ofwat's final determination, resulting in an associated allowance of £2.3 million for these activities.

Customer protection

5.418 Anglian's smart metering scheme is a major enhancement project with substantial associated funding. We therefore consider it is appropriate to protect customers in case Anglian decides to delay or reduce its proposed activities.

5.419 We considered a potential approach which would provide separate ODI mechanisms to protect customers against scaled back activity for each of infrastructure and meter installations. However, we are concerned that this presents practical difficulties regarding the specification of infrastructure claw-back levels, as this is likely to be lumpy and the outputs may be difficult to specify with sufficient precision.

5.420 Our view is that a single PC which protects customers against under delivery of the entire smart meter programme is appropriate. To do so, we have provisionally set the PC at the level of the complete meter rollout proposed by Anglian (1,096,397 meters) and calibrated the ODI rate based on the entire smart meter allowance.¹⁰⁸⁶ This results in an ODI unit rate of £52.35 per meter.¹⁰⁸⁷

¹⁰⁸⁴ [South East Water submission](#), p6

¹⁰⁸⁵ £44.30 per meter to upgrade from basic to AMI, being applied to 51,244 new meters = £2.3 million

¹⁰⁸⁶ Total smart metering allowance: £22.4 million + £29.4 million + £2.3 million + £40.6 million + £20.1 million = £114.8 million.

¹⁰⁸⁷ £114.8 million / 1.096 million meters = £104.71 * 50% cost sharing rate = £52.35 per meter.

5.421 However, we recognise that this approach is an approximation particularly as the infrastructure spend would not increase linearly with volume. Therefore, our provisional view is to include a deadband at 80% of the specified volume (877,118 meters), above which no penalties would be paid. However, to the extent that Anglian did not deliver its scheme in full during the AMP, we would expect Ofwat to monitor this and take the fact into account in the future, particularly to ensure that the company does not receive additional funding for the same activities in future Price Reviews (for example, the cost of upgrading these additional meters).

Overall provisional decision

5.422 For all the reasons explained above, our provisional decision is to allow Anglian £131.8 million for the delivery of its metering programme. This is £5.5 million more than was included in Ofwat's final determination.

5.423 We consider that our provisional determination provides Anglian with all the funds it requires to undertake its proposed activities for smart metering. The cost of replacing the standard meters is covered by base allowances (in this and future AMPs), while the incremental costs of upgrading these to smart meters is covered by the additional enhancement allowances we are providing.

5.424 We have included a scheme-specific ODI to incentivise the delivery of the funded scheme, and to protect customers if Anglian does not ultimately undertake this work.

Deep dive 6: Anglian – Water Resilience Scheme

5.425 In its PR19 Business Plan, Anglian included a proposal to invest approximately £9 million¹⁰⁸⁸ in a programme to strengthen its water resilience. This represented the costs of undertaking two specific activities:¹⁰⁸⁹

- (a) replacing existing 'critical shutdown panels' in its water treatment works with safer versions; and
- (b) implementing a risk visualisation dashboard to predict where the risk of supply interruptions is increasing.

¹⁰⁸⁸ Anglian SoC, Table 20

¹⁰⁸⁹ Anglian SoC, page 190, paragraph 782, water resilience case study

5.426 Ofwat rejected Anglian's request in full, as it considered that these activities were already funded through base allowances.¹⁰⁹⁰

Anglian's views

5.427 Anglian stated that the driver for these investments is to increase its service resilience and reduce the risk to customers.¹⁰⁹¹ Anglian explained that its approaches to risk management of water quality have evolved over time, particularly highlighting the DWI's new Risk Management Assessment Scheme (RMAS) which was launched on 1 August 2019. Anglian received its RMAS certification on the same day.¹⁰⁹²

Background and need for the scheme

5.428 In relation to the critical shutdown panels, Anglian stated that:¹⁰⁹³

- (a) the existing panels do not meet the standard safety requirements and in particular have the risk that they may fail in a 'non-fail-safe' mode which would risk un-disinfected water being supplied to customers; and
- (b) the planned investment will provide protection against low-probability high-impact events caused by the failure of a shutdown system to operate effectively.

5.429 In relation to the risk visualisation dashboard, Anglian stated that utilising its asset criticality models, combined with its real time performance data and current water quality information, would allow a risk dashboard to provide a current predicted risk status, allowing early intervention to protect service to customers.¹⁰⁹⁴

5.430 Anglian told us that it anticipated that the benefits of these schemes would be measurable and quantifiable in the following areas:

- (a) a reduction of events or incidents related to shutdowns or reductions in output at its water treatment works which affect our customers. This would be directly measurable through an improvement in Compliance Risk Index

¹⁰⁹⁰ [Ofwat's Response to Anglian's SoC](#), p 2

¹⁰⁹¹ Anglian

¹⁰⁹² Anglian

¹⁰⁹³ Anglian (2019) [PR19 draft determination, supplementary evidence](#), p31

¹⁰⁹⁴ Anglian (2019) [PR19 draft determination, supplementary evidence](#), p32

(CRI)¹⁰⁹⁵ and Event Risk Index (ERI),¹⁰⁹⁶ both of which are regulatory measures reportable to the DWI and represent the quality of service provided to customers.

- (b) a reduction of reactive work due to asset/process failure and process/site shutdowns due to early warning allowing more proactive intervention and better prioritisation of alarm response work.

Robustness and efficiency of claim's costs

5.431 Anglian told us that its cost estimates were based on costs incurred to develop a proof of concept dashboard at one site, from its framework consultants. The framework rates were market tested through a competitive tendering process.

Ofwat's views

5.432 Ofwat considered that the spend on both the replacement of Anglian's shutdown panels and its implementation of a risk visualisation dashboard are covered by base costs allowances.¹⁰⁹⁷

5.433 In relation to the critical shutdown panels, Ofwat stated that it did not dispute the need for Anglian to ensure that its assets are maintained to meet prevailing safety standards. However, it considered that these activities reflected routine asset maintenance, constituting incremental improvement activities that are included in historical base costs.¹⁰⁹⁸

5.434 In relation to the risk visualisation dashboard, Ofwat welcomed the introduction of approaches which improve risk management but stated that this is a core activity for a company and ultimately cost-beneficial to the company due to the costs avoided from expensive failure events.¹⁰⁹⁹

5.435 Ofwat stated that these schemes therefore related to capital maintenance or to management control activity to assess asset criticality risks and were

¹⁰⁹⁵ The definition of [compliance risk index](#) is set by the DWI. A CRI score is calculated for every individual compliance failure at water supply zones, supply points and treatment works, and service reservoirs, Ofwat (2019) [Anglian PR19 outcomes performance commitment appendix](#), section 1.1.1

¹⁰⁹⁶ The [Event Risk Index](#) is a measure defined by the DWI and designed to illustrate the risk arising from water quality events. It is calculated by reference to the seriousness of each drinking water quality event (the Event Category score), a measure of the company performance in managing the event and the impact of each event

¹⁰⁹⁷ [Ofwat's response to Anglian's SoC](#), p92, Table 3.10 2

¹⁰⁹⁸ [Ofwat's response to Anglian's SoC](#), p92, Table 3.10

¹⁰⁹⁹ Ofwat

therefore related to base activities and covered by base allowances. Ofwat therefore disallowed these claims as resilience enhancements.¹¹⁰⁰

- 5.436 Ofwat also highlighted Anglian's statements about similar work that it had completed in this area historically (without additional funding), which Ofwat interpreted as supporting the views that such developments are simply a core function of a well-run company, and cost-beneficial over the longer term.¹¹⁰¹

Our provisional assessment and decision

- 5.437 We agree with Ofwat and Anglian that the proposed schemes represent important and useful activities which provide customers with an improved level of service by reducing the likelihood of service failure in the future. We have therefore focused on the question as to whether these activities should attract additional funding, or whether they have already been funded through base allowances.

- 5.438 These activities appear to reflect incremental improvements which the sector has delivered, and continues to deliver, as part of its day-to-day operational functions and so would be reflected in the base cost models. While major step-changes in safety requirements may require additional funding to meet for many companies in the sector, capital maintenance and related activities would be expected to continue to meet gradual improvements in standards. While the particular schemes proposed by Anglian may be company-specific, we consider that these represent one example of the types of activity which an efficient company delivers as part of its base activities.

- 5.439 Furthermore, we consider that the following principles are likely to apply to these schemes:

- (a) Where investments result in lower whole-life costs to Anglian (including reductions in operating costs or through avoiding expensive failure events), it will already have the incentive and implicit funding to implement these changes. This is because over the longer term, it is likely to recover any initial outlay through lower ongoing costs.
- (b) Where these investments improve service levels against performance commitments with financial incentives,¹¹⁰² the outcomes framework

¹¹⁰⁰ [Ofwat enhancement model, resilience](#), sheet deep dive ANH

¹¹⁰¹ Anglian (2019) [PR19 draft determination supplementary evidence](#), p31

¹¹⁰² For example, water quality compliance, Ofwat (2019), [PR19 final determinations, Anglian Water Outcomes performance commitment appendix](#), p4

provides the opportunity for additional funding through rewards or reductions in penalties.

5.440 Overall, we consider that these activities form part of Anglian's base activities and so have already been funded in the determination. Providing enhancement funding would therefore be likely to result in customers paying twice for the same activities. We therefore provisionally decide to provide no associated increase in cost allowances for these schemes.

Deep dive 7: Anglian – SEMD/non-SEMD

5.441 Planned enhancement spend on water security measures is differentiated between the categories of SEMD and non-SEMD based on whether it relates to the Security and Emergency Measures Directive (SEMD),¹¹⁰³ or otherwise.¹¹⁰⁴

5.442 Anglian included enhancement expenditure of £16.8 million¹¹⁰⁵ in its business plan, approximately £1.7 million related to SEMD and £15.1 million of non-SEMD spend.

5.443 Ofwat rejected Anglian's SEMD enhancement expenditure in full, disallowing approximately £1.7 million. For non-SEMD, Ofwat applied a cost challenge of approximately 10% on the basis of insufficient evidence on cost efficiency, resulting a reduction in this allowance of £1.6 million to £13.5 million.¹¹⁰⁶ Therefore, Ofwat's final determination included a total of £13.5 million funding for Anglian's requested £16.8 million for SEMD and non-SEMD expenditure.

5.444 Although SEMD and non-SEMD are both related to security, and Ofwat assessed these as a single cost category, we consider that the relevant facts differ, and so we have assessed these individually as set out below.

¹¹⁰³ [The Security and Emergency Measures \(Water and Sewerage Undertakers\) Direction 1998](#) directs undertakers to maintain plans to provide a supply of water at all times. [The Security and Emergency Measures \(Water Undertakers\) Direction 2006](#) places a qualified duty on undertakers to provide a water supply to a licensed water supplier where (i) there is an access agreement in place and (ii) the licensed water supplier requests the water undertaker to provide it with a supply of water in the event that the licensed water supplier is unable to provide a supply to its customers due to an emergency or security event. See the following for more details: Defra, [Water supply and sewerage licensing: updating security and emergency measures directions consultation webpage](#).

¹¹⁰⁴ Other costs associated with water security driven by the requirement to ensure that the water network is resilient in the event of an emergency situation.

¹¹⁰⁵ Anglian (2019) [PR19 draft determination supplementary evidence](#), p38

¹¹⁰⁶ [Ofwat Water Security Feed Model](#), sheet 'Allowance'

SEMD

Anglian's views

5.445 Anglian stated that the additional SEMD funding aimed to provide:¹¹⁰⁷

- (a) £1 million to invest in additional tankers, to meet alternative supplies provision, to address low-probability, high-impact loss of supply incidents;¹¹⁰⁸ and
- (b) £0.7 million for emergency preparedness, driven by necessary security upgrades to a 'Critical National Infrastructure' site.

5.446 Anglian told us that these activities provided additional protections to customers and represented a specific requirement from DEFRA. This is similar to previous AMP periods where Anglian invested to meet the requirements.¹¹⁰⁹ In addition, Anglian stated that certain requirements arose during the course of the previous AMP which have necessitated these additional activities.

5.447 Anglian told us that all infrastructure installed must be procured from a limited number of the Centre for the Protection of National Infrastructure¹¹¹⁰ Product Approved Specialist vendors, which limits the availability of benchmarking data. It therefore developed the costs in its plan based on the benchmarks which were available alongside its own experience of historical delivery of schemes.¹¹¹¹

Ofwat's views

5.448 Ofwat told us that it did not dispute the need for Anglian to ensure it operates securely and meet its legislative obligations. However, in PR14 it had provided the company with a substantial security enhancement allowance to deliver a large programme which provided a significant step-change in security access to the network.¹¹¹²

5.449 Ofwat therefore considered that the previous allowance envelope was sufficient for Anglian to undertake this scheme. Whilst Ofwat acknowledged

¹¹⁰⁷ Anglian

¹¹⁰⁸ Such incidents may occur through a variety of causes, within and outside of Anglian's management control.

¹¹⁰⁹ [Anglian PR19 draft determination supplementary evidence](#), pp37-38

¹¹¹⁰ The Centre for the Protection of National Infrastructure is the government authority for protective security advice to the UK national infrastructure. Its role is to protect national security by helping to reduce the vulnerability of the national infrastructure to terrorism and other threats.

¹¹¹¹ [Anglian PR19 draft determination supplementary evidence](#), p41; Anglian other.

¹¹¹² [Ofwat response to Anglian's SOC](#), p92, Table 3.10

that certain additional requirements arose during AMP6 which would result in an improved level of security, it believed that Anglian's SEMD costs were already funded.¹¹¹³

Our provisional assessment and decision

5.450 It appears to be common ground that Anglian's planned activities relate to new requirements, identified during the course of AMP6. The requirements were therefore not known at the time of PR14.

5.451 Whilst in some circumstances it may be possible for a previous cost envelope to be sufficient to cover new activities (such as if there were other activities which were thought to be required at the point of the determination, but which ended up not being required), this appears less likely for SEMD activities since this:

(a) is a legal requirement with little opportunity for reducing scope through finding alternative approaches; and

(b) requires delivery through approved vendors, further limiting the company's ability to flex its activities within a specified cost allowance.

5.452 This would seem to indicate an expectation that these new activities should attract the necessary additional funding, unless there were specific reasons not to do so. We are not aware of any such reasons.

5.453 On this basis, our provisional decision is to allow the £1.7 million cost allowance associated with Anglian's requested SEMD activities.

Non-SEMD

Anglian's views

5.454 Anglian submitted that its non-SEMD enhancement costs were directly attributable to ensuring vulnerable sites are compliant with new regulatory requirements, namely the Network and Information Security (NIS) Directive.¹¹¹⁴

5.455 Anglian submitted that prior to the NIS directive, surveying sites for cyber security vulnerabilities was not a recognised requirement and therefore not

¹¹¹³ [Ofwat FD Security Enhancement Feeder Model](#), sheet deep-dive_ANH

¹¹¹⁴ Anglian (2019) [PR19 draft determination supplementary evidence](#), p40

undertaken, and its submitted costs were directly attributable to meeting this increased requirement (over and above its general replacement plans).¹¹¹⁵

5.456 Anglian stated that although Ofwat had voiced some concerns about the costs which Anglian had included in its plan:

- (a) Anglian has one of the largest telemetry systems in the industry, and so would be expected to have a high absolute cost compared to other companies;¹¹¹⁶ and
- (b) companies which Ofwat used for its comparison have included very different levels of activity in their enhancement plans.¹¹¹⁷

5.457 To support its cost estimates, Anglian produced a schedule of costs showing a breakdown of component and unit costs which were used to develop its estimates. This also provided a brief explanation of the source(s) used to generate the relevant estimates, as shown in Table 5-21 below:

Table 5-21: Summary non-SEMD cost schedule

<i>Description</i>	<i>Estimated cost (£ million)</i>
106 water sites upgraded with new scada systems, based on estimated average cost per site, includes hardware set up costs, site local area network upgrade, server hardware, licenses and server rack	12.5
ASDL connection, includes local firewall, BT construction charges, installation resource effort	1.0
106 water sites BT costs at an average cost per site per annum	0.5
Remote monitoring, vulnerability and threat management	1.0
FTE cost for ongoing management of scada systems	0.3
Total	15.3

Source: Anglian

5.458 Anglian noted that these costs were derived using both external and internal data sources including prevailing market rates for certain cost components and specialist personnel. However, for certain elements, the early stage of the process and the site-specific differences means that these costs are unknown. This has therefore required Anglian to estimate these costs.

5.459 Anglian also stated that customers are protected in relation to the delivery of the investment of its non-SEMD plan through an associated ODI as set out in Ofwat's final determination.

¹¹¹⁵ Anglian (2019) [PR19 draft determination supplementary evidence](#), p40

¹¹¹⁶ Anglian (2019) [PR19 draft determination supplementary evidence](#), p40

¹¹¹⁷ Anglian (2019) [PR19 draft determination supplementary evidence](#), p40

Ofwat's views

5.460 Ofwat did not dispute the need for Anglian to ensure it operates securely but considered that at the time of the Ofwat final determination, Anglian had not provided sufficient evidence to justify its high non-SEMD costs nor demonstrated how its costs have been derived, and so Ofwat applied approximately a 10% cost challenge.

Our provisional assessment and decision

5.461 The dispute between Ofwat and Anglian on non-SEMD allowances appears to centre on the extent to which the submitted costs have been demonstrated to be robust and efficient.

5.462 During our redetermination process, Anglian submitted additional evidence, which we consider broadly supports its case. However, the schedule of costs provided indicates that an element of uncertainty remains about whether these estimates are a robust reflection of efficient costs. In particular, around one third of the requested costs result from the estimate of a figure for which actuals are unknown and no cost models are available.¹¹¹⁸

5.463 The CMA accepts that intrinsic uncertainty is something which companies need to deal with on these types of projects, particularly early on in the process.¹¹¹⁹ Nonetheless, we are also concerned that cost outturn may be lower than estimated and customers should not bear the cost of this. This risk is particularly acute in areas of severe information asymmetry such as is the case here.

5.464 As explained in paragraphs 5.157 to 5.166 above, the standard deep dive efficiency challenge we have adopted for this provisional determination is 10%, equivalent to the cost challenge which Ofwat applied to this scheme in its final determination. However, we consider that the evidence provided by Anglian (and described above) is sufficiently robust to warrant a lower, scheme-specific efficiency challenge of 5%.

5.465 Therefore, we provisionally decide to allow Anglian £14.4 million for the delivery of its non-SEMD scheme; this is an increase of £0.8 million over Ofwat's final determination.

5.466 In reaching this provisional decision, we note that this change in allowance should be reflected in the existing associated ODI, and

¹¹¹⁸ £45k per site for Site LAN upgrade at 106 sites = £4.8 million

¹¹¹⁹ Anglian

provisionally set Anglian's underperformance payment-standard rate to £0.068 million / unit.¹¹²⁰

Deep dive 8: Anglian – Bioresources Scheme

- 5.467 Anglian submitted a proposal for £12.5 million¹¹²¹ of enhancement investment to provide additional sludge treatment capacity at its Whitlingham sludge treatment centre (STC), to accommodate additional sludge production due to population growth and increased levels of P-removal.¹¹²²
- 5.468 Ofwat recognised that the level of sludge was likely to increase over time for the reasons which Anglian identified.¹¹²³ However, Ofwat applied a challenge based on its views as to the need for Anglian to develop this capacity in-house. Ofwat's allowance was based on its view of the efficient costs of an outsourced contract for bioresource processing. Ofwat's final determination therefore included a cost allowance of £5.7 million,¹¹²⁴ disallowing £6.8 million of Anglian's request.

Anglian's views

Background and need for the scheme

- 5.469 Anglian stated that there would be an increase in sludge production in the future as a result of increasing population and higher levels of activity of P-removal. Therefore, additional sludge treatment capacity would be required, beyond the level it currently has available.
- 5.470 Anglian explained that when operating the STCs at 90% of the design average capacity, production can be expected to outstrip available treatment capacity for around 24 weeks of the year. However, it is able to manage periods of insufficient capacity by flexing its assets, balancing sludge production through storage and working with markets for potential trades, or by use of mobile treatment plants.¹¹²⁵

¹¹²⁰ The ODI protection for customers as set out at page 123 of Ofwat (2019), [PR19 final determinations – Anglian Water outcomes performance commitment appendix](#).

¹¹²¹ Amount reflected as the representation value assessed in final determination, Ofwat [Wholesale Wastewater Enhancement feeder model: Sludge](#), sheet deep dive_ANH

¹¹²² Ofwat [Wholesale Wastewater Enhancement feeder model: Sludge](#) sheet deep dive_ANH

¹¹²³ [Ofwat's response to Anglian SoC](#), p93

¹¹²⁴ Ofwat [Wholesale Wastewater Enhancement feeder model: Sludge](#) sheet deep dive_ANH

¹¹²⁵ [Anglian PR19 DD supplementary evidence](#) (SOC169), p43

5.471 With the proposed investment, Anglian expects it would end AMP7 with capacity in a broadly similar position as at the start of the AMP.

5.472 Anglian selected the location of Whitlingham to expand its sludge treatment capacity because this site is the only one it has which offers the opportunity to increase the capacity throughput by upgrading the process design, to enable a relatively 'low build' engineering upgrade at a subcomponent level, rather than a need to replace or duplicate the whole anaerobic digestion pre-treatment process stream.¹¹²⁶

Best option for customers

5.473 Anglian considered the option for outsourcing its sludge processing to a third-party supplier. These potential suppliers can be broadly categorised as either neighbouring WASCs, or other third parties.

5.474 In relation to outsourcing to other WASCs, Anglian told us that it already had existing trading arrangements with neighbouring WASCs to make use of available short-term capacity.¹¹²⁷ However, Anglian considered that this would not be able to provide the additional capacity it requires because:¹¹²⁸

- (a) presently, viable trades are largely limited to its three directly neighbouring WASCs as a result of the legislative restrictions and challenges surrounding co-treatment;
- (b) its neighbouring WASCs are currently operating with similar levels of limited headroom, with uncertainty and capacity reductions resulting in companies being unable to make a firm offer on trades, with many having had plans to add capacity reduced as a result of Ofwat's final determination;
- (c) the seasonal variance in sludge production will be broadly similar across all WASCs limiting available capacity for trading during peak sludge production times; and
- (d) any contract for guaranteed capacity with a neighbouring WASC would be on the basis of a fully loaded gate fee, to include capital costs elements as opposed to short-term non-committed trades, which typically have gate fees for the marginal operating cost plus fees only.

¹¹²⁶ Anglian

¹¹²⁷ Anglian (undated) [Anglian Our Business Plan 2020-2025](#), p124

¹¹²⁸ Anglian (2019) [Anglian PR19 DD supplementary evidence](#) (SOC169), p43

- 5.475 Anglian submitted that currently it is only other WASCs that can be contracted to procure additional digestion capacity for its bioresources. This is because, although it is theoretically possible for other third parties to treat and dispose of sewage sludge, the additional cost burden for non-WASCs resulting from the current regulatory regime is preventing third parties from entering the market.
- 5.476 Anglian told us that the wider market was therefore not currently able to provide guaranteed resilient capacity for bioresources. In particular, it submitted that it had completed a market consultation in January 2018 in order to assess the level of interest from third party anaerobic digestion plant operators in the treatment of sewage sludge. This was sent to 88 potential third-party operators within the Anglian region, but only six suppliers responded, including two neighbouring water companies and the third-party supplier currently used for mobile lime treatment services.¹¹²⁹
- 5.477 Furthermore, Anglian stated that expanding its existing Whitlingham STC represents the lowest whole-life cost approach. To support this, Anglian produced a comparison between its planned capacity investment at Whitlingham and its view of the approach reflected in Ofwat's final determination. Anglian assumed Ofwat's allowance is based on a view of a fixed contract of 30 tds per annum in AMP7 commencing 1 October 2022 and estimated a trade out gate fee of 30/tds. The third-party provider would need to guarantee capacity.¹¹³⁰ Anglian's cost comparison is provided at Table 5-22 below.

Table 5-22: Relative whole of life cost profile: Anglian and Ofwat respective solutions

	<i>Anglian (£ million)</i>	<i>Ofwat (£ million)</i>
Equivalent annualised cost	0.7	2.6
Discounted whole life cost	15.5	39 ¹¹³¹

Source: [Anglian SoC](#), paragraph 787

Robustness and efficiency of cost estimation

- 5.478 Anglian submitted that it has extensive experience from previous AMPs of building digestion and sludge treatment systems and that its estimated costs for this scheme are built bottom-up using component costs based on

¹¹²⁹ Anglian

¹¹³⁰ [Anglian SoC](#), paragraph 787

¹¹³¹ Subsequently revised by Anglian, having identified an error in its earlier statement of case.

comparators such as historical actuals, competitive tenders for at-scale projects, and its own cost models.

- 5.479 As the investment comprises an extension to Anglian's existing plant, Anglian stated that it can make use of much of the existing infrastructure to support its development, making this a lower cost option than if this were a stand-alone project.

Ofwat's views

Ofwat's statements on its approach to the bioresources market

- 5.480 Ofwat has been actively reviewing the bioresources market in the past number of years and made an explicit decision to separate out these activities in PR19 as a distinct price control:¹¹³²

'We are taking steps to inform, enable and encourage the development of two new markets – sludge (which is becoming recognised as a bioresource and we use this term in place of sludge) and water resources – where there is potential to unlock substantial benefits for customers, companies, investors and the environment.'

- 5.481 Ofwat stated that it saw the potential that the trading of bioresources could be a real breakthrough. It believed that it should be seeking to 'kick-start' the market to develop even more low-carbon energy generation and reduce water bills.¹¹³³

- 5.482 Ofwat recognised that these steps will take some time to have their intended effects, for example stating that 'We expect sludge markets to develop gradually'.¹¹³⁴ It also noted that barriers exist in this market, for example stating that 'it is challenging and costly for incumbents and potential entrants, both other WASCs and firms in wider waste markets, to identify profitable trades or optimisation opportunities'.¹¹³⁵

¹¹³² Ofwat (2017) [Information Notice IN 17/01](#)

¹¹³³ Ofwat (2020) [Bioresources market webpage](#)

¹¹³⁴ Ofwat (2016) [Water 2020: Our regulatory approach for water and wastewater services in England and Wales](#), p112

¹¹³⁵ Ofwat (2017) [Bioresources market information guidance](#), p3

Ofwat's decision on Anglian's bioresources enhancement scheme

- 5.483 Ofwat agreed with Anglian that the level of sludge was likely to increase over time which would result in increased treatment requirements.¹¹³⁶ However, Ofwat was concerned whether Anglian had demonstrated that its proposed scheme represented the best option for customers. Ofwat benchmarked Anglian's costs against a two-and-a-half year guaranteed trade contract with a third-party provider and stated that this produced a lower estimated cost than Anglian's plan.^{1137, 1138}
- 5.484 Ofwat's specific allowance of £5.7 million was derived on the basis of the cost for 3 years of initial Opex to manage increased bioresources volumes and a 2.5-year contract in the bioresources market between 2022-25 with the efficient fully loaded gate fee applied to 6,400tds pa capacity.¹¹³⁹
- 5.485 Ofwat disagreed with Anglian's views about the restrictions on the ability of third party suppliers to provide additional capacity, in particular disagreeing with Anglian's views that only WASCs can process waste sludge, since other third parties can undertake co-treatment with appropriate permits. Ofwat also stated that it may be economically viable for a third party with currently unused digester capacity to either co-digest or co-locate treatment facilities for both materials. Ofwat noted that this option did not appear to have been considered by Anglian.¹¹⁴⁰

Our provisional assessment and decision

- 5.486 AMP7 appears to be a transitional period in which Ofwat is attempting to start opening up the bioresources market, and in that context, we understand why it may be reticent to allow Anglian to use its customers' money to build additional fixed assets for sludge treatment.
- 5.487 However, we consider that the evidence Anglian has provided supports its submissions that:
- (a) there are likely to be limited or no third-party suppliers in the foreseeable future to which it is able to outsource these services (either other WASCs or non-WASCs); and

¹¹³⁶ [Ofwat response to Anglian's SoC](#), p93

¹¹³⁷ Ofwat [Wholesale Wastewater Enhancement feeder model: Sludge](#) sheet deep dive_ANH

¹¹³⁸ Ofwat [PR19 final determinations, Securing cost efficiency technical appendix, December 2019](#) p118

¹¹³⁹ [Ofwat sludge enhancement feeder model](#), sheet Deep dive_ANH, cell D17

¹¹⁴⁰ Ofwat [Wholesale Wastewater Enhancement feeder model: Sludge](#) sheet deep dive_ANH tab, cell D17

(b) whilst Anglian building in-house capacity has a higher upfront cost, the lower whole life cost represents a more efficient form of delivering the necessary activities.

5.488 We are not convinced that adopting a less efficient outsourcing approach relying on the emergence of significant bioresource suppliers is an appropriate basis for our provisional determination. In particular, this appears to be predicated on the market opening up substantially during the course of the AMP, which appears highly uncertain.

5.489 On this basis, we provisionally decide to allow Anglian its full proposed allowance of £12.5 million for the delivery of this scheme (ie an increase of £6.8 million over Ofwat's final determination).

5.490 In reaching this provisional decision, we note that, if the bioresources market was opened up to competition in the short-term and Anglian were to participate in this market making use of assets paid for by customers through the price control, then it could result in some degree of double funding.¹¹⁴¹ We consider that the most appropriate approach to managing this risk is for Ofwat to consider the treatment of the bioresources RCV as part of the market opening, since this risk is not unique to this specific scheme but reflects a general concern about bioresource assets owned by the WASCs.

Anglian metaldehyde costs: treatment of uncertainty

5.491 Anglian raised the issue of metaldehyde treatment in its redetermination representations. In December 2018, DEFRA introduced a ban on the use of metaldehyde slug pellets outdoors, to take effect from spring 2020.

5.492 Metaldehyde is costly to remove from water. Since much of Anglian's region is rural and agricultural, the ban would have a significant operational impact for it. Anglian had initially forecast that – absent the ban – metaldehyde removal would cost £68 million over the AMP (this estimate has subsequently been reduced to £63 million).¹¹⁴²

5.493 On the basis of the ban, during Ofwat's determination process, Anglian had agreed to remove £68 million from its Business Plan that had been earmarked to deal with metaldehyde pesticide.

¹¹⁴¹ For example, customer funds are used to build the asset, which then generates a higher return reflecting a competitive return on capital in the opened market.

¹¹⁴² Anglian confirmed during the CMA redetermination process that the costs associated with metaldehyde treatment are £63 million, as an additional £5 million was included in the Business Plan to expenditure associated with investment at Elsham treatment works.

5.494 In July 2019, the ban was overturned by the High Court after its lawfulness was challenged. While the government has since stated that it will consider reintroducing the ban, there is uncertainty regarding whether and when the ban may be reintroduced. The situation leaves Anglian required to undertake significant expenditure (on treatment works to remove the pesticide from water resources) unless and until a ban is reintroduced. It does not have an allowance for this expenditure.¹¹⁴³

Ofwat's approach in the final determination

5.495 Ofwat recognised in its final determination that Anglian could be exposed to additional costs during AMP7 and that these would be beyond management control. It proposed that the mechanism for determining what unfunded costs were incurred, and the extent they should be recovered, was via a Notified Item.

5.496 Notified items can be considered in interim determination applications. Before an interim determination takes place, a materiality test is used to determine whether the costs incurred are significant enough to be considered for an interim determination. The materiality threshold stipulates that the claim will not be considered unless the value of the claim for additional funding is at least equal to 10% of turnover. Based on Anglian's current turnover and its claimed £63 million exposure on this issue, there is no realistic prospect of reaching this threshold.

5.497 If the threshold is not met and no interim determination takes place allowing Anglian to recover further funds, Anglian's means to recover costs would instead be via the existing cost sharing mechanisms, which would only allow it to access part of the costs (the company estimated around £22 million of the estimated £63 million costs).¹¹⁴⁴

Dispute between the parties

5.498 Anglian asked that measures be taken so that it has certainty from Ofwat that the materiality condition would be amended to lower the threshold so that the Notified Item would be subject to an interim determination, or for the provision of another workable reimbursement mechanism. It believes that it should be

¹¹⁴³ We note that on 18 September 2020, DEFRA announced a decision to ban metaldehyde and phase it out by 31 March 2022. Given the timing of this announcement, we have not reflected this in our provisional decision. Defra (18.09.2020). [Press release Outdoor use of metaldehyde to be banned to protect wildlife](#)

¹¹⁴⁴ These costs had previously been £68 million, but Anglian confirmed during the CMA redetermination process that has since clarified that the costs associated with metaldehyde treatment are £63 million, as an additional £5 million was included in the Business Plan for expenditure associated with investment at Elsham treatment works.

able to recover the full costs of measures to deal with metaldehyde, should the ban be delayed or abandoned.

- 5.499 Ofwat recognised the possibility of material costs for Anglian, but the final determination for Anglian kept metaldehyde treatment costs as a Notified Item which can be considered for an interim determination throughout PR19 if these costs do arise.
- 5.500 During the redetermination process, Ofwat has agreed to review the threshold specifically relating to the Elsham costs (another Notified Item which was to be directly procured),¹¹⁴⁵ but not for the metaldehyde costs. Ofwat stated that an individual Notified Item does not need to meet the materiality threshold by itself for an interim determination because Notified Items can be aggregated in order to pass the materiality threshold. It also said that when considering materiality for an interim determination it would calculate the net present value of net additional operating costs (including both capital and operating expenditure) over a 15-year period in accordance with sub-paragraph 14.2(6)(b) of Condition B of Anglian's licence.¹¹⁴⁶
- 5.501 The exact materiality threshold calculation cannot be precisely specified from either parties' arguments. What is agreed is that Anglian will be subject to substantial costs which it cannot avoid unless and until a ban is reintroduced.

Our provisional assessment and decision

- 5.502 We consider it appropriate that Anglian should have assurance that additional costs which it incurs for the treatment of metaldehyde, which were removed from their allowance due to the (subsequently withdrawn) ban, are fully funded, but it is not necessary to make other changes for Elsham (the other Notified Item which Anglian raised). In reaching this view, we observe that:
- (a) Anglian removed the costs from its business plan when the ban was introduced;
 - (b) Ofwat is unable to exercise discretion in relation to the materiality threshold of an interim determination under the current licence conditions;
 - (c) Ofwat retains some discretion over how to calculate the threshold and determine whether it has been met (for example, it could reduce operating costs to zero within the 15-year calculation period due to the anticipated reintroduction of the ban);

¹¹⁴⁵ [Ofwat's response to Anglian's SoC](#), paragraphs 1.57-1.58 and 3.238

¹¹⁴⁶ Defra (2019), [Anglian Water Licence 14.2\(6\)\(b\) of Condition B](#)

- (d) Ofwat's residual discretion, in turn, means there is ongoing uncertainty for Anglian over whether costs which are both material and beyond management control can be recovered in full; and
- (e) With regard to the potential for the wider Elsham scheme to be unfunded if the Direct Procurement for customers results in the contract being delivered in-house by Anglian: Ofwat had confirmed it would consult on this and Anglian confirmed it will engage openly and that, should this provide a workable solution to the problem, the issue need not be dealt with as part of the CMA redetermination.¹¹⁴⁷ In its hearing, Anglian confirmed this was being discussed with Ofwat and is likely to be resolved, hence we make no provisional determination on this matter.

5.503 We provisionally determine that Anglian should receive the full £63 million allowance for the costs it expects to incur treating metaldehyde. Alongside this allowance, we propose to introduce a clawback mechanism for these costs if the ban is reintroduced. In this instance, any costs not incurred must be returned to customers. We also propose to remove the (75/25, customer/business) pass-through rate for metaldehyde-related costs which Ofwat set.

5.504 This set of arrangements provides Anglian with certainty with regards to treatment costs associated with metaldehyde in all possible scenarios, whilst ensuring customers will not pay for costs which are not incurred.

5.505 Anglian has not detailed the reasoning behind its forecast expenditure profile and as such we provisionally determine that the clawback mechanism for the £63 million should be profiled evenly across the five year period.

The application of frontier shift on enhancement allowances

5.506 Having set out our views on most aspects of enhancement, we consider whether it is appropriate to apply a frontier shift to these allowances.

5.507 Our overall approach to frontier shift is discussed in the section on modelled base costs in paragraphs 4.298 to 4.393, including setting the provisional figure. In this section, we discuss some specific issues which arise around the application of frontier shift to enhancement allowances specifically.

¹¹⁴⁷ [Anglian's Reply to Ofwat's Response](#), Part C:2, 2.1, page 2

Water companies' views

- 5.508 Three of the four Disputing Companies (Anglian, Northumbrian, and Yorkshire) raised concerns about the application of a frontier shift to enhancement spend, in particular the fact that Ofwat's enhancement assessment relies on forward-looking company business plans. The companies said that to the extent that water companies had already included some level of frontier shift assumption in these business plans, any challenge would effectively be applied multiple times resulting in inappropriate double-counting.
- 5.509 Each of these three Disputing Companies stated that they had included the effects of frontier shift in their own business plan figures, which gave rise to concerns about double counting.¹¹⁴⁸
- 5.510 Two of the Disputing Companies stated that companies which affected Ofwat's upper quartile wastewater WINEP benchmarks had appeared to include a frontier shift in their business plans, which would then feed into the forward-looking efficiency challenge applied to other companies.¹¹⁴⁹

Ofwat's views

- 5.511 In Ofwat's final determination it applied its frontier shift and RPEs to wastewater WINEP and some parts of metering. Ofwat's justification for applying this to enhancement costs was that its estimated figure was based on all costs in comparator industries, not just base or on-going costs. However, it applied this challenge only to certain elements because it considered the potential gains from productivity improvements were likely to be more significant for large, relatively homogenous programmes of work that were more common across companies.¹¹⁵⁰ Ofwat also stated that it did not apply a frontier shift to other enhancement costs because it already made relatively large adjustments to other enhancement costs, where required, for lack of appropriate justification for cost efficiency and optioneering.¹¹⁵¹
- 5.512 In response to the Disputing Companies' submissions on the risk of double counting, Ofwat accepted that enhancement costs were based on company estimates of future costs and that therefore, to the extent that these had already incorporated future efficiency improvements due to frontier shift, there

¹¹⁴⁸ [Anglian SoC](#), Chapter 4.E, Overview; [Northumbrian SoC](#), paragraph 412; [Yorkshire SoC](#), paragraph 201; Yorkshire other

¹¹⁴⁹ [Anglian SoC](#), paragraph 791; [Northumbrian SoC](#), paragraph 446

¹¹⁵⁰ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), section 5.1.2

¹¹⁵¹ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p190

could be scope for double counting.¹¹⁵² However, Ofwat stated that it reviewed the available evidence and found that company forecasts of frontier shift on enhancement expenditure were often unclear, tended to be limited and were offset, or more than offset, by RPE adjustments.¹¹⁵³

5.513 Ofwat submitted its view of the best available evidence, which it stated supported its view that the Disputing Companies had not applied a ‘net frontier shift’ (ie any cost decreases from frontier shift were at least offset by cost increases from the company’s assumed RPEs):

Table 5-23: Ofwat’s view on company business plan frontier shift and RPE assumptions (negative shows cost decreases, positive show cost increases)

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
Frontier shift challenge	-1.0%	-0.9%	-1.0%	Unclear, possibly 0%
RPE allowance	+1.2 to +1.4%	+0.9%	+1.0%	0.6 to 0.9%
Net challenge	+0.2 to +0.4%	0.0%	0.0%	Unclear, possibly 0.6 to 0.9%

Source: [Ofwat’s further response to cross-cutting issues](#), Table 2.1

5.514 Ofwat also assessed figures and statements from the four companies which it assessed as representing the most efficient wastewater WINEP performers and stated that there was no evidence that any of these had applied a frontier shift once you had accounted for the effect of RPEs.¹¹⁵⁴

Our assessment and provisional decision

5.515 For the reasons explained in paragraph 4.298 to 4.393 above, our provisional view is to apply a frontier shift and RPE adjustment to all of wholesale Totex, and that this should include both base and enhancement costs. We do not consider it appropriate to constrain this to specific elements of enhancement.

5.516 However, we agree with Ofwat and the Disputing Parties that if the figures included in business plans (which we have used in our assessment) have already included a frontier shift, this could result in a degree of double-counting which should be removed. This could arise either as a result of double-counting in business plans of the Disputing Companies themselves (for example, for shallow dives using business plans), or from those

¹¹⁵² [Ofwat’s response to common issues in companies’ statements of case: Cost efficiency](#), paragraph 7.66

¹¹⁵³ [Ofwat’s further submission on cross-cutting issues](#), paragraph 3.20; [Ofwat’s response to common issues in companies’ statements of case: Cost efficiency](#), paragraph 7.66

¹¹⁵⁴ [Ofwat’s response to common issues in companies’ statements of case: Cost efficiency](#), paragraph 7.68 to 7.72

companies which set the comparative benchmarks (for example, the upper quartile wastewater WINEP companies).

5.517 In order to better understand the basis on which water companies submitted their business plans, we asked each of the Disputing Companies and those which represent the wastewater WINEP upper quartile benchmark¹¹⁵⁵ to provide us with the frontier efficiency and RPE assumptions that they incorporated into their enhancement costs as part of their business plans. Although individual companies built their business plans differently and so did not always clearly report total enhancement frontier shift for us to use, we found that:

- (a) Once we account for frontier shift and RPEs, three of the four Disputing Companies appear to have projected costs to be flat or even slightly increasing.¹¹⁵⁶
- (b) One of the Disputing Companies (Anglian) appears to have included some degree of future cost decrease, albeit less than we have provisionally decided on.¹¹⁵⁷
- (c) The two non-disputing water companies which set the upper quartile benchmark for wastewater WINEP told us that they were not able to report on exact frontier shift and RPE assumptions on enhancement costs. This is because they had not included explicit top-down challenges on frontier shift and RPEs, since their bottom-up business plan had already incorporated their best view of expected efficiency improvements from various sources. We note that Ofwat's final determination included a lower allowance than requested in their business plans, partly as a result of applying the frontier shift and RPE estimates.

5.518 Our view is that this evidence does not appear to support concerns about systematic double-counting of frontier shift in enhancement. Furthermore, to the extent that individual companies have adopted marginally different frontier shift and RPE estimates, we do not consider it necessary or proportionate to adjust all enhancement figures to try to reflect these.

5.519 Our provisional decision is to apply our frontier shift and RPE to all enhancement allowances for each of the Disputing Companies, as we have with base allowances.

¹¹⁵⁵ Welsh Water and United Utilities. We note that at the time, the companies which would represent our wastewater WINEP benchmarks were not settled and so we also asked another water company but have not reflected its response here.

¹¹⁵⁶ Bristol, Northumbrian, and Yorkshire

¹¹⁵⁷ Anglian; combined effect of frontier shift and RPEs appears to reflect c.0.35% pa.

5.520 We note that, in the future, there may be benefit in clarifying the basis for the reporting of these figures more explicitly, in order to avoid factual disputes of this nature (such as double counting).

Implications for enhancement allowances for the Disputing Companies

5.521 The overall effect of the above provisional decisions on the Disputing Companies' enhancement allowances are shown in Table 5-24 below:

Table 5-24: Implication of provisional determination on Disputing Companies' enhancement allowances, including variations from Ofwat's final determination (£ million)

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
Ofwat FD allowance	1,425	30	352	906
Water models	0	0	0	0
Wastewater models (incl WINEP)	0	N/A	+4	+9
Shallow dive challenges	0	0	0	0
Deep dive challenges	0	0	-7	-5
Deep dives	+54	0	+20	+7
Metaldehyde	+63	0	0	0
Frontier shift*	-16	-1	-5	-1
Net change in leakage†	-3	-1	0	+93
Total enhancement allowance	1,522	29	365	1,008
<i>Change vs Ofwat FD</i>	<i>+97</i>	<i>-1</i>	<i>+13</i>	<i>+103</i>

Source: CMA analysis

* Figures reported in the table above this line do not include the effects of frontier shift – all of this challenge is included in the specified row; this row includes both changes to scope and scale of frontier shift

† Leakage enhancement allowances are discussed in section 8.

5.522 Furthermore, we aim to include scheme-specific performance commitments and ODIs or adjustments to existing performance commitments and ODIs for the following:

- (a) Including a new performance commitment and ODI for Yorkshire's scheme to reduce flooding in Hull and Haltemprice;
- (b) Including a new performance commitment and ODI for Northumbrian's Essex Resilience Scheme (potentially by adjusting its existing water resilience scheme performance commitment and ODI);
- (c) Removing Northumbrian's Sewer Flooding Resilience Scheme performance commitment and ODI;
- (d) Adjusting Anglian's Strategic Interconnector performance commitment and ODI;

- (e) Adjusting Anglian's Smart Metering Scheme performance commitment and ODI;
- (f) Adjusting Anglian's non-SEMD performance commitment and ODI; and
- (g) Including a new performance commitment and ODI for Anglian's metaldehyde programme in case the ban is reintroduced.

6. Overall Totex assessment

Introduction

- 6.1 In this section we consider the output from sections 4 and 5 to arrive at an overall provisional view of Totex for the Disputing Companies.
- 6.2 This section sets out:
- (a) Modelled base costs;
 - (b) Unmodelled base costs;
 - (c) Enhancement costs; and
 - (d) Other costs.
- 6.3 We also set out our provisional view on the appropriate adjustments to each Disputing Company's Totex allowances for leakage costs.
- 6.4 Finally, we discuss cost-sharing rates, information revelation incentives and performance incentives.

Totex allowances

Modelled base costs

Raw base models

- 6.5 Base cost modelling is the first building block of Ofwat's methodology to reach a view of each company's Totex allowance. Ofwat uses econometric models with the companies' historical costs as the dependent variable and cost drivers, such as the size of the network, as independent variables. Ofwat uses this modelling to identify how efficient companies are and estimate future cost allowances.
- 6.6 Our approach to the modelling is similar to that adopted by Ofwat but we made three changes. We have not used Ofwat's models using specifications relating to the number of new connected properties, the APH, the percentage of mains renewed or relined, and performance on leakage targets. We also have not used Ofwat's model employing the specification relating to the number of properties per sewer length. We also used updated ONS forecast data for the number of connected properties and population density.

Catchup efficiency

- 6.7 Ofwat's cost models estimate how much it would cost the average water company to cover base operations over the next five years, given the company's forecast cost drivers. Ofwat wanted to set cost allowances for an efficient water company and therefore built a ranking of the companies, from most efficient to least efficient. This ranking was based on comparing the companies' historic costs in 2015 to 2019 with the costs the model predicted they should have incurred.
- 6.8 Our cost models estimate how much it would cost the average water company to cover base operations. We provisionally decide to adopt an approach similar to Ofwat's. We use the same comparator set Ofwat used and the same five-year period to assess efficiency. However, we want to set cost allowances for an efficient water company, and so we apply a catchup efficiency challenge based on our assessment of the upper quartile performers. Our provisional conclusion is to apply an upper quartile benchmark which we consider sets a challenging benchmark whilst acknowledging the limitations of our econometric modelling (and the consequent risk that the company will have insufficient allowed revenue to ensure a base level of service).
- 6.9 This results in an efficiency challenge of 3.9% in wholesale water and 1.0% in wholesale wastewater. These challenges are lower than the Ofwat figures of 4.6% and 2.0%.

Frontier shift

- 6.10 'Frontier shift' refers to the reduction of cost allowances on an annual basis to account for the expected productivity improvements in the sector. Frontier shift represents the ability of even the most efficient firms in the sector to increase their efficiency over time through, for example, adopting new technology. It differs from catch-up, which reflects laggard firms improving to catch up with the performance of the industry leaders.
- 6.11 Ofwat applied a frontier shift on an annual basis to all wholesale base costs,¹¹⁵⁸ WINEP enhancement costs and some metering enhancement costs.¹¹⁵⁹ Ofwat did not apply frontier shift to other wholesale enhancement costs or retail costs.

¹¹⁵⁸ This included both modelled and unmodelled base costs

¹¹⁵⁹ Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p122

- 6.12 We provisionally decide to apply a frontier shift of 1% per year. This is slightly lower than the frontier shift estimate Ofwat applied (1.1%) and leads to slightly higher cost allowances for the Disputing Companies. The resulting changes to modelled base cost allowances for the four companies are summarised in Table 6-1.

Table 6-1: Difference in frontier shift impact on PR19 modelled base cost allowances CMA approach compared to Ofwat determination (water and wastewater)

	£m
<i>Impact of frontier shift changing from 1.1% to 1%</i>	
Anglian	13
Bristol	1
Northumbrian	8
Yorkshire	12

Source: CMA analysis.

- 6.13 We provisionally decide to apply this to the whole of the wholesale cost base, including unmodelled costs and enhancement costs where it has not already been applied.

Real price effects

- 6.14 Real price effects (RPEs) adjust companies' allowed revenues to account for expected changes in the price of inputs above or below the level of CPIH, the indexation which is applied to all allowed revenues. RPEs may be applied to cost items such as labour, energy, and chemicals. There may then also be a true-up mechanism to reconcile expected changes allowed for in RPEs with out-turn changes in input prices.
- 6.15 Ofwat, based on EE analysis, made an RPE adjustment to account for the changes in labour costs above the CPIH but did not make an adjustment for any other costs.
- 6.16 We provisionally decide to provide an RPE adjustment based on OBR forecasts for labour, but not for energy, chemicals, MPE nor for other costs. We provisionally decide to use a true-up for labour costs based on manufacturing wages out-turn index, but not use a true-up for energy, chemicals, MPE nor for other costs.
- 6.17 This approach does not result in any changes to the cost allowances calculated by Ofwat.

Growth

- 6.18 Serving new properties involves additional costs for water companies, both from the cost of installing a new connection, and more broadly from an overall

increase in demand in an area necessitating reinforced or additional infrastructure (like the cost of an additional treatment works).

6.19 Ofwat estimated growth expenditure in four steps.

- (a) Step A – Ofwat allowed for growth expenditure in its base models by not separating growth costs for other modelled base costs. These base models fund the costs of an efficient company serving the average historical number of new connections.
- (b) Step B – Ofwat used the growth unit rate adjustment to account for the growth costs not captured by the base models if there was a difference between the forecast new connections and the average historical number of new connections in the sector.
- (c) Step C – Ofwat undertook deep dive assessments to address growth related atypical factors which affected individual companies and were not captured by steps A and B.
- (d) Step D – Ofwat decided to apply a true-up mechanism to adjust companies' allowed revenue at the end of the regulatory period. This will correct for differences between the out-turn and forecasted number of connections.

6.20 We provisionally decide to take a similar approach to that adopted by Ofwat as no superior approaches have been suggested to us and we have not found any better alternatives.

- (a) We use similar integrated growth models with the same four steps as Ofwat.
- (b) We use ONS household growth rate projections, but use the updated 2018 release, rather than the 2016 data Ofwat used. The growth unit rate adjustment is based on the difference between the ONS projections used and the average historical growth rate in the sector. Therefore, using the updated ONS projections affected this adjustment. In itself this changes the companies allowances by -£3.3 million for Anglian, +£0.2 million for Bristol, +£4.7 million for Northumbrian and +£9.3 million for Yorkshire.
- (c) We reject Anglian's request for a cost adjustment.

6.21 We provisionally decide to take an approach that differs in the following ways from Ofwat's approach:

- (a) We calculate the downward growth unit rate adjustment (Step B) in the same way as the upward growth unit rate adjustment. This contrasts with

Ofwat's approach, which was to halve this figure. In itself this changes the Northumbrian and Yorkshire allowance by -£26.4 million and -£34.7 million, respectively.

- (b) We expand the DRSA true-up mechanism (Step D) to capture total growth costs.
- (c) We apply a frontier shift and RPEs to the growth unit adjustment and the expanded DSRA mechanism. Applying the frontier shift and RPEs to the growth unit rate adjustment in itself changes the companies allowances by -£0.9 million for Anglian, -£0.1 million for Bristol, +£0.6 million for Northumbrian and +£0.8 million for Yorkshire.

6.22 These changes result in different cost allowances for the four companies which are summarised in Table 6-2 below.

Table 6-2: Changes in base cost allowances for growth (water and wastewater)

	Updating ONS projection in the growth unit rate adjustment	Full downward growth unit rate adjustment	Frontier shift and RPEs on growth unit rate adjustment	Combined changes in growth allowance
Anglian	-3.3	0	-0.9	-4.1
Bristol	0.2	0	-0.1	0.1
Northumbrian	4.7	-26.4	0.6	-16.0
Yorkshire	9.3	-34.7	0.8	-14.9

Source: CMA analysis

Note: The combined change is not the sum of the separate changes as these are interdependent parts.

Adjustment for enhancement Opex implicit allowance

6.23 Ofwat's approach to setting prices for the water industry in PR19 relied on appropriately setting a total expenditure (Totex) allowance for companies for the period 2020-2025.¹¹⁶⁰ In assessing the Totex allowance Ofwat sought to assess enhancement cost allowances and base cost allowances separately.

6.24 Ofwat's historical data collection approach contained no distinction between base operating expenditure (Opex) and enhancement Opex. This meant that the Opex included in historical costs, which Ofwat used to model base costs, included both base Opex and enhancement Opex. Ofwat's allowance for modelled base costs therefore implicitly included an allowance for enhancement Opex, taking it beyond base costs.¹¹⁶¹ Since Ofwat set separate allowances for base costs and enhancement activities, Ofwat's cost

¹¹⁶⁰ See Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p11 for details of overall approach

¹¹⁶¹ Base costs include Opex and Capex as well as some enhancements which can be modelled appropriately.

allowance could double count the enhancement Opex if an adjustment was not applied.

- 6.25 With a view to avoid double counting enhancement Opex, Ofwat estimated the implicit enhancement Opex allowance in its base models and subtracted this estimate from companies' base allowance.
- 6.26 We considered whether an adjustment should be made.
- 6.27 Our provisional decision is to apply an adjustment to cost allowances using the same approach as that used by Ofwat in its PR19 final determination.

Anglian cost adjustment claims

- 6.28 We assessed two cost adjustment claims specifically raised by Anglian: capital maintenance and sludge transport. We also considered a smart meter cost adjustment claim for Anglian, and leakage more generally, which are discussed later in this section.
- 6.29 We provisionally decide not to allow Anglian a cost adjustment for capital maintenance, because its projected increase in its capital maintenance costs is allowed for by the base cost model.
- 6.30 For sludge transport, Anglian did not submit additional information to support its case. We considered that the application of materiality thresholds here is sensible and pragmatic, given the need to prioritise resources and that companies are only likely to raise complaints about cost allowances and not report where they benefit from cost allowances. Furthermore, any deep dive into Anglian's cost adjustment claim would be impractical due to the degree of information asymmetry between the companies and the CMA. Therefore, we provisionally decide to reject the Anglian claim.

Total modelled base costs

- 6.31 The overall effect of our modelling changes described above is shown in Table 4-.

Table 6-3: Summary of modelled base costs

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
				£m
Raw base models	3,518	357	2,099	3,070
Catch-up	-74	-14	-56	-72
Frontier shift + RPEs	-78	-8	-46	-67
Growth unit rate adjustment	36	4	-42	-50
Enhancement Opex	-14	-2	-11	-14
Cost adjustment claims	26	6	5	16
Total modelled base costs	3,414	343	1,949	2,883

Source: CMA analysis

6.32 We also show the implication of our provisional determination on the Disputing Companies' modelled base cost allowances, including variations from Ofwat's final determination, in Table 4-.

Table 6-4: Implication of provisional determination on Disputing Companies' base cost allowances, including variations from Ofwat's final determination

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>£m</i> <i>Yorkshire</i>
Ofwat FD allowance	3,368	340	1,955	2,896
Raw base models	+31	-1	-17	-37
Catch-up	+31	+3	+18	+28
Frontier shift + RPEs	+12	+1	+8	+12
Alternative model specifications	-50	0	0	0
Growth unit rate adjustment	-4	0	-16	-15
Enhancement Opex	0	0	0	0
Cost adjustment claims	+26	+1	0	0
Total base cost allowance	3,414	343	1,949	2,883
<i>Change vs Ofwat FD</i>	<i>+46</i>	<i>+4</i>	<i>-7</i>	<i>-12</i>

Source: CMA analysis

Note: numbers may not sum due to rounding.

Unmodelled base costs

6.33 Ofwat's base cost modelling approach covers most but not all of the costs a WOC or WASC may incur as part of its general operations under base expenditure. As set out in section 4, the costs which are not included in the base cost models are referred to as 'unmodelled base costs'. The Disputing Companies raised a series of concerns, both general and company-specific, about how unmodelled base costs had been treated. They asked CMA to look again at these costs and ensure they were adequately reflected in the determination.

6.34 Where a company exceeds its unmodelled base costs allowances in AMP7, Ofwat included a 75/25 cost-sharing approach for the recovery of these costs – that is, 25% of the overrun to be funded by the company. Conversely, if the company underspends, it passes 75% of the savings to customers, but shareholders capture a benefit of 25% of the underspend. Ofwat's rationale for this approach was that this leaves relatively small exposures to risk of variation in charges, while keeping companies incentivised to manage costs and ensure they are efficient.

6.35 As a general approach, we provisionally decide that in most instances applying a 75/25 (customer/business) cost split for variances in the actual outturn of unmodelled base costs relative to the allowances provided is reasonable.

6.36 We also looked at specific issues raised by the Disputing Companies which we set out below.

Abstraction

- 6.37 The largest and most frequently raised issue on unmodelled base costs related to the cost of abstraction – namely the costs related to taking or extracting water from a natural source (rivers, lakes, groundwater aquifers, etc). Ofwat provided both:
- (a) A PR24 reconciliation mechanism (75/25 sharing rate) for abstraction charges, due to the uncertainty around rates given the Environment Agency’s consultation, and the lower controllability, and
 - (b) An additional provision that companies on a case by case basis can claim for an additional adjustment, if they can demonstrate material changes outside prudent management control.

Bristol

- 6.38 Before Ofwat’s final determination, Bristol submitted a cost adjustment claim for £8.6 million in relation to payments to the CRT pursuant to a long-term bulk supply agreement, which covers supply of water, maintenance of the canal system to facilitate abstraction, and the costs of any emergency situations preventing abstraction. Ofwat deducted £2.7 million to reflect potential savings it argued Bristol made from using the G&S Canal, which are costs associated with capture, storage and transportation of water which are reflected in the base cost models, but which Ofwat stated that Bristol did not incur.
- 6.39 We provisionally decided to allow Bristol a cost adjustment claim of £8.6 million to reflect its higher abstraction charges.

Northumbrian abstraction at Kielder

- 6.40 Northumbrian argued that it had an atypical exposure to abstraction costs compared with the sector average, in particular because of its agreement with the Environment Agency to manage the Kielder transfer scheme. It argued these costs were set to rise, that management could not mitigate these costs and that their final determination created unjust downside risks.
- 6.41 We provisionally decided that a full allowance should be made to Northumbrian to cover the increase in the Kielder abstraction costs. Any over or underspend at the end of AMP7 should be trued up at the end, such that customers only pay the costs incurred.

Northumbrian abstraction from Thames Water

- 6.42 Northumbrian also argued that the increase in costs to the Thames Water supply was not reflected in Ofwat's final determination because Thames Water raised the additional liability in November 2019.
- 6.43 Increases in these costs are subject to a 75/25 (customer/company) split. We consider that there is a degree of management influence over these costs and hence that Ofwat's approach to cost sharing is appropriate.

Other Issues

- 6.44 We set out our provisional decisions on the other specific issues raised by the Disputing Companies below:
- (a) Traffic Management Act costs: we provisionally decide that a 50% reduction to Yorkshire's estimated costs is reasonable, resulting in an allowance of £21.6 million.
 - (b) Business rates: we provisionally determine that a 90/10 (customer/company) cost sharing arrangement is appropriate. We also provisionally determine that Northumbrian's allowance for business rates, where Ofwat made an over allowance of £11.74 million per year for business rates for Northumbrian following revaluations in 2017, should be reduced accordingly.
 - (c) With regard to IED compliance costs:
 - (i) reflecting detailed evidence from the company and substantiation from the Environment Agency, to provide Northumbrian with an upfront allowance of £12 million and then a reconciliation mechanism – on a 75/25 (customer/business) cost-sharing basis – to recover costs that exceed the allowance at the end of the AMP; and
 - (ii) in the case of Yorkshire, to provide a reconciliation mechanism on a 75/25 (customer/business) cost-sharing basis to recover IED related compliance costs at the end of the AMP.
 - (d) Licence fee costs: we provisionally conclude not to award the projected increased costs to Bristol.
- 6.45 In all other regards, our provisional determination on unmodelled base costs is similar to Ofwat's final determination.

Overall effect on unmodelled base costs

6.46 The overall effect of our approach on unmodelled base costs described above is shown in Table.

Table 6-5: Implication of provisional determination on Disputing Companies' unmodelled base costs

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	£m <i>Yorkshire</i>
Abstraction	49	17	193	26
Traffic management	6	4	6	21
Business rates	304	23	181	273
IED compliance	0	0	12	0
Total unmodelled base costs	359	44	391	320

Source: CMA analysis.

Note: Numbers may not sum due to rounding.

6.47 The comparison between Ofwat's final determination and our provisional findings on unmodelled base costs is shown in Table.

Table 6-6: Implication of provisional determination on Disputing Companies' unmodelled base costs

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	£m <i>Yorkshire</i>
Ofwat FD allowance	357	42	376	319
Difference in abstraction	0	+3	+60	0
Difference in traffic management	0	0	0	0
Difference in business rates	+1	0	-56	+1
Difference in IED compliance	0	0	+12	0
Total unmodelled base allowance	359	44	391	320
<i>Change vs Ofwat FD</i>	<i>+1</i>	<i>+3</i>	<i>+15</i>	<i>+1</i>

Source: CMA analysis.

Note: Numbers may not sum due to rounding.

Enhancement costs

6.48 Broadly speaking, enhancement expenditure relates to investment for the purpose of enhancing the capacity or quality of service beyond a base level. It may be driven by a number of factors including new statutory obligations and strategic priorities. Examples include building a new reservoir or treatment works, building strategic interconnectors to connect up parts of the network, and introducing new measures to protect wildlife.

6.49 Ofwat's final determination included an enhancement allowance of £8.8 billion across the industry, which it estimated as being c.35% higher than the actual spend in years 1-4 of AMP6.¹¹⁶² For the four Disputing Companies, Ofwat's allowance comprised £2.7 billion, which it estimated as being around a 130%

¹¹⁶² Ofwat response to RFI 011, Q18

increase on actual spend in years 1-4 of AMP6, and around 16% lower than that included in the companies' response to draft determinations:

Table 6-7: Comparison of enhancement allowances

			£m
	<i>AMP6 actuals (years 1 to 4)</i>	<i>Company DD reps</i>	<i>Ofwat FD</i>
Anglian	514	1,644	1,425
Bristol	71	35	30
Northumbrian	172	440	352
Yorkshire	427	1,119	905
Total of Disputing Companies	1,184	3,238	2,712

Source: Ofwat response to RFI 011, Q18.

6.50 The largest drivers of proposed enhancement spend in AMP7 are generally:

- (a) **Environmental improvements:** Water companies have proposed numerous environmental projects, whilst also facing increasing obligations to improve their environmental outcomes including from the increased scope of the WINEP, which is a set of statutory requirements overseen by the Environment Agency. In particular, Anglian, Northumbrian and Yorkshire face significant additional costs to remove phosphorus (which can cause excessive algal growth if discharged into rivers) from wastewater.
- (b) **Supply-demand balance:** One of the responsibilities of a water company is to secure a balance of supply and demand including in light of ongoing trends such as climate change and population growth. Water companies have a statutory requirement to develop a water resource management plan (WRMP) every five years, setting out how they intend to balance supply and demand over at least the next 25 years. Supply-demand balance can be influenced by investment in major new infrastructure (e.g. reservoirs) but also by measures to reduce leakage or reduce consumption.
- (c) **Resilience:** Enhancement funding aims to provide improved operational resilience by funding schemes which address the risk of low-probability high-consequence events, such as ensuring properties are not reliant on a single source of supply or adding in additional support / back-up for critical infrastructure.

6.51 Ofwat's preferred method of assessment for enhancement was a benchmarking analysis of forecast costs. For other categories, Ofwat followed a 'risk-based process' of having a lighter touch ('shallow dive') assessment for low-materiality costs and a more thorough assessment of the evidence ('deep dive') for high-materiality costs, each based on the company's business plans.

- 6.52 We have adopted the same broad overall approach as Ofwat to assess enhancement allowances, including a combination of benchmarking, deep dives and shallow dives. We have applied these approaches to categories of spend for the Disputing Companies, and considered any efficiency challenges which should be applied to these allowances.

Use of benchmark models for enhancement

- 6.53 Almost all Ofwat's benchmark modelling for enhancement was based only on company forecasts of required Totex levels.¹¹⁶³ While this raises some inevitable questions over the reliability of model results for the areas in which it was used, we did not identify a preferable alternative assessment method for determining AMP7 enhancement allowances, among those we considered, to the benchmarking of forecast costs (supplemented by cross-checks of the kind undertaken by Ofwat, where feasible). In line with this, our assessment focuses primarily on the extent to which Ofwat's benchmark modelling is likely to have given insufficient weight to material factors, and whether alternative approaches can be identified that are likely to provide a better means of taking such factors into account.
- 6.54 We assessed modelled allowances for water and wastewater enhancement benchmark models, set out below.

Wastewater models

- 6.55 Our assessment of wastewater enhancement modelling focused primarily on P-removal. Phosphorus is an essential nutrient for plant life, but high levels can lead to excessive growth of algae and other plants, and this can lead to a corresponding depletion of oxygen levels in water and a loss of biodiversity. Ofwat's final determination included allowances for P-removal that totalled around £2.3 billion across all WASCs and accounted for around 50% of overall wastewater enhancement Totex allowances across all WASCs. For Yorkshire, P-removal accounted for a significantly higher share of the wastewater enhancement Totex allowed for in Ofwat's final determination; around 71%.
- 6.56 Our provisional view is that the modelled WINEP allowance should remain unchanged from Ofwat's final determination for Anglian, and be increased by £4 million for Northumbrian and by £9 million for Yorkshire as a result of increased modelled P-removal allowances.

¹¹⁶³ Ofwat's 'first time sewerage' modelling also used actual cost data from AMP6.

- 6.57 Our provisional view is that other modelled wastewater enhancement allowances should be the same as the levels set by Ofwat in its final determination.

Water models

- 6.58 Ofwat used a benchmark model for at least some allowances in four of its cost categories in water. Anglian raised specific concerns about two of these benchmark models: meter rollout and meeting lead standards, which we set out below. We received no specific evidence or arguments on the approach for the other two water enhancement categories (supply/demand balance and security) and provisionally decide that Ofwat's modelling approach on these elements is appropriate and we use the same in our provisional determination.

- *Meter rollout*

- 6.59 These allowances reflect the cost of installing new meters in properties which have not previously had one. Our provisional decision is to use a modelling approach based on numbers of meters, without a meter penetration variable, as Ofwat did. This results in no change to the Disputing Companies' allowances compared to Ofwat's final determination.

- *Meeting lead standard*

- 6.60 The allowances for meeting lead standards reflect the costs required to meet obligations to manage customer exposure to levels of lead below a statutory limit, by replacing pipes and treating drinking water. Our provisional decision is to use a modelling approach based on number of communication pipes replaced, as Ofwat did. This results in no change to the Disputing Companies' allowances compared to Ofwat's final determination.

Wastewater WINEP cost efficiency challenges

- 6.61 Ofwat applied an upper quartile efficiency adjustment on a 'WINEP in the round' basis. Ofwat identified an overall level of WINEP wastewater modelled allowance by summing the modelled allowances it had determined for each WINEP area (including P-removal). An upper quartile adjustment was then applied based on the relationship between the requested and modelled allowance at this 'WINEP in the round' level. This resulted in a 6.94% downward adjustment to modelled allowances.

- 6.62 Ofwat said that the forecast upper quartile was only used as a benchmark in enhancement areas where the accuracy of modelling was considered sufficient, including for WINEP, where it was applied at a programme level.¹¹⁶⁴
- 6.63 Our provisional assessments of modelled allowances do not affect Ofwat's upper quartile calculation. We considered whether using our broader set of P-removal models (in particular, Models 1, 2, 4 and 5) to determine the modelled allowances for all companies would imply a materially different upper quartile adjustment to that in Ofwat's final determination. However, we found this not to be the case. Our provisional view is that a upper quartile adjustment of 6.94% should be applied to modelled WINEP allowances as in Ofwat's final determination.

Deep and shallow dive efficiency challenges

- 6.64 We now assess the approaches to applying efficiency challenges on shallow dives and deep dives. We assessed three approaches: company-specific challenge (shallow dive), company-specific challenge (deep dive), and scheme-specific challenge.

Company specific efficiency factor (shallow dive)

- 6.65 Ofwat calculated company-specific efficiency figures by taking the ratio of its view of efficient modelled **base** costs to the company view of modelled **base** costs.¹¹⁶⁵ Anglian and Bristol disagreed with Ofwat's approach to shallow dive company-specific challenges.
- 6.66 Our provisional decision is to maintain the use of a base cost proxy for calculating a shallow dive company-specific efficiency factor. In order to avoid undermining the incentive to submit efficient business plans, we use the same figures from companies' business plans used by Ofwat, but update the calculation to reflect our provisional view on each Disputing Company's efficient base costs. We use this to calculate new company-specific efficiency factors for water and wastewater, which we then constrain within a range of 0% to 10% for use in our shallow dive assessment.
- 6.67 This results in calculations and resulting factors as shown in Table 6-8 and Table 6-9:

¹¹⁶⁴ For example: [Ofwat's Response to Anglian's SoC](#), paragraphs 3.168-3.173

¹¹⁶⁵ For this calculation, Ofwat removed enhancement Opex from the company's view of modelled base costs; Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p55. For this calculation, Ofwat removed enhancement Opex from the company's view of modelled base costs; Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p55

Table 6-8: Updated calculation of raw efficiency factors

	<i>Company business plan (from Ofwat feeder), £m</i>	<i>Our provisional view on efficient base costs, £m</i>	<i>Raw efficiency figure</i>
Anglian - water	1,575	1,310	16.8%
Anglian - wastewater	2,430	2,104	13.4%
Bristol - water	386	343	11.1%
Bristol - wastewater	n/a	n/a	n/a
Northumbrian - water	1,127	1,125	0.2%
Northumbrian - wastewater	887	824	7.1%
Yorkshire - water	1,306	1,338	-2.5%
Yorkshire - wastewater	1,833	1,545	15.7%

Source: [Ofwat company efficiency factor model](#); CMA calculations

Table 6-9: Provisional decision on shallow dive company-specific efficiency factors

	<i>Water</i>	<i>Wastewater</i>
Anglian	10.0%	10.0%
Bristol	10.0%	n/a
Northumbrian	0.2%	7.1%
Yorkshire	0.0%	10.0%

Source: CMA calculations

Company specific efficiency factor (deep dive)

6.68 To calculate deep dive company-specific efficiency factors, Ofwat adopted the same general approach as it did for shallow dives, as described in 6.65 above. However, having calculated its raw figures, Ofwat constrained them within a range between 5% and 10%. Ofwat stated that the reason for applying a higher floor compared with shallow dives (where this was set at 0%) was that there was insufficient evidence that proposed costs are efficient.¹¹⁶⁶

6.69 Our judgement in this case, and our provisional decision, is that a figure of 10% deep dive company-specific efficiency factors appears appropriate, and properly balances the objectives of providing a sufficiently strong incentive to conduct a robust costing exercise and reveal this to the regulator, and of not risking disproportionate interventions which could cause wider concerns (including financeability issues).

The assessment of specific projects ('deep dives')

6.70 We now turn to the eight deep dives we have conducted on specific schemes which the Main Parties have highlighted.

(a) Yorkshire – Living with Water Partnership in Hull and Haltemprice: we provisionally decide that the price control should include an allowance of

¹¹⁶⁶ Ofwat (2019) [PR 19 final determinations: Securing cost efficiency technical appendix](#), p55

£23 million to enable Yorkshire to deliver the proposed scheme. This is equivalent to an increase of £6.6 million over the Ofwat final determination.

- (b) Northumbrian – Essex Resilience Scheme: we provisionally decide to allow Northumbrian an additional £20.4 million for the delivery of this scheme.
- (c) Northumbrian – Sewer Flooding Resilience Scheme: we provisionally decide not to allow Northumbrian any additional customer funds, through enhancement allowances, to improve its sewer flooding.
- (d) Anglian – Strategic Interconnector Scheme: we provisionally decide to increase Anglian’s Totex allowance by £38.9 million above Ofwat’s final determination for this scheme.
- (e) Anglian – Water Resilience Scheme: we provisionally decide to provide the same cost allowance as in Ofwat’s final determination for this scheme.
- (f) Anglian – Smart Metering Scheme: we provisionally decide to allow Anglian £131.8 million for the delivery of its metering programme, which is £5.5 million more than was included in Ofwat’s final determination.
- (g) Anglian – SEMD/non-SEMD:¹¹⁶⁷ we provisionally decide to allow Anglian its requested £1.7 million cost allowance associated with its SEMD activities, which Ofwat had rejected in full. For non-SEMD, we provisionally allow Anglian £14.4 million for the delivery of its non-SEMD scheme. This is an increase of £0.8 million over Ofwat’s final determination, where Ofwat had applied a 10% cost challenge to Anglian’s requested £15.2 million.
- (h) Anglian – Bioresources Scheme: we provisionally decide to allow Anglian its full proposed allowance of £12.5 million for the delivery of this scheme. This is an increase of £6.8 million over Ofwat’s final determination.

Anglian metaldehyde costs – treatment of uncertainty

6.71 Anglian raised the issue of metaldehyde treatment in their redetermination representations. In December 2018, The Department for Environment and Rural Affairs introduced a ban on the use of metaldehyde slug pellets outdoors, to take effect from spring 2020.

¹¹⁶⁷ The Security and Emergency Measures (Water and Sewerage Undertakers) Direction (SEMD) 1998 directs undertakers to maintain plans to provide a supply of water at all times

- 6.72 On the basis of the ban, during the PR19 process Anglian had agreed to remove £68 million from its Business Plan that had been earmarked to deal with metaldehyde pesticide. In July 2019, this ban was overturned by the High Court after its legality was challenged. While government has since stated that it will consider reintroducing the ban, there is uncertainty regarding whether and when the ban may be reintroduced. The situation leaves Anglian required to undertake significant expenditure (on treatment works to remove the pesticide from water resources) unless and until a ban is reintroduced. It does not have an allowance for this expenditure.¹¹⁶⁸
- 6.73 Ofwat recognised in its final determination that Anglian could be exposed to additional costs during AMP7 and that these would be beyond management control. It proposed that the mechanism for determining what unfunded costs were incurred and the extent they should be recovered was via a Notified Item. Anglian asked that measures be taken so that it has certainty from Ofwat that the materiality condition would be amended to lower the threshold so that the Notified Item would be subject to an interim determination, or for the provision of another workable reimbursement mechanism. It believed it should be able to recover the full costs of measures to deal with metaldehyde, should the ban be delayed or abandoned.
- 6.74 We considered that Anglian should have assurance that additional costs it incurs for the treatment of metaldehyde, which were removed from its allowance due to the (subsequently withdrawn) ban, are fully funded.
- 6.75 We provisionally determine that Anglian should be awarded the full £63 million allowance for the costs it expects to incur treating metaldehyde, profiled evenly across the five year period. Alongside this allowance, we introduce a clawback mechanism for these costs if the ban is reintroduced; in this instance costs not incurred must be returned to customers. We also remove the pass-through rate (75/25 customer/business) for metaldehyde which Ofwat set.

Application of frontier shift on enhancement allowances

- 6.76 We consider whether it is appropriate to apply a frontier shift to enhancement allowances. Three of the Disputing Companies (Anglian, Northumbrian, and Yorkshire) raised concerns about the application of a frontier shift to enhancement spend, in particular: the fact that Ofwat's enhancement assessment relies on forward-looking company business plans; and since, to

¹¹⁶⁸ We note that on 18 September 2020, Defra announced a decision to ban metaldehyde and phase it out by 31 March 2022, [Defra press release](#). Given the timing of this announcement, we have not reflected this in our provisional decision.

the extent that water companies had already included some level of frontier shift assumption in these business plans, the companies stated that this challenge would effectively be applied multiple times resulting in inappropriate double-counting.

- 6.77 In Ofwat's final determination it applied its frontier shift and RPEs to wastewater WINEP and some parts of metering. Ofwat's justification for applying this to enhancement costs was that its estimated figure was based on all costs in comparator industries, not just base or on-going costs. However, it applied this challenge only to certain elements because it considered the potential gains from productivity improvements were likely to be more significant for large, relatively homogenous programmes of work that were more common across companies.¹¹⁶⁹ Ofwat also stated that it did not apply a frontier shift to other enhancement costs because it already made relatively large adjustments to other enhancement costs, where required, for lack of appropriate justification for cost efficiency and optioneering.¹¹⁷⁰
- 6.78 Our provisional view is to apply a frontier shift and RPE adjustment to all of wholesale Totex, and that this should include both base and enhancement costs. We do not consider it appropriate to constrain this to specific elements of enhancement.
- 6.79 We found that the evidence available did not appear to support concerns about systematic double-counting of frontier shift in enhancement. Furthermore, to the extent that individual companies have adopted marginally different frontier shift and RPE estimates, we do not consider it necessary or proportionate to adjust all enhancement figures to try to reflect these.
- 6.80 Our provisional decision is to apply a frontier shift and RPE to all enhancement allowances for each of the Disputing Companies, as we have with base allowances.

Overall effect for enhancement allowances for the Disputing Companies

- 6.81 The overall effect of the above provisional decisions on the Disputing Companies' enhancement allowances is shown in Table 6-10 below.

¹¹⁶⁹ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), paragraph 5.1.2

¹¹⁷⁰ Ofwat (2019) [PR19 final determinations Securing cost efficiency technical appendix](#), p190

Table 6-10: Implication of provisional determination on Disputing Companies' enhancement allowances, including variations from Ofwat's final determination

	Anglian	Bristol	Northumbrian	Yorkshire	£m
Ofwat FD allowance	1,425	30	352	906	
Water models	0	0	0	0	
Wastewater models (incl WINEP)	0	N/A	+4	+9	
Shallow dive challenges	0	0	0	0	
Deep dive challenges	0	0	-7	-5	
Deep dives	+54	0	+20	+7	
Metalddehyde	+63	0	0	0	
Frontier shift*	-16	-1	-5	-1	
Net change in leakage†	-3	-1	0	+93	
Total enhancement allowance	1,522	29	365	1,008	
<i>Change vs Ofwat FD</i>	<i>+97</i>	<i>-1</i>	<i>+13</i>		<i>+103</i>

Source: CMA analysis

* Figures reported in the table above this line do not include the effects of frontier shift – all of this challenge is included in the specified row; this row includes both changes to scope and scale of frontier shift

† Leakage enhancement allowances are discussed below.

Note: Numbers may not sum due to rounding.

Leakage Totex

6.82 We consider allowances for funding leakage reduction measures in section 8. We set out our provisional determination in this section as it relates to appropriate adjustments to each Disputing Company's Totex allowance.

6.83 The Disputing Companies submitted that they could not deliver the leakage levels they had committed to without more funding than was implied in the Ofwat base cost models. Northumbrian told us that it proposed to cover the shortfall from its own resources. The other companies asked us to make a variety of base cost adjustments and enhancement cost Totex allowances.

6.84 We considered the need for changes in base cost allowances and additional cost allowances to reflect differentials in the current level of leakage between the different water companies.

6.85 We provisionally find that the Disputing Companies should be allocated the following funding for maintaining and reducing their leakage levels for AMP7 (above their overall base funding). The enhancement Totex is indicative and subject to review of the supporting evidence that the Totex is needed to achieve the leakage reduction, consistent with our approach:

- (a) Anglian: £25.7 million for base costs,¹¹⁷¹ £68.0 million for enhancement Totex;

¹¹⁷¹ Which largely offsets our disallowance of the £24.5 million Ofwat allowed through its base models (see paragraph 4.144)

- (b) Bristol: £539k for base costs, £4.3 million for enhancement Totex;
- (c) Yorkshire: £93.3 million for enhancement Totex; and
- (d) Northumbrian: no allowance.

6.86 This is shown in Table 6-11:

Table 6-11: Provisional determination of allowances for leakage based on indicative approach

	AMP7 Base Cost Adjustment for Leakage Expenditure in CMA PFs	AMP7 Enhancement Cost Adjustment for Leakage Expenditure in CMA PFs	AMP7 Total Cost Adjustment for Leakage Expenditure in CMA PFs	£m Increase / (decrease) to Ofwat FD19
Anglian	£25.723m	£68.0m	£93.7m	(£2.1m)
Bristol	£0.539m	£4.3m	£4.8m	(£6k)
Northumbrian	-	-	-	-
Yorkshire	-	£93.3m	£93.3m	£93.3m

Source: CMA analysis

6.87 As our provisional decision is to (i) provide an adjustment to base costs for upper quartile performance and (ii) allow enhancement Totex where a need has been identified to achieve sector-wide reductions in leakage, Anglian, Bristol and Yorkshire have all provisionally received enhancement funding. We will be seeking more detailed information on the business case for this enhancement funding in parallel with this provisional determination. Northumbrian did not indicate that there was a need for enhancement funding, and we have therefore provisionally made no adjustment for it for leakage enhancement.

Total Totex allowances

6.88 Our provisional determination of the Disputing Companies' wholesale Totex allowances is shown in Table 6-12 below.

Table 6-12: Total Totex by type of cost, 2020-25 (2017-18 CPIH deflated prices)

	Anglian	Bristol	Northumbrian	£m Yorkshire
Modelled base allowance (including CAC)	3,414	343	1,949	2,883
Unmodelled base allowance	359	44	391	320
Enhancement allowance	1,522	29	365	1,008
Other Totex allowances*	-85	-6	-54	-67
Total	5,209	410	2,651	4,145

Source: CMA analysis.

* Other Totex allowances include: operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost-sharing adjustment; grants and contributions (after adjustment for income offset); and pension deficit recovery costs.

Note: Numbers may not sum due to rounding.

6.89 The difference between our provisional determination and Ofwat's final determination for all of the Disputing Companies is shown in Table 6-13 below:

Table 6-13: Comparison between CMA provisional decision on total Totex and Ofwat's final determination (2017-18 CPIH deflated prices)

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>	£m
Ofwat's FD	5,065	405	2,630	4,053	
CMA provisional decision	5,209	410	2,651	4,145	
Delta	+144	+5	+22	+92	

Source: Ofwat, CMA analysis

Note: Numbers may not sum due to rounding.

Cost-sharing incentives

6.90 This section considers the appropriate cost-sharing incentives for use in our determination. These provide incentives for the water companies to outperform, as they retain part of any underspend. They also provide some protection for the water companies against overspend. A Totex cost-sharing incentive contains two parts:

- (a) cost basis – the allowance, which is compared to actual costs to calculate the cost difference; and
- (b) sharing rate – the proportions in which any cost difference is shared between customers and investors.

Cost basis

6.91 Ofwat set the cost basis equal to the companies' Totex allowances, adjusted for certain items, such as pension deficit recovery costs, which are subject to different cost sharing mechanisms.

Sharing rates

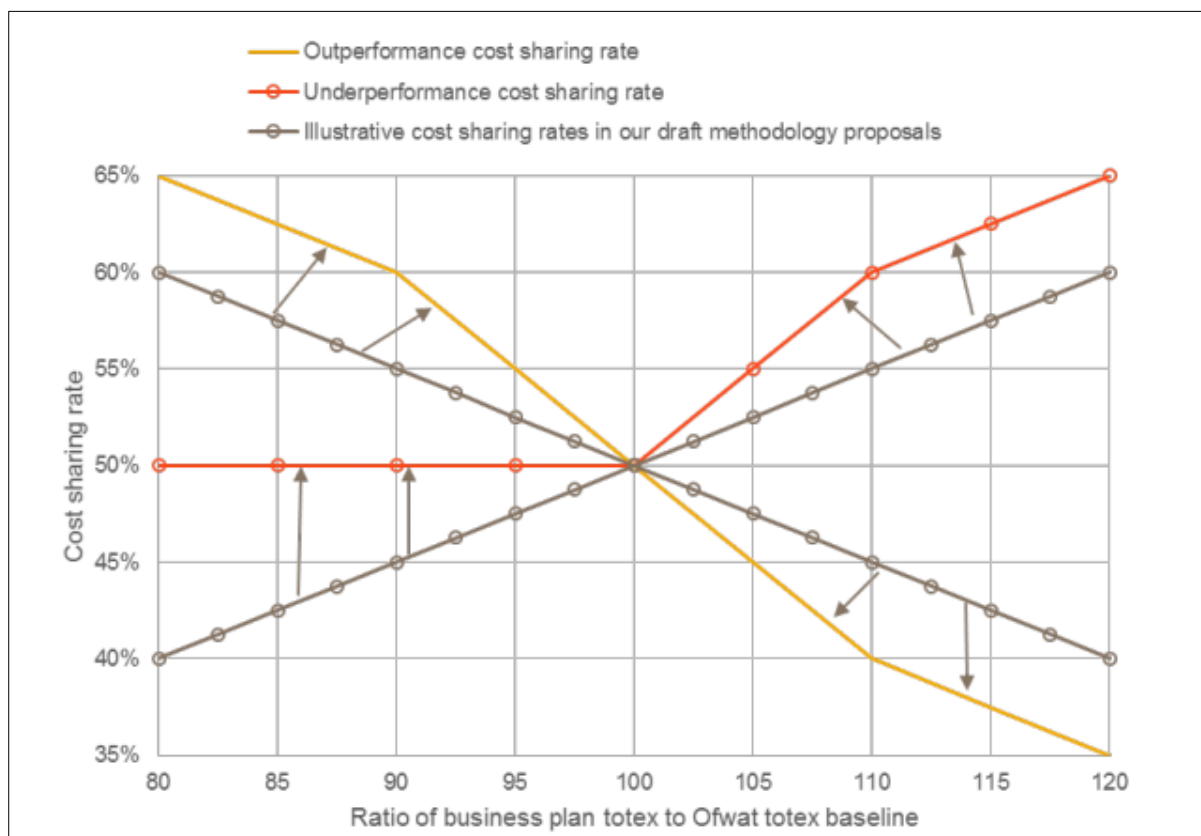
6.92 The sharing rates set the proportion of underspend or overspend that a company is exposed to (that is the proportion of any savings that a company gets to keep or the proportion of any cost overruns that it must bear). Once determined, the cost sharing rate applies throughout AMP7.

6.93 For fast track companies, Ofwat set the sharing rate at 50%. For slow track companies, the sharing rates depended on the difference between Ofwat's Totex allowance and the two iterations of the companies' business plans

submitted during PR19. Ofwat specified distinct sharing rates for underspend and overspend.

- 6.94 Figure 6-1 summarises how the sharing rates vary according to the difference between Ofwat's Totex allowance and the companies' Totex estimates contained in their business plans.¹¹⁷²

Figure 6-1: The PR19 cost sharing mechanism



Source: Ofwat, Delivering Water 2020: Our final methodology for the 2019 price review, Appendix 11: Securing cost efficiency

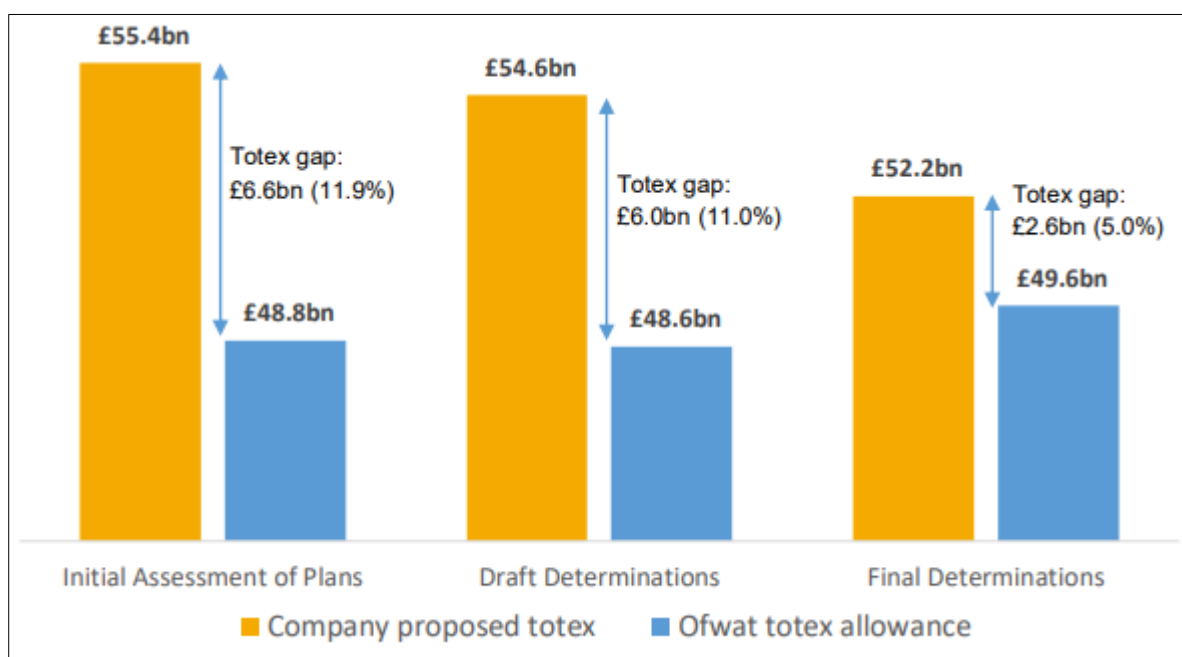
- 6.95 Ofwat said that the gap between its cost allowances and the company business plans narrowed over the stages of the PR19 process.¹¹⁷³ This is shown in Figure 6-2.¹¹⁷⁴

¹¹⁷² Ofwat (2017) *Delivering Water 2020: Our final methodology for the 2019 price Review. Appendix 11: Securing cost efficiency*, p5

¹¹⁷³ Ofwat (2019) *PR 19 final determinations: Securing cost efficiency technical appendix*, p7

¹¹⁷⁴ Ofwat (2019) *PR19 final determinations: Securing cost efficiency technical appendix*, p 8

Figure 6-2: Difference between company plans and Ofwat allowance over time



Source: Ofwat, PR19 final determinations: Securing cost efficiency technical appendix

6.96 This iterative process, which was carried out separately for water and wastewater, and the approach summarised in Figure 6-1 together produced the sharing rates for each of the Disputing Companies. These are summarised in Table 6-14.

Table 6-14: Cost sharing rates for 2020-25

Company	Water resources and water network plus		Wastewater network pls	
	Out-performance	Under-performance	Out-performance	Under-performance
Anglian	31.89%	68.11%	34.96%	65.04%
Bristol	39.76%	60.24%	n/a	n/a
Northumbrian	46.19%	53.81%	34.40%	65.60%
Yorkshire	38.06%	61.94%	33.21%	66.79%

Source: Ofwat¹¹⁷⁵

Notes:

1. Fast-track companies receive 50% cost sharing rates.
2. Percentage rates shown are the proportion of underspend (outperformance) received, or overspend (underperformance) borne, by the companies. The remainder is passed to customers.

Disputing Companies' views

6.97 All the Disputing Companies said that they would like us to replace Ofwat's sharing rates with a symmetrical 50/50 sharing rate.

6.98 Northumbrian said that the cost basis should be adjusted by applying its views on specific cost items, rather than Ofwat's views. It said that this approach

¹¹⁷⁵ Ofwat (2019) *PR19 final determinations: Securing cost efficiency technical appendix*, Table 24, p140

would mean that its forecast would be close to Ofwat's plan, resulting in revised sharing rates of 49:51 for water and 50:50 for wastewater.¹¹⁷⁶

- 6.99 Northumbrian said that, rather than incentivising efficient business plans, the cost sharing incentive scheme incentivised companies to submit business plans that were low relative to the expected Ofwat cost allowance to secure a more favourable sharing rate.¹¹⁷⁷

CMA analysis: choice of sharing rate

6.100 Ofwat's sharing rates had two purposes:

- (a) First, to provide incentives for information revelation - offering more advantageous sharing rates to those companies with lower costs in their business plans.
- (b) Second, to provide incentives to be more efficient – offering companies the opportunity to keep a proportion of any underspend.

6.101 First, on information revelation, Ofwat said that the PR19 process had successfully reduced the gaps between the companies' business plans and Ofwat's allowances.¹¹⁷⁸ In addition to fast-tracking, the cost sharing methodology was an important part of the way PR19 had been designed to provide incentives for companies to agree to plans which were more closely aligned to Ofwat's draft allowances.

6.102 We note that while there was some movement between the initial business plans and the companies' business plans in responding to the draft determination, the objectives of the information revelation incentives are not necessarily the same for different cost elements. For example, it is often more difficult to forecast enhancement allowances than base cost allowances because enhancement spend tends to be more idiosyncratic and often relates to novel activities.

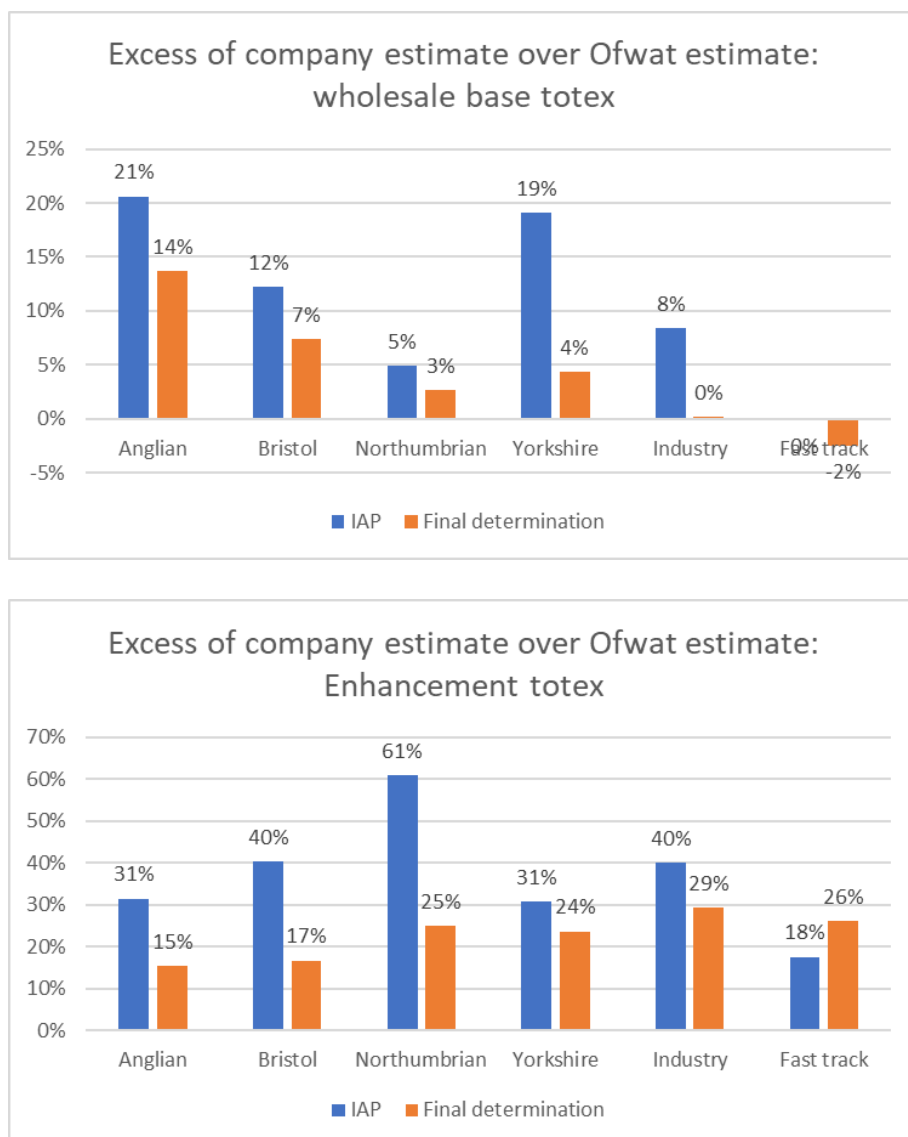
6.103 Figure 6-3 shows that, in percentage terms, the differences in ex-ante cost estimates were wider for enhancements compared to wholesale base Totex. Fast track companies had smaller base Totex gaps compared to the Disputing Companies at both the IAP and final determination stage, but this was not true for enhancements.

¹¹⁷⁶ Northumbrian SoC, paragraph 525

¹¹⁷⁷ Northumbrian SoC, paragraph 499-528 and Table 33

¹¹⁷⁸ Ofwat (2019) *PR 19 final determinations: securing cost efficiency technical appendix*, p7

Figure 6-3: Totex gaps for wholesale base and enhancement



Source: CMA analysis of Ofwat data

6.104 Northumbrian said that for base costs the companies could have the incentive to bid lower than Ofwat’s cost allowance to receive more advantageous sharing rates.¹¹⁷⁹

6.105 There is little evidence that this occurred: the iteration of bidding shows that companies submitted plans for higher Totex than Ofwat’s view, particularly for enhancement Totex, and that the gap narrowed across the sector in successive rounds. However, there are a number of (potentially competing) incentives on companies when they submit business plans and it is very hard to assess how the companies took these incentives into account when

¹¹⁷⁹ [Northumbrian SoC](#), paragraphs 510-515

bidding. Thus, even though the companies did not bid below Ofwat's proposed allowances, the cost sharing incentives could still have influenced the bidding in the business plans and, if so, the effect is likely to have been different for enhancement and base cost forecasts. There is no single way of separating the different assumptions with the business plan forecasts, and the numbers suggest that there is no simple link between the size of the sharing rates and the effectiveness of the information revelation incentives.

6.106 In summary:

- (a) Fast track companies could benefit from more advantageous sharing rates, but fast track companies also received other benefits, including a higher WACC.
- (b) Information revelation is more challenging for enhancement costs rather than base costs, and both were addressed through a single sharing rate; and
- (c) An overly formulaic approach to sharing rates could provide perverse incentives to submit lower business plan figures, although there was limited evidence of this.

6.107 Second, on performance incentives, there are incentives for the companies to minimise spend irrespective of the sharing rate, subject to consistency with three other incentives.

- First, enhancement incentives, where Ofwat has implemented a number of adjustment mechanisms. There are also scheme-specific ODIs which result in under-spend on certain enhancement schemes being returned to customers. Our understanding is that these other mechanisms would apply before cost saving benefits are received, and therefore that the two can work together.
- Second, ODIs, where the Totex sharing mechanism was incorporated into the process for calibrating ODIs. The penalties and rewards for some ODIs take into consideration the costs to achieve improvements in performance against the relevant service measures. We would need to revisit the ODI calibration if we decided to make a significant change to the approach.
- Third, the treatment of costs over multiple periods. Ofwat's approach to sharing rates raises concerns over the incentives companies may have when evaluating different enhancement options. In particular, companies may be discouraged from adopting lower whole-life cost options if those options involve incurring higher costs in AMP7 offset by savings in future

periods. Under the final determination sharing rates, the Disputing Companies would have to bear around two thirds of any Totex overspend as a result of additional AMP7 costs that may be associated with adopting lower whole-life cost options. However, they would be unlikely to expect to be able to retain more than around 50% of any associated expected savings in future AMPs.

- 6.108 Anglian and Yorkshire said that Ofwat's final determination discouraged the adoption of more sustainable approaches to P-removal.¹¹⁸⁰ The companies said that more sustainable approaches involved higher upfront capital expenditure than traditional chemical dosing approaches but had lower whole-life costs and other environmental benefits, due to lower chemical requirements. Similar concerns arose in other enhancement areas where the distribution of likely costs and benefits across AMPs could differ materially between options, including smart metering roll-out decisions.
- 6.109 We found that when considering the benefits and costs of stronger cost-sharing incentives, and the use of cost-sharing incentives for information revelation, the approach chosen should be consistent with these broader regime objectives of providing incentives to optimise investment, including identifying lowest whole-life cost options for investment.

Provisional determination – choice of sharing rates

- 6.110 In PR19, Ofwat's approach resulted in companies with Totex estimates that were higher than Ofwat's allowance receiving a cost-sharing rate that was less favourable to companies (and thus more favourable to customers). To achieve a 50/50 cost-sharing rate a company would either need to be in the 'fast track' or submit a business plan with identical, or lower, Totex than Ofwat's final determination. As a result, all four Disputing Companies had materially asymmetric sharing rates, with rewards below 40% for outperformance in at least one of water or wastewater and corresponding penalties above 60%.
- 6.111 The cost-sharing rate worked alongside other reward mechanisms that Ofwat applied at the business plan assessment stage to incentivise companies to submit high quality business plans. There was no way to isolate the contribution of the cost-sharing rate from the overall package of information revelation incentives.

¹¹⁸⁰ [Anglian SoC](#), p193-197 and [Yorkshire SoC](#), paragraph 30

- 6.112 The Disputing Companies asked us to apply symmetrical cost-sharing rates, which we interpret as a 50/50 allocation between company and customers in relation to both Totex outperformance and underperformance.
- 6.113 We agree that there is merit in Ofwat's approach of providing incentives to provide accurate business plan information, which placed companies in various tracks during its assessment process. This improved Ofwat's operational flexibility and ability to prioritise the reviewing of company business plans during the price review period. However, this does not mean that the particular cost-sharing rates applied by Ofwat were necessarily the best way to achieve this.
- 6.114 The formula Ofwat applied to determine the sharing rates may incentivise companies to submit unattainably low Totex estimates in order to secure more favourable sharing rates - although we did not find any evidence that this had occurred. Most of the companies bid higher on enhancement, which might be expected given the information asymmetry that exists for enhancement schemes.
- 6.115 The choice of cost-sharing rates needs also to provide effective incentives for cost efficiency. The widened range of sharing rates applied in PR19 will reduce companies' incentives to outperform and will also expose companies to higher risks from underperformance. There may be circumstances where these asymmetric cost-sharing rates create unintended incentives, including in relation to schemes that require investment over multiple periods.
- 6.116 Based on this analysis, we consider that an effective cost-sharing mechanism should seek to achieve the following:
- (a) Be sufficiently close to a symmetric cost-sharing rate to avoid creating a significant risk of perverse incentives, particularly over multiple periods.
 - (b) Maintain a distinction between the rates applied to fast and slow track companies, as part of the package of information revelation incentives.
 - (c) Avoid some of the potential distortions which result from the formulaic approach, particularly the theoretical incentive to under-bid in some areas of base and over-bid in some areas of enhancement.
- 6.117 We were not in a position to re-run this entire process and our assessment of Ofwat's approach suggests that there is no single alternative mechanistic model that we could apply at this stage to derive sharing rates consistently for all the Disputing Companies.

6.118 On that basis, we provisionally decide to apply the same asymmetric sharing rates to all the Disputing Companies. For outperformance the sharing rate should be 55% customers and 45% companies. For underperformance the sharing rate should be 55% company and 45% customers. These sharing rates would therefore apply as follows:

- (a) For Totex spend above our allowance, the company would face 55% of the cost, with 45% being shared with customers;
- (b) For Totex spend below our allowance, the company would retain 45% of the benefit, with 55% being shared with customers.

7. Outcomes: Performance commitments and incentives

Introduction

- 7.1 As part of the building blocks of its approach, Ofwat sets the level of the outcome targets for certain performance commitments (PCs), together with a package of financial and reputational incentives or penalties (ODIs) relating to whether the relevant company fails to meet or surpasses these targets. These cover a range of outcomes, including customer-facing outcomes such as water supply interruptions, support for vulnerable customers and customer experience, and other outcomes relating to statutory obligations, asset health and resilience. In our redeterminations, we clarify the outcomes that the four Disputing Companies should achieve for their customers and stakeholders in the period 2020-25.
- 7.2 The outcomes regime is designed to ensure that service performance by the companies is measured against the outcomes that customers want from their water and wastewater providers. It also provides a means of assessing companies' standards of service delivery, and acts as a tool for incentivising companies to improve their performance. Ofwat introduced the incentive framework as a way of encouraging companies to focus on delivering what matters to customers and society; it said the framework has spurred extensive customer and stakeholder engagement, and would align the interests of management and shareholders with those of customers, by linking performance on metrics that are important to customers with returns that companies earn. In our redeterminations, we determine the outcomes that the four Disputing Companies should achieve for their customers and stakeholders in the period 2020-25.
- 7.3 The Disputing Companies raised concerns about the level and design of PCs and ODIs, including caps and collars on ODIs and potential asymmetric impact. In general terms, they indicated that the package of outcome incentives had increased levels of risk for companies, notably from the asymmetric profile of ODIs, and that, together with the other elements of Ofwat's final determination, this had undermined financeability.
- 7.4 In this section, we cover the PCs and associated ODIs which include both financial and reputational incentives. The structure is:
- (a) We review the general approach followed by Ofwat in setting PCs and ODIs including caps, collars and asymmetric incentives.

- (b) We assess the decisions within Ofwat's approach and provisionally determine whether to adopt the same approach. This includes considering:
 - (i) the approach to setting levels for PCs and ODIs including comparisons across the companies;
 - (ii) the role of customer evidence;
 - (iii) whether there is a 'cost-service disconnect' and if so, what is the effect on the PCs and ODIs;
 - (iv) the use of caps, collars and deadbands; and
 - (v) the role of asymmetry in the outcomes framework.
- (c) Based on our assessment of the overall approach to setting PCs and ODIs, we then set out our provisional decision on each of the common ODIs, and on selected bespoke PCs and ODIs.
- (d) We consider Ofwat's use of an overall cap on rewards calculated on a gross basis.
- (e) We finally consider the overall package of incentives and impacts on risk for investors.

7.5 We have separately considered issues relating to leakage, covering both funding and PCs and ODIs in section 8. We have considered this issue separately both because of its importance and the fact that the step-change in targets imposed by Ofwat raises different issues to those relating to the other PCs, in particular in relation to funding.

Overview of Ofwat's PR19 approach

7.6 In this section, we set out Ofwat's approach to setting the outcomes framework for PR19.

Ofwat's PR19 process

7.7 At the start of the PR19 process, Ofwat asked the water companies to prepare business plans for the AMP7 period containing proposed PCs. These were intended to set target standards of service, PC levels, based on customer and stakeholder priorities. To determine these priorities, Ofwat

required that extensive evidence of robust customer research and CCG engagement should be presented.¹¹⁸¹

- 7.8 Ofwat expected the companies to demonstrate in their business plans how the targets proposed were sufficiently 'stretching', particularly where a company's current service standard lagged behind that of its comparators. Ofwat explained that by 'stretching', it meant stretching performance by reference to each company's business plan.¹¹⁸²
- 7.9 Some of the PCs were to be subject to financial incentives (ODIs), based on rewards for outperformance and/or penalties for underperformance. Other PCs were to be determined without an associated financial impact but failure to meet the PC would be subject to reporting and transparency requirements, with a potential reputational impact.
- 7.10 Companies were also asked to propose recommended reward caps (see paragraph 7.24), penalty collars (see paragraph 7.26), and deadbands (see paragraph 7.30), for the ODIs where applicable.
- 7.11 The value of the financial incentives was to be determined based on willingness to pay evidence from customer research, reflecting the relative importance that customers give to different performance indicators.
- 7.12 Ofwat then reviewed these business plans, in an iterative process that eventually led to Ofwat applying adjustments to those PCs and ODIs based on an assessment of the quality of the company's plans, and by comparison to other companies' plans. Interventions were made for a number of different reasons, including:
- (a) where company proposals were different to the proposals from other companies and where Ofwat concluded that the variation was not supported by evidence or suitable explanation;
 - (b) where Ofwat concluded that the business plans were not sufficiently 'stretching'; and
 - (c) where Ofwat concluded that evidence of customer preferences was not sufficiently robust.¹¹⁸³

¹¹⁸¹ In this respect the CCG's role was to challenge companies on the quality of their customer engagement, and how well the company's proposed outcomes, associated commitments and ODIs reflect their customer engagement and wider consumers' views and priorities.

¹¹⁸² Ofwat (July 2018) [Putting the sector in balance: position statement on PR19 business plans](#), p7

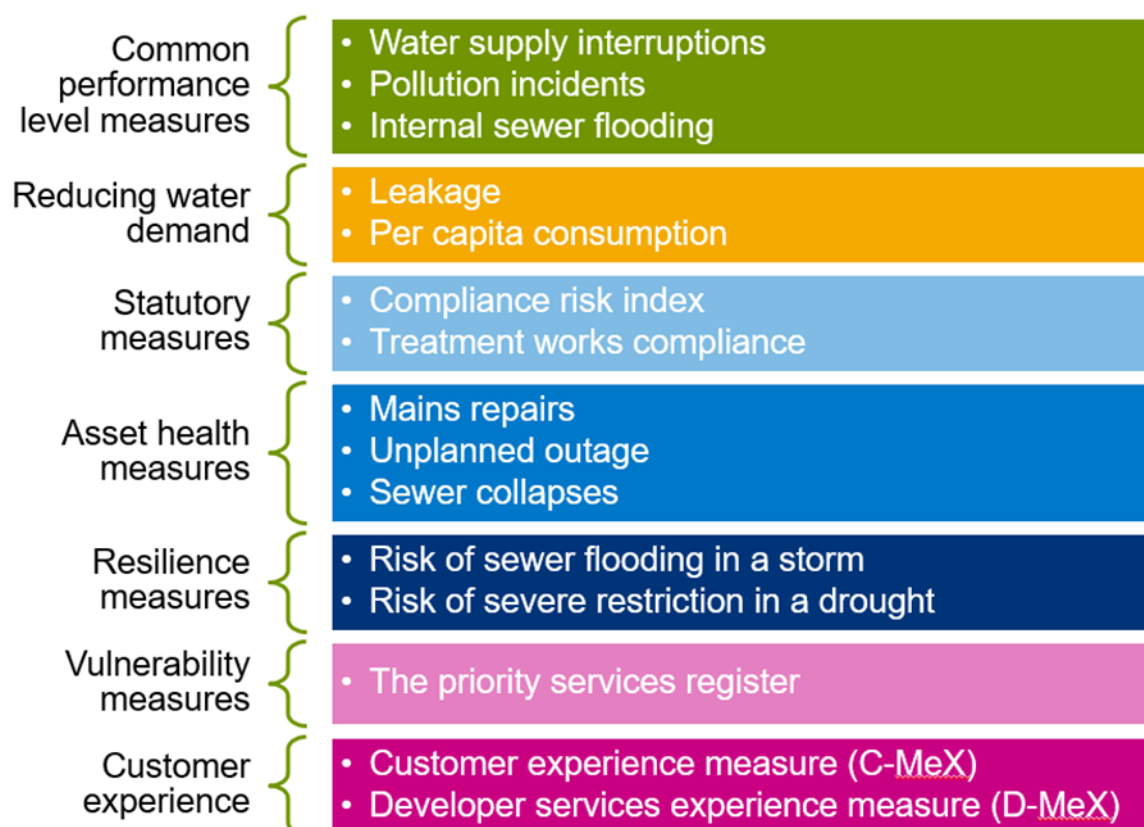
¹¹⁸³ Ofwat's reasoning is outlined in full in Ofwat (2019), [Delivering outcomes for customers policy appendix](#)

Overview of Ofwat's approach

Types of PC

7.13 Ofwat determined that the companies should be required to meet fifteen Common PCs applying to all relevant companies in PR19 (sewage sector PCs applied just to the 11 WASCs and not any WOCs). These are shown in Figure 7-1.

Figure 7-1 Common performance commitments



Source: [Ofwat Reference overview](#), p36

7.14 These measures apply to all companies with relevant responsibilities. The PCs for pollution incidents, internal sewer flooding, treatment works compliance, sewer collapses and the risk of sewer flooding in a storm are only relevant to WASCs, so they apply to Anglian, Northumbrian and Yorkshire. All the other PCs apply to all water companies, including all four Disputing Companies.¹¹⁸⁴

7.15 We have not assessed the detailed working of the retail price controls,¹¹⁸⁵ and therefore we have also not reviewed the associated customer measure of

¹¹⁸⁴ Ofwat (2019), [Delivering outcomes for customers policy appendix](#)

¹¹⁸⁵ See paragraphs 3.20-3.21

experience and developer services measure of experience PCs (C-MeX and D-MeX PCs). In our redetermination, these common PCs are unchanged. In the rest of this section, we refer to ‘common PCs’ as the wholesale common PCs which we have reviewed.

- 7.16 In addition to the common PCs, there are ‘bespoke’ PCs. These may apply to only one company, or to a group of companies with similar circumstances and customer priorities. If they apply to multiple companies, and the PCs have the same or similar characteristics, they are called ‘comparable bespoke’ PCs.
- 7.17 In addition to the common PCs, Yorkshire has 28 bespoke PCs, of which 16 have financial incentives (ODIs). Northumbrian has 35 bespoke PCs, including 22 with ODIs. Anglian has 28, of which 14 have ODIs, and Bristol has 19, of which 14 have ODIs.¹¹⁸⁶

Determination of PC levels

- 7.18 PC levels are the service targets that companies are expected to meet, and against which their performance will be measured to determine any ODI rewards or penalties. Ofwat set PC levels taking into account companies’ own proposals in their business plans, and evidence from across the sector. Where Ofwat made amendments to company proposals for PC levels, it did so using a range of approaches. For example:
- (a) For water supply interruptions, internal sewer flooding and pollution incidents, Ofwat set a common performance level for all companies derived from the upper quartile of all companies’ business plan forecasts.
 - (b) For PCs related to statutory requirements, the Compliance Risk Index (CRI) and treatment works compliance, Ofwat set the PC level at full compliance with the statutory measure.
 - (c) For the asset health PCs, Ofwat determined an industry ‘good’ level of performance and set companies’ PCs by reference to that level.

Financial ODI rates

- 7.19 A number of PCs have associated financial penalties and/or rewards. In setting financial incentive rates, Ofwat first asked for proposals from the

¹¹⁸⁶ The exact number depends on whether some ODIs are considered together. Full details are in Ofwat (2019) [PR19 final determinations: Anglian Water – Outcomes performance commitment appendix](#); [PR19 final determinations: Bristol Water – Outcomes performance commitment appendix](#); [PR19 final determinations: Northumbrian Water – Outcomes performance commitment appendix](#); [PR19 final determinations: Yorkshire Water – Outcomes performance commitment appendix](#)

companies. Companies were expected to set their ODI rates on a bottom-up basis using evidence of customer valuations for service increments and the forecast efficient marginal cost of delivering them.

- 7.20 Ofwat carried out a series of checks on companies' proposed outperformance and underperformance rates, starting with a benchmarking check against the 'reasonable range'. This provided an initial check that a company's proposed rates were comparable to the rest of the industry.
- 7.21 Following this initial benchmarking check, Ofwat assessed the customer research evidence, company-specific evidence, including rates in AMP6 if these applied, and company performance to decide whether or not to intervene on each ODI rate. Ofwat also looked at the balance of the overall ODI package and adjusted rates to prevent over- or under-incentivising spend and management focus on particular PCs.¹¹⁸⁷

Reputational incentives

- 7.22 Some PCs do not have financial incentive rates and instead have what Ofwat refers to as reputational incentives. All companies are required to report outturn performance annually against their PCs. Customers and other stakeholders can therefore see if their company has under or outperformed, and so all PCs carry potential reputational effects. There is evidence that CCGs and other customer representatives understand how their company has performed, including in comparison with other companies.¹¹⁸⁸
- 7.23 We have not intervened further in reputational incentives, which sit outside the price control. We encourage Ofwat, the industry and other stakeholders including customer representatives to consider ways of ensuring performance data is made available in a way which can be easy for users of that data to understand, particularly in light of the large number of PCs that apply to each company.

Caps and collars

- 7.24 Caps on outperformance payments limit the financial reward that a company can receive, so as to provide protection for customers from increased bills, and also mitigate the risk that incentives will unduly distort its behaviour, for example leading a company to 'chase' outperformance on a particular PC,

¹¹⁸⁷ Ofwat (2019), [Delivering outcomes for customers policy appendix](#), section 4.3.3

¹¹⁸⁸ For example, CCWater's comments on internal sewer flooding ODI rates in Ofwat's [PR19 Anglian Water – Delivering outcomes for customers final decisions](#), Bristol Water Challenge Panel's comments on water supply interruptions in Ofwat's [PR19 Bristol Water – Delivering outcomes for customers final decisions](#)

perhaps one that is relatively easier for it to perform well on, to the detriment of delivering on others.

- 7.25 Ofwat's general approach to setting the cap for each PC was to regard the P90 performance level as indicating a reasonable cap (that is, the level at which there is only an estimated 10% chance that the outcome performance level would be higher). However, during the feedback process of PR19 Ofwat made some adjustments to both cap levels and to its estimated P90 levels, raising these where a company's proposed cap was above its original estimate.¹¹⁸⁹
- 7.26 Ofwat also set 'collars', which are limits to the exposure that companies face to financial penalties in relation to missing the PC levels. The objective of collars is to address the risk that companies may face disproportionate high penalties, for example as a result of one-off failures in the network (an illustration of this being in the case of water supply interruptions: Bristol faced a single event which resulted in performance being multiple times worse than the PC targets in one year, see paragraph 7.112).
- 7.27 For most common and comparable bespoke PCs, Ofwat set collars as a multiple of the 2020-21 PC level and used this collar for all years. This has the effect of increasing the total potential financial consequence of not meeting the PC over time, as PC levels tend to get progressively more 'stretching' over the period.¹¹⁹⁰ In some cases, Ofwat set a graduated collar, with linearly increasing exposure over the price control period.
- 7.28 The collars for all the common PCs were fixed for the Disputing Companies for the five years of the price control, with the following exceptions:
- (a) Yorkshire and Northumbrian's collar for internal sewer flooding was profiled to be closer to the PC level in early years and further from it in later years;
 - (b) Anglian's collar for sewer collapses was profiled to become slightly closer to the PC level over the five years.
- 7.29 For bespoke PCs, Ofwat set collars at the P10 performance level, that is, the level at which there is only an estimated 10% chance that the outcome performance level would be worse.

¹¹⁸⁹ Ofwat (2019), [Delivering outcomes for customers policy appendix](#), pp163-165

¹¹⁹⁰ Ofwat (2019), [Delivering outcomes for customers policy appendix](#), p168

Deadbands

- 7.30 For some PCs, Ofwat introduced a 'deadband' for underperformance. A deadband is a value below the PC for which companies will not incur a penalty. Deadbands can also be set for outperformance, intended to ensure companies are rewarded only for significant over-delivery of a PC, but Ofwat did not set outperformance deadbands for the common PCs in PR19.
- 7.31 Ofwat set deadbands for CRI and Treatment Works Compliance, both of which are linked to statutory requirements, and both of which have PCs set around 100% compliance targets.

Asymmetric incentives

- 7.32 Some of the ODIs set by Ofwat are symmetric, that is, the increase in allowed revenues for each unit of outperformance is equal in size to the reduction for each unit of underperformance. However, for three common PCs, the rate for underperformance is greater than the rate for outperformance. In the context of this redetermination, ODI rates with this structure are called 'asymmetric'.
- 7.33 Additionally, where Ofwat has set caps on outperformance rewards and collars on underperformance penalties, the cap is normally set closer to the PC level than the collar is set. This has the same effect as asymmetric rates, in making the total award available lower than the possible penalty for underperformance.
- 7.34 For five common PCs, there are only penalties for underperformance; outperformance does not attract a financial reward.
- 7.35 Ofwat's approach resulted in the following balance of symmetric and asymmetric ODIs for the common PCs associated with the wholesale business:
- two symmetric ODIs: For supply interruptions and internal sewer flooding, there are upper quartile PCs, but symmetric ODIs around those PCs for almost all companies, including the Disputing Companies;
 - three asymmetric ODIs: For leakage, per capita consumption and pollution incidents, Ofwat set asymmetric ODI rates, within 'reasonable ranges'; and
 - five penalty-only ODIs: For the two statutory PCs (CRI and treatment works compliance), and for three other common PCs (mains repairs, unplanned outages and sewer collapse), Ofwat set penalty-only PCs with few exceptions. The only exception for the Disputing Companies is for

Northumbrian on mains repairs, where an outperformance payment is possible.

- 7.36 Table 7-1 sets out the common PCs, whether they have related financial incentives, and if so, whether these are symmetric.

Table 7-1: Structure of the wholesale common PCs in Ofwat's PR19 final determination

<i>Performance category</i>	<i>Financial/ reputational</i>	<i>Rewards for outperformance</i>	<i>Penalties for underperformance</i>	<i>Symmetrical ODIs?</i>
Water supply interruptions	Financial	Yes (except for Hafren Dyfrdwy)	Yes	Yes
Internal sewer flooding	Financial	Yes	Yes	Yes, for all 3 disputing WASCs
Pollution incidents	Financial	Yes for most companies (but not Hafren Dyfrdwy South West and Thames)	Yes	No
Leakage	Financial	Yes	Yes	No
Per capita consumption	Financial	Yes	Yes	No
Compliance Risk Index	Financial	No	Yes	No
Treatment works compliance	Financial	No	Yes	No
Mains repairs	Financial	Only for some companies, including Northumbrian	Yes	No
Unplanned outages	Financial	Only one company (South Staffordshire)	Yes	No
Sewer collapses	Financial	Only some companies	Yes	No
Risk of severe flooding in a storm	Reputational	N/A	N/A	N/A
Risk of severe restriction in drought	Reputational	N/A	N/A	N/A
Priority services register	Reputational	N/A	N/A	N/A

Source: Ofwat

Enhanced ODIs

- 7.37 For some PCs, companies proposed 'enhanced' ODI rates above and below certain performance levels. Enhanced ODI rates are a new initiative in PR19 and are in place only on request for high-performing companies. The purpose of enhanced ODIs is to drive frontier shift and set new benchmarks for sector performance. The highest-performing companies are given additional incentives to innovate in order to further improve performance and develop new techniques for doing so which can be shared across the sector.
- 7.38 Where enhanced rates apply, the company will earn (or pay) a standard ODI rate for outperformance and underperformance to up to the standard rate cap

or collar. Additional outperformance or underperformance attracts higher rates, up to an enhanced cap or collar.

- 7.39 For enhanced ODIs, Ofwat set caps on the amount that a company can earn on a single PC at 1% of its return on regulated equity (RORE)¹¹⁹¹ measured by reference to the RCV of the water service, or wastewater service, as relevant. Ofwat's view was that caps on enhanced outperformance rates 'will mitigate the risk that the enhanced ODI rate may be incorrectly specified or that companies focus excessively on a single PC to the detriment of their wider commitments'.¹¹⁹²

Overall reward caps

- 7.40 Ofwat set a cap on the amount of aggregated outperformance payments a company can earn. This cap was set at 3% of the projected RORE, to be applied on an annual basis. Ofwat said that this cap would provide additional protection for customers against bill volatility.¹¹⁹³ Outperformance rewards above this limit are shared 50:50 with customers. The aggregated outperformance payments are calculated gross, that is, they are not offset by any underperformance penalties the company has incurred in the year. Similarly, Ofwat set a symmetric collar of 3% of RORE on underperformance penalties.
- 7.41 Ofwat said that a gross overall reward cap is more appropriate than a net cap, 'as it provides a higher level of customer protection with a greater focus on minimising poor performance'.¹¹⁹⁴

Assessment of the overall approach to the incentive framework

Our approach

- 7.42 We now set out our review and assessment of an appropriate PC incentive framework. As set out in paragraph 3.5, we have based our approach on the building blocks used by Ofwat and have agreed with many aspects of Ofwat's approach.
- 7.43 In general, the overall framework for PCs and its objectives are not a material point of dispute between Ofwat and the Disputing Companies. It is the

¹¹⁹¹ The return on regulated equity is defined as the return to shareholders as a proportion of the equity component of regulatory capital value (RCV), calculated by reference to the notional capital structure. The RCV represents a measure of the capital base of a company, used in setting price limits.

¹¹⁹² Ofwat (2019), [Delivering outcomes for customers policy appendix](#), p122

¹¹⁹³ Ofwat (2019), [Delivering outcomes for customers policy appendix](#), p171

¹¹⁹⁴ Ofwat (2019), [Delivering outcomes for customers policy appendix](#), p171

application of the system that has been challenged, particularly the interventions to company business plan proposals for PCs and ODIs that Ofwat imposed.

- 7.44 The outcomes framework was introduced as part of PR14. Ofwat's decisions at PR14 appear to have resulted in some performance improvements, and not resulted in major financial gains for the companies during AMP6. This experience suggests that the framework of defining PCs and associated ODIs can be applied in a way which balances company and customer interests.
- 7.45 We have reviewed each of the common ODIs, and considered on a case-by-case basis whether to redetermine the level of the PCs and associated ODIs. We have not reviewed the majority of bespoke measures. Our review has focused on the way Ofwat applied changes to the companies' business plans. This is partly because neither Ofwat nor the four Disputing Companies have suggested there are material issues for us to review in respect of the majority of the individual PCs and ODIs. However, there are also significant practical challenges to us testing and proposing alternatives. For example:
- (a) If we were to conclude that fresh evidence from customers would have helped with defining the form of PCs or the appropriate PC level target, it would not have been plausible to ask companies to provide new evidence of customer engagement within the timescale of a redetermination. Ofwat did this at the Initial Assessment of Plans (IAP) stage when there were several months available for the companies to undertake further specific customer research.
 - (b) The timescale of a redetermination does not allow for a full technical assessment of each PC.
 - (c) We are not in a position to conduct a trial of new different reporting definitions or new measures of performance whereas the new common PCs have been subject to 2 years of shadow reporting to test their application.

Our assessment – framework for assessing ODIs and PCs

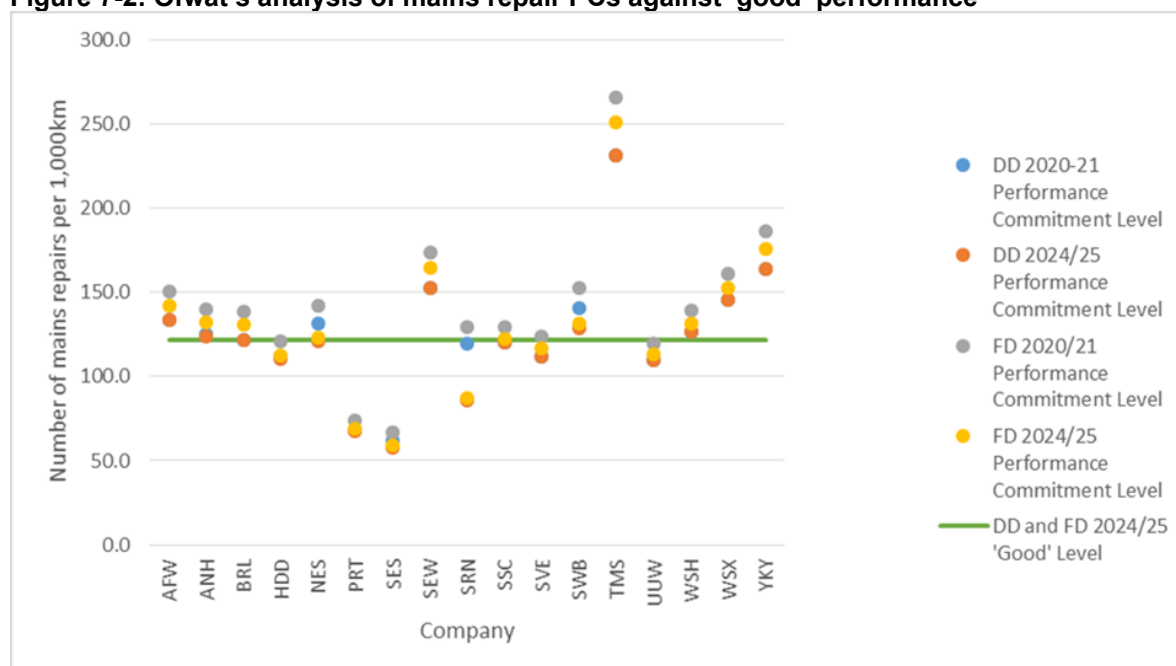
- 7.46 In this section we review the approach taken by Ofwat and come to a view on the framework we will follow to come to a redetermination of the package of PCs and ODIs. We consider the following in turn:
- (a) approach to setting levels for PCs and ODIs including comparisons across the companies;
 - (b) role of customer evidence;

- (c) whether there is a 'cost-service disconnect' and if so, what is the effect on the PCs and ODIs;
- (d) the use of caps, collars and deadbands; and
- (e) the role of asymmetry in the outcomes framework.

Setting levels of PCs and ODIs

- 7.47 We first describe the way in which levels of PCs and ODIs were determined by Ofwat and then go on to evaluate the Disputing Companies' objections to Ofwat's approach.
- 7.48 As noted at paragraph 7.12, Ofwat made a number of changes to the level of PCs proposed by companies in their business plans.
- 7.49 In each case, Ofwat made adjustments to bring PC levels in line with its assessment of 'good' performance, either from 2020-21 onwards or on a glide path towards it. For example, Figure 7-2 illustrates how Ofwat took into consideration 'good' performance in setting targets for mains repairs.

Figure 7-2: Ofwat's analysis of mains repair PCs against 'good' performance



Source, Ofwat outcomes policy appendix, page 198

- 7.50 Ofwat also made a number of changes to the level of ODIs suggested by the companies, starting with a benchmarking check against the 'reasonable range'. The 'reasonable range' of ODI rates for most PCs was defined by Ofwat as ± 0.5 standard deviations around the mean rate proposed by all companies in September 2018. However, Ofwat considered alternatives on a case-by-case basis. For example:

- (a) For water quality contacts (a comparable bespoke PC), the mean from the April 2019 business plans was used.
- (b) For three asset health PCs, including sewer collapses (a common PC), Ofwat set the boundaries of the reasonable ranges using the industry median and the inter-quartile of the industry range, as the existence of outliers meant that its standard approach would give too wide a range.¹¹⁹⁵
- (c) For mains repairs underperformance ODI rates, Ofwat set the underperformance rate for almost all companies, including the Disputing Companies, at the average of the reasonable range, to address what it considered would otherwise introduce unreasonable downside risk.¹¹⁹⁶

7.51 These examples illustrate to us that Ofwat has followed an approach of considering a range of evidence, but that where it has intervened, it has in generally been to reflect differences in the companies' proposals. We agree as a matter of principle that there are good reasons for a sector regulator to take into account data from different companies. Where Ofwat has done so, the reasons for intervening and the form of the interventions both are consistent with normal regulatory practice. One reason not to intervene to address regional differences in targets across companies would be if targets which were achievable in one region were unachievable in another for reasons of topography or weather conditions. Our review of Ofwat's approach suggests that this should not be such a material concern as to undermine the case for intervention:

- (a) companies can apply for enhancement expenditure to reflect local investment requirements;
- (b) Ofwat did not change all PCs to the sector average, but took an approach of mitigating the largest proposed differences in the performance that customers in different regions would achieve; and
- (c) Ofwat followed a similar approach in assessing changes for the different PCs, and therefore whilst an approach may result in some PCs being more challenging for some companies, this should balance out across the common and comparable PCs for an efficient company.

7.52 Overall, we agree with Ofwat that it is reasonable to apply adjustments to PCs and ODIs to reflect differences across the water company proposals. We

¹¹⁹⁵ Ofwat (2019), [Delivering outcomes for customers policy appendix](#), section 4.3 beginning on p92

consider whether the specific adjustments made by Ofwat are appropriate for each of the ODIs on a case-by-case basis in our assessment below.

- 7.53 Another reason not to intervene to reflect regional differences in targets across companies would be if customers reflected clear differences of opinion about their willingness to pay for different service measures. We have also considered Ofwat's general approach in light of representations made to us about the role of customer evidence as well as the link between cost and service. We now describe these issues further.

Role of customer evidence

- 7.54 Anglian requested that we largely reverse all Ofwat's changes on PCs and ODIs on the basis that Ofwat had put in place a process under which companies obtained and took into account customer views when formulating their business plans, so Ofwat should not have then intervened to change those plans.¹¹⁹⁷
- 7.55 We have considered evidence of customer research on the PCs and ODI rates, as Ofwat did. Our view is that customer research can be highly informative in relation to particular issues, and that there is significant potential for development of customer research methodologies and its appropriate application. Perhaps more importantly, consistent with our findings about reputational ODIs (see paragraph 7.22), the extensive engagement and research undertaken has gone a long way to encourage company business plans and regulatory decisions to reflect the specific priorities and values of customers. We consider that this is a positive part of the business plan process and encourage Ofwat and companies to continue to develop the approach.
- 7.56 The outcomes framework is an area where customers and key stakeholders properly play a role in determining the standards of performance that companies should be held account for. That said, and having examined examples of customer research (see for example paragraph 7.224), we consider that there are limits to the weight such evidence should be given. This derives from questions over the validity of research methods, the extent to which customers can comment meaningfully on complex technical matters, make comparisons between companies, or evaluate between different options.

¹¹⁹⁷ [Anglian SoC p232](#)

- 7.57 In our review of customer evidence provided by the Disputing Companies, we have seen examples of PCs or ODIs being proposed that imply differences between customer groups of an order of magnitude that is hard to accept as an accurate reflection of the variation in customer preferences across different regions. This has underlined for us the importance of reviewing company-specific customer research alongside other evidence.
- 7.58 More generally, we consider it is the role of the regulator, whether us or Ofwat, to take a view on the evidence available to it in the round when setting targets, which will include evidence from comparator companies and other sources not available to customers. We would therefore be concerned were expectations to be raised that customer evidence in and of itself should be determinative.
- 7.59 In the circumstances, we do not consider it would be appropriate to revert to company business plan proposals on PC and ODI rates as proposed by Anglian.

Cost-service disconnect

- 7.60 A number of the Disputing Companies raised concerns about what they perceived to be a disconnect between the service delivery requirements of the outcomes regime and the allowed expenditure, the so-called 'cost-service disconnect'.

Parties' assessment of the link between cost and service

- 7.61 Ofwat's final determination set PCs separately to the base cost allowances, and Ofwat considered that efficient companies should be able to be high performers both in cost and service performance. Ofwat provided examples from past performance of some firms that had managed to be high performers in both cost and service.
- 7.62 The Disputing Companies raised concerns that Ofwat failed to recognise the connection between improved performance and the higher cost that firms incur to achieve and sustain that performance. We have therefore considered the arguments as to whether it is appropriate to set PCs separately to the base cost allowances.
- 7.63 Anglian provided detailed submissions on its view of the link between cost and service and why this matters.¹¹⁹⁸ Anglian said that it was generally

¹¹⁹⁸ [Anglian SoC](#), section F

accepted that improved service incurs additional costs.¹¹⁹⁹ Anglian provided specific examples, including the costs of improving leakage and the costs in AMP6 of achieving better performance in water supply interruptions.

- 7.64 The other Disputing WASCs (Northumbrian and Yorkshire) also said that there was a disconnect between costs and service which would affect the achievability of the PCs set by Ofwat at upper quartile targets. Yorkshire said that Ofwat's approach of requiring service improvements at the same time as requiring a frontier efficiency shift was a double count of any productivity improvements.¹²⁰⁰

Evidence from AMP6 on the link between cost and service

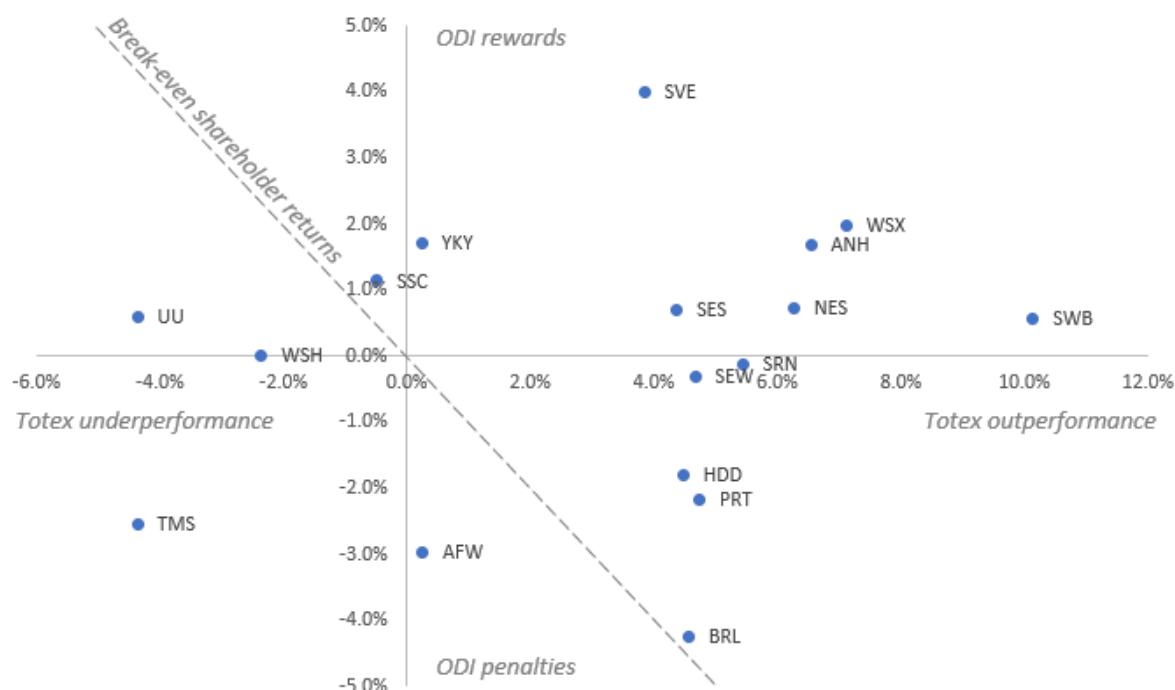
- 7.65 We have considered the evidence provided by Ofwat and the companies on the relationship between costs and service during AMP6 which was the first period when ODIs were implemented alongside PCs.
- 7.66 Data provided by Ofwat suggests that during the first four years of AMP6, the water industry as a whole underspent (ie outperformed) its totex allowance by over £500 million, while generating net ODI rewards of over £100 million.¹²⁰¹ Assuming an average totex cost-sharing rate of 50%, this results in operational outperformance contributing over £350 million of additional shareholder returns over the period.
- 7.67 Below the industry level, individual companies differed in their operational performance. However, the overall results mirrored that of the total industry in demonstrating a skew towards outperformance with:
- (a) 13 out of 17 companies generating positive shareholder returns from these operational metrics;
 - (b) 7 out of 17 companies succeeding in outperforming on totex while simultaneously generating net ODI rewards; and
 - (c) only 1 company (Thames Water) underperforming on totex while simultaneously suffering from net ODI penalties.
- 7.68 This can be seen in Figure 7-3:

¹¹⁹⁹ [Anglian SoC](#), paragraph 911

¹²⁰⁰ [Yorkshire SoC](#), paragraph 140(c)

¹²⁰¹ Ofwat (2019), [Service delivery report data 2018-19](#)

Figure 7-3: Operational performance across years 1 to 4 of AMP6, and associated financial rewards for shareholders (as % of RORE), by company



Source: Ofwat, service delivery report data 2018-19

Note: applies a 50% cost-sharing rate to totex figures; Returns on notional regulated equity, taken as a sum of the individual % RORE figures across the four years.

7.69 The four Disputing Companies all generated positive shareholder returns from these measures of operational performance, and three of them succeeded in outperforming on totex while simultaneously generating net ODI rewards. These results are shown in Table 7-2.

Table 7-2: Operational out/underperformance across AMP6

Company	Totex outperformance		Net ODI payments	
	Absolute (£m)	% RORE*	Absolute (£m)	% RORE*
Anglian	£324m	6.5%	£42m	+1.7%
Bristol	£13m	4.6%	-£7m	-4.2%
Northumbrian	£171m	6.3%	£10m	+0.7%
Yorkshire	£1m	0.2%	£36m	+1.7%

* Absolute totex outperformance figures shown here do not include any cost-sharing rates; the RORE figures apply a 50% cost-sharing rate; Returns on notional regulated equity, taken as a sum of the individual % RORE figures across the four years

Source: [Service delivery report data 2018-19](#)

7.70 This indicates that three of the Disputing Companies (Anglian, Northumbrian and Yorkshire) underspent allowances while benefitting from net ODI payments suggesting target outcomes had been exceeded. This suggests that there has not been in practice a systematic link between cost and achievement of PC target levels.

7.71 Our overall review of the evidence provide on the companies' performance against individual ODIs and the related areas of cost assessment also suggested that there was no clear pattern of the highest performance for

those companies which had increased spending. This also indicated there is no clear link in the evidence from AMP6 between the performance against PC and ODI targets, and the costs incurred by the water companies.

Our assessment of the link between cost and service

- 7.72 As a starting point the question associated with the existence of a cost-service disconnect is not, for the purposes of this determination, whether there are links between cost and service as a matter of general principle. The question that we have to address is whether there are improvements in service required which go beyond the service performance that should be achievable by an efficient firm through base totex.
- 7.73 We have provisionally concluded that Ofwat's approach of setting PC targets which require higher service performance does not automatically result in increased expenditure relative to Ofwat's models of base expenditure. In some cases, improvements to service could be achieved at little cost, or may be of a recurring nature that would be included in base funding. For example:
- (a) improvements to operational processes and/or efficiency could lead to improved services at no cost, or at low costs that are not repeated;¹²⁰²
 - (b) some similar improvements could need repeated additional expenditure, such as training or recruiting staff whose skills command higher pay, and which might therefore already be included in base funding;
 - (c) introducing technology could come at low one-off costs (for example, 'off the shelf' technology that is in wide use and has been proven elsewhere);
 - (d) new technology, once deployed, could reduce the ongoing costs of delivering the improved service; and
 - (e) baseline costs may already include some investment that was made in prior periods to deliver performance improvements.
- 7.74 We expect that these assumptions are likely to hold in practice for many of the common PCs where Ofwat has intervened to require improvements in performance. We are aware of a number of examples where companies have in practice been able to improve service performance by new techniques and/or improving efficiency without any associated cost increases. This is also consistent with the evidence from AMP6 that the high performing companies

¹²⁰² Our engineering advisers have noted that for wastewater incidents, for example, early notification, timely response, effective mitigation measures and appropriate repair by motivated, informed and engaged operatives will logically lead to higher performance.

on cost were often high performers on service. The performance regime should appropriately balance the interests of customers and the companies, and a situation where many companies consistently exceeded all or the vast majority of their PCs would not achieve that objective.

- 7.75 The approach taken by Ofwat is likely to mean that not all companies can achieve all targets without additional investment, and that it is for company management to decide how best to achieve an optimal outcome for that company and its customers across all the PCs by reference to its own circumstances. The ODIs have been designed on the basis that some companies may choose to underperform on some ODIs, if they conclude that the investment cost associated with achieving the targets is disproportionate.
- 7.76 While we have not found a systematic link between high performance and high costs, we agree that there are likely to also be examples, including companies already at frontier performance, where improvements in performance will only come at a cost. For example, an efficient company using optimal approaches and technology may find utilisation of more inputs is the only practical way to improve outcomes.
- 7.77 As a result, in our analysis of individual PCs and ODIs, we consider the potential for service improvements to result in higher costs on a case-by-case basis, reflecting the considerations above.

Use of caps, collars and deadbands

- 7.78 Caps and collars can serve a useful function as part of the design of effective ODIs:
- (a) Caps provide protection for customers from increased bills, and also mitigate the risk that a company's objectives could be distorted by the opportunity to outperform on particular ODIs.
 - (b) Collars mitigate the risk that underperformance on one PC (which could arise for various reasons, potentially including ones outside the control of the company) could lead to extreme penalty levels for firms.
- 7.79 We also agree that deadbands may be appropriate in certain circumstances. Deadbands may be appropriate where outcomes may not be fully within the control of management:
- (a) The measure itself allows very little tolerance: In these cases, a company might 'miss' the PC without necessarily having objectively failed in management of the commitment. Ofwat set deadbands for the two statutory PCs (the water quality Compliance Risk Index, and sewage

treatment works compliance), for which the PC level is full compliance (an index score of zero, or 100% treatment works compliance).

- (b) Delivery of the PC is not wholly within companies' control: circumstances outside management control could lead to a small underperformance.
- (c) The measure is new, and its relation to desired company management behaviours and outcomes is not clear: setting a deadband can offer some reassurance to companies, while maintaining the incentive to deliver good performance.

7.80 Where one or more of the reasons above apply to a PC, a further pragmatic advantage of a deadband is to avoid unnecessary complications in processing small penalties (or rewards) where the link to the company's service delivery is uncertain, or not strong, for small variations in the measured output.

7.81 The common theme across caps, collars and deadbands is that they are able to make ODIs more effective in circumstances where there is difficulty in setting targets and defining a single appropriate level of penalty and rewards against those targets. We agree that some of the PCs and ODIs would be more effective if these additional mechanisms are applied in addition to standard reward and penalty rates.

Asymmetric rates

7.82 As noted at paragraph 7.35, Ofwat's PR19 included asymmetric ODIs. There are a number of sources of asymmetry, primarily:

- (a) underperformance penalties exceed outperformance rewards;
- (b) penalty-only ODIs; and
- (c) where caps are set closer to the PC level than collars.

7.83 The Disputing Companies said that the ODI package, along with other elements of Ofwat's final determination such as the cost-sharing mechanism, was unfairly skewed towards penalising them, compared with rewarding them for high performance. They linked this perceived skew to potentially undermining incentives, and the duty to ensure companies are financeable.

7.84 In this section we consider what role asymmetry should play in our re-determination.

7.85 Ofwat made the following statements about the role of asymmetry:

Where we intervene, we set outperformance rates lower than underperformance rates in absolute terms (using a multiple of 1.2), to capture the likely diminishing returns of service improvement. This captures customer preferences and the average ratio of underperformance to outperformance suggested in companies' business plans. We only use the multiplier where we are intervening on an underperformance or outperformance rate and need to adjust the corresponding rate accordingly. Where we do not have reason to intervene then we consider that the ratio between under- and outperformance rates could be different to 1.2 for that particular PC.¹²⁰³

First, our approach to outperformance was based on customer engagement, and in some cases, customers did not want to have an outperformance payment, or found it hard to value it. For example, customers can struggle to financially value asset health measures, and in any case often consider asset health a core function of the business for which it should not receive additional outperformance payments. It would be inappropriate to have outperformance payments that are higher than the value that customers place on the benefit or are willing to pay. Companies have also, based on their interpretation of customer research, proposed underperformance rates exceeding outperformance rates. This suggests that companies also believe that customers can take a different view of outperformance to underperformance.

Second, in some cases 100% compliance is the statutory requirement. In these cases, our underperformance rate simply reflects lack of compliance with statutory obligations, and outperformance payments are not feasible.¹²⁰⁴

7.86 Anglian said about the ODI framework in Ofwat's final determination:

High penalties relative to low rewards and unattainable targets translate into a pronounced downside skew ... where companies are likely to trigger penalties even if improving performance levels. In several cases, companies may prefer simply to accept a penalty than to strive to meet an unrealistic target. This creates

¹²⁰³ Ofwat (2019), [Delivering outcomes for customers policy appendix](#), p98

¹²⁰⁴ Ofwat (May 2020), [Outcomes – response to common issues in companies' statements of case](#), p50

perverse incentives and takes away funding which could be spent in ways which customers value.¹²⁰⁵

7.87 Bristol said:

Ofwat's introduction of significant asymmetric risk is not appropriate as a regulatory design and undermines our financeability, given the inadequate financial resilience it has imposed on us under the final determination through the cost of capital errors and cost allowance errors. It further compromises our ability to secure a reasonable return on our capital is one of the reasons why Ofwat has failed to meet its finance duty.¹²⁰⁶

7.88 Northumbrian said:

In aggregate FD19 results in an asymmetric package of measures which is unfinanceable. PC/ODI incentives are negatively skewed overall with reasonable analysis indicating more downside risk than upside opportunity even before the level of stretch in the targets themselves is considered, cost-sharing factors and uncertainty mechanisms are also negatively skewed. Overall this results in an unfinanceable package, we discuss this more in Section 9.9.¹²⁰⁷

7.89 Yorkshire said:

The consequence of Ofwat's interventions is that the final determination ODI package is heavily skewed towards downside risk – which Ofwat could have established, if it had used a more robust approach to risk analysis.¹²⁰⁸

7.90 We have considered the potential effects of symmetrical and asymmetrical ODIs for the common PCs with financial ODIs, and the aggregate effects to estimate the scale of the downside risks faced by the companies under these common ODIs.

7.91 Our analysis is shown in Tables 7-3 and 7-4. Note that this includes leakage, which is considered separately in section 8. This provides a maximum penalty amount a company could incur for each PC. Taking the net effect of the maximum penalty, and the maximum reward, available for a single PC gives

¹²⁰⁵ Anglian SoC, paragraph 105

¹²⁰⁶ Bristol SoC, paragraph 40

¹²⁰⁷ Northumbrian SoC, paragraph 497

¹²⁰⁸ Yorkshire SoC, paragraph 154

to the overall financial risk of the ODIs attached to that PC – neutral (for symmetric ODIs), or downside risk (for penalty-only or asymmetric ODIs).

- 7.92 We calculated the possible penalties at P10 performance level, or by collars where this appeared more relevant, and compared with the potential rewards for asymmetric but not penalty-only ODIs. We have netted this against the maximum reward available for each PC. For symmetric ODI rates, we have assumed that the net downside risk is zero. Given the difficulty in accurately measuring the likelihood of significant outperformance against underperformance, we have not attempted to measure the effect of differences in approach to setting caps relative to collars, which would represent an additional source of asymmetry.

Table 7-3: Analysis of Ofwat's common PCs' ODI downside penalty risk

		£m							
PC	Symmetry/ Penalty only/ Penalty rate higher than reward rate	Northumbrian		Anglian		Yorkshire		Bristol	
		Maximum penalty	Net downside	Maximum penalty	Net downside	Maximum penalty	Net downside	Maximum penalty	Net downside
Compliance Risk Index	P only	-18.2	-18.2	-29.3	-29.3	-17.9	-17.9	-1.8	-1.8
Water supply interruptions	Symmetric	-15.1		-97.4		-68.9		-8.1	
Leakage	P rate 1.2 x reward rate.	-23.9	-4.0	-45.6	-39.4	-33.8	-5.6	-2.0	-0.3
Per capita consumption	P rate 1.2 x R rate	-0.8	-0.1	-18.7	-3.1	-32.6	-5.4	-3.4	-0.6
Mains repairs	P only, except Northumbrian	-3.3	-1.1	-22.1	-22.1	-63.8	-63.8	-6.0	-6.0
Unplanned outages	P only	-36.6	-36.6	-19.1	-19.1	-58.5	-58.5	-4.5	-4.5
Internal sewer flooding	Symmetric	-22.9		-52.9		-79.2		n/a	n/a
Pollution	P rate 1.6 x R rate	-11.9	-4.5	-31.4	-11.8	-65.1	-24.4	n/a	n/a
Sewer collapses	P only	-2.5	-2.5	-26.0	-26.0	-21.8	-21.8	n/a	n/a
Treatment works compliance	P only	-9.0	-9.0	-24.3	-24.3	-53.5	-53.5	n/a	n/a
Total		-144.2	-76.0	-366.7	-175.1	-495.1	-250.9	-25.8	-13.2
Per annum		-28.8	-15.2	-73.3	-35.0	-99.0	-50.2	-5.2	-2.6

Source: CMA analysis

Note: Table based on CMA review of RFI submissions from the Disputing Companies. Where there are two-way penalties, the range of performance against the PC is assumed to be symmetric, except for Anglian's leakage caps and collars, where our calculations reflect that the collar includes greater penalties than the cap provides opportunities for rewards. Leakage is discussed further in section 8.

Table 7-4: Indicative total scale of asymmetry of Ofwat's ODI penalties and rewards

	Northumbrian		Anglian		Yorkshire		Bristol	
	Penalty	Asymmetry	Penalty	Asymmetry	Penalty	Asymmetry	Penalty	Asymmetry
£m per annum	-28.8	-15.2	-73.3	-35.0	-99.0	-50.2	-5.2	-2.6
% RCV	-0.8	-0.4	-1.1	-0.5	-1.3	-0.6	-1.0	-0.5
% RORE (40% equity)	-2.1	-1.1	-2.7	-1.3	-3.2	-1.6	-2.4	-1.2

Source: CMA analysis

7.93 As shown in Table 7-4, under our assumptions the potential exposure to downside risk for the Disputing Companies varies between 2.1% and 3.2% of RORE. Looking at the asymmetry of netting off the maximum penalty against the maximum reward, this is a net downside of between 1.1% and 1.6% of RORE. Given these asymmetric ODIs could potentially have a significant impact on returns, we consider further whether and when their use can be justified.

Potential reasons to favour asymmetric incentives

- *where the standard for compliance is set at the minimum*

7.94 The first reason to use penalty-only incentives is where there is a significant negative effect of the failure to achieve a PC, but conversely, out-performing the measure may not result in a better standard of service for customers, or is not possible.

7.95 This is most obvious for the statutory measures: CRI, which relates to drinking water quality, and treatment works compliance. The statutory requirement for CRI is for a company to score zero, that is no recorded incidents of unwanted contents in drinking water.¹²⁰⁹ Companies are expected to deliver the statutory standard for the funding they receive. It is not possible to out-perform these statutory commitments, and so incentives to do so would not make sense.

- *to reflect customer preferences on relative performance*

7.96 Customers may be concerned about companies earning rewards for outperformance against some PCs. For example, Ofwat noted that customers often consider asset health a core function of the business for which it should not receive additional outperformance payments (see paragraph 7.85).

7.97 More broadly, on any measure where there may be diminishing benefits from further improvements in performance, customer interests may be better served by lower benefits once a target level is achieved.

- *to focus management attention on achieving the PC*

7.98 Performance against some PCs may be directly linked to management spend and time, and for these PCs a target with a penalty, or an asymmetric ODI, may be most effective in providing strong incentives to management to achieve the target.

7.99 ODIs with strong penalties can also ensure that companies have the incentive to mitigate the consequences of adverse events, even if the events themselves could not have been avoided.

¹²⁰⁹ The CRI gives weights to the presence of various contaminants in drinking water, based on their potential effect on customers (health, aesthetics such as smell and taste) and other measures such as indicators of sub-optimal screening and treatment. A guide to the index is available here: [DWI Compliance Risk Index](#)

- *to reflect the asymmetric information (or limited information) faced by Ofwat when setting incentives*

7.100 The PC/ODI level is initially set using information from companies, and it is possible in some cases that there could be errors in the setting of the PC/ODI which Ofwat is not able to identify. Where there is the greatest uncertainty about setting the appropriate levels of the PC/ODI, there is a case for reduced financial incentives. Equally, this may also be a reason to moderate the size of penalties, in cases where there is uncertainty about the achievability of PCs.

Our provisional conclusions on asymmetric rates

7.101 In light of the above factors for and against the use of asymmetric incentives, we have provisionally decided to assess the proposed use of asymmetric incentives with reference to the following criteria:

- (a) Is there evidence that customers would not be willing to pay for outperformance, including where there is a statutory minimum requirement?
- (b) Is the PC hard to measure, and therefore is there good reason not to provide rewards to companies which may be in practice due to the approach to calibration of the PC?
- (c) Is there a strong link between failing the PC and management failure?

7.102 Where these criteria are most clearly met, we consider that there is justification for an asymmetric or penalty-only incentive.

7.103 At the same time, we recognise that ODIs have the disadvantage as part of the overall risk and reward framework that that they represent additional asymmetric risks to investors. We consider this risk further below in the context of the overall PC and ODI package for each Disputing Company resulting from our re-determination (see paragraph 7.239).

7.104 We have therefore considered adjustments to the design of ODIs, where there is weaker evidence for asymmetric incentives against the criteria in paragraph 7.101. This should both provide an appropriate form of incentive to meet the relevant PCs and also to reduce the scale of asymmetric risk faced by investors.

Summary of our approach to assessing the ODIs

7.105 Based on the analysis above, we take the following approach to assessing the PCs and ODIs in the scope of our review (common PCs and a limited number of bespoke ODIs);

- (a) we agree with Ofwat that comparing across the companies is appropriate, and assess the adjustments Ofwat made on that basis for each of the ODIs;
- (b) we consider for each of the ODIs where there is an improvement in service required across the sector, whether there is evidence that the costs to achieve would not be included in base totex;
- (c) we review the case for caps, collars and deadbands, particularly where the targets and incentives are most difficult to measure; and
- (d) we have assessed the use of assumptions which result in asymmetric ODIs, having regard to the criteria in paragraph 7.101. We also consider the effect of a package of asymmetric ODIs as part of our analysis of the cost of capital and financeability.

Assessment of common PCs and ODIs

7.106 We now review the common PCs that Ofwat set and their associated ODIs, with the exception of four measures:

- (a) the C-MeX and D-MeX PCs, see Figure 7.1, which have financial incentives attached. These are measures of satisfaction with the service received and fall within the retail price control. Neither the Disputing Companies nor any third party made representations on these. As indicated in our Approach Document, we have therefore decided not to consider further Ofwat's determinations of these PCs and the incentives associated with them.¹²¹⁰
- (b) the resilience PCs (risk of sewer flooding in a storm, and risk of severe restriction in a drought), which do not have related financial incentives. Neither the Disputing Companies nor any third party made representations on these.

¹²¹⁰ CMA (June 2020), [Approach to the redeterminations](#), paragraph 73

7.107 We first assess the three common PCs set with PC levels at upper quartile level, which are water supply interruptions, internal sewer flooding and pollution incidents. We then review the remaining individual common PCs.¹²¹¹

The three upper quartile PCs

7.108 This section reviews three common PCs where Ofwat set targets based on upper quartile performance. Ofwat asked the water companies to propose PC targets in their business plans based on their view of upper quartile performance.¹²¹² Ofwat then intervened to set the targets for all the companies at a level based on the upper quartile of these business plan targets. For one of the three upper quartile PCs, water supply interruptions, Ofwat then moderated the target in its final determination to reflect submissions from the companies and past performance.

7.109 The use of upper quartile as a target for companies to achieve efficient performance is fairly standard in regulation and has also been used in the assessment of base totex. Whether upper quartile is achievable by the sector as a whole on any particular measure will depend on the reasons for the difference in performance between average and high-performing companies. In the case of the three common PCs, the upper quartile targets are based not on actual upper quartile performance but on a comparison of the targets included in business plans. We have considered the targets for each of the relevant PCs based on evidence of actual performance and based on the Parties' submissions.

Water Supply Interruptions

7.110 This PC deals with interruptions to water and incentivises water companies promptly to resolve operational events that lead to no water supplies. Significant supply interruptions, affecting multiple properties, often arise from bursts on trunk mains, but they can also arise from failures of upstream assets. While local conditions may affect the differing extent of challenges faced by companies, this PC is principally measuring the efficiency of responses to resolve operational incidents.

7.111 Water supply interruptions are measured as the time, in minutes, that customers on average are without water, rather than minutes per interrupted customer. It captures only 'no water' incidents lasting over three hours. Hence

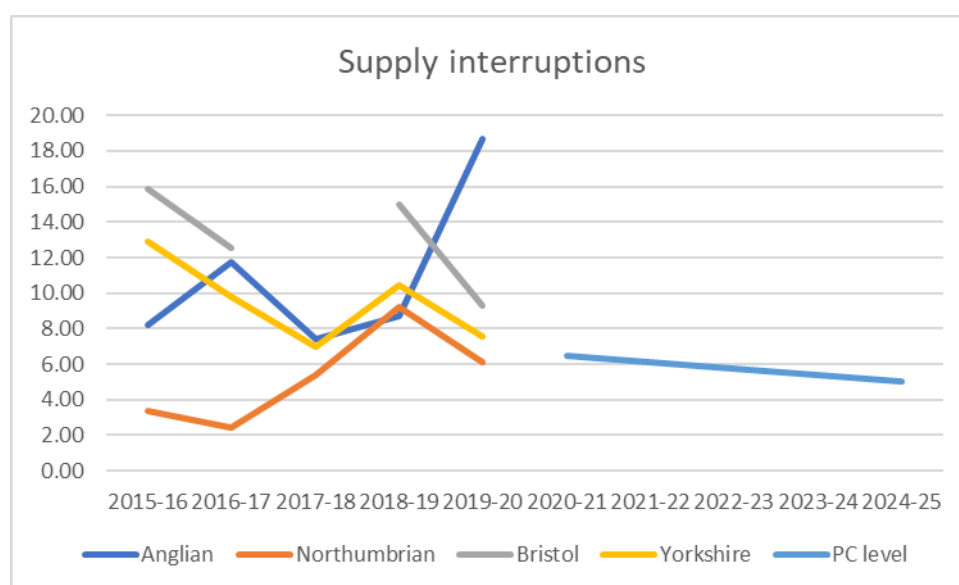
¹²¹¹ Unless otherwise stated, the performance data for the charts in this section was provided to us by Ofwat.

¹²¹² Ofwat (2019), [Delivering Water 2020: Our final methodology for the 2019 price review](#), page 53

it serves to encourage companies both to have resilient networks and to restore supplies without delay through efficient operations.

7.112 The PC in Ofwat's PR19 final determination is based on a glidepath from 6 ½ minutes in year 1 of AMP7 (2020-21) to 5 minutes by year 5 (2024-25). To put this into context, Northumbrian's average AMP6 outturn was just over 5 minutes; for Anglian and Yorkshire it was around 10 minutes; whereas Bristol averaged over 25 minutes due to a major operational incident in 2017-18 when 35,000 properties were without water for up to 29 hours. This is shown on the following Figure 7-4, with Bristol's outturn of 75 minutes per property in 2017-18 excluded from the chart to assist with scaling.

Figure 7-4: Disputing Companies' supply interruptions performance in AMP6, and AMP7 PC level



Source: CMA analysis. Average minutes per property with no water.
Bristol's performance in 2017/18 was 76 minutes and is excluded from this chart to preserve scaling.

7.113 Ofwat provided Figure 7-5, which illustrates the level of 'stretch' in the PC for water supply interruptions in AMP7, by showing the industry average performance in AMP6 for comparison.

Figure 7-5: Industry average performance on water supply interruptions in AMP6, and Ofwat's PC level for AMP7 for all companies



Source: Ofwat ¹²¹³

7.114 The rewards for outperformance and penalties for underperformance are symmetrical and there are no deadbands. Ofwat agreed to both Yorkshire and Northumbrian having enhanced ODIs as they are high performers.

Ofwat's views

7.115 Ofwat told us that it had softened the target from the Draft Determination based on representations that a target of 3 minutes for upper quartile by year 5 was too 'stretching' for many companies and hence may not be achievable. It noted that AMP6 performance had been mixed, rather than an improving trend. Ofwat also noted that Northumbrian already had strong performance that had been regularly better than the AMP7 PC and that Yorkshire Water had forecast much better performance than the AMP7 PC.

Disputing Companies' views

7.116 Only one of the four Disputing Companies raised significant concerns about the PC for water supply interruptions. Anglian suggested that to meet the upper quartile target, it would have to make investments in a range of equipment which would increase its ability to address unplanned interruptions

¹²¹³ Ofwat (May 2020), [Submission to CMA 'Common Issues on Outcomes'](#)

within the target period. Anglian also told us that its customers were unwilling to pay for improvements in supply interruptions.

Engineering Adviser Views

- 7.117 Our engineering adviser, WRc, advised us that Ofwat's PC for water supply interruptions would be a challenge for some companies, but that a PC of 5 minutes in 2024-25 is achievable, whereas 3 minutes is unrealistic. It did not suggest that there were company specific issues outside of management control, such as topography, that were so unique or unusual, that would require company specific adjustments to be made to the target. It noted that while some major operational incidents may be triggered by events outside management control, a company's response to that incident lies within management control.
- 7.118 Companies may receive penalties if they do not resolve major problems promptly during rare extreme operational events. Such penalties are subject to collars, which contain the financial effect of major incidents whose trigger event may be outside management control. Our engineering advisers advised that companies could improve by learning lessons from previous events and that for some companies in the sector, there was scope to prioritise this further. For example, our engineering advisers told us that companies could improve by developing good telemetry and sensor coverage and a workforce that is able to respond quickly to maintain supply (and/or minimise the number of customers affected) through appropriate interventions such as re-valving or bypassing mains failures through temporary connections. Our advisers also told us that the degree to which supply interruptions commitments can be met is in a large part down to the way in which network operations are managed and delivered.

Our assessment and provisional conclusion for supply interruptions

- 7.119 We consider that it is reasonable to impose PCs which require further improvement across the sector in the form of Ofwat's target of moving towards upper quartile level for supply interruptions. The moderated target of 5 minutes by the end of AMP7 appears to require improvements which are consistent with continuing historical trends in performance, and appears to be achievable based on current performance trends for high performing companies including Northumbrian and Yorkshire.
- 7.120 In relation to Anglian's claims that it would need to make additional investments to meet upper quartile targets, since we provisionally accept that it is reasonable to impose targets based on industry evidence, then Anglian will be expected to meet the cost of improvements which are necessary to

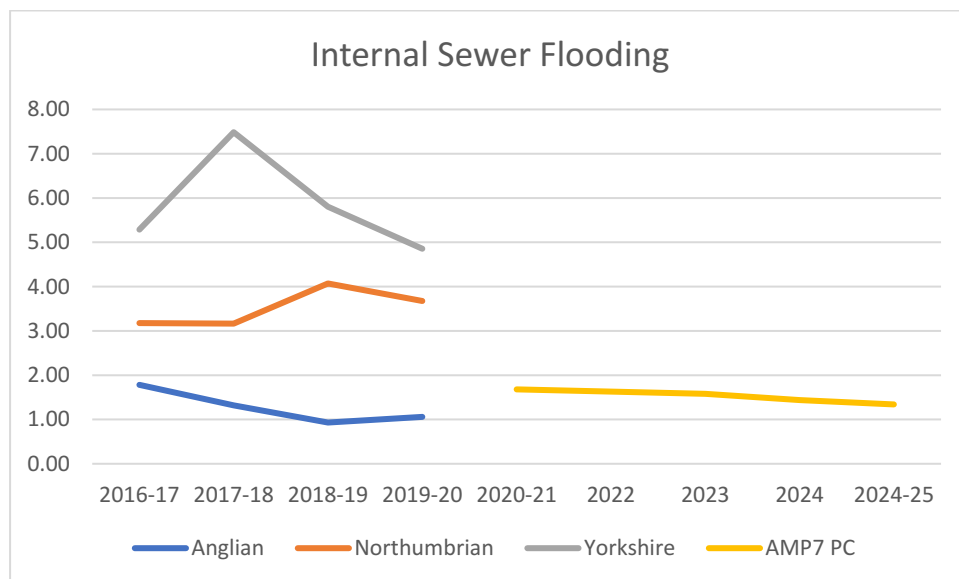
achieve the target. The implication of the sector comparison is that other companies are already delivering better performance, either through improvements in productivity or through existing investments which will be reflected in in base cost allowances.

- 7.121 It is therefore possible that Anglian has underspent relative to comparators in the past or has not invested as well in areas that would minimise supply interruptions. As noted above, while local conditions may impact on the differing extent of challenges faced by companies, this PC is principally measuring the efficiency of responses to resolve operational incidents. We are not persuaded that the costs identified by Anglian as being associated with improving performance against supply interruptions targets go beyond what could be expected to be in the base cost allowances.
- 7.122 Anglian provided a long list of examples of spend it might need to incur to improve performance further, based on AMP6 experience. We have separately considered any evidence from the Disputing Companies for enhancement spend to reflect any local conditions they face. Anglian has made a number of submissions for enhancement spend, which we consider in section 5. As discussed in paragraph 7.75, the framework for PCs and ODIs is designed with the intention that PCs are set at a level which is consistent with high performing companies, and therefore will require investment by other companies. It is for company management to work out how best to respond to those challenges.
- 7.123 We therefore provisionally conclude that it is appropriate to retain the PC and ODIs for water supply interruptions in line with the Ofwat's final determination for all four Disputing Companies. Furthermore, we provisionally reject any requests for cost allowances to be made to achieve the targets set.

Internal Sewer Flooding

- 7.124 This PC relates to the number of properties experiencing wastewater flooding in their property. The PC in Ofwat's PR19 final determination is based on a glidepath for forecast upper quartile performance from 1.68 (year 1) to 1.34 (year 5) incidents per 10,000 sewer connections. To put this into context, for the three relevant Disputing Companies, performance in 2019/20 was 1.1 for Anglian; 3.7 for Northumbrian and 4.9 for Yorkshire. This data also reflects overall AMP6 performance – Anglian already has comparatively strong performance for internal sewer flooding relative to Northumbrian and Yorkshire. This is shown in Figure 7-6.

Figure 7-6: Disputing Companies' internal sewer flooding performance in AMP6, and Ofwat's AMP7 PC level for all WASCs (incidents per 10,000 sewer connections)



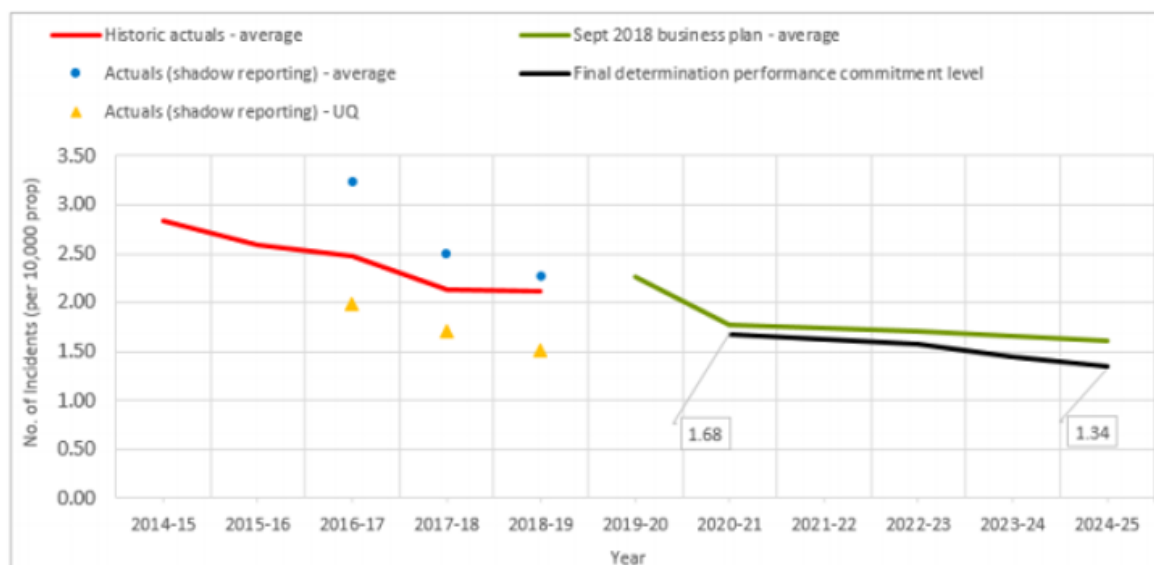
Source: CMA analysis.

7.125 The rewards for outperformance and penalties for underperformance set in Ofwat's final determination are symmetrical and there are no deadbands. The penalty collars at the end of AMP7 (year 5) are 3.35 for Anglian, 4.0 for Northumbrian, and 4.1 for Yorkshire in Ofwat's final determination. There are no enhanced ODIs. This PC does not apply to Bristol as it is a WOC.

Ofwat's views

7.126 Ofwat noted that the PC 'stretch' required in the AMP7 period was similar to the improvements experienced in the AMP6 period (2015-2020). Ofwat provided Figure 7-7, illustrating the level of 'stretch' in the PC for internal sewer flooding in AMP7, by showing the industry average performance in AMP6 for comparison. This shows that the AMP7 PC is based on an expectation that the historic improvement seen since 2014-15 should continue through to 2025.

Figure 7-7: Industry average performance on internal sewer flooding in AMP6, and Ofwat's PC level for AMP7 for all WASCs



Source: Ofwat ¹²¹⁴

Engineering adviser views

7.127 Our engineering adviser, WRc, suggested that there is insufficient evidence to provide a basis for settling individual PCs for internal sewer flooding for each of the WASCs. It noted that if all WASCs have the same PC for internal sewer flooding, some companies would have varying degrees of company specific challenges to address but considered this could be addressed through the cost allowances made. It noted that WASCs' work typically focuses on the improved management of operational issues, namely tackling sewer blockages and their potential impacts and through addressing the reliability of key assets that present a significant risk of failure, namely that of pumping stations and rising mains, which also contributes to preventing pollution incidents.

7.128 Our engineering adviser noted that the WASCs have invested heavily in past regulatory control periods to tackle many of the distinct sources of failure such as structural asset failure and areas at risk of hydraulic overload in the sewer network. This past investment was now having a positive impact on performance. Incident response was also a factor impacting on future performance. In our advisers' view, early notification, timely response, effective mitigation measures and appropriate repair by suitably trained staff will lead to higher performance and lower levels of sewer flooding incidents.

¹²¹⁴ Ofwat (May 2020), [Submission to CMA 'Common Issues on Outcomes'](#)

Disputing Companies

7.129 The three relevant Disputing Companies did not raise specific issues with this PC. However, Yorkshire and Northumbrian requested additional enhancement funding based on a desire to lower the risk of customers experiencing internal sewer flooding (see paragraphs 5.177-5.213 and 5.256-5.295).

Our assessment and provisional conclusion for internal sewer flooding

7.130 We provisionally consider that Ofwat's internal sewer flooding PC targets are set at reasonable levels. The PC trend required in AMP7 is broadly a continuation of historic performance. The PC should be achievable across the sector, subject to separate consideration of whether any enhancement spend is required. We recognise that two of the Disputing Companies, Northumbrian and Yorkshire, have been worse performers on internal sewer flooding, and that they will need to make significant improvements to achieve the PCs.

7.131 We have separately considered as part of our enhancement assessment the case made by Yorkshire and Northumbrian for additional cost allowances to cover the costs of mitigating certain causes of sewer flooding:

- for Yorkshire's Living with Water Partnership in Hull, we have provisionally approved additional enhancement funding in order to support improving service levels on sewer flooding and flooding more generally, see paragraphs 5.177-5.213.
- for Northumbrian's Sewer Flooding Resilience Scheme, we have provisionally rejected the proposed enhancement request, see paragraphs 5.256-5.295.

7.132 In our analysis of the components of this PC, we noted that Yorkshire's penalty collar for underperformance is set at 2.7 in year one rising to 4.1 incidents per 10,000 sewer properties by year 5. This is lower than its recent performance in the last four years of AMP6, where the outturn has been between 4.9 and 7.5 incidents per 10,000 connections, averaging at 5.9. For Northumbrian and Anglian, their penalty collars are set above historic levels of performance for internal sewer flooding.

7.133 We consider that there is a risk that the current penalty collar may not encourage Yorkshire to improve its performance, in that Yorkshire would stop incurring additional penalties at a level which is below current performance. We note that Yorkshire has made some improvement over the past two years. We provisionally conclude that its penalty collar for potential underperformance should be re-set in line with Table 7-5 to incentivise

improvements. The year 5 position of a penalty collar at 4.9 incidents per 10,000 sewer connections is consistent with Yorkshire's 2019-20 outturn performance.

Table 7-5: Yorkshire's internal sewer flooding performance in AMP6, and our proposed AMP7 underperformance collars for Yorkshire

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
Actual	5.3	7.5	5.8	4.9					
Ofwat FD									
Penalty Collar					2.7	3.0	3.5	3.7	4.1
CMA proposed									
Penalty collar					2.7	3.2	3.8	4.3	4.9

Source: Ofwat and CMA.

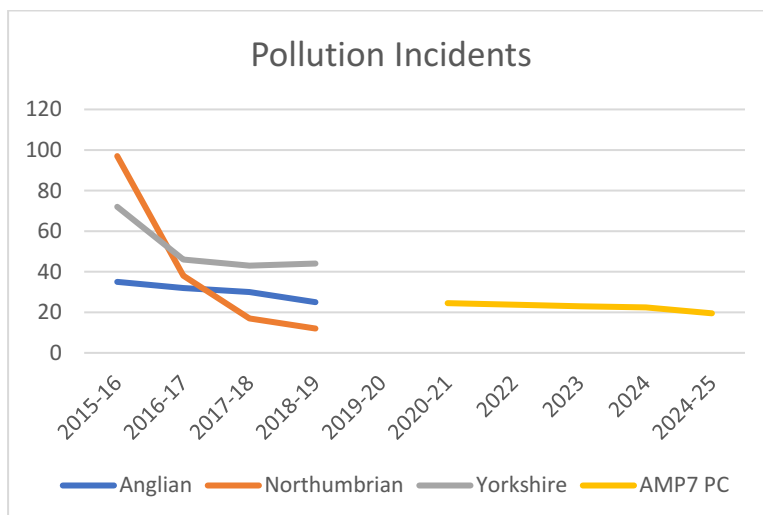
Note: numbers are per 10,000 connected properties.

7.134 We provisionally conclude that it is appropriate to retain the PC and ODIs for internal sewer flooding in line with Ofwat's final determination for the three relevant Disputing Companies, with a small adjustment to raise Yorkshire's penalty collar. Furthermore, we consider that the base cost allowances should be sufficient to allow for improvement in performance at a rate consistent with that achieved in AMP6. We have separately considered enhancement requests for related expenditure for Northumbrian and Yorkshire separately, and we allowed additional funds for Yorkshire.

Pollution Incidents

7.135 This PC relates to the number of pollution incidents caused by asset failures and operational activity associated with wastewater operations. The PC in Ofwat's final determination is based on a glidepath for forecast upper quartile performance from 24.5 (year 1) to 19.5 (year 5) incidents per 10,000 km of wastewater network. To put this into context, for the three relevant Disputing Companies, performance in the last years of AMP6 has averaged 30 for Anglian; 15 for Northumbrian and 41 for Yorkshire. Figure 7-8 shows the three companies' performance in AMP6, and Ofwat's PC level for AMP7.

Figure 7-8: Disputing Companies' pollution performance in AMP6, and the Ofwat PC level for AMP7 for all WASCs



Source: CMA analysis. Data is number of pollution incidents per 10,000 km of wastewater network.

7.136 Unlike the other two upper quartile PC's discussed above, the rewards for outperformance and penalties for underperformance for the pollution incidents PC are asymmetric. Penalty rates exceed reward rates. Yorkshire and Northumbrian have enhanced ODIs. There are no deadbands. The standard penalty collars are 36.8 for Anglian; 41.6 for Northumbrian; and 41.6 for Yorkshire. Anglian has a lower standard outperformance cap at 4.5, whereas this is 9.4 for Northumbrian and Yorkshire.

Ofwat's views

7.137 Ofwat noted that Northumbrian has industry leading performance on pollution incidents and confirmed it should receive outperformance rewards if it continues this good performance.¹²¹⁵ Yorkshire would face enhanced penalty ODI rates at a level slightly better than its 2018-19 performance, so Yorkshire has a stronger incentive to improve on AMP6 than for most companies. In Ofwat's view, the level of challenge for Yorkshire in meeting the PC level, based on its historically poor performance, reflected Yorkshire's lack of improvement in AMP6.¹²¹⁶

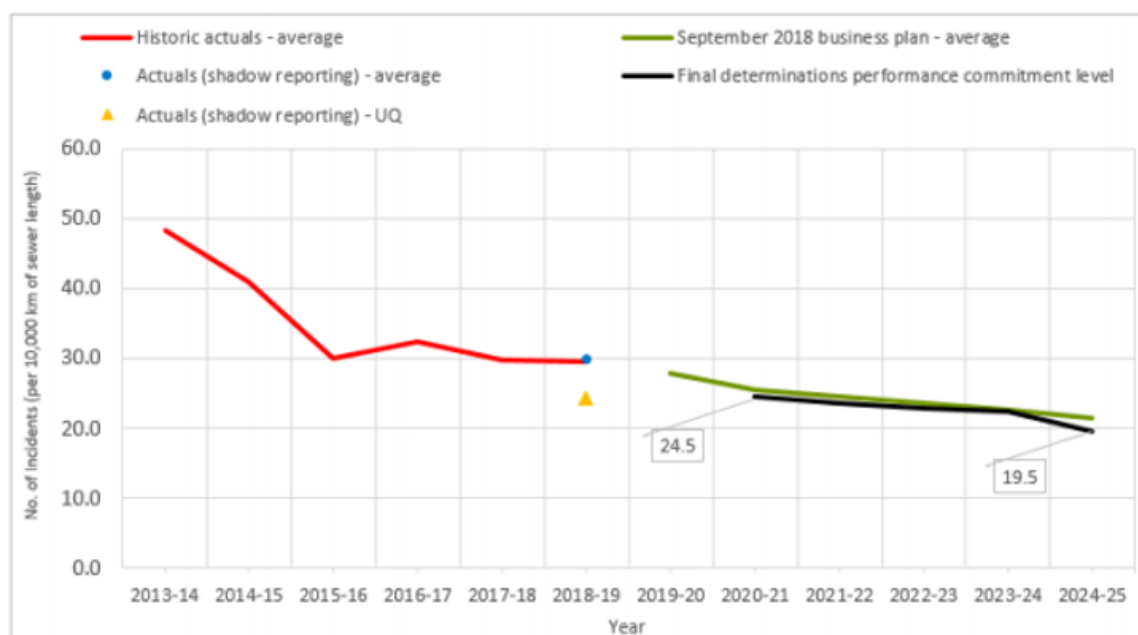
7.138 Ofwat provided Figure 7-9 illustrating the level of 'stretch' in the PC for pollution incidents in AMP7, by showing the industry average performance in AMP6 for comparison. This shows there has been historic improvement seen since 2013-14, with some flatlining across the AMP6 period. The AMP7 PC

¹²¹⁵ Ofwat's Response to Northumbrian's SoC, paragraph 4.9

¹²¹⁶ Ofwat's Response to Yorkshire's SoC, paragraph 5.25

represents an expectation that the rate of historic improvement should continue through to 2025.

Figure 7-9: Industry average performance on pollution incidents, and the Ofwat PC for AMP7 for all WASCS



Source: Ofwat ¹²¹⁷

Disputing Companies' views

7.139 The three relevant Disputing Companies did not raise specific issues with this PC.

Engineering adviser views

7.140 Our engineering adviser considered that Ofwat's targeted improvements in the PC were reasonable, given that pollution incidents were often preventable through:

- (a) compliance with recognised asset maintenance strategies, including focusing on key assets that present a significant risk to sewer pollution performance such as pumping stations and rising mains; and
- (b) implementation of proactive operational practices, namely tackling sewer blockages and their resultant impacts, either inside a property (resulting in

¹²¹⁷ Ofwat (May 2020), [Submission to CMA 'Common Issues on Outcomes'](#)

internal sewer flooding) or in a watercourse or other environmentally sensitive environment (which would lead to a pollution incident).

- 7.141 Our engineering adviser noted that performance on pollution incidents was influenced by very similar factors to that for internal sewer flooding. It reflected a combination of investment in key assets to maintain their health and resilience, coupled with good management action of operational issues.

Our assessment and provisional conclusion for pollution incidents

- 7.142 We provisionally conclude that the level for this PC represents a reasonable target for the sector as a whole, and that Ofwat had good reasons to intervene and set a sector-wide target for this PC. Whilst it is based on the upper quartile of projected performance, the PC trend required in AMP7 is broadly a continuation of historic actual trends in performance. We agree with Ofwat that this target should be achievable across the sector, subject to assessment of any enhancement expenditure for individual companies. As with the other common PCs, some companies will have to improve performance to achieve Ofwat's targets.
- 7.143 Our criteria for assessment of asymmetric ODIs (paragraph 7.101) suggest that asymmetric rewards and penalties are appropriate in this case. The nature of pollution incidents mean that customers would reasonably have concerns in paying rewards to companies for avoiding them, which should be part of the normal course of their business.
- 7.144 In our analysis of the components of this PC, we noted that Anglian's penalty collar for underperformance is set at 36.8 incidents per 10,000 km for each year of AMP7. This is only slightly above its AMP6 actual performance, where the outturn has been between 25 and 35 incidents per 10,000 km, with performance at 35 incidents occurring in two years.
- 7.145 We consider that there is a risk that the current penalty collar may not encourage Anglian to improve its performance, to the extent that it would stop incurring additional penalties at a level which is below current performance. Anglian does not have enhanced underperformance penalties, unlike Northumbrian and Yorkshire, so the basis of the standard underperformance penalty cap is particularly important. Also, its performance in 2019/20 represented a deterioration compared to the previous trend in AMP6, suggesting more powerful financial incentives may be needed. Hence, we provisionally conclude that its penalty collar for potential underperformance should be re-set at 41.6 incidents per 10,000 km, as shown in Table 7-6.

Table 7-6: Anglian’s pollution incidents performance and proposed AMP7 penalty collars

	2015-16	2016-17	2017-18	2018-19	2019-20	AMP7 (2020-21 to 2024-25)
Actual	35.0	32.0	30.0	25.0	35.0	
Ofwat FD						
Penalty Collar						36.8
CMA proposed						
Penalty collar						41.6

Source: Ofwat and CMA

Note: numbers are incidents per 10,000 km of wastewater network.

7.146 We provisionally conclude that it is appropriate to retain the PC and ODIs for pollution incidents in line with Ofwat’s FD for the three relevant Disputing Companies, with an adjustment to raise the level of Anglian’s penalty collar.

7.147 Furthermore, we consider that the base cost allowances should be sufficient to allow for improvement in performance at a rate consistent with that achieved in AMP6.

Other common PCs and ODIs

7.148 We now consider the remaining individual common PCs and ODIs.

Per capita consumption

7.149 All companies have a PC intended to encourage them to act to reduce household per capita consumption, measured as the annual average litres per person per day consumed. This helps reduce the demand for water which is important as water is a scarce resource and environmental protection is important. There are a variety of ways in which water companies can encourage their customers to use water wisely and hence reduce per capita consumption. These include extended take up of water meters, public and school education and awareness, encouragement to purchase more water-efficient domestic appliances and fix leaking taps, discouragement of unnecessary activities like garden watering with a sprinkler or hosepipe. Water companies can also provide free devices to customers like shower timers, tap washers and cistern devices. The PC levels are percentage reductions from the 2019-20 baseline.

7.150 Ofwat used several criteria in assessing companies’ proposed PC levels. These included:¹²¹⁸

(a) whether the proposed PC level was better than the WRMP target;

¹²¹⁸ Ofwat (2019), [Delivering outcomes for customers policy appendix](#), pp41-42

- (b) whether it was worse than the upper quartile absolute level of consumption of 128.6 litres per person per day in 2024-25;
- (c) whether the proposed reduction was at least 6.3%, the upper quartile percentage reduction;
- (d) the consistency of the proposed PC level with neighbouring or other similar companies;
- (e) whether the company has a supply/demand deficit;
- (f) other company-specific factors including demography, historic per capita consumption volumes, the total percentage reduction across AMP7 and metering penetration; and
- (g) the evidence provided by the company on why greater reductions than it had proposed would not be achievable.

7.151 Table 7-7 shows the percentage reductions set by Ofwat for the four Disputing Companies.

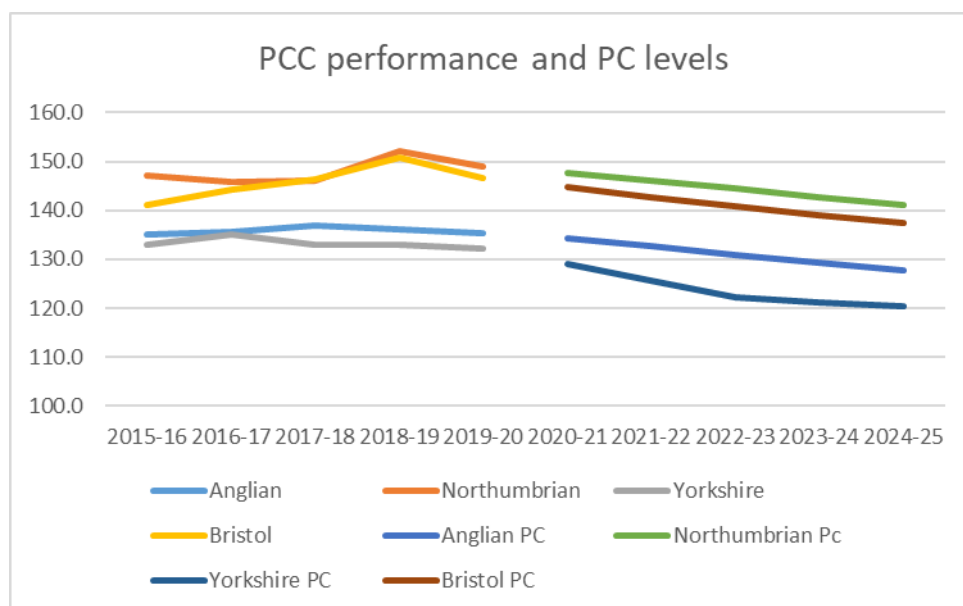
Table 7-7: Ofwat's PC levels for per capita consumption for the four Disputing Companies

Per capita consumption	% reduction on 2019-20 base				
	2020-21	2021-22	2022-23	2023-24	2024-25
Anglian	0.8	2	3.2	4.5	5.6
Northumbrian	0.8	1.8	2.9	4.1	5.3
Yorkshire	2.4	4.9	7.4	8.3	8.9
Bristol	1.3	2.6	3.9	5.1	6.3

Source: Ofwat (2019), [PR19 final determinations, Yorkshire Water – Outcomes performance commitment appendix](#)
Ofwat (2019), [PR19 final determinations, Anglian Water – Outcomes performance commitment appendix](#)
Ofwat (2019), [PR19 final determinations, Northumbrian Water – Outcomes performance commitment appendix](#)
Ofwat (2019), [PR19 final determinations, Bristol Water – Outcomes performance commitment appendix](#)

7.152 Figure 7-10 shows the Disputing Companies' performance in AMP6, and their PC levels for AMP7, calculated by the CMA by applying their percentage reduction targets to the 2019-20 outturn, which was not known at the time of Ofwat's FD.

Figure 7-10: Disputing Companies' per capita consumption performance in AMP6 and Ofwat's PC levels in AMP7



Source: CMA analysis.

Data is litres per person per day, annual average

7.153 Tables 7-8 and 7-9 show Ofwat's ODI rates, collars and caps for the four Disputing Companies. Table 7-8 shows the standard rates, and Table 7-9 shows enhanced rates, which apply to Yorkshire but no other Disputing Companies.

Table 7-8: Ofwat's per capita consumption ODI rates and collars for the four Disputing Companies

Per capita consumption					
	£m	% reduction		£m	% reduction
	Standard underperformance rate	Collar		Standard outperformance rate	Cap
Northumbrian	-0.198	-		0.175	-
Anglian	-0.374	-		0.312	-
Yorkshire	-0.222	-16		0.185	12.3
Bristol	-0.067	-8.6		0.056	9.7-11

Source: Ofwat (2019), [PR19 final determinations, Yorkshire Water – Outcomes performance commitment appendix](#)

Ofwat (2019), [PR19 final determinations, Anglian Water – Outcomes performance commitment appendix](#)

Ofwat (2019), [PR19 final determinations, Northumbrian Water – Outcomes performance commitment appendix](#)

Ofwat (2019), [PR19 final determinations, Bristol Water – Outcomes performance commitment appendix](#)

Table 7-9: Ofwat's per capita consumption enhanced ODI rates for Yorkshire

Per capita consumption enhanced ODI rates					
	£m	% reduction		£m	% of regulated water equity
	Enhanced underperformance rate	Collar		Enhanced outperformance rate	Cap
Yorkshire	-0.787	-17.6		0.787	1

Source:

Ofwat (2019), [PR19 final determinations, Yorkshire Water – Outcomes performance commitment appendix](#)

Company views

- 7.154 Bristol was the only Disputing Company to raise concerns about its ODI rates for this PC. Bristol said that it disagreed with Ofwat's determination of how to allocate customers' expressed willingness to pay for more efficient water use, across this PC and Bristol's PC for increasing meter penetration. It therefore considered that the ODIs for these two PCs, taken together, were wrongly calibrated.
- 7.155 Bristol had proposed a 75% allocation of customer willingness to pay to the meter penetration ODI, with 25% for per capita consumption, in its business plan. This would have led to an underperformance penalty of £-0.024 million per percentage of reduction not achieved, and an outperformance payment of £0.014 million per percentage for achieving additional reductions.¹²¹⁹
- 7.156 In response to the draft determination, Bristol proposed 'compromise' per capita consumption ODI rates of £-0.030 million for underperformance, and £0.025 million for outperformance.

Ofwat's views

- 7.157 Ofwat did not accept this allocation. Instead, it set a cost-recovery based ODI for meter penetration, in line with its broader approach to scheme-based PCs.¹²²⁰ On the basis that the meter penetration ODI did not reflect customer willingness to pay for efficient water consumption, it allocated 100% of expressed willingness to pay to the per capita consumption ODI.¹²²¹ The net result was an increase in the combined penalty rates. The per capita consumption ODI rates would be £-0.066 million for underperformance and £0.055 million for outperformance.
- 7.158 Ofwat rejected Bristol's submissions at draft determination and set ODI rates at similar levels of £-0.067 million and £0.056 million in its final determination.¹²²²

¹²¹⁹ [Bristol SoC](#), paragraph 610

¹²²⁰ Scheme-based PCs differ from other PCs in that they are focused on delivering specified elements of an identified scheme, which are inputs to customer benefit, rather than related to measured outcomes. Ofwat's approach to setting ODIs for scheme-based PCs is set out in [Delivering outcomes for customers policy appendix](#), pp135-141.

¹²²¹ [Ofwat's response to Bristol's SoC](#), paragraphs 4.29-4.31

¹²²² Ofwat (2019), [PR19 final determinations - Bristol Water – Delivering outcomes for customers final decisions](#), p6

Our assessment

7.159 Based on the submissions we have received, we do not agree with Ofwat's assumption that no proportion of customer willingness to pay for water efficiency can be assumed to be related to meter penetration, even if this is not used to derive the meter penetration ODI rate because another method is in use. Meter penetration contributes to more efficient water use which customers have placed some value on, and is funded from customer bills as a part of the total service.

7.160 Bristol provided evidence that its customers considered that Ofwat's per capita consumption ODI rates are too high, noting that per capita consumption is more within the customer's control than the company's, and is subject to external factors such as weather. The per capita consumption ODI ranked relatively low in customers' prioritisation of financial incentives. Bristol's CCG, the Bristol Water Challenge Panel, made this point in its representation to the CMA:

The research found that customer priorities did not align with the targets set by Ofwat in the Draft Determination. Customer preferences were supportive of the company's original ODIs and service priorities ...

7.161 We agree that the two PCs (per capita consumption and meter penetration) contribute to reducing water consumption, and we agree with Bristol that this overlap of outcomes should be recognised in setting ODI rates.

7.162 We also considered the application of the criteria in paragraph 7.101 to justify asymmetric incentives. There is evidence that customers place value on reducing unnecessary water usage and it is not evident that this is subject to diminishing returns. However, we accept that this measure is only partly under management control but will depend on customer behaviour to a considerable extent. Therefore, whilst an asymmetric incentive may be appropriate, the extent of that asymmetry should be limited.

7.163 We therefore provisionally determine to reduce Bristol's per capita consumption ODI rates to those it proposed in response to the draft determination: £-0.030 million for underperformance, and £0.025 million for outperformance.

Unplanned outages

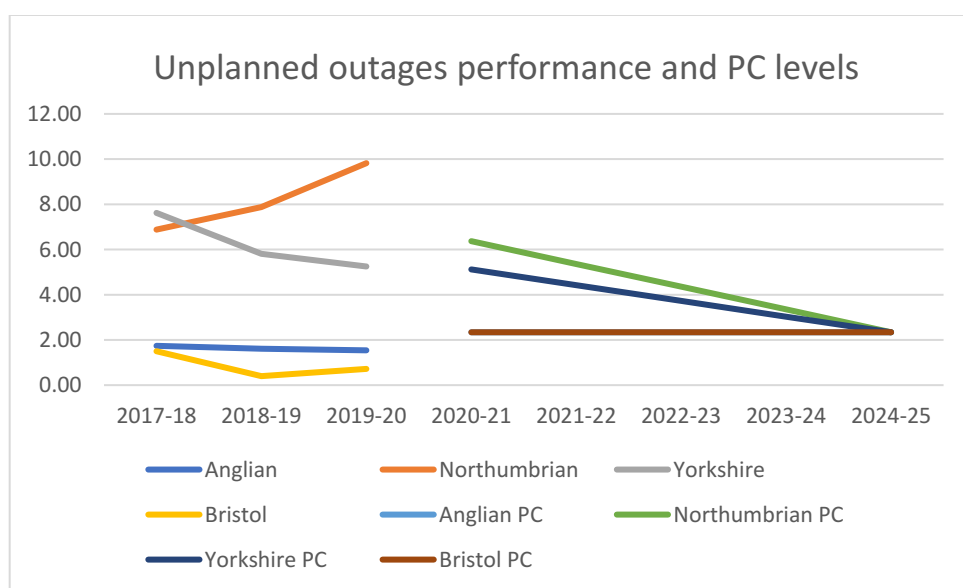
7.164 The unplanned outages PC is new for PR19. It is a Common PC designed to encourage good asset health. The PC and associated ODIs create an

incentive on companies to maintain their overground assets so that they are available to maintain reliable supplies.

7.165 Ofwat did not consider there was good enough historical data on unplanned outages to use as a base to set the PC level by extrapolation. Instead, Ofwat took the median level of all companies' forecasts for 2024-25, at 2.34% of peak week capacity lost to unplanned outages, as the 'good' performance level, and set that as the PC level for all companies in 2024-25. Companies at or below that level have a flat PC level profile of 2.34% in all years. Companies with proposed performance worse than this level were set a glide path to reflect the improvement needed to reach this level of performance in 2024-25.¹²²³

7.166 Figure 7-11 shows the Disputing Companies' recent performance (since 2017-18), and their PC levels. Table 7-10 shows the Disputing Companies' ODI rates and collars.

Figure 7-11: Disputing Companies' unplanned outage performance and PC levels for AMP7 (percentage of peak week production capacity lost through unplanned outages)



Source: CMA analysis

Notes: Units are the percentage of peak week production capacity lost through unplanned outages

¹²²³ Ofwat (2019), [Delivering outcomes for customers policy appendix](#), p56

Table 7-10: Disputing companies' unplanned outage ODI rates and collars

<i>Unplanned outages</i>	<i>£m</i>	<i>% of peak week production capacity</i>
	Standard underperformance penalty	Collars
Northumbrian	-1.72	12.74
Anglian	-1.324	5.22
Yorkshire	-1.799	10.23
Bristol	-0.381	4.68

Source: Ofwat (2019), [PR19 final determinations, Yorkshire Water – Outcomes performance commitment appendix](#)
Ofwat (2019), [PR19 final determinations, Anglian Water – Outcomes performance commitment appendix](#)
Ofwat (2019), [PR19 final determinations, Northumbrian Water – Outcomes performance commitment appendix](#)
Ofwat (2019), [PR19 final determinations, Bristol Water – Outcomes performance commitment appendix](#)

7.167 As this is a new PC, it does appear that there is some uncertainty around how the metric will work out in practice. The Disputing Companies acknowledged that unplanned outages may reflect asset management performance but noted there can also be unplanned outages arising from some factors that may be outside companies' control, such as source water quality or turbidity or power failures caused by thunderstorms. In other PC settings, Ofwat has applied a 3-year average to account for external influences. That approach does not work when the uncertainty concerns the metric itself, and therefore if the metric turns out to have unintended consequences, these may apply in each year.

7.168 Northumbrian also said that some unplanned outages are not problematic as the customer will not be affected if the company is able to find alternative sources to maintain supplies. We recognise that the asset health PCs are unusual in that the immediate effects of some of the outcomes are not directly relevant to customers. However, the objective of asset health PCs is to make sure companies maintain sufficient asset health before problems arise for consumers, so we do consider that the PC is relevant to customers.

7.169 We have also noted that Ofwat's underperformance collars are quite wide: double the first year's PC level, for all five years, meaning that the companies are exposed to a risk of fairly high financial penalties for a metric for which the effects are still under consideration.

7.170 With reference to the criteria in paragraph 7.101 for assessing asymmetric incentives, the untested nature of the measure and the possibility of outcomes due to matters outside management control suggest that the level of asymmetric risk exposure should be reduced.

7.171 For these reasons, we provisionally determine that an underperformance deadband should apply for each year for each of the four Disputing

Companies. Although the level of a deadband is ultimately a matter of judgment, we have provisionally proposed that the level is set at 1.2x the PC level, to allow for some failures related to fluctuations outside the company's control, and uncertainty in measurement of this new PC. There are no outperformance ODI payments, so an outperformance deadband would not be applicable.

Mains repairs

7.172 The mains repairs PC is a Common PC designed to encourage good asset health. This is a new PC for PR19.

7.173 Ofwat used the average of all companies' historical performance to project forecast performance, which produced a 'good' level of performance for 2024-25 of 122 mains repairs per 1,000 km of mains.¹²²⁴ For companies proposing PC levels worse than this, and for companies proposing deteriorating PC levels (even if they were at or better than the 'good' level), Ofwat set PC levels based on their best five years' historical performance. For companies proposing PC levels as good as this or better, and not proposing any deterioration, Ofwat accepted the proposals. Ofwat set the PC levels over AMP7 to increase performance levels by a reducing percentage, for all companies, in all years. The aim of this was to allow all companies flexibility to deliver a step change in leakage reduction, allowing more flexibility in the earlier years to use proactive mains repairs to reduce leakage.¹²²⁵

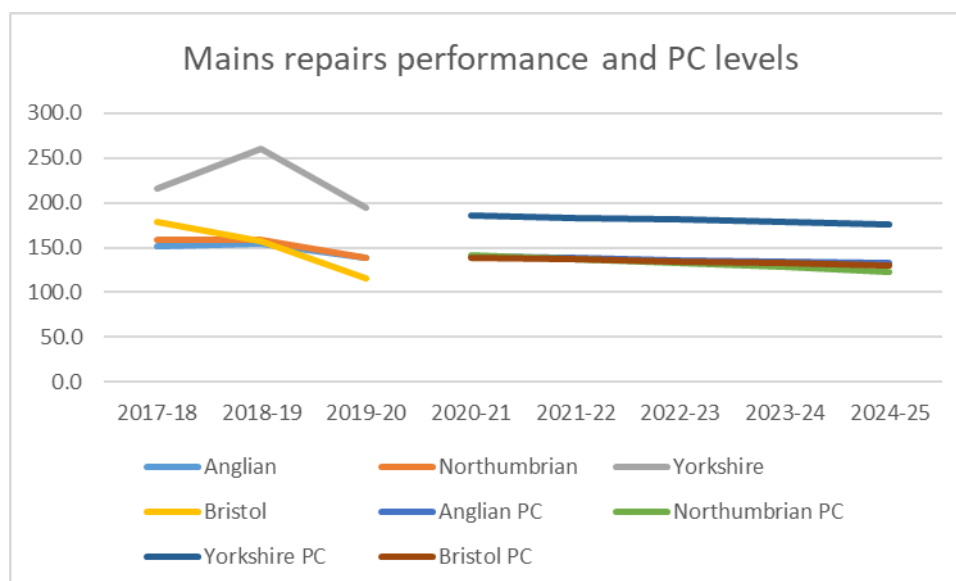
7.174 Ofwat set the underperformance rate for mains repairs for almost all companies, including the Disputing Companies, at the average of the reasonable range.

7.175 Figure 7-12 shows the performance of the Disputing Companies in AMP6, and the PC levels for AMP6. Table 7-11 sets out the ODI rates, collars and cap for the Disputing Companies. Only Northumbrian can earn outperformance rewards, and its cap moves downwards over AMP7 to remain around 14 repairs per 1,000 km of mains better than its PC level throughout the period.

¹²²⁴ Ofwat(2019), [PR19 final determinations – Delivering outcomes for customers policy appendix](#), p56

¹²²⁵ Ofwat(2019), [PR19 final determinations – Delivering outcomes for customers policy appendix](#), p17

Figure 7-12: Mains repairs performance in AMP6, and PC levels for AMP7 (number of mains repairs for each 1,000 km of mains)



Source: CMA analysis

Notes: performance and PC levels are expressed as the number of mains repairs for each 1,000 km of mains.

Table 7-11: Mains repairs ODI rates for the Disputing Companies

Mains repairs	Standard underperformance penalty	Collar	Standard outperformance payment	£m
				Cap
Northumbrian	-0.149	198.6	0.098	127.1 reducing over AMP7 to 110
Anglian	-0.165	-	-	-
Yorkshire	-0.167	-	-	-
Bristol	-0.04	193.8	-	-

Source: Ofwat (2019), [PR19 final determinations, Yorkshire Water – Outcomes performance commitment appendix](#)
Ofwat (2019), [PR19 final determinations, Anglian Water – Outcomes performance commitment appendix](#)
Ofwat (2019), [PR19 final determinations, Northumbrian Water – Outcomes performance commitment appendix](#)
Ofwat (2019), [PR19 final determinations, Bristol Water – Outcomes performance commitment appendix](#)

7.176 The PC and associated ODIs are intended to create an incentive on companies to lower mains repair numbers. This is because these repairs can cause problems with traffic disruption and potentially lead to customers experiencing either low pressure, no water, or in extreme cases flooding of properties. It therefore encourages companies to target mains replacement activity and other asset maintenance interventions so that mains prone to bursts or at high risk are renewed or have a lower risk of failure.

7.177 However, some pro-active leakage control activity will also find hidden leaks and bursts requiring a mains repair. The design of this Common PC could therefore serve to discourage such pro-active leakage control activity. Also, severe winter weather variations, such as freeze-thaw events, can influence

the level of repairs needed and these triggers are outside of management control. Applying our asymmetric incentives criteria (paragraph 7.101), these factors mean there are doubts over the benefits of outperformance and the extent to which outcomes are under management control.

- 7.178 For these reasons, we provisionally conclude that this mains repairs PC should have an underperformance deadband applied for the four Disputing Companies. This allows a range of underperformance close to the PC where the ODI penalties would not apply. We do not propose an outperformance deadband. While Northumbrian can earn outperformance payments, the ODI rate it has is a third lower than the rate for underperformance, so it does not seem necessary to apply an outperformance deadband.
- 7.179 The size of the deadband is a matter of judgment, based on balancing the risk of reducing incentives to improve the aspects of performance which matter most to customers against the objective of mitigating undue levels of penalty. We provisionally determine that the underperformance deadband be set at 10 repairs per 1,000 km above the PC for each of the four Disputing Companies in each year of AMP7. To put this into context, this is around 5-10% of the PC for the four Disputing Companies. We consider that this small deadband maintains the disincentive to allowing asset health to deteriorate, whilst allowing for some proactive repairs and noting that poor winter weather conditions can impact on the level of repairs needed.
- 7.180 Bristol challenged its ODI rates for this PC.¹²²⁶ We consider that introducing a deadband will adequately address our concerns with this PC and associated ODIs, and we are not proposing any other changes.

Compliance Risk Index, treatment works compliance and sewer collapses

- 7.181 These are three penalty-only common PCs on which the Disputing Companies did not raise objections. Nor was there other evidence that suggested we should consider making changes to them. Our asymmetric incentives criteria (paragraph 7.101) do not indicate the penalty-only design is inappropriate.
- 7.182 The Compliance Risk Index and treatment works compliance PC levels were set at full compliance with the statutory standard. The ODIs had a deadband, so that minor non-compliance would not attract a penalty.
- 7.183 For the sewer collapse PC, Ofwat determined an industry 'good' level of performance as 8 collapses per 1,000 km of sewer pipe. This was based on

¹²²⁶ Bristol SoC, paragraphs 607-616

the median of industry forecasts for 2024-25, using the forecasts from the April 2019 revised business plans and resubmitted data. Companies with proposed levels above this were set an improving profile based on the upper quartile percentage reduction proposed by other companies, with company-specific approaches applied in some cases.¹²²⁷

7.184 We note that Ofwat set the PC level for 2020-21 before outturn performance was known. All three Disputing Companies met or outperformed their 2020-21 level in 2019-20. However, we also note that the two companies with performance below the 'good' level had worse performance in at least one previous year, and over the short period shown, performance has varied in both directions. Information provided to us by Ofwat for other years for all companies, does not suggest a consistent trend in either direction.

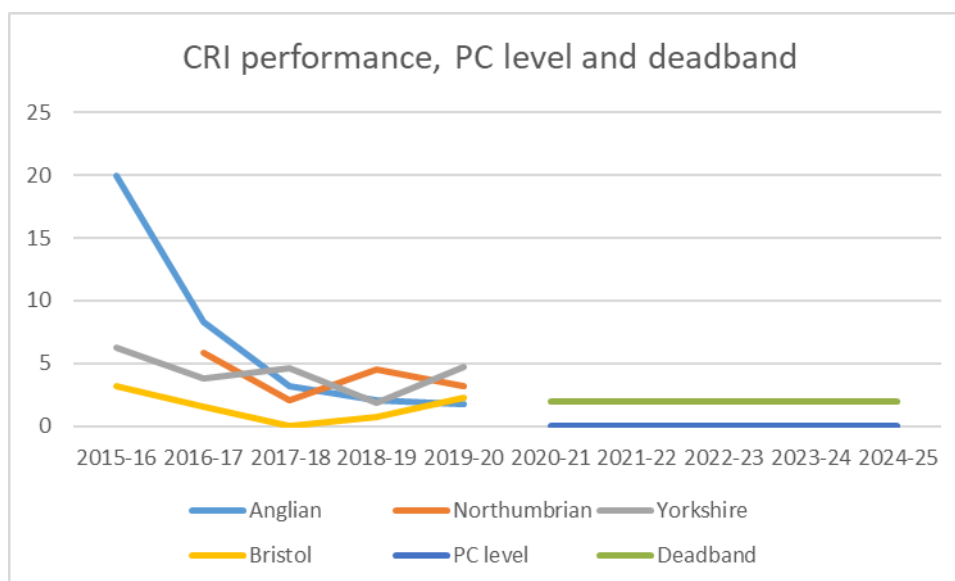
7.185 Ofwat set an underperformance collar for treatment works compliance for Anglian, to retain the maximum level of underperformance payment implied by the company's customer evidence in its April 2019 revised business plan submission.¹²²⁸

7.186 Figures 7-13 to 7-15 show the Disputing Companies' performance for these three PCs in AMP6, or for the past three years for sewer collapses. Table 7-14 also shows the Disputing Companies' PC levels for sewer collapses in AMP 7 and the PC levels for AMP7. Tables 7-12 to 7-14 show the ODI rates, caps and collars for these PCs.

¹²²⁷ Ofwat (2019), [Delivering outcomes for customers policy appendix](#), p56

¹²²⁸ Ofwat (2019) [PR19 final determinations, Anglian Water – Delivering outcomes for customers final decisions](#), page 17

Figure 7-13: Disputing Companies' performance on the Compliance Risk Index in AMP6, PC level and deadband



Source: CMA analysis

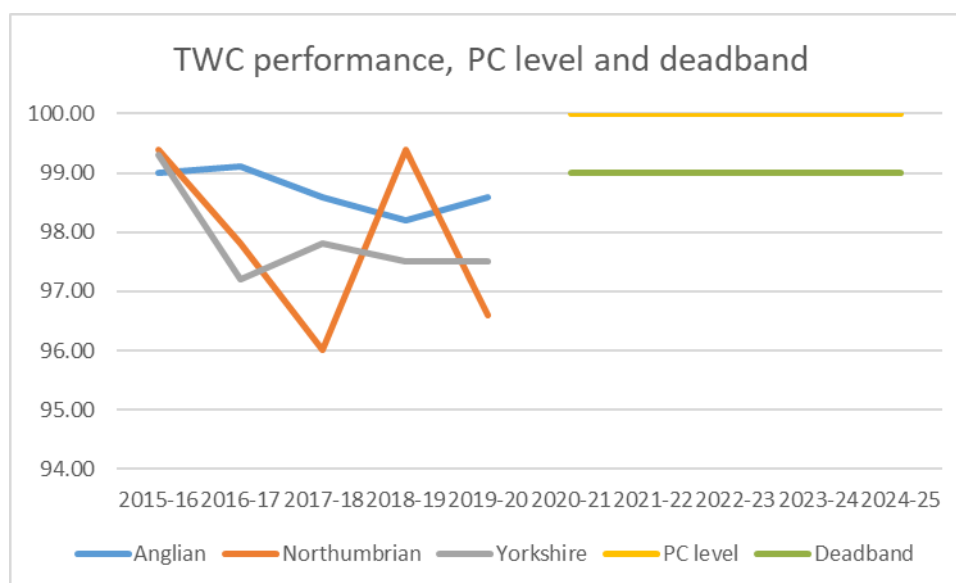
Note: the PC level for all companies is full compliance, ie a score of zero.

Table 7-12: Disputing Companies' Compliance Risk Index ODI rates

Compliance Risk Index	£m	
	Standard underperformance penalty	Collar
Northumbrian	-1.394	9.5
Anglian	-0.788	9.5
Yorkshire	-1.226	9.5
Bristol	-0.191	9.5

Source: Ofwat (2019), [PR19 final determinations, Yorkshire Water – Outcomes performance commitment appendix](#)
Ofwat (2019), [PR19 final determinations, Anglian Water – Outcomes performance commitment appendix](#)
Ofwat (2019), [PR19 final determinations, Northumbrian Water – Outcomes performance commitment appendix](#)
Ofwat (2019), [PR19 final determinations, Bristol Water – Outcomes performance commitment appendix](#)

Figure 7-14: Disputing Companies' treatment works compliance performance in AMP6, PC level and deadband



Source: CMA analysis.

Note: the PC level for all companies is full compliance with standards set by the Environment Agency or Natural Resources Wales, ie a score of 100%.

Table 7-13: Disputing Companies' treatment works compliance ODI rates and collars

Treatment works compliance	£m	
	Standard underperformance penalty	Collar, %
Northumbrian	-0.597	-
Anglian	-1.188	95.4
Yorkshire	-1.226	-

Source: Ofwat (2019), [PR19 final determinations, Yorkshire Water – Outcomes performance commitment appendix](#)

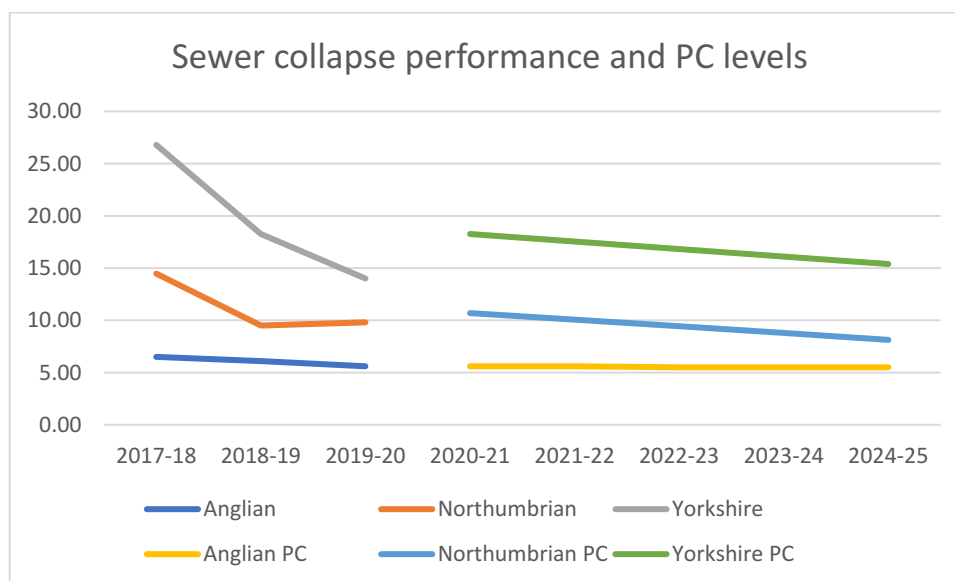
Ofwat (2019), [PR19 final determinations, Anglian Water – Outcomes performance commitment appendix](#)

Ofwat (2019), [PR19 final determinations, Northumbrian Water – Outcomes performance commitment appendix](#)

Ofwat (2019), [PR19 final determinations, Bristol Water – Outcomes performance commitment appendix](#)

Note: Ofwat introduced a collar for Anglian at final determination. Anglian was concerned that its ODI rate was higher than other companies'.

Figure 7-15: Disputing Companies' sewer collapse performance since 2017-18, and PC levels for AMP7



Source: CMA analysis

Note: Units are sewer collapses per 1,000 km of sewer network.

Table 7-14: Disputing Companies' sewer collapse ODI rates and collars

Sewer collapses	£m	
	Standard underperformance penalty	Collar
Northumbrian	-0.322	-
Anglian	-2.298	7.86-7.76
Yorkshire	-0.221	-

Source: Ofwat (2019), [PR19 final determinations, Yorkshire Water – Outcomes performance commitment appendix](#)

Ofwat (2019), [PR19 final determinations, Anglian Water – Outcomes performance commitment appendix](#)

Ofwat (2019), [PR19 final determinations, Northumbrian Water – Outcomes performance commitment appendix](#)

Ofwat (2019), [PR19 final determinations, Bristol Water – Outcomes performance commitment appendix](#)

7.187 We are not proposing to make any changes to the PC levels, ODI rates, caps or collars in relation to these PCs. For these three incentives, our provisional determination is to retain the PCs and ODIs as set by Ofwat in PR19.

Priority Services Register

7.188 The Priority Services Register is the means by which water companies identify customers who may be in need of special assistance. The PC level is the same for all companies and specifies a minimum level of households identified and contacted during AMP7. The Priority Services Register is one means by which vulnerable customers are supported, with others (and in particular social tariffs) falling outside the ambit of the price control (and this determination).

- 7.189 In the CMA approach document,¹²²⁹ we indicated our intention to review the PC for the Priority Services Register.
- 7.190 Citizens Advice¹²³⁰ submitted that it received considerable attentions from customers on issues of affordability, debt repayments and financial support. It asked us to consider whether the overall support package for consumers should be enhanced and whether we should require different water companies to better coordinate and standardise additional support mechanisms. Examples of these mechanisms include social tariffs that companies may offer.
- 7.191 Citizens Advice expressed concern that the water industry had low customer engagement with support mechanisms and low awareness of the Priority Services Register among customers. It noted there were around 300,000 registered customers on the Priority Services Register for water compared to some 6 million for electricity. It also said there was variability on Priority Services Register registration rates between regions (and so suppliers), and it proposed that we should encourage the industry to better coordinate across water suppliers and with the energy sector.
- 7.192 In addition to the Common PC for the Priority Services Register, there are a number of bespoke PCs which support delivery of appropriate services to vulnerable customers, including inclusive services PCs and the assessed satisfaction of customers on the priority services register with how the company has engaged with them in this regard, which we welcome. Some companies (including Anglian, Northumbrian and Yorkshire) have PCs relating to direct financial assistance schemes. Various companies, including Northumbrian and Anglian, have identified innovative ways to support vulnerable customers and provide access to the support initiatives available to them.^{1231,1232} A thorough and up-to-date register may also prompt companies and their CCGs to think about further innovations that will help vulnerable customers.
- 7.193 At the moment the Priority Services Register PC is reflected in reputational impacts. Both Ofwat and the water companies currently appear to be giving support for vulnerable customers a high priority and high profile. Given current interest, we think the threat of reputational consequences is likely to carry considerable weight with companies. It is not clear, and we received no suggestions on, how any financial ODI would work. Given the importance of

¹²²⁹ CMA (June 2020), [Approach to the redeterminations](#), paragraph 47

¹²³⁰ Citizens Advice (June 2020), [Further Submission on Ofwat's FD](#)

¹²³¹ [Anglian SoC](#), paragraphs 272-274

¹²³² [Northumbrian SoC](#), paragraphs 124 and 195

this issue, we suggest that Ofwat monitor closely the success of this PC in increasing uptake of the Priority Services Register and growing awareness of support measures. It is imperative that Ofwat use the full potential of reputational incentives by publicising those companies that successfully engage and support vulnerable customers. Likewise, if any companies do not address this with sufficient attention, this should be made clear.

7.194 In relation to the Citizens Advice points about a lack of coordination between suppliers, differences from the energy sector and a lack of awareness across the industry, we agree this is a risk.¹²³³ Outside this redetermination, there appears to be scope for regulators and companies across the water sector and across utilities to share experience of developing registers, and their approach to developing the criteria for inclusion. Regulators and regulated companies have a growing bank of experience and understanding of ways to assist vulnerable customers. In our opinion, this would fit well with government's SPS priority in relation to low income and other vulnerable household customers.¹²³⁴

7.195 Our provisional determination is to retain the PC and we recommend that Ofwat progress this as a reputational ODI throughout AMP7.

Assessment of bespoke PCs and ODIs

7.196 As noted at paragraph 7.45, we have not reviewed the majority of bespoke PCs and ODIs. Here, we address three specific bespoke PCs, and their associated ODIs, which do not apply to all companies. The PCs we have looked at are 'comparable' bespoke PCs for water quality contacts and bathing water quality, and Yorkshire's low water pressure PC.

Water quality contacts

7.197 A number of companies have separate ODIs for water quality contacts from customers for appearance, taste and smell. The ODIs can include penalties for numbers of contacts above the PC level, and/or rewards for contacts below that level. Water quality contacts is a comparable bespoke PC. It was not mandatory, but many companies have it because it is a common issue for customers to care about, and because it was in place for many companies in AMP6.¹²³⁵ The drivers of customer concerns and hence contacts vary by area

¹²³³ Citizens Advice (June 2020), [Further Submission on Ofwat's FD](#), pp5-6

¹²³⁴ Department for Environment, Food and Rural Affairs (September 2017), [The government's strategic priorities and objectives for Ofwat](#), p8

¹²³⁵ Ofwat discouraged companies from abandoning ODIs they had in PR14, on the grounds that it did not want companies to opt out of obligations they were struggling to meet. See Ofwat (December 2017), [Delivering Water 2020: Our methodology for the 2019 price review](#), Appendix 2: [Delivering outcomes for customers](#), p30-31

(for example depending on the geology of the area). Among the Disputing Companies, Anglian and Yorkshire have a single water quality contacts ODI, while Bristol and Northumbrian have two separate ones.

- 7.198 For the purposes of setting the PC for water quality contacts at its Initial Assessment, Ofwat looked at each company's proposed target for total contacts – ie taking the two different types of contacts together where necessary – and set the minimum target at the upper quartile of the proposed reductions, which amounted to a reduction by 34% over the period.¹²³⁶
- 7.199 Ofwat considered that a 'good' level of performance would be 0.67 contacts per 1,000 properties, on appearance and taste and smell combined. Anglian's, Yorkshire's and Northumbrian's PC level glide paths produced by the 34% reduction approach, but do not meet, the 'good' level in 2024-25. Bristol's PC level glide path is just above the 'good' level in 2024-25, at 0.68.
- 7.200 Anglian and Yorkshire asked us to adjust Ofwat's decisions regarding this PC.
- 7.201 Anglian submitted that it was already a good performer in this area, albeit not quite upper quartile, and that its customers did not want it to spend significant amounts of money to achieve large improvements. It therefore proposed that we should set its PC level at its 2019-20 level of performance for each year of AMP7.¹²³⁷
- 7.202 Anglian's submissions on customers' willingness to pay for further improvements contrasts notably with what Northumbrian told us. For example, as part of its submissions on customers' priorities between different ODIs, Northumbrian said that 'customers of our Northumbrian Water service area told us their preference was to allocate 1.33% of their bill to reducing contacts for discoloured water, compared to 0.47% of the bill for reducing interruptions to supply'.¹²³⁸
- 7.203 Similarly, Bristol went well beyond the minimum set by Ofwat and proposed to cut its water quality contacts by half, while Yorkshire described it as 'a priority for customers'.¹²³⁹ None of these companies performed as well as Anglian during AMP6, but they were not far behind.
- 7.204 The evidence provided by the Disputing Companies suggests a range of different views from their customers. In that context, we recognise that Ofwat used an approach which sought to have regard to the evidence gathered by

¹²³⁶ Ofwat (2019), [Delivering outcomes for customers policy appendix](#), p6

¹²³⁷ [Anglian SoC](#), p249-250

¹²³⁸ [Northumbrian SoC](#), p116

¹²³⁹ [Yorkshire SoC](#), p56

the companies as a whole, in order to set a common challenge. We understand Anglian has particular concerns relating to the definition of its targets and recognise that there is a risk that it will incur costs to achieve the proposed target. It is less clear that these additional costs would not be allowed as part of the assessment of Base Costs. As with the other common PCs other than leakage, we were not persuaded that there was sufficient evidence that the PC would represent an unreasonable improvement in performance relative to past achievement as to require an adjustment either to PCs or to the Base Cost assessment. Therefore, we have provisionally decided to keep the level of targets set by Ofwat for this ODI.

7.205 Yorkshire made a different submission about water quality contacts. In its statement of case, it pointed out that water quality contacts are to some extent driven by factors outside the company's control, such as the nature of its water sources and the types of pipes that it has installed.¹²⁴⁰

7.206 We agree that this is relevant to the achievability of the PC. However, the examples Yorkshire gives are factors that a company can control to some extent. It can develop new abstraction sources and manage carefully how it uses the ones it already has. Similarly, it can replace pipes to avoid water quality deteriorations from the cast iron pipes that it already has.

7.207 Moreover, Ofwat calibrated this ODI in terms of the percentage reduction, not each company's absolute performance. That is why Yorkshire has a 2024-25 target of 0.81 contacts per 1,000 population, compared with Anglian's 0.77 and Bristol's 0.68. We consider that this already reflects that different companies have different starting levels of performance, in part due to their existing asset base.

7.208 Therefore, we have provisionally decided not to change the water quality contacts PCs and ODIs set by Ofwat.

Bathing water quality

7.209 Bathing water quality is another comparable bespoke PC. The measure is the number of bathing waters (beaches designated for swimming) rated 'excellent' by the Environment Agency. Ofwat set companies' PC levels based on numbers of bathing waters in each company's region, taking into account the levels the company had proposed.

¹²⁴⁰ Yorkshire SoC, p56

7.210 Ofwat's final determination set Anglian's PC levels (the number of beaches that should meet the 'excellent' standard) to rise from 33 to 36 beaches by 2024-25. The increments to meet the 2024-25 level began in 2022-23, the third year of AMP7.¹²⁴¹

7.211 Ofwat's final determination was that:

- for this PC, the assessment would be made in 2024-25 and not in intervening years;
- the financial incentive would only apply for service delivery calculated for 2024-25;¹²⁴²
- the assessment would use calendar years rather than financial years; and
- bathing water assessments would be based on three years of previous data plus the current year.¹²⁴³ This meant that the 2024-25 assessment would take into account performance in calendar 2024, 2023, 2022 and 2021.

7.212 Anglian's underperformance ODI rate is £-0.2248 million per designated swimming beach below the PC level, and its outperformance ODI rate is £0.1154 million.¹²⁴⁴

7.213 Table 7-15 shows Anglian's proposed PC levels for AMP7, Ofwat's PC levels set in its final determination, and Anglian's ODI rates.

Table 7-15: Anglian's bathing water quality PC levels and ODI rates

	2020-21	2021-22	2022-23	2023-24	2024-25
Anglian proposed PC level	33				36
Ofwat PC level	33	33	34	35	36
Underperformance rate, £m	-0.2248	-0.2248	-0.2248	-0.2248	-0.2248
Collar	25	25	26	27	28
Outperformance rate, £m	0.1154	0.1154	0.1154	0.1154	0.1154
Cap	38	38	39	40	41

Source: Ofwat (2019) [PR19 final determinations: Anglian Water - Outcomes performance commitment appendix](#), section 1.2.5. pp57-59

¹²⁴¹ Ofwat (2019), [PR19 final determinations: Anglian Water – Outcomes performance commitment appendix](#), section 1.2.5. pp57-59

¹²⁴² [Ofwat response to Anglian SoC](#), p141

¹²⁴³ Ofwat (2019) [PR19 final determinations: Anglian Water - Outcomes performance commitment appendix](#), section 1.2.5. pp57-59

¹²⁴⁴ Ofwat (2019) [PR19 final determinations: Anglian Water - Outcomes performance commitment appendix](#), section 1.2.5. pp57-59

Anglian's position

- 7.214 Anglian's business plan forecast was for 33 beaches to meet the 'excellent' standard in 2019-20, the end of AMP6, and for 36 beaches to meet this standard in 2024-25. This number is out of Anglian's total of 49 beaches designated for swimming. Anglian did not propose performance levels for the intermediate years of AMP7.
- 7.215 Anglian challenged the PC levels at draft determination, and in its SoC. It said it was concerned that Ofwat's profile would require improvements to be underway before the beginning of AMP7. It said that the PC level profile would require it to improve outcomes (from 33 to 34) by 2022-23. Anglian said that its PC level profile should not include any increase in 'excellent' bathing waters until year 4 of AMP7, 2023-24.

Ofwat's response

- 7.216 In its response to Anglian's SoC, Ofwat said that it had changed the application of the ODI, from each year in AMP7 to once, at the end of the AMP7 period. This followed representations after its draft determination.
- 7.217 This change meant that using the four-year average would not include any years before the start of AMP7.
- 7.218 Ofwat also said that using rolling averages for assessing performance against PCs was not unusual, mentioning the leakage and per capita consumption PCs.¹²⁴⁵

Our assessment and provisional conclusion

- 7.219 We have reviewed the available detail about the application of this PC to Anglian. We note that Ofwat's change for its final determination means that performance before the beginning of AMP7 will not count towards the assessment for 2024-25. We also note that Anglian was planning to improve performance to have 33, rather than 32, 'excellent' bathing waters in 2019-20, before the beginning of the price control period. This suggests that it was already taking action in AMP6 to improve the quality of its bathing waters not yet at the 'excellent' standard.
- 7.220 We provisionally conclude that Anglian's PC levels, ODI rates and ODI application and timing should not be changed.

¹²⁴⁵ [Ofwat's response to Anglian's SoC](#), paragraph 4.43

Yorkshire low pressure

7.221 As part of its initial business plan, Yorkshire proposed a bespoke PC and ODI for 'low pressure', which was adopted unamended by Ofwat.¹²⁴⁶ The purpose of this ODI is to incentivise the company to reduce the number of properties that are at risk of experiencing or experience their water supply having low pressure. Low pressure is a comparable bespoke PC.¹²⁴⁷

7.222 Yorkshire's PC level for this ODI is 14 properties taken out of the register of those experiencing or at risk of experiencing low pressure in 2020-21, 13 properties in 2021-22, and 12 properties in each year thereafter.¹²⁴⁸ Its PC level is the lowest (best outcome performance) of all companies with this PC, and considerably better than the industry 'good' level as assessed by Ofwat as 0.5 properties per 10,000 connections receiving or at risk of receiving low pressure.¹²⁴⁹ The incentive is a reward as well as a penalty, with a symmetric incentive rate of £139,000 per property.

7.223 During AMP6, Yorkshire's performance was as follows:

- (a) 2015-16: 11 properties;
- (b) 2016-17: 8 properties;
- (c) 2017-18: 11 properties;
- (d) 2018-19: 9 properties; and
- (e) 2019-20: 14 properties.

7.224 We have considered the consumer engagement evidence that Yorkshire submitted with its business plan to justify its proposed incentive rate. This evidence consisted of a mixture of revealed preference evidence and stated preference (survey) evidence, with the latter typically coming out much higher. Despite the large differences in estimates produced by these different methods, Yorkshire and its advisers triangulated the figures to produce a willingness to pay estimate per customer of £0.11 for household customers and £0.15 for business customers. Multiplying by the number of customers

¹²⁴⁶ Ofwat (2019), [PR19 final determinations: Yorkshire Water – Outcomes performance commitment appendix](#), pp111-112

¹²⁴⁷ We note that this ODI corresponds to the DG2: low pressure metric that was used for June Returns in the past, and that was an element of Yorkshire's Asset Health ODI in PR14.

¹²⁴⁸ These are absolute numbers of properties, not proportionate rates, ie this refers to a very small number of properties.

¹²⁴⁹ Ofwat (2019), [Delivering outcomes for customers policy appendix](#), page 201

and applying the formula that Ofwat proposed for calibrating ODIs produced the incentive rate of £139,000.

- 7.225 Our review of this evidence suggests this is a clear example of the difficulty that companies face when surveying customers about performance metrics with which they are unlikely to have personal experience. The fact that the stated preference results were so much higher than the revealed preference results should have cautioned Yorkshire against relying on them, or at least should have caused them to do further work.
- 7.226 We also note that whilst incentives for actions which benefit all or most customers (directly or indirectly) should reflect, with justified interventions by the regulator, the expressed willingness to pay of all customers, different concerns apply for actions which directly benefit a much smaller number of customers. In such cases, we consider that costs should play a part in setting incentives.
- 7.227 For example, only a small number of customers may be at risk of experiencing low pressure. However, every customer may place a small value on not experiencing low pressure (whether or not they are at risk of doing so). Multiplied across the customer base of the company as a whole, this would suggest that customers as a whole value not experiencing low pressure quite highly. However, if that value is then divided among the small number of properties experiencing low pressure, the derived 'value' of solving the problem may exceed the relevant cost. In such a case, an ODI derived in such a way is likely to overstate the value of the remedial action, and so over-incentivise it in comparison with other service improvements that could be made.
- 7.228 We consider that an ODI approach to service improvements that are extremely localised, for example to individual properties, risks over-rewarding (or over-penalising) outturn delivery. While the overall willingness to pay is a useful reference point and could serve as a 'ceiling' for any rate, a cost and benefits analysis should be taken into account in determining the appropriate rate.
- 7.229 In these circumstances, and in light of the above consideration, the CMA has provisionally decided to disallow the reward rate for low pressure that Yorkshire proposed, since there is insufficient evidence that customers are truly willing to pay these amounts for overperformance. Instead, we

provisionally decide to make this ODI penalty-only, consistent with the approach taken by a number of other companies that have similar ODIs.¹²⁵⁰

Overall reward cap

7.230 As noted at paragraph 7.40, Ofwat set a cap on the amount of aggregated outperformance payments a company can earn. This is intended to protect customers from excessive outperformance payments. This cap is set at 3% of the projected RORE. The aggregated outperformance payments are calculated gross, that is, they are not offset by any underperformance penalties the company has incurred in the year.

7.231 Northumbrian submitted that a better approach would be to have net rewards and penalties, rather than gross, and suggested that this be limited to 2% of RORE for any net rewards earned.¹²⁵¹ A net position is where the rewards and penalties are netted off before any caps or collar are applied, for example, 3.5% rewards and 1.7% of penalties results in a net position of 1.8%, and no cap is applied to the rewards. Under Ofwat's approach with a gross limit of 3%, the company would receive lower rewards than under a net approach. The extra 0.5% of rewards would be reduced, as at least half of the benefits above the 'cap' are automatically returned to customers. Northumbrian proposed, on the basis of customer consultation, that there should be a threshold of 2% of RORE based on net rewards.

7.232 Northumbrian said its 'net' proposal strengthened the protection against customer bill volatility, and a further benefit was that it reduced the likelihood that companies' could earn large returns from factors outside of their control, which is not the intention of ODIs. The maximum reward that Northumbrian could receive in each year would be lower under Northumbrian's proposal. However, its 'net' proposal would have the effect of reducing potential penalty rates as well as reward rates for companies.

Our provisional conclusion

7.233 Overall, we have provisionally decided to reject Northumbrian's proposal. We recognise that the 'net' cap does have potential benefits, but at the moment we have not received sufficiently compelling reasons that it is better than the 'gross' cap to make this change.

¹²⁵⁰ Among the companies that have ODIs related to low pressure in some way, Affinity, Hafren, Portsmouth, Southern, and Thames have penalty-only ODIs, whilst Anglian, Bristol and South East Water have a reward rate that is lower than their penalty rate. Only Severn Trent and United Utilities have a symmetrical ODI for low pressure.

¹²⁵¹ [Northumbrian SoC](#) paragraphs 544-562

7.234 Ofwat imposed a ‘gross’ approach to capping rewards, which would be more effective in addressing the risk that the company is able to make very high returns on individual ODIs, for example due to unintended consequences from the difficulty in accurately calibrating a wide range of financial ODIs. The choice between a ‘gross’ and a ‘net’ cap is finely balanced, and we note the proposal for a ‘net’ cap has to date only been supported by one of the four Disputing Companies. On balance, we have decided that the benefits associated with a ‘net’ cap are modest, and we are not persuaded that Northumbrian’s proposal adequately addresses the risk that there might be unexpectedly high rewards arising from some ODIs. We have provisionally decided to retain Ofwat’s approach of a ‘gross’ cap for all the companies.

Overall package of incentives

7.235 We have considered the overall package of PCs and ODIs in light of the provisional decisions we have made on their design including our revisions to the implementation of some of the common and bespoke PCs, and concerns expressed by the companies that the overall package increased the downside risk faced by companies due to asymmetric and penalty only ODIs.

7.236 We considered the effect of our provisional determination on the asymmetry of the package of incentives. We have provisionally concluded that in most cases, Ofwat was justified in including asymmetric incentives, although we have included some moderation of the downside in mains repairs and asset health. The asymmetry of the common PC ODI rates, following our provisional conclusions, are shown in Table 7-16.

Table 7-16: Indicative asymmetry of the package of common wholesale ODIs

	Northumbrian		Anglian		Yorkshire		Bristol	
	Penalty	Asymmetry	Penalty	Asymmetry	Penalty	Asymmetry	Penalty	Asymmetry
£m per annum (Ofwat’s FD)	-28.8	-15.2	-73.3	-35.0	-99.0	-50.2	-5.2	-2.6
£m per annum (CMA PFs)	-27.3	-13.7	-82.5	-42.9	-99.1	-47.2	-5.6	-3.3
% RCV (CMA PFs)	-0.8	-0.4	-1.2	-0.6	-1.3	-0.6	-1.1	-0.6
% RORE (40% equity) (CMA PFs)	-2.0	-1.0	-3.1	-1.6	-3.2	-1.5	-2.7	-1.5

Source: CMA analysis

Note: This analysis includes leakage, which is discussed further in the next section, and where Anglian and Bristol have higher asymmetric incentives under the CMA’s approach, which are affected by the level of the cap and the collar, relative to the PC.

7.237 Our analysis suggests the sum of the exposure for the Disputing Companies to penalties in asymmetric ODIs is in the range of 1-2% of RORE. We have estimated this by reference to collars and stated P10 downside scenarios.

The expected loss will be lower: on the basis that these scenarios represent P10 estimates, the expected loss would be of the order of 0.1%-0.2% RORE. This is only intended to be a broad estimate of the scale of downside risk for an averagely efficient company: in practice the risk of P10 downside across the package of PCs resulting in 1-2% downside will be small, but there is a greater likelihood than that of smaller penalties in respect of penalty-only ODIs. Based on our in-the-round assessment of the package of ODIs, we consider that 0.1%-0.2% of RORE is a reasonable estimate of the expected loss from the asymmetric incentives for an average performing company.

- 7.238 This analysis does not include bespoke ODIs and is only intended to be indicative of the overall scale of risk associated with the package of ODIs. It does not include asymmetric ODIs relating to clawback of enhancement totex allowances, including for leakage, as these ODIs are intended to balance the risk to customers from under-investment.
- 7.239 In our view, overall (including taking account of our provisional determination on leakage in section 8) the package of PCs and ODIs is not inappropriately unbalanced. However, we note that some of the incentive rates nevertheless create a downside risk against expected performance, which should be considered as part of the overall balance of risk in the price control. Our provisional conclusions on the cost of capital (see paragraphs 9.670 and 9.673) and financeability (see paragraph 10.72) take into account the effects of the overall package of PCs and ODIs, including the scale of risk faced by the companies and the asymmetry of the package of ODIs.

Summary of our provisional determinations

- 7.240 We consider that it is appropriate to set a package of challenging PC targets. Overall, we have not found evidence to suggest that the structure of the PCs and ODIs should be changed significantly. We have broadly retained the same structure of caps, collars, deadbands and use of asymmetric rates, subject to some revisions below.
- 7.241 We have considered Ofwat's adoption of upper quartile PC standards for supply interruptions, pollution incidents and internal sewer flooding, and we provisionally conclude that the PC levels for the three common level PCs are appropriate. We provisionally reject any requests for cost allowances to be made to achieve the targets set except for Yorkshire for internal sewer flooding. We have provisionally determined a slightly higher penalty collar for Yorkshire in respect of internal sewer flooding, and a slightly higher penalty collar for Anglian in respect of pollution incidents.

7.242 We have retained the same PCs and ODIs as proposed by Ofwat in PR19. We have provisionally decided on some minor changes to the detail of how six of the common PCs have been implemented for the Disputing Companies.

7.243 We have provisionally determined:

- (a) to reduce Bristol's per capita consumption ODI rates;
- (b) on unplanned outages and mains repairs, an underperformance deadband should apply for each year for each of the four Disputing Companies; and
- (c) to disallow the reward ODI rate for Yorkshire's low pressure PC.

7.244 We have provisionally concluded not to change the overall reward cap.

7.245 Our provisional conclusions on the revisions to the PC arrangements set at PR19 (excluding leakage, see section 8) are summarised in Table 7-17.

Table 7-17: CMA provisional determinations in respect of PCs and ODIs

Category	PC	CMA decision by comparison to Ofwat's FD
Common performance measures	Water supply interruptions	no change
	Pollution incidents	Anglian: increase collar to 41.6
	Internal sewer flooding	Yorkshire: increase collars in years 2,3,4 and 5
Reducing demand	Leakage	All four companies: remove enhanced ODI rates and for three companies, adjust their funding, and amend Tier 1 penalties, Bristol: reduce ODI rates to £-0.03m and £0.025m
	Per capita consumption	
Statutory measures	Compliance risk index	no change
	Treatment works compliance	no change
Asset health measures	Mains repairs	Deadband of 10 for all four companies
	Unplanned outage	Deadband of 1.2 x PCL for all four companies
	Sewer collapses	no change
Vulnerability measures	Priority services register	no change
Bespoke ODIs	Low pressure	Yorkshire: remove outperformance incentive
	Water quality contacts	no change
	Bathing water quality	no change
Other	Overall RORE reward cap	no change, pending additional evidence

Source: CMA

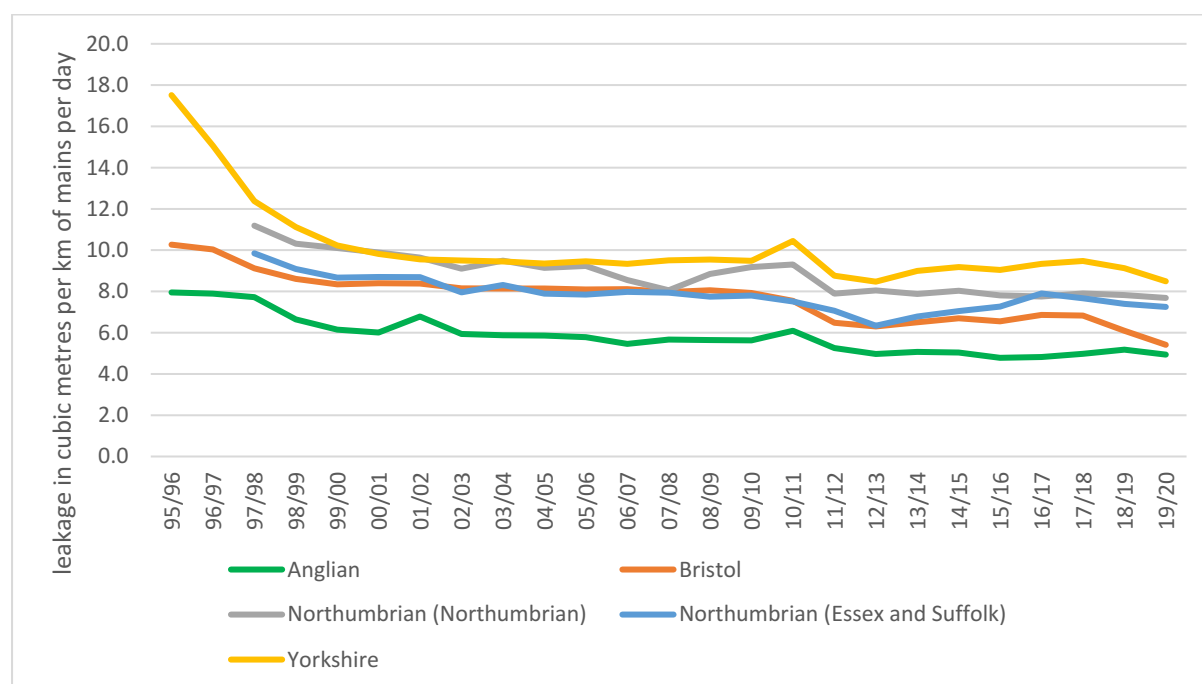
8. Leakage

Introduction

- 8.1 In this section we consider issues of funding and incentives in relation to leakage and set out our provisional determinations on the appropriate adjustments to each Disputing Company's Totex allowances for leakage costs and the relevant PCs and ODIs.
- 8.2 We have treated leakage as a separate section due to the interaction of funding and outcome incentives in relation to reducing leakage, and because of the importance that has been given to leakage in the SPS and in Ofwat's determination. As noted at paragraphs 2.112-2.117, Ofwat attached significant weight to industry performance on leakage in forming its views on the need for a step change in its regulation.
- 8.3 The government's SPS for Ofwat emphasised the importance of reducing the industry's demand for water, met by abstraction of raw water and driven by consumption of clean water, wastage in water treatment and wastage in distribution (leakage). In order to achieve that goal, the government wrote that it expected Ofwat to 'promote ambitious action to reduce leakage and per capita consumption, where this represents best value for money over the long term, including exploring setting targets in future.'¹²⁵²
- 8.4 The background to the government's and Ofwat's concern about leakage is the companies' performance since the start of the century. The four Disputing Companies' leakage rates (in terms of cubic metres per km of mains per day) since 1995 are shown in Figure 8-1. The Figure shows separate leakage rates for Northumbrian's Essex and Suffolk operating area and its Northumbrian area.

¹²⁵²Defra (2017), *The Government's strategic priorities and objectives for Ofwat*, paragraph 15

Figure 8-1: Historic leakage performance of the Disputing Companies, cubic metres of leakage per km of mains per day



Source: CMA analysis. Numbers show cubic metres of water lost per km of mains per day

8.5 As Figure 8-1 shows, the performance of the companies typically improved rapidly following privatisation. The rate of improvement has fallen markedly since the turn of the century, and in some years has failed to improve at all. This is despite continuing improvements in methods and technologies to pre-emptively prevent leaks and to detect and remedy leaks that do occur.

8.6 For example, Ofwat has referred to:

many ... leakage reduction solutions that are proven (such as pressure management, transient event identification and removal, targeted mains replacement and renewal, communication and customer side leakage activity). Companies identify other emerging capabilities (such as smart networks, 'calm networks' and innovative repair techniques) which could prove to be highly beneficial.¹²⁵³

8.7 The Disputing Companies all told us about the techniques they employ to detect and prevent leaks. For example, Anglian said:

Anglian goes beyond using active leakage control which only targets visible leaks, to constantly innovating with new leak-detection technologies such as thermal imaging drones (which

¹²⁵³ Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), p59

identify differences in soil temperature which could be caused by water escaping from a pipe), acoustic noise logging, satellite imagery and analytics and smart meters to help locate otherwise elusive leaks in a time- and cost-efficient way. Anglian also has a pressure calming programme to reduce leakage, reduce pressure transients and prevent mains bursts... Leak detection ...solutions are more costly in the short term but cheaper in the long-term.¹²⁵⁴

- 8.8 It is inevitable that water networks which are many years old such as those in England and Wales will have some leakage, and there is no suggestion that the sector should target to remove all leakage. However, leakage remains at what appear to be very high levels. As shown in Figure 8-1, in 2019-20 the Disputing Companies still lost between 4.5 and 8.5 cubic metres of water to leakage per km of water mains each day, on average. This is equivalent to 15%-22% of all water that enters their distribution networks.

Ofwat's approach to setting targets for leakage

- 8.9 The objective of setting leakage targets that are in the best interests of customers, has in the past been understood to mean that companies should reduce leakage where the benefits of doing so outweigh the costs, as assessed under an agreed economic framework.¹²⁵⁵
- 8.10 When setting leakage targets in the past, Ofwat used a SELL model (described at paragraph 4.127) to carry out such analysis.¹²⁵⁶ SELL is the level of leakage where the incremental costs and benefits of reducing leakage are exactly equal, taking into account both the costs and benefits to the company, and the costs and benefits to other affected parties.
- 8.11 This approach of assessing the wider costs and benefits of reducing leakage allows the target to be determined based on a measure which includes the social and economic costs of abstracting water and of leakage. For example, higher leakage means higher abstraction, and if that abstraction is from vulnerable sites, that imposes a particular cost on the environment. Similarly, if leakage is in urban areas both the leak and its repair may interfere with normal traffic flows, which imposes a social cost on the users of the streets.
- 8.12 Such an approach accepts that allowing a degree of leakage is efficient. It is difficult to apply in practice, in particular estimating these social and

¹²⁵⁴ Anglian SoC p259

¹²⁵⁵ For example see Ofwat *Final Determinations Future Water and Sewerage Charges 2000-2005*, p127

¹²⁵⁶ SMC (2012), *Review of the calculation of sustainable economic level of leakage and its integration with water resource management planning*, report

environmental costs is difficult. But this approach may also be flawed in the incentives it creates regarding continuous improvement.

8.13 Ofwat told us that it was concerned because the SELL concept starts from each company's own costs, meaning that an inefficient company that spends more money on detecting and repairing leaks would then have a higher SELL. Because of that, it said, the use of the SELL concept has led to stagnation in leakage performance. It removed the incentive to get more efficient at leakage prevention, detection, and repair, which would have led to improved leakage performance.¹²⁵⁷ The resilience objective, introduced in the Water Act 2014, and the SPS in 2017 both place increased attention on leakage reductions.

8.14 Ofwat therefore decided to move away from the SELL approach. Ofwat's approach moved to developing targets for leakage reductions. In designing targets, Ofwat said:

Leakage is a high profile and important issue for customers, companies and regulators. Reducing leakage levels is important for ensuring resilient future supplies as we are faced with challenges such as climate change and population growth. Many customers see reductions in leakage as a prerequisite to taking steps to reduce their own water consumption.¹²⁵⁸

8.15 In July 2017 Ofwat published its methodology consultation, which included a challenge to the water companies. Ofwat suggested that water companies should include at least a 15% reduction in leakage in their PR19 business plans.¹²⁵⁹ Almost all companies took up this challenge.

8.16 In PR19, Ofwat set PCs for leakage as percentage reductions compared with the 2019-20 level, using three-year running averages (to reduce the impact of variability arising from events - typically extreme weather - outside management control). These percentage reductions were based on the companies' business plans, which were themselves influenced by Ofwat's stated target of a 15% reduction. Ofwat then adjusted some of the targets in a way that was comparable to its approach to other common PCs as described in section 7.

¹²⁵⁷ See for example the results from the SMC 2012 review set out in Ofwat's [Cost efficiency – response to common issues in companies' statements of case](#) p56.

¹²⁵⁸ Ofwat (May 2020), [Cost efficiency – response to common issues in companies' statements of case](#) paragraph 5.3

¹²⁵⁹ Ofwat (2017), [Delivering Water 2020: Consulting on our methodology for the 2019 price review](#), pp68-70

8.17 In PR19, Ofwat set the following PCs for leakage, see Table 8-1. We have added a line showing the combined commitment of Northumbrian for its two regions.¹²⁶⁰

Table 8-1 Disputing Companies' leakage PC levels

	% reduction on 2019-20				
<i>Company</i>	<i>2020-21</i>	<i>2021-22</i>	<i>2022-23</i>	<i>2023-24</i>	<i>2024-25</i>
Anglian	1.4	5.6	8.5	12.4	16.4
Bristol	6.1	11.4	15.8	19.0	21.2
Northumbrian (NR)	1.0	3.0	6.0	9.0	12.0
Northumbrian (ESK)	1.3	3.7	7.2	10.5	14.1
<i>Northumbrian (combined)</i>	<i>1.1</i>	<i>3.2</i>	<i>6.4</i>	<i>9.5</i>	<i>12.7</i>
Yorkshire	3.4	7.4	9.4	11.7	15.0

Source: Ofwat Final Determinations, CMA analysis for Northumbrian (combined)

8.18 We note that these PCs are broadly consistent with the WRMPs that the companies have developed in parallel to their business plans.¹²⁶¹ The goal of WRMPs is to ensure that all water resources zones have adequate supply-demand balance,¹²⁶² and one way to do that is to reduce leakage. WRMPs typically have a long-term (25 years) and short-term (5-years) leakage target, particularly when there is a supply-demand deficit. Since the 2019 WRMPs and the PR19 business plans were developed in tandem, they generally have the same or similar leakage targets.

8.19 In their submissions to this determination, all the companies and Ofwat have indicated that they agree that it is appropriate for AMP7 to undertake an additional challenge on leakage relative to performance in recent periods. Northumbrian raised concerns about the design of the leakage PC and suggested that the baseline for leakage reduction should be based on AMP6 targets, rather than 2019-20 actuals.

8.20 However, none of the Disputing Companies explicitly asked us to move away from Ofwat's approach to designing the PCs of requiring a material reduction in leakage.

¹²⁶⁰ During our redeterminations, Northumbrian and Ofwat discovered that an error had been made in setting Northumbrian's Performance Commitments. The Parties agreed on an alternative set of commitments, which is shown in the table.

¹²⁶¹ See 'environmental improvements' in paragraph 5.7 of Section 5 on Enhancement. WRMPs are a statutory requirement. Ofwat in its July 2017 consultation [Delivering Water 2020: Consulting on our methodology for the 2019 price review](#), and its final statement [Delivering Water 2020: Our final methodology for the 2019 price review](#) said that water companies should integrate their WRMPs into their business plans for reducing leakage.

¹²⁶² WIA91 [Part III, Chapter 1](#)

Our provisional decision on the leakage PCs

- 8.21 We accept Ofwat's position that the average company should be able to deliver a substantial improvement in leakage performance by adopting the technologies and other best practices that have been developed in the last 20 years.¹²⁶³ The Disputing Companies showed us a variety of different approaches and technologies which they had introduced or were implementing at the 'virtual site visits'. Our engineering advisers also told us that the PCs were achievable, but would be likely to require additional expenditure, at least for some companies. We discuss the costs associated with achieving improvements in leakage in the next section.
- 8.22 We are also conscious of the Secretary of State's statement about leakage in the SPS. We are required to act in accordance with the SPS, in the same way as Ofwat). The SPS requires Ofwat to promote ambitious action to reduce leakage and per capita consumption, where this represents best value for money over the long term.
- 8.23 We saw a number of examples of best practice which illustrate why significant changes should be possible in AMP7. We therefore accept that an approach which imposes leakage targets that requires all the companies to achieve significant reductions across the sector is likely to deliver net benefits and therefore to represent value for money at least in this period. The sector-wide challenge should provide opportunities to identify best practice and to act as a starting point in moving towards longer-term efficient levels of leakage.
- 8.24 We would however expect that the development of leakage targets beyond AMP7 would build on the experience in developing a broader assessment of the benefits of leakage against the costs, including the longer-term environmental benefits. This would allow targets beyond AMP7 to be set in a way which promotes efficiency across the sector and is consistent with the long-term value for money criterion in the SPS.
- 8.25 We therefore consider that there are good reasons to put in place performance targets which require a material increase in the rate of leakage reduction by comparison to previous periods. We have not seen evidence to suggest that there are better alternatives available to determine leakage targets for AMP7, and the companies have agreed with Ofwat's substantial targets as part of the price control and WRMP processes.

¹²⁶³ Ofwat (May 2020), [Cost efficiency – response to common issues in companies' statements of case](#), paragraph 5.43

- 8.26 As a result, we provisionally decide to retain the PCs for leakage reduction set by Ofwat (as in Table 8-1).
- 8.27 We considered Northumbrian's concerns about how the baseline target for leakage was determined. Northumbrian identified a theoretical concern which we agree should be considered in designing PCs over time. We did not see any evidence that the actual targets Northumbrian has to achieve under this approach are inconsistent with the objectives of the leakage PCs, and do not propose to make any changes specifically for Northumbrian.
- 8.28 In paragraphs 8.75 to 8.99 we consider the structure of ODIs attached to these PCs.

Leakage Totex

Introduction

- 8.29 In this section, we consider allowances for funding for leakage reduction measures. Reducing leakage rates will require companies to take measures both to detect and repair leaks, and also to reduce the risk of leakage in the first place.

Parties' submissions on the costs of reducing leakage

- 8.30 The Disputing Companies submitted that they could not deliver the leakage levels they had committed to without more funding than was implied in the Ofwat base cost models. Northumbrian told us that it proposed to cover the shortfall from its own resources. The other companies asked us to make a variety of base cost adjustments and enhancement cost allowances.¹²⁶⁴

- 8.31 Anglian said:

Anglian is unable to deliver on the plans its customers have consistently supported as Ofwat has: (i) allowed a level of base costs that is far below what is required to maintain Anglian's current frontier performance; (ii) compounded the problem by allowing insufficient Enhancement costs to shift the leakage frontier further during AMP7 in line with Anglian's performance commitment level ('PCL'), a task already made impossible by the

¹²⁶⁴ While Northumbrian did not ask for a base cost adjustment or for enhancement Totex, it did say that 'a consistent approach would be appropriate'. Our analysis focuses on the amounts that Northumbrian and the other Disputing Companies told us they would need to spend, rather than the adjustments they asked us to make to Ofwat's approach.

insufficient level of base costs to maintain current performance...¹²⁶⁵

8.32 Bristol said:

In the Final Determination, Ofwat only made allowances for the marginal cost of leakage reduction activities that take companies beyond the upper quartile level of performance, classed as enhancement expenditure. However, Ofwat has made no specific cost allowance for leakage expenditure below the upper quartile level of performance, and these activities must be funded from base expenditure. In our case, the base cost allowance is insufficient to fund these activities.¹²⁶⁶

8.33 Northumbrian said:

This unprecedented reduction in leakage may be possible, but will require sustained investment in new technology and infrastructure. This will be a significant challenge given the other elements of the PR19 framework which set a tough cost challenge. These stretching targets have not been accompanied by the additional funding for the investment required to deliver them.¹²⁶⁷

8.34 Yorkshire had proposed a more stretching 25% leakage reduction target to Ofwat, but sought more funding to meet that target.¹²⁶⁸ It told us:

As regards leakage, Ofwat relies upon econometric models using an implausibly low estimate for the additional cost for an efficient company of meeting Ofwat's stretching leakage performance commitment.¹²⁶⁹

8.35 In their submissions, the Disputing Companies have typically adopted a distinction with respect to the costs of leakage: that base cost adjustments are meant to cover any unusual costs associated with maintaining current levels of leakage while enhancement costs are meant to cover the cost of reducing leakage relative to the status quo level which is based on actual leakage levels in 2019-20. Three of the Disputing Companies requested additional funding in the form of a base costs adjustment and/or for enhancement

¹²⁶⁵ Anglian SoC, paragraph 83

¹²⁶⁶ Bristol SoC, paragraph 370

¹²⁶⁷ Northumbrian SoC, paragraphs 539-540

¹²⁶⁸ Yorkshire SoC, paragraphs 162-163

¹²⁶⁹ Yorkshire SoC, paragraph 142b

expenditure. Northumbrian did not request a base cost nor an enhancement cost adjustment.

8.36 Ofwat's policy position was that its 15% baseline challenge should be funded from existing base cost allowances.¹²⁷⁰ Ofwat's rationale for this approach was that:¹²⁷¹

- (a) In recent AMPs, there had been virtually no improvement in leakage, suggesting that the companies had not invested sufficiently in leakage improvements. As such, it considered it would be fair that they should now start to reallocate monies for the 'catch-up' that they were now being asked to undertake.
- (b) There was ample scope for innovative approaches, which should allow the companies to achieve significant leakage reductions at little or no cost.¹²⁷²
- (c) The companies could fund part of any additional costs associated with meeting the leakage target through the cost sharing mechanism. Moreover, if they overperformed their targets, the costs of doing so would be met through ODI rewards as well.

8.37 Ofwat therefore rejected any increased base cost allowances for leakage expenditure at PR19 for the four Disputing Companies, with the exception of Anglian. Anglian was allocated an extra £50.2 million from the results of Ofwat's alternative econometric model specifications, some of which included models with leakage performance as a cost driver.¹²⁷³ Anglian told us that £24.5 million of this £50.2 million base cost adjustment related to leakage.¹²⁷⁴

Assessment of base costs for leakage

8.38 This section considers the need for changes in base cost allowances to reflect differentials in the current level of leakage between the different water companies.

8.39 Anglian, Bristol and Yorkshire have advocated that leakage should be included as a variable in our base cost models. They said that if we were to include leakage in the base models, then the models could be used to directly

¹²⁷⁰ Ofwat (May 2020) *Cost efficiency – response to common issues in companies' statements of case*, paragraphs 5.20, 5.45, and 5.53, in particular.

¹²⁷¹ For example, the bullets listed in *Cost efficiency – response to common issues in companies' statements of case*, paragraphs 5.53-5.54

¹²⁷² For example, *Cost efficiency – response to common issues in companies' statements of case*, paragraph 5.43

¹²⁷³ Further detail on the alternative model specifications is provided in Section 4, paragraphs 4.35-4.252.

¹²⁷⁴ *Anglian SoC*, paragraph 900

determine any additional costs associated with improvement in leakage between AMP6 and AMP7. For the reasons set out in (see paragraphs 4.134-139), we provisionally decide not to do so, nor to retain the alternative modelling approaches developed by Ofwat that included leakage as a cost driver.

- 8.40 Our provisional decision on the Disputing Companies' Totex results in a change to Anglian's Totex allowance. Part of this change is the removal of the £50.2 million that Anglian received from the alternative econometric modelling specifications, which were influenced by Anglian's lower leakage rate (and where £24.5 million related to leakage, see paragraph 8.37). The reasons for removing this £50.2 million are explained in paragraph 4.147-4.149.
- 8.41 We note, however, that this decision does not rule out an adjustment to base costs altogether. It simply means that any such adjustment cannot be based on econometric modelling of costs. Instead, we consider the case for a company-specific adjustment to reflect different performance in leakage relative to the outputs of the base models.
- 8.42 At a high level, Anglian, Bristol, and Yorkshire all argued that maintaining lower leakage levels was more expensive than maintaining higher leakage levels.¹²⁷⁵ Our engineering adviser was of a similar view. To maintain a lower level of leakage, a company needs to spend more money on both Capex (such as noise sensors to find the leaks) and Opex (such as staff to repair the leaks). Given the limited asset life of the Capex involved, these expenditures needed to be made on an ongoing basis.
- 8.43 In our view, since all companies incur these costs, and have incurred these costs throughout the period covered by the base cost models, an allowance for them is implicit in the base cost allowances. It is consistent with the overall incentive framework that the base cost model should provide an allowance which would be sufficient to deliver upper quartile performance. In addition, those companies with better leakage performance may also gain from some of the wider benefits of reduced leakage.
- 8.44 We have provisionally concluded that companies at or below upper quartile should therefore be able to maintain their current level of leakage without any need for an adjustment to base costs. This is consistent with the overall approach to benchmarking, which assumes that all firms should be expected

¹²⁷⁵ For example Bristol referred to Assessing Ofwat's Funding and Incentive Targets for Leakage Reduction commissioned from NERA by a number of water companies (including Anglian and Yorkshire) to assess Ofwat's funding and incentive targets for leakage reduction. NERA showed that the marginal cost of leakage reduction rises as companies reduce leakage to lower levels.(see [Bristol SoC](#), paragraph 386).

to move towards upper quartile performance, and that the base cost allowance is expected to represent a sufficient allowance for them to do so.

- 8.45 If we assume that there is a link between current performance on leakage and the costs to achieve them, then those companies currently performing better than upper quartile are likely to be incurring more cost than will be reflected in the base cost models. In order to maintain their current level of performance, these high performing companies would be expected to incur costs that exceed the implicit allowance for leakage costs that is included in the base cost allowance. This is consistent with the principles followed by Ofwat in allowing Anglian a base cost adjustment. Given that these are high performing companies on a metric where Ofwat is encouraging sector-wide improvement, we therefore agree with Anglian's position¹²⁷⁶ that this should be recognised in setting an adjustment to base costs.
- 8.46 However, 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. We do not agree with Anglian¹²⁷⁷ that it should be funded in addition to base Totex for all of the costs which it has identified as being associated with achieving leakage targets, and for the reasons in paragraphs 4.120 to 4.141 we were not persuaded by any of the economic models put to us which might allow for modelling of the additional costs associated with the highest level of performance. We have some concerns that the reasons for high performance are likely to be a combination of regional differences, historical levels of investment and past efficiency in achieving targets.
- 8.47 We therefore provisionally decide to allow the high performing companies a share of their stated base expenditure to achieve leakage targets, on the basis that much but not all of this expenditure should already be included in an efficient level of base Totex. We provisionally decide that this should be achieved by giving the companies with above upper quartile performance a share of the amount they said they would need to spend, the share corresponding to the percentage by which each company outperformed the upper quartile in 2019-20.¹²⁷⁸ This increases the additional allowance in proportion to how close they are to frontier performance and therefore how challenging it is likely to be to maintain these levels.

¹²⁷⁶ [Anglian SoC](#), paragraphs 1036-1039

¹²⁷⁷ [Anglian SoC](#), paragraph 1069

¹²⁷⁸ For the purposes of this exercise, we have standardised leakage performance in terms of leakage per length of mains per day.

- 8.48 As a result, the higher performing companies will receive a higher additional allowance. Companies that were below the upper quartile will not receive any additional allowance but will not be penalised as they also have to improve relative to historical performance. On balance, we consider this provides some additional benefits to the highest performing companies without overcompensating companies through large company-specific adjustments which would be likely to double count other allowances.
- 8.49 Anglian outperformed the upper quartile by 19%.¹²⁷⁹ Under our proposal, it will receive an adjustment equal to 19% of the base cost amount it said it was going to spend on maintaining current levels of leakage. Likewise, since Bristol outperformed the upper quartile by 4%,¹²⁸⁰ it will receive 4% of the amount it said it was going to spend. The CMA's provisional view is that, together with the implicit allowance for leakage costs in the base cost allowance, this provides a total cost allowance which appropriately balances the need to allow companies to recover leakage costs with consumers' interests.
- 8.50 On that basis, the CMA's provisional decision is that Anglian should receive an adjustment to base costs for leakage of £25.7 million for AMP7, Bristol should receive an adjustment of £539k, and the other two Disputing Companies (Northumbrian and Yorkshire) should not receive an adjustment to base costs for leakage. This is shown in Table 8-2:

Table 8-2: CMA provisional determination of adjustments to base costs for leakage

<i>Companies</i>	<i>AMP7 Base Cost Adjustment for Leakage Expenditure in CMA PFs (£ million)</i>	<i>Difference to Ofwat FD19 (£ million)</i>
Anglian	£25.723m	+£1.2m
Bristol	£0.539m	+£0.539m
Northumbrian	-	-
Yorkshire	-	-

Source: CMA analysis

Assessment of Enhancement Costs adjustments for leakage

- 8.51 This section considers the need for additional cost allowances to reflect the reduction in leakage relative to a level which should be achievable through the base cost allowances. Any additional cost allowances above base are included within enhancement costs.

¹²⁷⁹ Based on CMA analysis of the performance of each firm relative to the upper quartile performance, using the 3 year average level of leakage (2017-18 to 2019-20). Leakage was assessed based on cubic metres per km of water main per day. The base cost adjustment request from companies was taken from company responses to a CMA RFI.

¹²⁸⁰ Based on the same approach as for Anglian.

- 8.52 Ofwat's policy position in respect of enhancement costs for leakage was that a company should not receive enhancement funding for leakage reduction unless their forecast absolute level of leakage for 2024-25 was in the upper quartile of forecasts for that year.¹²⁸¹ In respect of the Disputing Companies:
- (a) For Anglian, which was an upper quartile performer, Ofwat allowed £71.4 million compared to the Company final business plan position of £76.9 million;
 - (b) For Bristol, which was also an upper quartile performer, Ofwat allowed the full £4.8 million that the Company had requested;
 - (c) Northumbrian did not request any leakage enhancement Totex in its business plan, or in its statement of case to the CMA;
 - (d) Yorkshire's performance on leakage was not upper quartile, so it did not qualify under Ofwat's approach for consideration for additional leakage enhancement expenditure. Yorkshire told the CMA it needed £94.7 million of enhancement Totex for leakage.
- 8.53 Ofwat allowed enhancement costs related to leakage as part of its supply-demand balance feeder model. However, it did so only for the companies whose forecast performance for 2024-25 was in the upper quartile (Anglian and Bristol among the Disputing Companies).
- 8.54 Our assessment of the Disputing Companies' submissions on enhancement costs for leakage reduction proceeded on the basis of two initial questions:
- (a) Is there already an implicit allowance for leakage reduction costs in our base cost allowances?
 - (b) If not, is there a reason why a company should not be able to recover these costs from customers?
- 8.55 With regard to the former question, the Disputing Companies have pointed out that there was, on average, little improvement in leakage performance during the eight-year period considered by our base cost models (see section 4]). Instead, during this period each company continued to make investments in leakage equipment, and in ongoing operating costs, whilst only broadly maintaining or slightly improving leakage. As discussed above, we have provisionally concluded that for most companies, the base cost models can be

¹²⁸¹ Ofwat (May 2020), *Cost efficiency – response to common issues in companies' statements of case*, paragraph 5.23

assumed to allow sufficient costs to achieve upper quartile leakage performance.

- 8.56 The Disputing Companies contrasted this with the approximately 15% reduction in leakage they are being asked to deliver during AMP7, which they considered constituted an enhancement in their performance which needs to be funded separately.
- 8.57 We provisionally agree that there will be an additional cost associated with this level of leakage reduction. The Leakage PC target represents a step change in expectations compared to the last decades. Therefore, it cannot be said that the Disputing Companies can achieve this leakage reduction goal by following the same practices to address leakage performance as during the eight-year period considered by our base cost models. They will have to do substantially more. This may also include exploring and adopting new approaches to reduce leakage. We expect that this will mean additional cost and our engineering advisors confirmed that this was likely to be the case.
- 8.58 This distinguishes leakage from the other PCs discussed in section 7, where the targets, even where set at upper quartile, represent the continuation of existing trends of improvement in industry performance.
- 8.59 On the basis that any costs of achieving the leakage reduction targets will not be included in base cost models, the question remains whether companies should be allowed to recover these costs from customers. The most obvious reason why we might refuse this is if the companies had voluntarily chosen to underperform in the past. If the companies are consistently challenged to improve their leakage performance, and consistently funded to do so, they should not be funded for that same leakage reduction again if they do not deliver it the first time.
- 8.60 Throughout the redetermination process, Ofwat has made statements that seem to imply that it viewed the situation in this way. For example, Ofwat told us:
- (a) 'Performance on leakage has stagnated for considerably longer. Over the past two decades, despite material technological progress, the sector has achieved no overall reduction in leakage at the sector level. (...) This trend has masked some large reductions in leakage from individual

companies – showing that considerable reductions are possible – and substantial deterioration in other companies.’¹²⁸²

(b) ‘We consider the targeted efficiency challenge well justified, given the poor performance by most of the sector over leakage over the last 20 years and the central importance of the issue to customers. And the scale of technological change over recent years should allow companies to reduce leakage efficiently.’¹²⁸³

- 8.61 These statements from Ofwat indicated that it appears to be of the view that the companies should have been spending money on new technologies that would have allowed them to continue to improve their leakage performance (to upper quartile levels), but that they have spent their money on other things instead. If we accept that view, it would follow that there would be no need for leakage enhancement costs now, because the companies would have already been allowed that funding in the past.
- 8.62 We have provisionally decided that there is not sufficient evidence to disallow non-upper quartile performers (Yorkshire and Northumbrian) from recovering the costs of achieving leakage reductions. Our analysis of the leakage targets that were set in the past, and the Totex allowances that were given, suggests that historically both were set in tandem. As Ofwat explained to us, the leakage targets were set based on the SELL approach,¹²⁸⁴ and accordingly there was little need for additional funding related to leakage. That is, different companies were set different targets based on how (supposedly) efficiently they were able to reduce leakage, but also based on other factors such as their supply-demand balance. For a company such as Yorkshire this would have typically meant a leakage target that was not very challenging compared with those of other companies (because it was not as water constrained as some other companies), but with no built-in opportunities to earn outperformance rewards.
- 8.63 The evidence suggests that the leakage targets that Ofwat set in the past were appropriately funded, and that the companies generally met those targets. We have not seen any evidence that the Disputing Companies,

¹²⁸² Ofwat (March 2020), [Reference of the PR19 final determinations: Overview](#), paragraph 2.9, as well as Ofwat (May 2020), [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies’ statements of case](#), paragraph 5.17, which is in identical terms.

¹²⁸³ Ofwat (May 2020), [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies’ statements of case](#), paragraph 7.16.

¹²⁸⁴ Ofwat (May 2020), [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies’ statements of case](#), fn 250.

specifically, profited by underperforming their leakage targets, or by obtaining excessively generous funding for those targets.

- 8.64 Therefore, we provisionally conclude that the Disputing Companies which identified that they required enhancement cost funding for achieving the leakage reductions they committed to should be allowed the efficient cost of doing so, regardless of their current performance relative to other companies. We consider that this approach balances the benefits to customers from improvements in leakage, with allowing the companies to recover efficient costs of achieving these improvements.
- 8.65 In order to estimate the efficient cost of delivering a leakage reduction for the upper quartile companies that it allowed to recover costs, Ofwat used a unit cost model.¹²⁸⁵ However, this unit cost model only takes into account the enhancement costs that the companies put forward for funding, not the costs they anticipated incurring that they planned to pay for themselves, or the costs that they assumed would be included as an implied allowance in the base cost allowance they were expecting to receive. Therefore, there is no unit cost for Northumbrian included in the model, for example, and there is such a wide range of unit costs identified by that model that we have concerns about its reliability in predicting the unit costs for the Disputing Companies.
- 8.66 Therefore, we have provisionally decided not to use a unit cost model for leakage enhancement Totex. Instead, as the most practical approach, we have decided to follow the approach that was used by Ofwat, and also in this determination in other areas of enhancement spend. We propose to make an allowance to reflect the investments identified by the companies, and that this allowance should be subject to a review of the need for the additional costs included in the companies' business plans to achieve the additional reductions in leakage required by the PCs. We intend to undertake this review, which results from our provisional decision not to follow Ofwat's approach in this area, between our provisional and final determination.
- 8.67 We intend to ask the companies which have requested allowances for enhancement Totex for further information to confirm the details of the spend which they have proposed. We will be seeking to confirm the link between the proposed enhancement spend, and the achievement of the reduction in leakage. We will review the information provided to assess whether it provides sufficient confidence that the level of expenditure proposed will be in customers' interests.

¹²⁸⁵ This model is included in Ofwat's feeder model for wholesale water enhancement Totex: supply-demand balance, which is published as part of its [final determination models](#).

8.68 As an indication of the effect of this approach, we have calculated provisional allowances for the three companies assuming we follow the approach taken to shallow dives. In this scenario, we have taken each company's efficiency factor, as derived from the base cost models (see paragraph 5.148-5.156), and applied it as a reduction against the amount the company said it would need to spend on enhancement, with a maximum reduction of 10% (see paragraph 5.154). We have also assumed that we would apply the frontier shift adjustment challenge and incorporate Real Price Effects into this allowance calculation, as set out in paragraphs 5.516-5.520.

8.69 Table 8-3 shows the provisional CMA allowances for leakage enhancement spend for the four Disputing Companies, in the scenario that we follow the approach taken to shallow dives:

Table 8-3: Provisional determination of allowances for leakage enhancement

<i>Companies</i>	<i>AMP7 Enhancement Cost Adjustment for Leakage Expenditure in CMA PFs (£ million)</i>	<i>Difference to Ofwat FD19 (£ million)</i>
Anglian	£68.0m	(£3.4m)
Bristol	£4.3m	(£0.5m)
Northumbrian	-	-
Yorkshire	£93.3m	£93.3m

Source: CMA analysis

8.70 As noted above, Northumbrian did not seek additional adjustments for enhancement costs relating to leakage reduction. It told us that this was part of its approach to setting stretching targets for performance and efficiency in its plan. While it provided an estimate of the cost of achieving the new target reduction, it did not distinguish between base costs (to hold current leakage levels) and enhancement to achieve the incremental reduction. Northumbrian gave us no evidence to indicate that it needed an adjustment to its Enhancement Cost allowance to achieve the leakage reductions.

8.71 Yorkshire's provisional additional allowance for leakage enhancement arises because it did provide evidence that there was a need for enhancement expenditure, but it did not qualify under Ofwat's approach for consideration for additional leakage enhancement expenditure as it was outside the upper quartile. We have provisionally decided to follow an approach which would allow Yorkshire to recover the cost of this investment, if it is able to demonstrate that the costs are needed to deliver the leakage improvements in the plan and required by the leakage PC.

Provisional conclusion

8.72 Using this methodology, we provisionally find that the Disputing Companies should be allocated the following funding for maintaining and reducing their

leakage levels for AMP7 (above their overall base funding). The enhancement Totex funding is indicative and subject to review of the supporting evidence that the Totex is needed to achieve the leakage reduction:

- (a) Anglian: £25.7 million for base costs,¹²⁸⁶ £68.0 million for enhancement Totex;
- (b) Bristol: £539k for base costs, £4.28 million for enhancement Totex;
- (c) Yorkshire: £93.3 million for enhancement Totex; and
- (d) Northumbrian: no allowance.

8.73 Table 8-4 shows the provisional CMA allowances for total (base + enhancement) leakage spend for the four Disputing Companies in comparison to Ofwat's final determination for PR19. The differential to Anglian and Bristol is relatively small because these companies were given allowances by Ofwat due to their upper quartile status. Our provisional decision has a greater effect on Yorkshire, on the basis that it did not have upper quartile status and therefore was not given a similar allowance by Ofwat. We have assumed that additional funding will be needed across the sector to deliver targeted improvements in leakage which are in line with the enhancement Totex identified by the firms in their submissions to the CMA.

Table 8-4: Provisional determination of allowances for total (base + enhancement) leakage £m

<i>Companies</i>	<i>AMP7 Cost Adjustment for Leakage Expenditure in CMA PFs (£ million)</i>	<i>Increase / (decrease) to Ofwat FD19 (£ million)</i>
Anglian	£93.7m	(£2.1m)
Bristol	£4.8m	(£6k)
Northumbrian	-	-
Yorkshire	£93.3m	£93.3m

Source: CMA analysis

8.74 In summary, as our provisional decision is to (i) provide an adjustment to base costs for above upper quartile performance and (ii) allow enhancement Totex where a need has been identified to achieve sector-wide reductions in leakage, Anglian, Bristol and Yorkshire have all provisionally received enhancement funding. Anglian and Bristol also have provisionally received base funding. We will be seeking more detailed information on the business case for this enhancement funding in parallel with this provisional determination. Northumbrian did not indicate that there was a need for enhancement funding, and we have therefore provisionally made no adjustment for it for enhancement Totex to achieve leakage reduction.

¹²⁸⁶ Which largely offsets our disallowance of the £24.5million Ofwat allowed through its base models.

Leakage incentives

Incentive rates

Standard ODIs

8.75 In order to set ODIs for leakage, and consistent with its overall methodology, Ofwat instructed companies to propose incentive rates that reflected customers' willingness to pay (WTP) and their incremental costs of improving performance.¹²⁸⁷ Company proposals were then reviewed and adjusted in an iterative process. The penalty and reward rates in Ofwat's final determination are shown in Table 8-5.

Table 8-5: Ofwat's Final Determination ODI penalty and reward rates for leakage

<i>Companies</i>	<i>Penalty Rate (Tier 1)</i>	<i>(£/HH/% Distribution Input)</i>	
		<i>Penalty Rate (Tier 2)</i>	<i>Reward Rate</i>
Anglian	-0.28	-0.365	0.219
Bristol	-0.064	-0.191	0.164
Northumbrian (NR)		-0.175	0.150
Northumbrian (ESK)		-0.180	0.154
Yorkshire		-0.167	0.139

Source: Ofwat

8.76 Two penalty rates apply to Anglian and Bristol. The Tier 1 penalties applied only to companies that had been awarded enhancement spending. If a company maintained its 2019-20 level of performance, but did no better, it would have to return its enhancement costs allowance to customers. Its effect was therefore to act as a clawback mechanism for the enhancement Totex they received.

8.77 The Tier 2 penalty rate applied to all companies. If a company dropped below its status quo level of performance, it would be penalised.

Enhanced ODIs

8.78 Enhanced incentive rates were introduced in PR19 to incentivise outperformance that genuinely surpasses frontier performance. As discussed in section 7, the objective of enhanced ODIs was to provide incentives for performance improvements which would benefit all customers, as the outperformance can be used to set more challenging performance

¹²⁸⁷ Ofwat (2017), [Delivering Water 2020: Our methodology for the 2019 price review, Appendix 2: Delivering outcomes for customers](#), paragraph 3.6

commitments in the next period. Enhanced penalty rates also apply to discourage excessive risks taken in pursuit of enhanced ODIs.

- 8.79 Bristol did not propose any enhanced ODIs for leakage. The other three Disputing Companies have enhanced ODIs for leakage with symmetric penalty and reward rates. These are shown in Table 8-6.

Table 8-6: Ofwat's Final Determination Enhanced ODI penalty and reward rates for leakage

Companies	(£/HH/% Distribution Input)	
	Penalty Rate	Reward Rate
Anglian	-0.782	0.782
Northumbrian (NR)	-0.266	0.266
Northumbrian (ESK)	-0.488	0.488
Yorkshire	-0.702	0.702

Source: Ofwat

- 8.80 Enhanced ODIs are triggered at performance levels set to reflect an estimate of frontier performance.
- 8.81 Ofwat's approach to setting the enhanced rewards thresholds was:¹²⁸⁸
- (a) Starting point: the best of outturn 2017-18 and 2018-19 and forecast 2019-20.
 - (b) Upward shift: estimate the average annual shift in the upper quartile of performance since 2014-15. Because these annual shifts turned out to be quite volatile, a single shift factor was set for all ODIs, based on the lowest shift estimate of all of them, which was 1.4%, for per capita consumption.
 - (c) Profile: Extrapolate from the last year of AMP6 to each subsequent year to set a threshold that shifts by 1.4% each year
 - (d) Adjust: Companies that proposed thresholds that were more stretching than the Ofwat-calculated threshold, keep the ones they proposed. Companies that had proposed less stretching thresholds were given the Ofwat-calculated threshold.
- 8.82 The enhanced penalty thresholds were set at the level of the lower quartile of outturn performance in 2018-19.¹²⁸⁹
- 8.83 Caps apply to leakage ODIs, including the enhanced ODIs for the three companies with enhanced ODIs, however, these are generally quite far away

¹²⁸⁸ Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), page 120-121

¹²⁸⁹ Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), page 121

from the PCs. The Disputing Companies have not raised concerns regarding their leakage ODI caps.

Analysis of leakage incentives

- 8.84 In this section we consider the ODIs proposed by Ofwat and the Disputing Companies submissions on the structure and level of these ODIs.

Standard penalties for ODIs and the Tier 1 / Tier 2 structure

- 8.85 Anglian submitted that the Tier 1 part of its incentive structure should be removed, effectively creating a deadband. That is, it proposed that the penalties should not be effective unless it underperforms relative to its current performance.¹²⁹⁰ Anglian's submission was that it was not reasonable that it might incur a penalty, even if its actual performance is better than its current performance and better than the upper quartile of the sector.
- 8.86 Ofwat told us in response that Anglian failed to produce convincing evidence of customer support for this feature of its plan,¹²⁹¹ and that in any event the Tier 1 penalty is not a proper penalty but a clawback.¹²⁹²
- 8.87 We agree; in our view Anglian's submission misunderstands the purpose of the Tier 1 penalty, as it is a clawback mechanism there to ensure that consumers do not pay for quality improvements that are not delivered. Given that the Tier 1 arrangements only recover this additional funding, this 'penalty' would not in fact penalise Anglian, Bristol, or the other companies that received enhancement Totex for leakage reduction if they fail to make the investment required. These companies therefore effectively benefit from a deadband before the Tier 2 penalty comes into force at the status quo level of performance.
- 8.88 For these reason, our provisional decision is that the Tier 1 incentive should be increased, so that it covers both the penalty element of underperformance, and also the clawback of any enhancement Totex for those companies which request and are granted enhancement Totex allowances. Any risk that the companies might incur penalties due to factors outside their control is already mitigated by the use of a 3-year rolling average. We have therefore provisionally determined to apply the Tier 2 standard penalty to all

¹²⁹⁰ Anglian SoC, paragraph 1069 (iv)

¹²⁹¹ [Ofwat response to Anglian](#), paragraph 4.56-4.74

¹²⁹² [Ofwat response to Anglian](#), paragraph 4.60

underperformance, and add the clawback increment to arrive at the revised Tier 1 standard penalty.

- 8.89 As shown in Table 8-3, we have provisionally allowed Anglian, Bristol and Yorkshire funding for enhancement costs to achieve leakage reductions, although the allowances for funding are indicative at this stage, and therefore the penalty rates linked to clawback of these allowances are also indicative. Northumbrian has not requested and so not been provisionally allocated any enhancement funding, and we retain Ofwat's penalty rates.
- 8.90 Using this approach, we provisionally find that the Disputing Companies should have the following underperformance penalty rates, shown in Table 8-7:

Table 8-7: Provisional leakage underperformance ODI rates for the Disputing Companies

Company	<i>(£ million per MI/d)</i>	
	Tier 1 penalty	Tier 2 penalty
Anglian	0.786	0.365
Bristol	0.269	0.191
Northumbrian (Northern Region)	0.175	0.175
Northumbrian (Essex & Suffolk)	0.180	0.180
Yorkshire	0.692	0.167

Source: CMA analysis

- 8.91 In all five cases, the Tier 1 penalty applies to underperformance between the PC and the status quo level of performance¹²⁹³, and the Tier 2 penalty applies to any additional underperformance. Northumbrian does not have an enhancement allowance, and therefore its targets are in practice the same.
- 8.92 We received no evidence to suggest that the other aspects of Ofwat's standard ODIs are inappropriate, nor have we identified concerns with their operation and levels. We therefore provisionally determine to retain the standard ODI reward rates.

Enhanced ODIs

- 8.93 Enhanced ODIs are intended to drive frontier shifting outperformance. The incentive payment rates shown in Table 8-6 are substantially greater than the standard rates in Table 8-5. These rates can be set above customer willingness to pay (because the benefits of frontier shift accrue to more than

¹²⁹³ The Tier 1 penalties are based on the difference between 2019-20 leakage performance and target leakage performance. The Tier 1 penalty reflects the CMA allowances for enhancement Totex, and is based on a clawback mechanism which would recover a 50% share, comparable to the Totex underspend which would be retained by the companies if they do not make the enhancement investments.

just the company's customers). This could induce companies to substantially increase expenditure on leakage reduction measures.

- 8.94 We have agreed that enhanced ODIs appear to be appropriate as a policy tool and have retained them for the ODIs which we have assessed in section 7. However, we have concerns about their role in leakage.
- 8.95 We are concerned that neither the companies nor Ofwat have adequately analysed the wider costs and benefits of further reductions in leakage. As discussed above, leakage targets have in the past been set relative to an economic level, with the assumption that there will be a level of leakage reduction beyond which there may be additional costs which offset the benefits of further reduction.
- 8.96 None of Ofwat's PR19 documents or its submissions to us contain estimates of the incremental costs and benefits of reducing leakage, either for individual companies or for the sector as a whole. However, we have concluded that leakage improvements will require additional funding, and so they will impose costs on customers.
- 8.97 There will be a level of leakage below which the costs of further reduction will outweigh the benefits, including wider social and environmental costs and benefits. While Ofwat had good reasons for moving away from the previous SELL measure and for targeting reductions in leakage in accordance with its statutory objectives and the SPS, we consider that robust economic analysis of the optimal level of leakage reduction is necessary to justify incentivising additional leakage reduction through enhanced ODIs. This is consistent with the intention of the SPS, which supported ambitious targets for leakage reduction, but that this should be where this represents best value for money over the long term.
- 8.98 We note that Ofwat estimated the efficient costs of a wide range of activities as part of its PR19 price control process. It could be possible in future for Ofwat to seek to estimate each company's efficient costs of leakage prevention, detection, and repair as well.¹²⁹⁴ An estimate of efficient leakage costs could then be the basis of an alternative analysis. However, in the absence of evidence for the cost-benefit trade off of further leakage reductions, we do not consider it would be appropriate to expect customers to fund a more challenging target by including potentially large rewards for substantial outperformance through the enhanced ODIs.

¹²⁹⁴ As with other cost items considered in PR19, and depending on data availability and reliability, such analysis could be econometric or more akin to unit cost model, it could set an upper quartile benchmark or an average cost benchmark, it could include a frontier shift or not, etc.

8.99 We have therefore provisionally decided:

- (a) to maintain the standard rewards for leakage reduction, but to remove the enhanced rewards and penalties;
- (b) to adopt the caps and collars set by Ofwat for the leakage ODIs. For the companies which had enhanced ODIs, these caps and collars will now act as caps and collars for the standard rewards and penalties; and
- (c) to amend the standard penalties to reflect the changes to Tier 1 rates, see Table 8-7.

Summary of our provisional determinations on leakage

8.100 Our provisional determinations on leakage are:

- (a) we provisionally decide to retain the PCs for leakage reduction set by Ofwat;
- (b) the Disputing Companies should be allocated funding for maintaining and reducing their leakage levels for AMP7, with the following provisional allowances:
 - (i) Anglian: £25.7 million adjustment to base costs, £68.0 million enhancement Totex;
 - (ii) Bristol: £539k adjustment to base costs, £4.282 million enhancement Totex;
 - (iii) Yorkshire: £93.3 million enhancement Totex; and
 - (iv) Northumbrian: no allowance.
- (c) we will further review the enhancement Totex submissions by the companies, which may result in changes to the provisional enhancement allowances based on the companies' ability to demonstrate the need for their proposed levels of investment;
- (d) we have determined new underperformance penalty rates, as shown in Table 8-7; and
- (e) we have removed enhanced ODIs for leakage.

9. Cost of Capital

- 9.1 This section outlines our provisional approach to calculating the cost of capital allowance for the four Disputing Companies, including our provisional decisions on Bristol's request for a company specific uplift to its cost of capital, the use of a retail margin adjustment and the use of a gearing outperformance sharing mechanism.
- 9.2 The cost of capital is an input to the calculation of the companies' allowed revenue and is used to calculate the profit that the companies need to earn to repay their investors within the PR19 price control.
- 9.3 Ofwat and the Disputing Companies had very different views on the right level of cost of capital allowance, which contributed significantly to their different views on overall allowed revenues. Ofwat chose a 2.96% appointee level cost of capital allowance, a figure that is materially lower than their PR14 allowance of 4.67%¹²⁹⁵ due to both changes in Ofwat's calculation methodologies and as a result of lower market prices (which form the inputs to many elements of the cost of capital).
- 9.4 Ofwat's 2.96% cost of capital allowance was also significantly below the cost of capital allowances suggested by the Disputing Companies during this redetermination, which we review in Table 9-1 below:

Table 9-1: Ofwat PR19 appointee¹²⁹⁶ WACC versus Disputing Company estimates.

<i>CPIH-real point estimate or midpoint of range</i>	<i>Anglian</i>	<i>Bristol (industry level)</i>	<i>Bristol (inc. CSA)</i>	<i>Northumbrian</i>	<i>Yorkshire</i>	<i>Ofwat PR19</i>
Appointee WACC	3.62%	3.32%	4.04%	3.54%	3.78%	2.96%

Source: Anglian SoC, paragraph 1221 (based on midpoint of an RPI-real range of 2.5% to 2.9%), Bristol SoC, paragraph 150 (industry estimate based on nominal point estimate of 5.35%, Bristol SoC, paragraph 24 (inc SCA estimate based on a nominal point estimate of 6.08%), Northumbrian estimated figure relates to KPMG expert report for Northumbrian, section 8.1 and an RPI-real range of 2.49% to 2.75%), Yorkshire estimate is based on KPMG's metrics other than Yorkshire's specific requests on cost and proportion of debt.

Note: Where no overall point estimate or range was explicitly presented, we have estimated the company's view from either component metrics or other sources such as commissioned expert analysis. This table should be read as indicative only.

¹²⁹⁵ Ofwat's PR14 cost of capital allowance was 3.74% in RPI-real terms. For comparison we have inflated this number by 0.90% to quote it in CPIH terms. Please see paragraphs 9.15 to 9.28 for our discussion of the inflation metrics used in our determination.

¹²⁹⁶ In this provisional determination we conduct our cost of capital analysis and set our provisional determination of the cost of capital allowance at the 'appointee' level. This is the cost of capital allowance awarded to each water or sewage licence holder. In Ofwat's final determination, it distinguishes between appointee WACC and the WACC earned by a company's wholesale operations, which is calculated by deducting a retail margin adjustment from the appointee WACC to account for earnings in a company's retail operations. The CMA does not adopt this methodology - see paragraphs 9.535 – 9.564 for the CMA's approach to accounting for a retail margin adjustment.

- 9.5 We have performed our own determination of the cost of capital using the Capital Asset Pricing Model (CAPM). The CAPM is an established methodology with well-understood theoretical foundations. The CAPM is used by all UK regulators when calculating the cost of capital, and was the framework used by Ofwat in their PR19 final determination. We took a fresh look at each of the parameters of this model, although our analysis often built on our interpretation of the analysis and data provided by the Parties. In some cases, we considered alternative ways to calculate those parameters and have included additional and more up-to-date information in our assessment.
- 9.6 After considering the relevant evidence, we estimate a cost of capital allowance that we believe appropriately balances the various duties and considerations that a regulator must take into account when setting a price control. The cost of capital used in a price control can have a material impact on the level of customer bills. Our aim is to provide a cost of capital allowance that ensures appropriate levels of investment within the sector without overcompensating investors at the expense of customers.
- 9.7 In this chapter we first explain how the weighted average cost of capital is calculated, using the CAPM. We then set out our analysis of the appropriate ranges of estimates for the components of the cost of equity and cost of debt. We then consider the range of values for an overall cost of capital allowance for the Disputing Companies and provide our provisional point estimate of the cost of capital allowance for the PR19 price control.

The Weighted Average Cost of Capital and the Capital Asset Pricing Model

- 9.8 The cost of capital applied in our determination is a Weighted Average Cost of Capital (WACC), which is based on three inputs:
- (a) Cost of equity;
 - (b) Cost of debt; and
 - (c) Gearing.¹²⁹⁷
- 9.9 The WACC is multiplied by each Disputing Company's Regulatory Capital Value (RCV) to calculate the allowed return within the price control. The

¹²⁹⁷ Gearing is defined as $g = \frac{D}{(D+E)}$, where D is Debt and E is Equity.

RCV is also indexed by inflation in each year, and therefore the cost of capital is expressed in real terms. In PR19, Ofwat is transitioning its inflation indexing process, and so is using a combination of RPI and CPIH indexing. For consistency, all of our WACC estimates will be quoted in CPIH real terms¹²⁹⁸.

9.10 The CAPM is an established methodology with well-understood theoretical foundations. It is used by all UK regulators and the CMA when calculating the cost of capital. The CAPM was also used by the Disputing Companies in their submissions to the CMA. The remainder of this section discusses the approach to calculating the cost of capital parameters, on the assumption of using the CAPM.

9.11 The CAPM relates the cost of equity (K_E) to the risk-free rate (R_{rf}), the expected return on the market portfolio (R_m), and a firm-specific measure of investors' exposure to systematic risk (beta¹²⁹⁹ or β) as follows:

$$K_E = R_{rf} + \beta(R_m - R_{rf})$$

9.12 If a business were entirely funded by equity, the expected return on equity could be considered to be its 'cost of capital'. However, most firms are funded by a combination of both debt and equity, such that the appropriate cost of capital to consider is the weighted average cost of debt and equity. The WACC is given by the following expression:¹³⁰⁰

$$WACC = K_E \times \frac{E}{(D + E)} + K_D \times \frac{D}{(D + E)}$$

9.13 The return on capital for investors should also take into account the effects of tax on returns to capital providers. The returns to debt holders take the form of interest payments which are usually tax-deductible. The returns to equity holders (dividends), on the other hand, are taxed. Hence, where the cost of capital is expressed 'pre-tax', the cost of equity used must reflect the fact that the actual return to shareholders will be reduced by the rate of tax.

¹²⁹⁸ CPIH became Ofwat's preferred measure of inflation in PR19. As of 21 March 2017, the Consumer Prices Index including owner occupiers' housing costs (CPIH) became the Office of National Statistics' lead inflation index; it is the most comprehensive measure of inflation as it includes owner occupiers' housing costs and Council Tax, which are excluded from the CPI. For more info please see ons.gov.uk

¹²⁹⁹ We will discuss the concept of beta in paragraphs 9.223-9.319

¹³⁰⁰ Where K_E is the cost of equity, K_D is the cost of debt, E is weight to equity within the capital structure and D is weight to debt within the capital structure.

- 9.14 We will update our pre-tax assumptions at the final determination stage of the redetermination process following appropriate consultation on our underlying assumptions.

Inflation and estimating ‘real’ levels of the cost of capital

- 9.15 In the following sections, many of our estimated metrics are presented in CPIH-real terms. In order to calculate these metrics, we are variously required to deflate nominal input data and inflate RPI-real input data.
- 9.16 This requirement predominately impacts the costs of debt, which are incurred by companies (and estimated by us) in nominal terms but compensated through the price control in ‘real’ terms. There is also an impact on our measurement of the risk-free rate, where most market metrics are quoted in either RPI-real or nominal terms, and on our measurement of the total market return, where the available historic data is quoted in nominal terms.
- 9.17 In order to make these adjustments we are required to take a view on the most appropriate inflation assumptions to use for the price control. In the following paragraphs we will consider the evidence presented on this issue.

Inflation – Parties’ views

Ofwat

- 9.18 Ofwat’s PR19 approach assumed that:
- (c) CPIH is 2.0%, based on the assumption that the Bank of England will hit its 2.0% CPI inflation targets over the long-term, and that CPIH will not systematically be higher or lower than this.
 - (d) RPI is 3.0%, based on the assumption that the OBR estimate of the long-term RPI-CPI wedge is 1.0%¹³⁰¹
- 9.19 At the final determination stage, Ofwat considered recent (pre-final determination and so pre-COVID-19) data and considered that there was no basis for changing their long-term assumptions.
- 9.20 In its response to the Disputing Companies’ statements of case, Ofwat stated that as it used a 15-year investment horizon throughout the

¹³⁰¹ Ofwat (2019), [PR19 final determinations: Allowed return on capital technical appendix](#), section 2.1-2.3

determination, it was correct to use a long-term inflation measure, not 2020-25 estimates.

The Disputing Companies

- 9.21 Northumbrian and Yorkshire raised objections to Ofwat's approach and suggested that the CMA should use the latest economic outlook to set its inflation assumption. Yorkshire argue that the updated OBR figures suggest that inflation would be 1.88% (CPI) and 2.77% (RPI) over the period) and that this will impact the setting of real metrics.¹³⁰²

Inflation – CMA assessment

- 9.22 There are a variety of inflation estimates that could be used in our calculations. In the recent NATS (En Route) Plc (NERL)/CAA Regulatory Appeal (from here referred to as NATS/CAA), appeal, we used HM Treasury's summary of independent forecasts for this exercise, while the CAA and NERL used their own estimates of inflation.¹³⁰³ The latest published version of the HM Treasury survey figures (August 2020) suggest an average annual CPI for the 2020-2024 period of 1.70%¹³⁰⁴, below Ofwat's assumptions and Yorkshire's recommended figures. The current survey estimate suggests a more material deviation from the long-term target than was suggested by this measure when considered in the NATS/CAA case.
- 9.23 We also note that the OBR's December update reduced the estimate of the forward looking RPI-CPI wedge (the estimated structural difference between RPI and CPI) by 0.1% to 0.9%.¹³⁰⁵
- 9.24 In reviewing inflation data over the last decade, we can see that CPI has rarely been precisely at the Bank of England's 2.0% target. However, we note that it has been remarkably close on average. CPI has averaged 2.1% in the period from June 2010 to June 2020, while CPIH has averaged 2.0% over the same period.¹³⁰⁶
- 9.25 It is hard to pick a point estimate of inflation over the price control. We have taken account of arguments that for reasons such as the impact of COVID-19, current estimates suggest inflation will be below the Bank of England's

¹³⁰² Northumbrian SoC, paragraph 882, Yorkshire SoC, paragraphs 242-244

¹³⁰³ CMA (2020) *NATS (En Route) Plc/CAA Regulatory Appeal – Final Report (NATS/CAA)*, paragraph 13.160

¹³⁰⁴ HM Treasury (August 2020) *Forecasts for the UK economy: a comparison of independent forecasts*, p18

¹³⁰⁵ Office for Budget Responsibility (December 2019) *Forecast evaluation report*, pp20-21 Box 2.3

¹³⁰⁶ ONS *CPI Inflation June 2020 Report* (data downloaded to excel and calculated by the CMA). See Appendix C, Figure 1 for the related graph.

target over the price control period. However, we also note that it is just such estimates that are likely to lead to a policy response that may cause inflation to be higher than current estimates. We also note that we are required to inflate/deflate both current data and historic data, and that historic data will have been incurred in a variety of inflation environments (which, as we can see from the last decade, have tended to average towards the target CPI/CPIH level of 2.0% over time).

Inflation – CMA provisional determination

- 9.26 We acknowledge that there is currently downward pressure on inflation projections, and that this is a very different scenario to the inflation projections available during the CMA's NATS/CAA price control process (where market estimates were close to the Bank of England's 2% target).
- 9.27 As a result of the current uncertainty surrounding the impact of COVID-19 on economic metrics such as inflation, we do not think it would be appropriate to base our real cost of capital estimates for the entire price control on what could be temporarily distorted figures. We have provisionally decided to match Ofwat's approach to estimating CPIH at 2.0%, basing our assumption on the Bank of England's long-term CPI target of 2.0% (and assuming that CPIH inflation will not be systematically different). We update Ofwat's 1.0% RPI-CPI wedge assumption for the OBR's new estimate, and instead use a 0.9% wedge in our calculations involving RPI-real data.
- 9.28 We consider that using a longer-term estimate in this way is the fairest way to calculate real cost of capital at this time. We would suggest that if actual inflation deviates from the long-term inflation target to the extent that it has a material impact on the operations or financeability of water companies, that this is considered and dealt with by Ofwat at the industry level.

Gearing

Background

- 9.29 Gearing refers to the amount of debt within a company's capital structure. In the case of water companies, it is defined as net debt (debt minus cash) divided by the Regulatory Capital Value (RCV) of the company. In more general terms, gearing can be thought of as debt divided by the total capital base (debt plus equity).
- 9.30 Gearing determines the proportion of the cost of debt (and by implication the proportion of the cost of equity) within the overall cost of capital.

- 9.31 Both Ofwat and the CMA calculate allowed return on capital with reference to a notional company with a predetermined level of gearing. This notional approach allows companies to make their own choice about their financial structure whilst ensuring that customers only pay for costs associated with the efficient cost of capital for a notionally structured company.

PR19 Decision

- 9.32 Ofwat reduced their notional gearing from 62.5% at PR14 to 60% at PR19. Ofwat stated that this was appropriate given the greater share of revenue at risk associated with service performance and its proposals to make greater use of markets on a forward-looking basis.
- 9.33 Ofwat noted that it did not receive representations on its notional gearing assumption in advance of its final determination.¹³⁰⁷

Gearing – CMA assessment

- 9.34 Most submissions we received related to gearing focused on the impact on beta, the gearing outperformance sharing mechanism and financeability, rather than the notional level of gearing itself. We address these issues in the relevant sections of this report.¹³⁰⁸
- 9.35 We note that Ofwat have reduced notional gearing from 62.5% in PR14 to 60% in PR19, but that this relatively small move does not appear to have been contentious. We also note that the vast majority of the sector operates at levels of gearing in excess of the 60% notional level. Using Ofwat's data, average sector gearing was approximately 69% in 2019.¹³⁰⁹
- 9.36 We received no evidence that another notional level of gearing would better serve customers (other than in the specific areas discussed in paragraph 9.34 above).

Gearing - CMA provision determination

- 9.37 We provisionally choose a 60% notional gearing as the basis of our WACC calculations and financeability assessment.

¹³⁰⁷ Ofwat (2019), [Allowed return on capital technical appendix](#), section 3

¹³⁰⁸ See paragraphs 9.297-9.300 & 9.316-9.317 for discussion of gearing within beta, 9.565– 9.630 for discussion of the gearing outperformance sharing mechanism and 10.66 for gearing within the financeability assessment.

¹³⁰⁹ Ofwat (January 2020), [Monitoring financial resilience](#), p6 (also associated excel data tables).

Risk-Free Rate

Introduction

- 9.38 The Risk-Free Rate (RFR) is the representation of the return required on a 'zero beta'¹³¹⁰ asset within the CAPM. It is a measure of the rate of return that an investor can expect to earn without taking any systematic risks. In the CAPM, it is assumed that a 'zero beta' asset will earn the same as a risk-free asset, as non-systematic risk is fully diversifiable by investors.
- 9.39 The RFR is a hypothetical number as no investment has absolutely zero risk. As a result, it has become common practice to use the interest received (usually termed 'yield') on very high-quality debt instruments, often government bonds with strong credit ratings, as the best proxy for a risk-free investment rate. In the UK, this has traditionally meant using the yield on an RPI index-linked government gilt (ILG) at a relevant maturity (time until redemption).
- 9.40 In recent years there has been significant debate about the correct way to estimate the RFR, with falling and subsequently negative yields on government bonds causing concern that government bonds may be distorted. In practice, due to this and other factors, regulatory decisions have often used rates which vary from the prevailing yield on government bonds.¹³¹¹

Background

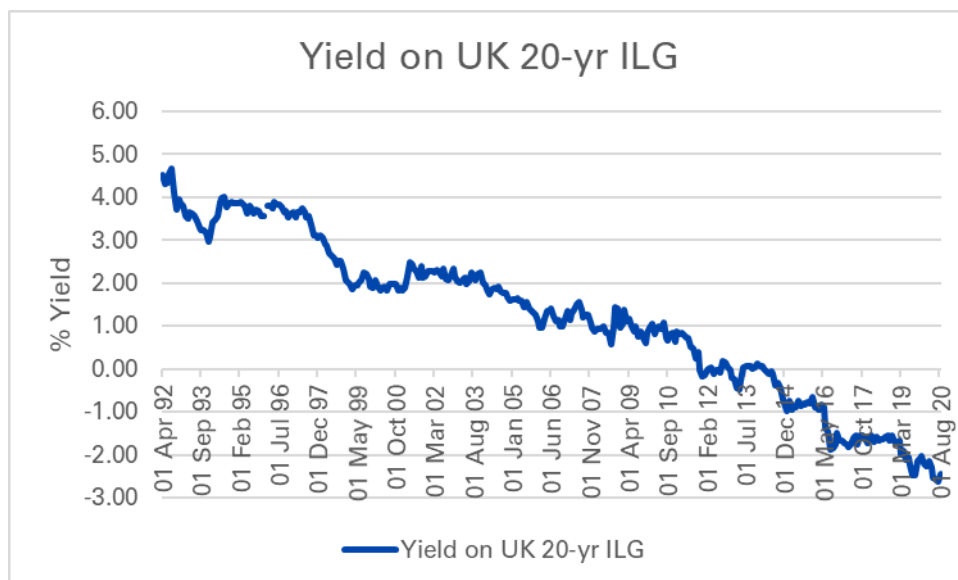
- 9.41 The majority of regulatory precedent is based around the use of government bonds (UK gilts) as the risk-free rate, often with a small uplift to reflect the expectation that currently low yields may revert to the longer-term mean over time. In recent reviews, this approach has been brought into question, as the yields have been persistently low for such a long period.
- 9.42 Although it is often suggested that the recent levels of gilt yields have been influenced by government policy, particularly quantitative easing, Figure 9-1 shows that real rates have been falling for an extended period. These falling rates, and in particular the move below zero, has led some experts to question whether gilt yields remain the right proxy for the RFR. The extended period over which gilt yields have remained low has also led

¹³¹⁰ Beta in this case measures covariance with equity prices. A zero-beta asset's price is completely unaffected by movements in equity prices.

¹³¹¹ See Appendix C, Figure 2 for a chart showing regulators' choices versus prevailing market rates.

regulators to suggest that, even if they are the right proxy, an approach of assuming some form of mean reversion may no longer be sustainable and that it is more appropriate to accept low gilt yields without adjustment. The trend in government gilt yields can be seen in Figure 9-1 below:

Figure 9-1: Yield on government gilts since 1992



Source: CMA analysis of Bank of England data.

- 9.43 Some recent regulatory decisions have also included equity betas materially below one, which increases the importance of the decision on the risk-free rate, by comparison to regulatory precedent. In the context of both this practical consideration and the theoretical analysis of the consequences of current low interest yields, we received more lengthy submissions on the risk-free rate than in previous regulatory reviews. The approach to setting the risk-free rate should be based on similar considerations for different sectors, and therefore we received submissions from Third Parties in other sectors, as well as from Ofwat and the Disputing Companies.
- 9.44 In the following paragraphs we compare these submissions, which covered the following options in terms of potential benchmarks for the RFR:
- (a) UK ILGs, as used by Ofwat and recommended by the UK Regulators Network (UKRN) report;
 - (b) high-quality UK corporate bonds;
 - (c) nominal UK government bonds;
 - (d) non-UK government bonds; and

(e) estimates of the long-run equilibrium rate of interest.

9.45 For the reasons below, we consider that (a) and (b) above are the instruments which are most relevant to the choice of RFR in this determination. We then address arguments as to the best way to measure the market instruments chosen as the most appropriate proxies for the RFR, including the maturity of bonds and the need for any forward rate adjustment.

Ofwat PR19 Decision

9.46 Ofwat's chosen approach focused on RPI index-linked UK government bonds, known as Index-Linked Gilts (ILGs). In coming to its final determination, Ofwat chose to use UK government bond market data as the basis of its RFR estimate. Ofwat's PR19 final determination¹³¹²:

(a) used the 1-month (September 2019) average of yields on the 15-year ILG, giving a figure of -2.61%;

(b) adjusted this figure for average market-implied rate rises over PR14 of 0.26%, bringing its estimate to -2.35%

(c) inflated this number using an assumed 100bps 'wedge' between RPI and CPI, to give a CPIH figure of -1.39%

9.47 Ofwat followed the trend of regulators since 2018 of adopting the approach advocated in the 2018 UKRN cost of equity report by Wright et al (from here referred to as the UKRN report).

9.48 In their report¹³¹³, Wright et al suggest that the market price of indexed debt (and hence its implied yield) is simply what it is, and that the reason why it is this price is irrelevant. They explain this view by including a quote from Cochrane:

'...when you shop for a salad, all you care about is the price of tomatoes. Whether tomatoes are expensive because the trucks got stuck in bad weather or because of an irrational bubble in the tomato futures market makes no difference to your decision...' ¹³¹⁴

¹³¹² Ofwat (2019), *Allowed return on capital technical appendix*, section 5.2.3

¹³¹³ UKRN (2018), *Estimating the cost of capital for implementation of price controls by UK Regulators. A report by Wright, Burns, Mason and Pickford*, section 4.3.

¹³¹⁴ John H Cochrane (2011), *'Discount Rates'*, *National Bureau of Economic Research*, p38

As a result, the UKRN approach is now commonly referred to as the ‘price of tomatoes’ approach to estimating the risk-free rate.

- 9.49 As a result of this view, the UKRN unequivocally suggest that regulators should use the (zero coupon) yield on inflation-indexed gilts at their chosen horizon to derive an estimate of the risk-free rate at that horizon.
- 9.50 The authors state that their recommendation is not in line with the approach taken by regulators over ‘the past decade or so’, where the decline in RFRs chosen has been slower than the decline in the market rate ‘leaving an increasingly large gap between what markets say is the return on risk-free assets, and what regulators assume’.
- 9.51 The authors note the potential for the ‘dragging anchor’ approach in regulatory decisions, with regulators not responding to every movement in the market rate in the interest of regulatory stability. However, they suggest that this approach should be taken to the whole of the regulated expected return, not just the RFR, and that ‘the rope on the anchor cannot have infinite elasticity’ (suggesting that even if short-term fluctuations are ignored or smoothed, the metrics used by regulators eventually have to catch-up with the observed realities).
- 9.52 In dealing with arguments that the market for risk-free debt is distorted, for example due to pension regulation on required holdings, the authors suggest that there may or may not be distortion, but that it is ‘simply irrelevant’. They argue that the market price of indexed debt is simply what it is, and they see no reason to treat this market differently to any other.
- 9.53 In dealing with arguments that the RFR is negative, and so unsustainable, the authors argue that there is no economic principle that rules out a negative RFR. In addition, they suggest that there have been extended periods in the past when RFRs have been negative.
- 9.54 Finally, in dealing with arguments that a negative RFR is irrational, the authors argue that it is relatively rare, but not irrational. They suggest that a negative RFR is consistent with standard decision-making models and could, for example, suggest that market participants expect consumption to fall in the future or that the rate is negative purely based on RPI’s inability to capture the actual inflation felt by most households.
- 9.55 Ofwat also commissioned Europe Economics (EE) to review the academic literature on this topic. EE stated¹³¹⁵ that it takes an ‘observed asset

¹³¹⁵ EE (2019), *The Allowed Return on Capital for the Water Sector at PR19 – Final Advice*, Section 2.6.

approach', in which it treated the notion of a RFR as an approximation, with models deploying the idea of a RFR being more or less representative of reality partly according to how close to risk-free some actual asset in fact was. It noted that the usual proxy chosen is a government bond. For EE, the RFR was then simply the yield on this observed asset.

9.56 EE submitted that as a result it is not strictly necessary to consider how credible or otherwise a particular value (positive or negative) is for the risk-free rate. The bond yield simply is what it is, and regulators do not need to defend it as being 'plausible' when it is at that level, because it is observably so and market prices imply that it is expected to remain so.

9.57 In addressing the potential irrationality of a negative real interest rate, EE cited two potential rational 'causes' of a negative risk-free rate of return:

(a) That the marginal utility of income evolves through time with expectations of changes to income in the future. On this basis, the anticipation of a shrinking economy would lead people to save or lend more funds today rather than consume, so as to have increased funds available to smooth consumption later. In these circumstances, people would be willing to pay in order to save a sum up to the value of the utility gained by increasing their future consumption.¹³¹⁶

(b) Intergenerational wishes (such as a preference not to consume in order to increase money passed to children) may increase the utility from saving at negative rates in a country with an aging population.¹³¹⁷

9.58 EE also stated that suggestions that rates cannot stay below zero on the basis of substitute assets fail to recognise that cash typically accounts for a small fraction of the total assets of investors and is unlikely to be a viable store of value for large-scale investors. In addition, cash may also not be risk free, and is subject to inflation and currency revaluation risk. It was clear to EE that rational investors may trust inflation-linked government bonds more than they trust cash.¹³¹⁸

9.59 EE also stated that arguments that central bank policy would be unlikely to include negative interest rates unless 'even the equilibrium real interest rates are negative' are incorrect, suggesting that¹³¹⁹:

¹³¹⁶ EE (2019), [The Allowed Return on Capital for the Water Sector at PR19](#), section 2.6.1

¹³¹⁷ EE (2019), [The Allowed Return on Capital for the Water Sector at PR19](#), section 2.6.2

¹³¹⁸ EE (2019), [The Allowed Return on Capital for the Water Sector at PR19](#), section 2.6.6

¹³¹⁹ EE (2019), [The Allowed Return on Capital for the Water Sector at PR19](#), section 2.6.7

- (a) Equilibrium real rates could be negative;
- (b) The Taylor rule¹³²⁰ that underpins these arguments is not a policy in itself and there are a range of influences on central bank policy;
- (c) Central Bank policy rates will not necessarily reflect market rates; and
- (d) The Taylor rule argument assumes a closed economy, and that the market rate will in fact be influenced by international factors.

9.60 Finally, EE stated that regardless of arguments for and against low and negative rates, the factual evidence showed their presence in international policy rates¹³²¹:

- (a) The European Central Bank deposit rate was -0.5% in nominal terms as of September 2019, while inflation was +1.0%;
- (b) The Bank of Japan's main short-term interest rate was -0.1% (July 2019) while inflation was +0.5%;
- (c) The Swedish Riksbank repo rate was -0.25% (September 2019) while inflation was +1.4% (August 2019); and
- (d) The Swiss National Bank has a policy rate of -0.75% while inflation is +0.3%.

Submissions in support of using AAA non-government debt yields as a proxy for the RFR

9.61 Energy Network Association (ENA) submitted that Ofwat had set an erroneously low RFR by failing to uplift the spot rate of ILGs to account for the unique characteristics of sovereign bonds and the gap between corporate and sovereign risk-free financing rates. In their submission, ENA referenced (and supplied) a report by consultancy, Oxera, that examined the issue of whether sovereign yields are the risk-free rate for the CAPM.¹³²²

¹³²⁰ The Taylor Rule is a convention in monetary policy that suggest that as inflation rises the real interest rate (the nominal interest rate minus inflation) should be increased. In this case, the arguments would suggest that as inflation is generally positive in the UK, we should expect real rates to be positive. For further information on the Taylor rule, see John B Taylor (1993) *Discretion versus policy rules in practice*

¹³²¹ EE (2019), *The Allowed Return on Capital for the Water Sector at PR19*, section 2.6.8

¹³²² ENA submission 25 May 2020

- 9.62 Heathrow Airports Limited resubmitted their views previously stated as part of the NATS/CAA appeal to the CMA, including Oxera analysis of corporate bond spreads over sovereign yields.¹³²³
- 9.63 In these documents, Oxera submitted that the CMA's approach to estimating the RFR in the NATS/CAA appeal (using ILG market data as the basis for their RFR estimate) was inappropriate, and that this error leads to some of the issues the CMA identified in WACC increasing with gearing.¹³²⁴
- 9.64 Oxera submitted that the CAPM model assumes that investors can borrow and lend at the risk-free rate, and that even with the best available credit rating, non-government investors cannot access debt at the rate of ILGs. Oxera suggested that in order to be used as a proxy for the RFR, the spot yields on government bonds needed to be adjusted for the following¹³²⁵:
- (a) A convenience ('money-like') premium attached to government bonds that pushes down government yields relative to the RFR; and
 - (b) The gap between corporate and sovereign risk-free financing rates.
- 9.65 Oxera submitted that a convenience yield is present for reasons including¹³²⁶:
- (a) Treasury (government issued) securities are an important instrument for hedging interest rate risk;
 - (b) Treasury securities must be purchased by financial institutions to fulfil regulatory requirements;
 - (c) Collateral requirements faced by banks are significantly lower for Treasury securities versus other instruments with negligible default risk;
 - (d) Superior liquidity than other negligible default risk instruments; and
 - (e) The increased ability to use Treasury securities as collateral when raising finance.

¹³²³ [Heathrow Airports Ltd submission](#), 11 May 2020

¹³²⁴ Oxera, (2020) [Are sovereign yields the risk-free rate for the CAPM?](#) prepared for the Energy Networks Association, section 2

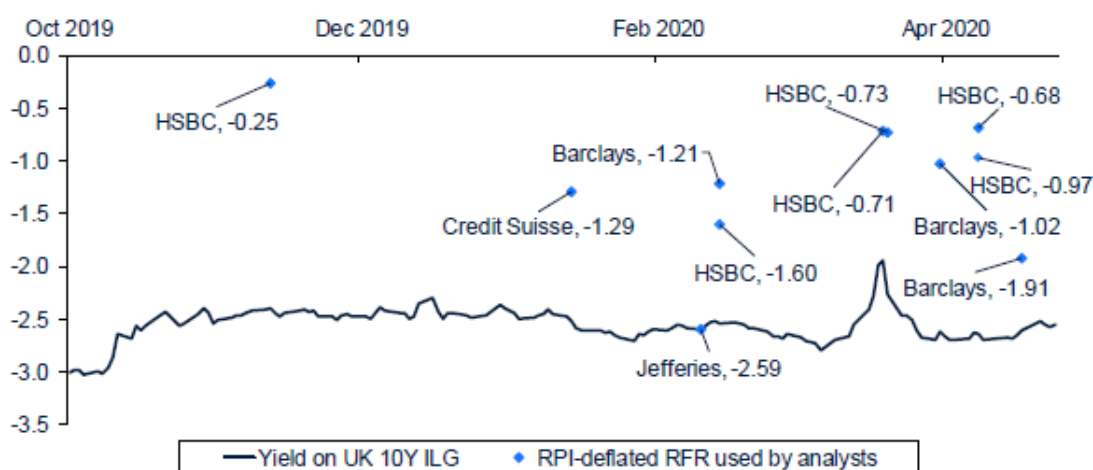
¹³²⁵ Oxera (2020), [Are sovereign yields the risk-free rate for the CAPM?](#) section 2

¹³²⁶ Oxera (2020), [Are sovereign yields the risk-free rate for the CAPM?](#) section 3.1

- 9.66 Oxera pointed to analysis by Feldhütter and Lando (2008) which suggests that yields on government bonds embed a convenience yield ranging from around 30bps to 90bps for US Treasuries between 1996 and 2005.¹³²⁷
- 9.67 Oxera also pointed out that the risk-free rates assumed by sell-side analysts covering utilities in the UK are almost always higher than the spot yields on government bonds. This data suggested that sell-side analysts take a range of factors into account when setting their estimate of the RFR, and do not (typically) use the spot market rate on ILGs. Oxera provided the following chart (Figure 9-2) showing rates used by sell side analysis.¹³²⁸

Figure 9-2: Chart from Oxera showing RFR assumptions used by sell side analysts.

Figure 4.1 Daily yields on 10Y ILGs and RPI-deflated risk-free rates adopted by sell-side analysts on the Oxera UK comparators



Note: Oxera UK comparators include National Grid, Pennon, United Utilities, Severn Trent and SSE. We used the 10-year tenor of the ILGs as Jefferies and HSBC explicitly disclose using this maturity in their analysis. Barclays and Credit Suisse do not disclose the maturity for the risk-free rate assumed in their analysis.

Source: Jefferies (2020), 'Utilities. When the Facts Change...Upgrade UU to Buy', 10 February; HSBC (2019), 'Pennon Group. Buy: Capital allocation – a point of inflection', 12 November; (2020), 'Pennon Group. Buy: FD accepted, waste purchasers queue up', 14 February; (2020), 'National Grid. Upgrade to Buy: A truly defensive play', 19 March; (2020), 'Pennon Group. Pure play company with Viridor sale', 20 March; (2020), 'SSE. Dividend disruption premium', 8 April; (2020), 'United Utilities. Upgrade to Buy: Financial prudence, high visibility', 8 April; Credit Suisse (2020), 'National Grid. Risk discount dissipating', 14 January; Barclays (2020), 'Pennon Group / Severn Trent. Happy Valentine's Day Ofwat – and could CMA referrals be a match for Ofgem?', 14 February; (2020), 'Severn Trent. Severn Trent in line for 2020 but 2021 may see some downgrades', 31 March; (2020), 'Severn Trent / United Utilities. Ofwat consults on providing temporary liquidity', 17 April.

Source: Oxera, Are sovereign yields the risk-free rate for the CAPM?

¹³²⁷ Oxera (2020), *Are sovereign yields the risk-free rate for the CAPM?* section 3.1.

¹³²⁸ Oxera (2020), *Are sovereign yields the risk-free rate for the CAPM?* Figure 4.1

- 9.68 Oxera's analysis compared government bond yields to yields on high-quality corporate bonds, specifically AAA-rated corporate bonds (measured by the yield on the index of the IHS iBoxx £ corp AAA 10-15 index). It found that the spread of the iBoxx AAA over government bonds suggests that an appropriate uplift to ILGs would be 75-86bps.¹³²⁹
- 9.69 Oxera recommended that an ILG-based RFR used in the calculation of WACC should be adjusted upwards by 50-100bps to control for the yield impact of the convenience premium and the gap between corporate and sovereign 'risk free' financing rates.¹³³⁰
- 9.70 Further analysis conducted by Oxera for ENA (following discussion with the CMA as part of the third party cost of capital roundtable discussion) and submitted to this appeal, suggested an alternative approach to calculating the RFR. Rather than making an upward adjustment to ILG yields, Oxera proposed adjusting AAA corporate bonds yields downwards to reflect default risk. Oxera consider work by Elton et al (2001), Berk and DeMarzo (2013) and Feldhütter and Schaefer (2018) to suggest a cumulative default probability for AAA bonds of 0.87% over a 10-year horizon and 1.71% over a 20-year horizon. A Black-Cox structural model (as used by Feldhütter and Schaefer) would suggest 0.54% and 1.18% over 10 and 20-year horizons respectively. On the basis of this data, Oxera estimated that at a 20-year investment horizon, AAA corporate bond yields with a downward adjustment of 5-20bps could be used as a reasonable proxy for the RFR within the CAPM.
- 9.71 Oxera submitted that the lack of previous debate on the issue of ILG spot rates giving an inappropriately low estimate of the RFR is a function of the historic regulatory approach. Oxera suggested that, prior to 2019, the issue of an underestimated RFR in the CAPM framework did not occur as the regulatory allowance for the RFR was consistently set above the spot yields on government bonds. Oxera stated that the average gap was 149bps over 10yr ILGs and 131bps over 20yr ILGs. The gap, created by what has sometimes been described as the 'dragging anchor' approach, had previously masked the ILG's underestimation of the RFR.
- 9.72 Oxera noted that these allowances were not explicitly set to compensate for the convenience yield or the gap between the corporate and sovereign risk-free financing rates. However, they happened to ensure that the

¹³²⁹ Oxera (2020), [Are sovereign yields the risk-free rate for the CAPM?](#) section 6

¹³³⁰ Oxera (2020), [Are sovereign yields the risk-free rate for the CAPM?](#) section 7, including Figure 7.1

imperfection of the spot sovereign yields as a proxy for the risk-free rate was mitigated.¹³³¹

ILGs and low-risk non-government bonds – CMA assessment

- 9.73 In this section we consider the choice of benchmark instrument from the different options available as a proxy for a risk-free investment. In assessing the most effective way to estimate the RFR for the PR19 price control, we start with the view that the RFR is the representation of the return required on a 'zero beta' or zero risk asset within the CAPM.
- 9.74 If we accept this premise, then the RFR must be a hypothetical number as we consider no investment can provide return with absolutely zero associated risk. As a result, we would argue that regulators should look to use a proxy metric, or range of metrics, which as closely as possible match the required characteristics of the RFR.
- 9.75 To do this, we consider that Modigliani-Miller theorem on WACC and the practical application of the CAPM¹³³² have two key requirements of the RFR:
- (a) that all market participants can both borrow and lend at the same price, and that market participants do borrow in order to optimise their investment options; and
 - (b) that all debt is considered as risk free.
- 9.76 We note that ILGs have traditionally been considered as the best proxy for the RFR. However, analysis of the current and historic yields associated with these instruments demonstrates that the government can borrow at rates significantly lower than would be accessible by even the highest-rated private investor. The Oxera report described above has provided a long list of reasons why this may be the case. However, we note that it is not necessary to explain why government bond yields may be lower than other high-quality bonds, as there is evidence that they are lower in practice.¹³³³
- 9.77 This issue is discussed by corporate finance specialists such as Berk and DeMarzo, who note that, while most discussion of the CAPM assumes that

¹³³¹ Oxera (2020), [Are sovereign yields the risk-free rate for the CAPM?](#) section 5

¹³³² Modigliani F & Miller MH (1958), *'The Cost of Capital, Corporation Finance and The Theory of Investment'*, American Economic Association, p268. See also, Sharpe WF (1964), *Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk*

¹³³³ See Appendix C, Figure 3 for a history of spreads over government borrowing rates.

investors face the same risk-free rate of interest whether saving or borrowing, in practice non-government investors cannot borrow at the same low rates as are achieved by the government. To address this issue, Berk and DeMarzo suggest that the different market participants will invest on the basis of different securities market lines (SMLs)¹³³⁴ depending on the rate at which they can borrow and invest. Berk and DeMarzo state that the 'market rate' of interest (in this case the RFR) sits on the efficient frontier at the point where different SMLs meet, suggesting that the market rate sits between the borrowing rates achievable by the government and relevant market participants.¹³³⁵

- 9.78 Our interpretation of Berk and DeMarzo analysis is that in order to achieve an accurate estimate of the 'market rate' for the RFR, we need to find proxies that best match the key requirements discussed in paragraph 9.75 and by implication are available to relevant market participants. We can then best estimate the RFR by using a level that takes account of rates suggested by these close proxies. We consider below the relevance of ILGs and high-quality corporate bonds as proxies on that basis.

ILGs

- 9.79 There are several factors to consider in the assessment of ILGs as a suitable proxy for the risk-free rate, including:

- (a) regulatory precedent;
- (b) ILGs' match to the key requirements of a risk-free rate;
- (c) evidence of distortion as a result of negative rates; and
- (d) consistency with the assumptions in the CAPM.

- 9.80 We observe a long history of UK regulators using the yield on government ILGs as at least the starting point of their estimate of the RFR. However, as noted by the report, we also note a long history of regulators making adjustments to market rates when setting their estimate of the RFR, either

¹³³⁴ The SML is the visual representation of the outcomes generated by the CAPM. It is thus an efficient frontier representing the trade-off between return and exposure to systematic risk. In this example, the rate of return achievable for a unit of risk is impacted by the rate at which an investor can borrow. An investor who could borrow at the government's lower interest rate would be able to achieve more return for a unit of risk (would have a steeper SML) compared to an investor who had to borrow money at the rate available to non-government market participant. For a visual representation of this, please see the extract from Berk and DeMarzo in Appendix C, Figure 4

¹³³⁵ Berk and DeMarzo (2014), *Optimal Portfolio Choice and the Capital Asset Pricing Model*, Chapter 11 Appendix, p398-399

through extended averaging of historic data or more ‘manual’ assumptions of likely future rates¹³³⁶.

- 9.81 We note that the 2018 UKRN report addresses and dismisses this historic approach. We also note that regulators in subsequent price reviews have used this report’s findings as justification for setting their estimate of the RFR based on market data with minimal adjustment.
- 9.82 The UKRN report argues that the market price of government bonds is freely observable and should be considered as fair when measuring ILG yields (the ‘price of tomatoes argument’). We agree that the UKRN report provides compelling reasons why there is nothing intrinsically irrational about negative interest rates, and specifically negative yields on government bonds. Supported by the evidence presented by EE on policy rates from several developed market countries (see paragraph 9.60), it does appear clear that there is now a strong body of evidence that government yields can remain negative for a significant period of time.
- 9.83 On this basis, the UKRN report does appear to effectively question the need for the upward adjustments to market data that regulators have made in the determinations prior to the publication of the report, to the extent that these adjustments reflect, at least in part, a sense that negative risk-free rates are unsustainable or inconsistent with the CAPM.
- 9.84 However, we also consider the corporate finance theory discussed above which supports the CAPM and suggests that ILGs are not a perfect proxy for the RFR that should be used in the CAPM for relevant market investors.
- 9.85 It appears clear to us that ILGs closely match our key second requirement of the RFR, that the bonds are risk free. The UK government enjoys a very strong credit rating (although AA/Aa2 not the top AAA/Aa1 rating following downgrades in 2016 and 2017¹³³⁷), and as a sovereign nation in control of its own money supply the UK can ultimately ‘print’ money in order to satisfy pound sterling denominated liabilities.
- 9.86 What is also clear is that ILGs do not meet the first requirement of the RFR as applied in the CAPM, that all market participants can borrow at the same

¹³³⁶ For example, in our Bristol PR14 Determination, the CMA noted that gilt yields were ‘very low’ at around 0%, but chose to rely on previous (NIE in 2014) estimate of 1-1.5% in order to generate a RFR point estimate of 1.25% (, paragraphs 10.171-10.173). In the NIE case itself, the CMA noted that in adopting a range for the RFR of 1 to 1.5% (which was considerably above rates on long duration index-linked debt of approximately 0 per cent), the CMA were adequately allowing for the possibility that rates might rise during the remainder of price control, (CC (2014) [Northern Ireland Electricity Limited price determination](#), paragraph 13.128)

¹³³⁷ S&P [downgraded](#) the UK from AAA to AA in June 2016. Moody’s [downgraded](#) the UK from Aa1 to Aa2 in September 2017.

rate. UK government can borrow at rates considerably lower than those that can be achieved by even higher-rated non-government issuers¹³³⁸. The investors in water companies cannot therefore be assumed to be able to borrow at the risk-free rate, if it is set at the UK ILG rate. For the reasons discussed below, this implies that a CAPM model based on the ILG rate may understate the return required by investors on equities, if it underestimates the return associated with a 'zero-beta' asset.

- 9.87 We acknowledge that the UKRN report may have correctly identified previous upward adjustments to market rates as being inappropriate on the basis of 'distortion' to ILG rates or a concern that rates may significantly 'correct' during the price control, discouraging this practice in subsequent price controls. However, we consider that there is merit in Oxera's argument that this may have removed an inadvertent mitigation to problems associated with the standard regulatory approach of sole reliance on the potentially imperfect RFR proxy of government bond yields.¹³³⁹
- 9.88 As a result, we conclude that appropriate maturity ILGs remain a useful input to the RFR estimation process, but that they are unlikely to provide a perfect (or wholly sufficient) proxy for the RFR in isolation.

AAA non-government bonds

- 9.89 In considering whether highly-rated non-government bonds may offer a superior proxy for estimating the RFR in a regulatory price control, we conduct our assessment based on the yields of the IHS iBoxx UK non-gilt AAA 10+ index (which has an average maturity of approximately 28 years) and the IHS iBoxx UK non-gilt AAA 10-15 index (which has an average maturity of approximately 12 years).¹³⁴⁰
- 9.90 These gilts are not 'risk-free' in the same way as government bonds denominated in the home country's currency, as investors still take country risk, as well as the additional risk of default associated with the issuer. However, the risk of loss resulting from default on these bonds is

¹³³⁸ See paragraph 9.68- 9.70

¹³³⁹ For example, an RFR that is set too low has been highlighted as a potential reason for regulators struggling with a WACC that strictly rises with gearing. One explanation for the increasing presence of this problem is that regulators have stopped manually increasing their estimates of the RFR in the face of falling and then negative rates. The use of debt betas has also been suggested as a possible factor in this problem. For further discussion of this issue, see NATS/CAA, appendix D

¹³⁴⁰ iBoxx data. Non-gilt index used as data quality appears to be improved by a greater number of constituent issuances versus alternative AAA non-government issuers benchmarks.

exceptionally low, and evidence from actual performance suggests that the expected loss is significantly lower than the debt premium.

- 9.91 In addition to the Oxera evidence referenced in paragraph 9.70, we note that S&P Global Ratings suggest that between 1981 and 2019, 15-year cumulative average corporate default rates amount to only 0.91% in aggregate over 15 years¹³⁴¹. These low risk bonds trade at a premium to government bonds for a wide range of reasons, including the requirements placed on certain investors, including some pension funds, to purchase government bonds to meet certain liabilities.
- 9.92 Although there is no perfect mechanism for calculating the size of the effect, the cost of equity for private sector investors would therefore also be expected to diverge from a notional equity return calculated by reference to government bond yields to reflect the absence of such a premium. In other words, the CAPM should not assume that investors would accept a lower return on zero beta (or very low beta) equities than the cost of financing that return by borrowing. It would be consistent with the CAPM to assume that the cost of borrowing by low-risk investors therefore forms a 'lower bound' for equity returns, and that this could therefore be another way of estimating the return on a zero-beta asset.
- 9.93 Returning to the key characteristics for the RFR highlighted in paragraph 9.75, we note that non-government bonds with the highest possible credit rating provide an input that is both very close to risk free (issuers with a higher credit rating than the UK government, but without some inflation and default risk) and is at least closer to representing a rate that is available to all (relevant) market participants. As a result, on the balance of evidence we consider AAA-rated non-government bonds to be a suitable input into our estimate of the RFR.
- 9.94 In the following paragraphs, we will turn to assessing arguments in favour of using nominal UK government bonds, long-run estimates of UK interest rates and non-UK government bonds as proxies for the RFR.

Submissions in favour of using alternative data as a proxy for the RFR

Nominal Bonds

- 9.95 Ofwat chose to use only ILGs and excluded nominal government bonds from its analysis. In making this choice, Ofwat submitted that including

¹³⁴¹ S&P Global Rating (2019) [Default, Transition, and Recovery: 2019 Annual Global Corporate Default And Rating Transition Study](#), Table 26

nominal yields would knowingly add inaccuracy (in the form of inflation risk premium) into an estimate of a risk-free rate. It also suggested that it would be inappropriate to provide water companies with compensation for inflation risk (as is present in nominal bonds) when they already enjoy an extremely high level of inflation protection to both revenues and their regulatory capital value.¹³⁴² It noted that this approach was in line with that taken by the 2018 UKRN report and recent estimates published by Ofgem, Ofcom and the Civil Aviation Authority.¹³⁴³

- 9.96 Ofgem stated that once the inflation risk premium had been taken into account that the yields on nominal and inflation-linked government bonds should give numerically similar estimates of the RFR. It also suggested that the CMA should consider the ‘price of tomatoes’ arguments proposed by the UKRN cost of equity report.¹³⁴⁴
- 9.97 Yorkshire stated that it agreed with many of the points put forward on behalf of regulatory companies as part of the NATS/CAA inquiry. In particular, it endorsed the use of nominal UK government bonds in addition to ILGs.¹³⁴⁵
- 9.98 Economic Insight worked on behalf of all the Disputing Companies, as well as other companies during the determination process. In a report for Bristol it argued that the RFR is a theoretical concept and cannot be directly observed, and that as a result neither ILGs nor deflated nominal bonds provide a perfect measure of the RFR. Specifically:
- (a) Nominal gilts will embed an inflation risk premium (as noted by Ofwat);
 - (b) ILGs will embed a liquidity premium; and
 - (c) ILGs may be further affected by market distortions which may or may not persist.
- 9.99 Economic Insight submitted that even using Ofwat’s own interpretation of inflation risk premium and inflation, there is a difference evident between ILG yields and deflated nominal yields.
- 9.100 Economic Insight, updating its previous work for NATS, noted Bank of England analysis of the liquidity risk premium on ILGs between 2004 and 2013 which suggests that estimates had averaged 15bps, but that before

¹³⁴² Ofwat (2019) *Allowed return on capital technical appendix*, section 5.2.3

¹³⁴³ Ofwat (2019) *Allowed return on capital technical appendix*, section 5.2.1

¹³⁴⁴ Ofgem submission, 11 May 2020

¹³⁴⁵ Yorkshire SoC, paragraph 7.1.2

the global financial crisis this figure was essentially zero (averaging - 0.02%). The same report noted that estimates of the inflation risk premium on nominal gilts varied considerably over time, averaging 15bps but peaking at 150bps and troughing at below zero. The pre-crisis period averaged only 0.09%.

- 9.101 Economic Insight recalculated its estimate using Bank of England estimates of inflation and liquidity risk premia, finding that the results suggest greater divergence between deflated nominal and ILG yields than was suggested by Ofwat. Economic Insight found that on this basis the RFR implied by ILGs was 40-51bps lower than the RFR that would be implied by the use of deflated nominal yields.¹³⁴⁶

Non-UK government bonds and long-run estimates

- 9.102 Anglian, Bristol and Northumbrian submitted evidence from KPMG that suggested that the estimation of the RFR should take other market and non-market data into account.
- 9.103 KPMG, including input from Professor Gregory, worked on behalf of Anglian, Bristol and Northumbrian during the PR19 determination by Ofwat, while Yorkshire referenced Professor Gregory in its representations to the CMA in response to the NATS/CAA provisional findings.¹³⁴⁷ Anglian, Northumbrian and Wessex also commissioned a report from Professor Gregory in order to 'assist the CMA in its redetermination of the price control for NERL'.¹³⁴⁸
- 9.104 KPMG submitted that the rates on the instruments traditionally used to estimate the RFR (such as government bonds and commercial bank liabilities) may currently be an unreasonable basis for setting the RFR (and so the cost of capital) in a regulatory price control. As the RFR is a fixed (not indexed) allowance, setting the RFR based on current gilt yields would assume that negative yields will prevail over the long run. KPMG submitted that there are several reasons why sustainably negative rates are unlikely:
- (a) The time preference for consumption now rather than consumption in the future would ensure a positive real interest rate, and that the 'neo-classical' assumption is that this rate would be close to the long-run steady-state GDP growth rate (as suggested by Taylor 1993).

¹³⁴⁶ See Appendix C, Figure 5 for Economic Insight's calculations.

¹³⁴⁷ Yorkshire [submission](#) (NATS/CAA appeal), April 2020

¹³⁴⁸ Gregory (2020), [Setting the Cost of Equity in UK Price Controls](#)

- (b) The International Fisher Effect suggests that real interest rates should be the same across countries (also known as purchasing power parity, PPP), and that whilst at present PPP theory has not translated into equivalent rates in the US and the UK, the theory brings sustainably negative rates into question.
- (c) The UK is currently in a volatile and unusual situation, with the COVID-19 outbreak causing high levels of market volatility. The significant spending plans announced by the government might reasonably be expected to lead to an increase in interest rates, while the Brexit debate continues to provide uncertainty about the Bank of England's future interest rate decisions.

9.105 KPMG suggested that instead of relying on potentially distorted and volatile market rates, the RFR should be set on the basis of a glide path from current market data to a forward-looking equilibrium rate for the UK. One estimate of such an equilibrium rate is the Bank of England's Inflation Report of August 2018 estimate, which suggested that the rate is lower than previously estimated but still positive at +0.5% real CPI. Another potential reference point could be US Treasury Inflation-Protected Securities, which have remained positive, on average, for the 10 years preceding Ofwat's final determination.

9.106 KPMG suggested that emphasising this equilibrium evidence and the theoretical arguments against a negative RFR would lead to an RFR estimate of 0.2% in CPIH terms (assuming that CPIH is broadly comparable to CPI). Alternatively, placing more weight on current market rates would result in a lower estimate, with the 1-year trailing average of current market rates being -0.5% in CPIH-terms.

9.107 KPMG suggested that a reasonable estimate of the real RFR would be -1.50% to -0.8% in RPI terms, and that using a 100bps wedge this would translate to -0.50% to +0.20% in CPIH terms. We note that, in Professor Gregory's paper for Northumbrian, Wessex and Anglian for submission in the NATS/CAA case, he estimated the appropriate range at 0% to +0.2% in CPI terms.¹³⁴⁹

¹³⁴⁹ Gregory (2020), [Setting the Cost of Equity in UK Price Controls](#), paragraph 8.15

Submissions in favour of using alternative data as a proxy for the RFR – CMA assessment

- 9.108 After considering the evidence presented on the use of nominal bonds within the estimation of the RFR, we are unconvinced that the use of nominal bonds is likely to materially improve our estimate.
- 9.109 We note that any assessment of ‘divergence’ between the price of ILGs and the price of deflated nominal bonds is intrinsically linked to the inflation assumption and liquidity premium that is used in the comparison. As we cannot exactly know the inflation assumptions used or liquidity premium required by market participants when pricing the two instruments, we do not believe that we can accurately assess the presence of any distortions to either price.
- 9.110 In addition, as deflated nominal government bonds are unlikely to have any features over and above ILGs that would allow them to better meet the desired characteristics of the RFR (as discussed in paragraph 9.75), but do have greater risks in terms of inflation risk, we do not believe that the inclusion of deflated nominal bonds is likely to materially improve our estimate of the RFR.
- 9.111 Addressing KPMG’s suggestion of including (or ‘gliding’ towards) the Bank of England’s R^* estimate of the UK’s long-run equilibrium interest rate, we note that this estimate comes from a report published in August 2018 with no subsequent update. In August 2018, the 20-year ILG rates averaged -1.59%. In July 2020 the same rates averaged -2.56%, almost a full percentage point lower.¹³⁵⁰
- 9.112 In considering both demographics and productivity trends, we consider the Bank of England’s R^* to offer a useful and independent assessment of long-term interest rates. However, we note the inherent uncertainties involved in creating the estimate, the significant uncertainty about the timeline of trend towards this rate and the infrequency of estimate updates. In our assessment, while this data may provide an interesting cross check, we do not believe it is robust enough to be a primary source of data for our estimate of the RFR.
- 9.113 In addressing the use of non-UK government bond yields, we acknowledge that US Treasury Inflation-Protected Securities currently offer higher yields than ILGs, although we note that US Treasury Inflation-Protected Securities

¹³⁵⁰ Bank of England (August 2018) [Inflation Report](#), pp 39-43, Box 6. Bank of England yield curve [data](#)

yields are negative at all durations.¹³⁵¹ However, we also note that, outside of the peak of the global financial crisis, UK bonds offered approximately a 0.50% higher yield than US bonds during the decade between 2004 and 2014. Following the period associated with the Brexit announcement there was a significant shift to US bonds offering a higher yield, with the 'inflation adjusted' premium sitting at roughly 1.50% in recent years.¹³⁵²

9.114 We are reluctant to give significant weight to an expectation that purchasing power parity should lead real rates to equalise over the period of our price control. We note that real rates are likely to be a function of a complicated range of inputs, including domestic demographic trends and productivity growth. We also note that significant stock market outperformance by the US over the UK may also reflect differences in trend growth between the two countries.

9.115 In addition, at the last datapoints that we have, 39% of US government debt was held by foreign owners while 28% of UK gilts were held by foreign owners. The value of UK gilts in issuance has increased by 250% since 2007 (pre-global financial crisis), while the share of foreign ownership has remained roughly flat at 28% (and is significantly higher than in the early 2000s).¹³⁵³ While there may be arguments for certain sovereign foreign investors to need to hold sterling assets for balance of payment reasons, international trade levels are unlikely to have increased by the same magnitude as the size of the gilt market over this period. Therefore, this data does not seem to suggest that (presumably rational) international investors see UK yields as distorted relative to other international yields (arbitrage theory suggesting that they would sell UK gilts and buy US Treasuries if so). The data also appears to imply that UK gilts may remain a suitable measure of risk-free investing, even for internationally mobile investors such as those invested in UK water companies.

9.116 We also acknowledge EE's evidence¹³⁵⁴ of negative policy rates from important international institutions such as the European central bank and individual countries such as Japan, Sweden and Switzerland, and note that there are a range of factors than can impact domestic lending and government bond rates. With US real rates now also having negative yields, we do not consider there to be strong evidence that UK rates are

¹³⁵¹ US Department of the Treasury as at end July 2020.

¹³⁵² This is CMA analysis comparing historic 10- and 20-year maturity US Treasury Inflation-Protected Securities yields to UK 10 and 20yr ILG plus 100bps (as an approximate way to convert UK ILGs to a similar basis and US Treasury Inflation-Protected Securities). This is superficial analysis only, as inflation measures in the UK and US are not directly comparable and the traditional 100bps 'wedge' may not be a useful tool in this instance.

¹³⁵³ Congressional Research Service (2019), [Foreign Holdings of Federal Debt](#). HM Treasury (2019), [Debt Management Report](#)

¹³⁵⁴ See paragraph 9.60

irrational or that our RFR estimate would benefit from factoring (implicitly ‘higher quality’) international data.

9.117 In the following paragraphs we consider the best way to measure and adjust our preferred input.

Submissions relating to the appropriate measurement period for market data

Ofwat

9.118 Ofwat used a month as an appropriate trailing average in order to mitigate temporary volatility. Ofwat submitted that longer-averages risk large gaps opening up between the trailing average of yields and recent evidence provided by spot (current) rates.¹³⁵⁵ Ofwat stated that there is no evidence of mean-reversion to historical levels and offered the view from Brattle that the best predictor of future risk-free rates is the current yield and that longer averaging periods risk including out-of-date data that is not relevant to the future.¹³⁵⁶

9.119 Ofwat noted in its Reply to the Disputing Companies’ statements of case that indexation of the RFR was not raised in the development of the PR19 methodology. It acknowledged that Ofgem has proposed to index the risk-free rate within the upcoming RIIO-2 price controls but note that this matter has not previously been considered or consulted upon in the water sector.¹³⁵⁷

Disputing Companies

9.120 Anglian suggested that rather than consider an average over a defined period, Ofwat had effectively used the spot estimate from 30 September 2019 – a non-trivial change from previous regulatory practice. Anglian stated that Ofwat’s approach provides no allowance for the recent volatility in government bond yields.¹³⁵⁸

9.121 Bristol stated that Ofwat’s chosen measurement period was a time where rates were volatile and in disequilibrium, as evidenced by the significant change in estimate between draft determinations (1.54% nominal) and final

¹³⁵⁵ Ofwat (2019), *Allowed return on capital technical appendix*, section 5.2.2

¹³⁵⁶ The Brattle Group (2016), *Review of approaches to estimate reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization*, section VI.A.4

¹³⁵⁷ Ofwat, *Risk and return – response to common issues in companies’ statements of case*, paragraph 3.45

¹³⁵⁸ *Anglian SoC*, paragraph 1142-1145

determinations (0.58% nominal). This approach risked setting a rate that is inappropriately low for the whole price control period.¹³⁵⁹

9.122 Northumbrian submitted that Ofwat's use of market yields from only September 2019 is not appropriate for estimating market conditions throughout the control period. Northumbrian accepted that the RFR could be determined at the time of a regulatory decision with 'minimal error', but submitted that a company's investment decisions occur throughout the 5-year period, and that setting allowed returns based on spot rates on a particular day may lock in inappropriately low rates that ultimately impact investment decisions.¹³⁶⁰

9.123 KPMG flagged that UK market data moves lead to a 0.93% change in Ofwat's estimate between draft and final determinations which is a significant movement over a 6-7-month period.

Submissions relating to the appropriate measurement period for market data – CMA assessment

9.124 We note that the Brattle report referenced by Ofwat (see paragraph 9.118 above) states that 'in theory' the most recent rate or yield available will give the best prediction of the future rates. However, we also note that the report goes on to say that longer-term averaging is defensible from a policy perspective and that spot yields risk introducing an element of randomness and volatility into the WACC decision. Brattle further submits that using a longer-term average yield 'smooths' changes in the yields, makes the WACC less dependent on timing issues and means that changes in the WACC are easier to predict, which is itself desirable from the perspective of regulatory stability and minimisation of regulatory risk.

9.125 Based on Brattle's analysis, the 'error' from stale data starts to increase at a greater rate when the averaging period exceeds one year, and that in their view a reasonable balance is for a regulator to set the risk-free rate by taking an average yield over a period of up to one year.¹³⁶¹

9.126 We agree with the Disputing Companies and with the Brattle report that averaging periods that are too short risks the introduction of inappropriate levels of volatility into the estimation process. We acknowledge that Ofwat's use of 1-month averaging attempts to address this issue but suggest that

¹³⁵⁹ Bristol SoC paragraph 286

¹³⁶⁰ Northumbrian SoC, paragraph 853

¹³⁶¹ The Brattle Group (2016), *Review of approaches to estimate reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization*, pp41-43

this is potentially still too short to reasonably mitigate the risk of short-term market fluctuations.

9.127 At this provisional stage we propose to average market data over a 6-month look back period, in line with the approach taken in the CMA's NATS/CAA decision.¹³⁶²

9.128 In addition, we note the very long-life assets and long-horizon investment decisions that are likely to be based on our cost of capital estimates. As a result, we suggest that a 20-year investment horizon would closely match the reality of decision-making within the sector and so use gilt and other market data at or close to 20-year maturities. We note this horizon is longer than the 15 years used by Ofwat.

The use of forward rate adjustments

9.129 Ofwat adjusted its -2.61% estimate of the RFR for market-implied rate rises over RP3 of 0.26%, bringing its estimate to -2.35%. Ofwat's consultants, EE, describe this adjustment as using yields on different maturity gilts so as to estimate the forward rates for relevant length gilts, thus capturing the implied future yield on an investment made in a certain number of years' time.

The use of forward rate adjustments – CMA assessment

9.130 We did not receive representations on the use of this forward rate adjustment or on the accuracy of the mechanism.

9.131 We acknowledge that it has become convention (when using market data as the basis for the RFR estimate) to adjust this figure to reflect rate increases that are anticipated through the price control period. The forward curve is typically used to calculate this increase, or it can equivalently be found using the 'expectation hypothesis' calculation as deployed by EE.¹³⁶³

9.132 However, we did not receive evidence in support of the notion that current forward curves provide an accurate measure of future spot rates. We note prior (2016) analysis by CEPA for Ofwat and the CAA which demonstrates

¹³⁶² [NATS/CAA](#), paragraph 12.265

¹³⁶³ The expectation hypothesis suggests that future interest rates can be calculated from current yields (interest rates) at relevant maturities. In a simple example, to estimate the 1-year spot rate in 1 years' time, we would note the return available from a 1-year bond bought today and held to maturity, and calculate what interest rate this would have to be reinvested at in 1-years' time in order to match the total return from a two-year bond bought today and held to maturity. See Appendix C, paragraph 8 for the CMA's calculation of the expected uplift to the middle of the price control.

a distinctly poor relationship between forward curves and future spot rates.¹³⁶⁴

- 9.133 While we acknowledge the theoretical underpinnings of the approach, and note that the forward curve may have practical implications for company-level factors such as hedging rates¹³⁶⁵, we have not been presented with sufficient evidence that forward curves or expectation hypothesis calculations offer a better indicator of future spot rates than the current (smoothed) market price. As such, we do not use forward rate adjustments in our provisional estimates.

Estimating the RFR - Our provisional approach

- 9.134 Based on the evidence analysis discussed above we believe that the ILG yield remains a useful and relevant input into the RFR calculation. However, we note that the yields on these instruments demonstrate that the UK government can borrow at rates significantly lower than other market participants.
- 9.135 It is our assessment that ILGs closely but imperfectly match the key requirements of the RFR within the CAPM model. They are very low risk but their yields demonstrate that the government can borrow at rates substantially lower than even higher-rated non-government market participants. As such, the yield on ILGs is likely to sit below the 'true' estimate of the theoretical RFR, if the RFR is expressed as the yield on a 'zero beta' asset. Given this, we use the 20-year maturity ILG as a lower bound for our estimate of the RFR, but we expect that the returns on low beta assets are likely to be higher than implied by a CAPM model which uses this rate as the RFR.
- 9.136 Based on the evidence analysis discussed above we also consider that very-highly rated non-government yields are likely to provide a useful and relevant input into the RFR calculation.
- 9.137 It is our assessment that AAA-rated non-gilt yields closely but imperfectly match the key requirements of the RFR within the CAPM model. These bonds trade at yields that are closer to the rate that would be available to all (relevant) market participants but do have some inflation and default risk over time. As such, the yield on AAA-rated non-government bonds is likely to sit above the 'true' estimate of the theoretical RFR. Given this, we use

¹³⁶⁴ CEPA (2016), [Alternative approaches to setting the cost of debt for PR19 and H7 for Ofwat and the Civil Aviation Authority](#), section 4.1.1 including Figure 4.1

¹³⁶⁵ The reference data used by companies and banks in order to price derivative contracts such as inflation or interest rate swaps.

the yield on the average of the IHS iBoxx £ Non-Gilt AAA 10+ and 10-15 indices as the upper bound for our estimate of the RFR.

9.138 We use 180-day (6 month) averages of this market data in order to mitigate the impact of any short-term market volatility and we make no forward rate adjustment.

9.139 We inflate RPI-real data by a 0.90% RPI-CPI wedge and deflate nominal data by our 2.00% estimate of CPIH inflation (as described in paragraph 9.27) in order to present CPIH-real estimates.

RFR - CMA provisional determination

9.140 Our provisional estimate of the RFR is based on the following data:

- (a) Using Bank of England data to the end of July 2020, the 180-day trailing average yield of the 20-year UK ILG is -2.28%. Inflating this figure by 0.90% suggests a CPIH-real low estimate for the RFR of -1.40%.
- (b) Using iBoxx data to the end of July 2020, the 180-day trailing average yield of the IHS iBoxx £ Non-Gilt AAA and 10-15 and 10+ indices were 1.04% and 1.30% respectively. The average of these two yields (to give an average maturity of approximately 20 years) is 1.17%. Deflating this figure by 2.00% suggests a CPIH-real high estimate for the RFR of -0.81%.

9.141 As a result of the above estimates, we estimate the CPIH-real RFR to lie between -1.40% and -0.81%. For reference, Ofwat's PR19 final determination was -1.39%.

Table 9-2: RFR Estimate

<i>CPIH Real</i>	<i>Low Estimate</i>	<i>High Estimate</i>	<i>Ofwat PR19 final determination</i>
Risk-free Rate	-1.40%	-0.81%	-1.39%

Source: CMA Analysis, Bank of England data, iBoxx data and Ofwat PR19 final determination

Total Market Return

Introduction

9.142 The total market return (TMR) is the total return that investors require for investing in a diversified basket of equities. It is the sum of the of the risk-free rate (RFR) and the equity risk premium (ERP), which is the part of this return that compensates investors for the additional risk associated with investing in equities, rather than in risk-free assets. The risk-free rate and

resultant ERP are inputs to the CAPM formula in the calculation of cost of equity. Hence, its calculation impacts the weighted average cost of capital (WACC).

9.143 There is no universally accepted method for deriving TMR, because it is concerned with investors' ex-ante expectations of returns, which are largely unobservable. The academic literature on the subject is large and can be categorised into three types:

- (a) studies that assume that historical realised returns are equal to investors' expectations (so-called 'historical ex-post' approaches);
- (b) studies that fit models of stock returns to historical data to separate out ex-ante expectations from ex-post good or bad fortune (so-called 'historical ex-ante approaches'); and
- (c) studies that use current market prices and surveys of market participants to derive current forward-looking expectations (so-called 'forward-looking approaches').

9.144 In this section we consider the evidence available under each of these three approaches to estimating the TMR.

Ofwat's PR19 Decision¹³⁶⁶

9.145 In coming to its final determination of a TMR of 6.5% in CPIH terms, Ofwat took into account evidence from all three potential approaches (historic ex-post, historic ex-ante, and forward-looking).

9.146 In terms of the historic ex-post approach, Ofwat used the Bank of England's composite historical CPI series to deflate long-run nominal returns (as sourced from the 2019 Credit Suisse Global Investment Returns Yearbook¹³⁶⁷) into real-terms equivalents, giving a TMR of 6.5-6.6% (CPIH). Ofwat assumed a holding period of between 5 and 10 years and placed most weight on two averaging approaches:

- (a) the Jacquier, Kane and Marcus ('JKM') estimator, a holding period-weighted average of geometric and arithmetic averages, which is

¹³⁶⁶ Ofwat (2019), [Allowed return on capital technical appendix](#), Section 5.3

¹³⁶⁷ E. Dimson, P. Marsh, M. Staunton, 'Credit Suisse Global Investment Returns Yearbook 2019', Credit Suisse, February 2019

designed to minimise mean-squared error when forecasting future returns based on their historical distribution; and

- (b) adjusting the whole-period geometric average return for the UK for different holding periods and serial correlation. This follows the UKRN's recommended approach to assessing the TMR for regulatory purposes. The size of the adjustment was based on PwC's analysis for the CAA¹³⁶⁸.

9.147 'Ex-ante' analysis for final determinations indicated a range of 5.6% to 6.6%, based on Ofwat's own Fama & French-style Dividend Growth Model and the 2019 Yearbook's 'decompositional approach'¹³⁶⁹, which seeks to adjust the historic world return for 'good luck' or 'bad luck' and unrepeatable events.

9.148 'Forward-looking' analysis for final determinations was based on multi-stage¹³⁷⁰ DDM outputs from PwC and EE¹³⁷¹, as well as estimates of TMR expectations from nine finance practitioners and analysis of Market-to-Asset Ratios covering the period March 2016 – March 2017. Ofwat concluded that, on the basis of this forward-looking evidence, an appropriate range for the TMR was between 6.0% and 6.8%.

9.149 Ofwat noted that the area of overlap from these approaches lay in the range 6.5% to 6.6% in CPIH terms, from which it picked a point estimate of 6.5%.

Key arguments

9.150 Parties presented arguments in several areas relating to estimating the TMR, including:

- (a) the appropriate inflation series to use when deflating historic nominal returns in order to identify historical real returns;
- (b) the approach used to average historic returns; and
- (c) the balance of the forward-looking evidence available to Ofwat.

¹³⁶⁸ PwC Economics (2019), [Estimating the cost of capital for H7 and PR3 - Response to stakeholder views on total market return and debt beta: A report prepared for the Civil Aviation Authority \(CAA\)](#)

¹³⁶⁹ E. Dimson, P. Marsh, M. Staunton, 'Credit Suisse Global Investment Returns Yearbook 2019', Credit Suisse, February 2019, p37.

¹³⁷⁰ Multi-stage refers to there being a different dividend growth assumption for short term and long-term projected returns.

¹³⁷¹ The models used to inform these ranges variously used income yield growth (ie average yield including both dividends and buybacks) as well as (UK) GDP growth to inform estimates of TMR.

- 9.151 We consider each of these arguments (as relevant) in our discussion of each of the three potential approaches for estimating the TMR.
- 9.152 Throughout our analysis, we have stated whether the figures derived are ‘RPI-real’ or ‘CPI-real’. In making our overall assessment, we have used the RPI-real figures and then converted our chosen range to CPIH for inclusion in our overall cost of capital calculation.

Historic ‘ex-post’ approach

- 9.153 The historic ex-post approach is based on the assumption that expected returns remain constant over time and that historic returns provide a reliable indicator of expected returns in the future. Therefore, in order to estimate the TMR, we reviewed data over the longest period possible, drawing on the Dimson, Marsh and Staunton (DMS) 2020 dataset¹³⁷², which spans 1900 to 2019 inclusive.
- 9.154 When considering historic evidence on returns, there are two key methodological considerations:
- (a) How to control for inflation when seeking to identify expected real returns; and
 - (b) The appropriate averaging method – arithmetic or geometric – and the relevant time period over which to consider returns. This is often also called the holding period, ie the period investors would hold equity in the firm.
- 9.155 We consider each of these methodological issues in turn.

Deflating historic returns – choice of inflation series

Parties’ views:

- 9.156 Ofwat explained that it had chosen to use the Bank of England’s CPI series, which combines actual CPI data from 1988 onwards, with ‘backcast’ (or estimated) CPI data between 1948 and 1987, and the implied consumption expenditure deflator (‘CED’), to deflate historical returns. It did this because it considered that changes in the composition and measurement of RPI over time have caused latter-day RPI to be structurally higher than in historical periods due to the higher RPI ‘formula effect’. This makes using unadjusted historical RPI-deflated returns an

¹³⁷² E. Dimson, P. Marsh, M. Staunton, ‘Credit Suisse Global Investment Returns Yearbook 2020’

unreliable guide to prospective RPI-deflated returns required by investors. As a result, Ofwat considered that the Bank of England's CPI series (which does not suffer from this problem) is a better index to use. Ofwat noted that the Bank of England's CPI and RPI series use the same underlying series between 1914 and 1947 – the implied consumption expenditure deflator. It found this approach to be justified as the only alternative series available for this period (the Cost of Living Index, 'COLI') is clearly rated as lower quality by the Office for National Statistics.¹³⁷³

9.157 Anglian,¹³⁷⁴ Bristol, Northumbrian, and Yorkshire¹³⁷⁵, as well as Third Parties (Electricity Networks Association and Heathrow Airport Limited)¹³⁷⁶, disagreed with this approach submitting (variously) that:

- (a) Ofwat should have either focussed primarily on RPI inflation, or should at least have also considered RPI-deflated returns alongside CPI-deflated returns, in coming to a view on TMR expectations for the following reasons:
 - (i) RPI was the actual measure of inflation that was being collected and reported as the official rate of inflation and acted on by investors. If reported inflation had been measured differently in the past, it is possible that investors may have made different asset allocation decisions, which in turn could have impacted returns. Hence, for internal consistency the most appropriate inflation series to use is the one that was the reported National Statistic for the longest part of the historical period.
 - (ii) RPI is available for the longest part of the period, in the form of reported, actual data and, as a result, it does not have to be estimated using data and assumptions made today. The RPI series is therefore not as heavily influenced by practitioner assumptions, current day data inadequacies and possible hindsight bias in interpretation.
 - (iii) It is not clear, when considering the full time period of the RPI series, to what extent the increase in the formula effect in 2010 makes RPI

¹³⁷³ Ofwat (March 2020), [Reference of the PR19 final-determinations: Cross-cutting-issues](#), paragraph 5.36.

¹³⁷⁴ [Anglian SoC](#), pp253 to 260.

¹³⁷⁵ [Yorkshire submission](#) (NATS/CAA appeal), April 2020.

¹³⁷⁶ [ENA submission](#) (NATS/CAA appeal) and [Heathrow Airport Limited submission](#) (NATS/CAA appeal), April 2020.

an inconsistent measure as there may be other, offsetting biases, in earlier historic data.¹³⁷⁷

(iv) The CPI data used for the period 1947 to 1987 is uncertain as it is modelled rather than actual data¹³⁷⁸ and, as such does not meet the ONS' criteria to be considered National Statistics. Moreover, the ONS has recognised that there are errors, which have not yet been corrected, in this modelled data series.¹³⁷⁹ Some parties highlight that the pattern of the 'wedge' between the CPI and the RPI series over time suggests that the CPI data series is unreliable.¹³⁸⁰

(b) When using the CED inflation series for the first half of the twentieth century, this should be combined with RPI inflation and not CPI inflation as it is more similar to the former. ENA explained that a deflator series may include a formula effect where the underlying constant price expenditure series used in its construction does and noted that analysis by National Grid¹³⁸¹ demonstrated that, for the period for which all data series are available, CEDs show greater alignment to RPI than CPI, and that the average differential between CED and RPI is relatively small for the full period that both data sets are available. On this basis, ENA submitted that it is likely that the CED series has been constructed using a methodology comparable to RPI and thus includes an element of the formula effect. As a result, the use of CED in both RPI and CPI series can be expected to artificially increase CPI data for the years 1900 to 1947, and hence artificially reduce estimated CPI real returns.¹³⁸²

¹³⁷⁷ Heathrow submitted analysis by Oxera which sought to control for structural breaks in the RPI series over the period from 1990 onwards. Oxera concluded that the maximum upward adjustment that would be required to make the long-run average of historical RPI inflation consistent with how RPI is calculated today was 30bps. Moreover, under some specifications of the structural break test, the net effect of all the changes was zero, implying that no adjustment should be made to the long-run average of RPI inflation. In other words, the long-run average of RPI inflation could be used to deflate the long-run average equity return without making any further adjustments for the forecast wedge between RPI and CPI inflation.

¹³⁷⁸ Robert O'Neill and Jeff Ralph (2013), *Modelling a Back Series for the Consumer Price Index*, ONS

¹³⁷⁹ *Modelling CPI*, ONS, 14 December 2018.

¹³⁸⁰ Since 1989, this wedge has been, on average around 73 basis points, while the further back in time one goes, the smaller the wedge becomes. Some parties have noted that there is a negative wedge observed between 1915 and 1949, although this depends on the RPI and CPI data series used. As a significant proportion of the wedge results from different averaging approaches, which create a positive 'formula effect', the existence of a negative wedge would suggest that CPI inflation is overestimated and TMR underestimated.

¹³⁸¹ National Grid (January 2020), *Total Market Return: The consistency of long-run CPI and RPI inflation series in the UK, and their relative suitability for use in calculating the actual historic long-run average equity market return in the UK on a 'real' basis*

¹³⁸² ENA submission (NATS/CAA appeal), paragraph 3.4

Deflating historic returns – CMA assessment

- 9.158 The various potential approaches to estimating the TMR are described as adopting either ‘CPI’ or ‘RPI’ as the inflation series with which to deflate nominal historical returns. However, for the period from 1900 to 1947, neither RPI nor CPI data exists: the two main inflation measures in use are the cost of living index (COLI) and the consumption expenditure deflator (CED). Whereas, in the period after 1947, the choice is between RPI or CPI, including the ‘backcast’ for the latter, in the period 1947 to 1988.
- 9.159 For the period prior to 1947 (for which no RPI or CPI data exists), we consider that the CED dataset should be used as this is the most reliable available source of inflation data. The Office for National Statistics has stated its preference for using the implied deflator, due to the COLI’s relatively limited coverage in terms of both products and population, and concerns about the quality of the weights.¹³⁸³
- 9.160 For the period from 1947 onwards, we have estimated historic returns using both the RPI and the CPI (actual plus ‘backcast’) inflation series. This reflects our provisional conclusion that both these data series have relevant strengths and weaknesses in the context of estimating real historic returns¹³⁸⁴. In particular:
- (a) CPI is a more reliable measure of inflation in the economy due to its use of the Jevons rather than Carli formula¹³⁸⁵, its weighting based on all private expenditure (rather than the Living Costs and Food Survey only, as it is the case for RPI) and its broader coverage of the population;
 - (b) In contrast, RPI is no longer a national statistic due to its heavy reliance on the Carli formula, as well as various issues with the source data for weights and its coverage;¹³⁸⁶

¹³⁸³ Office for National Statistics, [Consumer Price Indices Technical Manual, 2007 edition](#), p73

¹³⁸⁴ We recognise that RPI is no longer a National Statistic and that the ONS discourages its use, preferring CPI(H) for all purposes going forward.

¹³⁸⁵ In 2015, the independent [Review of UK Consumer Price Statistics](#) by Paul Johnson explored the Carli and alternatives including the Jevons and concluded that: ‘Carli should not be used in any index aiming to achieve a good estimate of changes in consumer prices’ and further that it ‘is not suitable for use’.

The [United Nations Practical Guide to Producing Consumer Price Indices](#) says: ‘A key result is that the Carli formula for the arithmetic average of price relatives has an upward bias relative to the trend in average item prices. In particular the Carli suffers from lack of transitivity i.e. when prices return to an earlier level the chained index doesn’t. Consequently, it is a formula to be avoided and some judge that it should be prohibited.’

¹³⁸⁶ For example, the [Johnson Review](#) states that: ‘As we stressed above it is generally hard in this area to come to absolute conclusions. But it is our strong view that the use of the Carli is inappropriate and that the RPI is upwardly biased because of its use. In light of this, ONS has introduced an additional inflation measure – RPIJ – which is essentially the same as the RPI except that it uses the Jevons method wherever the RPI uses the Carli... But it is not just the use of the Carli which is problematic in the construction of the RPI as a measure of consumer price inflation. Issues with the data source of the weights, population coverage and treatment of some

- (c) In addition, RPI is likely to be an inconsistent measure of inflation insofar as changes to the underlying methodology used to calculate the RPI mean that it is not comparable over time. The clearest example of this was the significant increase in the formula effect in 2010 as a result of a change to the way that clothing prices were collected. This increase in the formula effect, from around 0.45 percentage points to 0.75 percentage points, an increase of approximately 30 basis points, is shown in Figure 9-3. We note that in December 2019, the OBR forecast that the formula effect will be around 0.8% on a forward-looking basis.¹³⁸⁷
- (d) However, over the last 70 years – the period for which both CPI and RPI figures are available – the CPI inflation numbers are modelled for around 40 of those years, more than half the period. While this ‘backcast’ has been estimated using a sophisticated econometric approach¹³⁸⁸, it is impossible to know how accurate the figures are;
- (e) In contrast, the relevant data has been collected and actual RPI figures produced for the whole of the last 70 years, providing greater certainty over the actual figures (albeit recognising the data issues set out above).

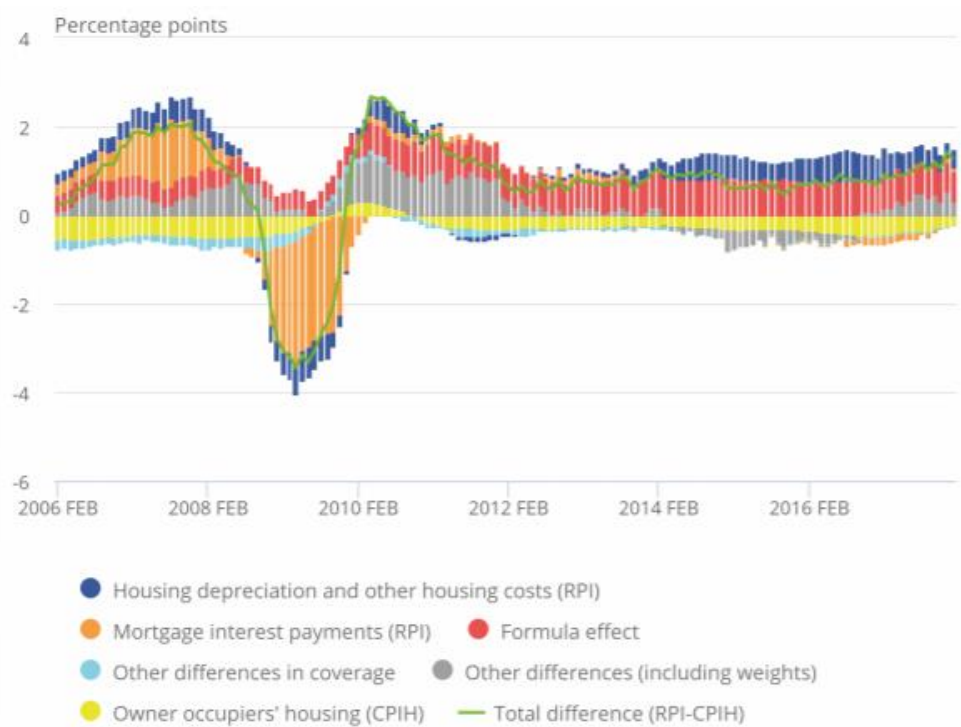
9.161 Therefore, in interpreting the results of our analysis, we have taken into account the level of historic returns produced using both measures of inflation. However, due to our concerns that, on balance, RPI-deflated returns are likely to overstate expected total market returns on an RPI-real basis going forward, we have placed less weight on the upper end of the RPI-deflated TMR range.

goods (like insurance and owner occupiers housing costs) make the RPI less suitable as a measure of overall inflation.’

¹³⁸⁷ OBR (December 2019) [Forecast evaluation report](#)

¹³⁸⁸ The authors state that: ‘The method provides only approximate results and there is no way to determine how accurate our method is as sufficient data to calculate the CPI do not exist prior to 1987.’ O’Neill R & Ralph J (2013), [Modelling a Back Series for the Consumer Price Index](#)

Figure 9-3: Causes of the difference between the RPI and CPIH inflation rates, 2006 to 2018



Source: ONS 2018

Discussion of parties' views

9.162 We have considered Oxera's work for Heathrow, which seeks to identify structural breaks in the RPI series and control for these, and its conclusion that the evidence supports a finding that the (average) RPI-CPI wedge historically is likely to be similar to the size of the wedge currently, with an upward adjustment to historical average inflation of at most 30bp to account for the cumulative impact of all changes to the RPI series over time.¹³⁸⁹ We recognise that there have been various changes in the RPI methodology over time and that pre-2010 changes may have reduced the formula effect. However, first we note that Oxera's analysis does not cover the full period from 1950 onwards, and hence does not provide strong evidence of the potential size of the formula effect over the whole period, and, second, during the early 1990s period when Oxera's analysis suggests that the size of the formula effect would have reduced due to various methodological changes, there is some other evidence from the ONS suggesting that the opposite effect may have been taking place.¹³⁹⁰

¹³⁸⁹ Oxera (2019) *The cost of equity for RIIO-2*, prepared for Energy Networks Association

¹³⁹⁰ O'Donoghue, J (1998), *Harmonised Index of Consumer Prices: Historical Estimates*

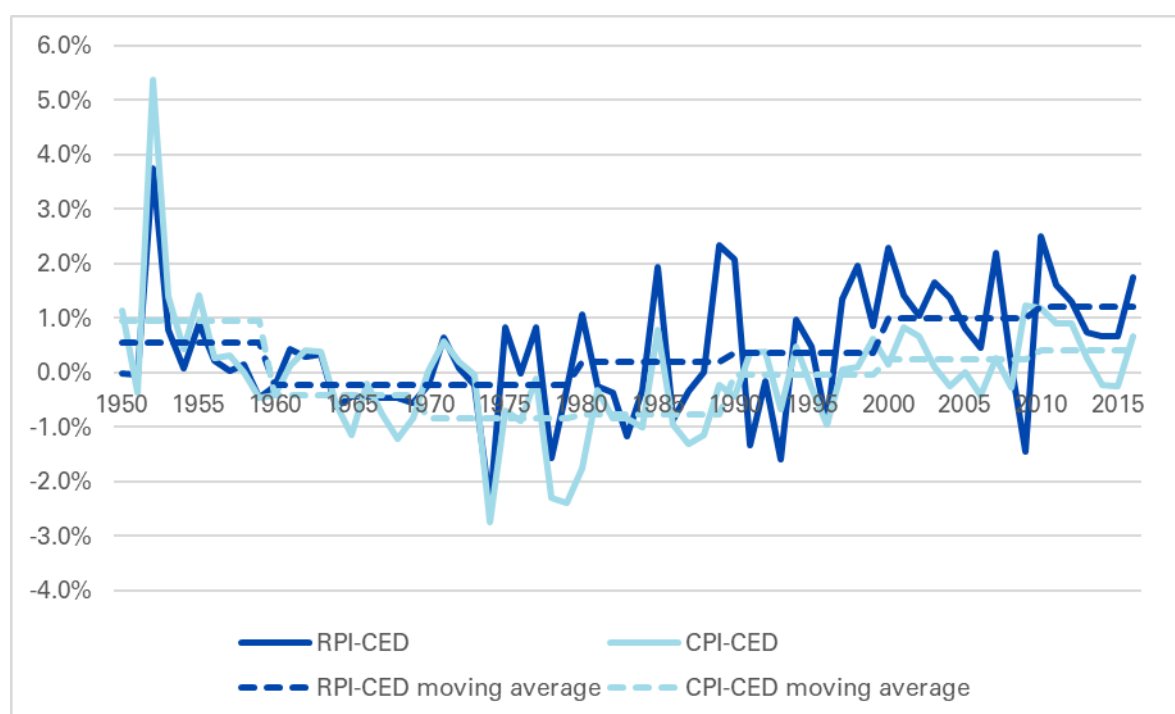
- 9.163 Our current view is that this evidence, on balance, suggests that RPI is likely to have been an inconsistent measure of inflation over time and that the size of the formula effect is likely to have increased over time. However, we recognise that there is material uncertainty over the extent of this inconsistency and the change in the formula effect, and we have taken that into account in our assessment (see paragraphs 9.216 to 9.222, below).
- 9.164 We considered the argument regarding RPI being the measure of inflation that was generally used by businesses and investors over the second half of the twentieth century. While this is clearly the case, we do not agree that it follows that investors today, when seeking to understand what real returns were in the past and hence, what they might expect them to be in the future, would similarly rely on a measure of inflation that is widely considered to be unreliable. We consider that our estimate of TMR, which is to be used on a forward-looking basis, should reflect the best available information, including on the actual real returns realised in the past.
- 9.165 From our review of the available CPI data, we were not persuaded that the errors identified by the ONS in the input data for the backcast highlighted in some of the submissions that we received, were likely to have an appreciable impact on the overall level of the backcast series given how small the adjustments made to the original data are. However, we observe that the CPI data series has some issues in terms of its coverage of goods and services, notably its exclusion of housing costs, and, more importantly, is comprised of a mix of actual and modelled data. With respect to the latter, we note that the researchers who carried out the backcast highlighted that '[t]he method provide[d] only approximate results and there is no way to determine how accurate [it]... is as sufficient data to calculate the CPI do not exist prior to 1987.'¹³⁹¹
- 9.166 As a result of these reservations about the CPI data available to us over the historic period, and taking into account the fact that actual RPI inflation data has been collected and an inflation series produced on this basis over the whole post-1950 period, we believe it is appropriate to take into account both CPI- and RPI-deflated estimates of the TMR.
- 9.167 Next, we considered the argument as to whether the CED is more similar to RPI or CPI inflation, and hence how the available inflation series should be combined over the full 1900 to 2019/20 to assure consistency as far as possible. We note that there are theoretical reasons to expect that CED

¹³⁹¹ O'Neill R & Ralph J (2013), *Modelling a Back Series for the Consumer Price Index* pp 2-3.

would produce different results from either RPI or CPI inflation series, notably the fact that it is a Paasche index rather than a Laspeyres index, which will tend to result in the under measurement of price movements.¹³⁹²

9.168 However, in order to understand the potential extent of differences arising from this different structure, we compared the implied consumption deflator, as measured by the Bank of England¹³⁹³, with both RPI and CPI from 1950 onwards, the period during which there is data for all three series (see Figure 9-4). This analysis indicates that the consumption deflator gives an inflation estimate between that of RPI and CPI, but closer to the latter on average over the period. Our current view, therefore, is that CED cannot be said to be more like RPI or more like CPI but that it is reasonable to combine CED data with both CPI and RPI, on the basis that it represents the most reliable measure of inflation available for the first half of the twentieth century.

Figure 9-4: Comparison of RPI and CPI against CED



Source: Bank of England data, CMA analysis

9.169 Figure 9-4 shows the difference between RPI and CED, and between CPI and CED (as well as moving averages of these differences by decade). The difference between RPI and CED was 0.4 percentage points on

¹³⁹² A Paasche index uses current-period quantity weightings while a Laspeyres index uses base-period quantity weightings. This means that a Paasche index takes into consideration (changes in) consumption patterns within period. As a result, it will tend to understate the changes in price because the index already reflects changes in consumption patterns when consumers respond to price changes and adopt substitutes.

¹³⁹³ [Bank of England, Millennium Data Set](#)

average over the 1950 to 2016 period, while the difference between CPI and CED was -0.1 percentage points, in other words CPI was slightly lower than CED on average. Ofwat submitted similar analysis, drawing on the ONS' Household Final Consumption Expenditure deflator (rather than the Bank of England implied consumption deflator), which gave the same average differences between RPI and CPI and the deflator of 0.4% for RPI and -0.1% for CPI (albeit with differences in the year-to-year figures).

Averaging historic returns

Parties' views

- 9.170 Ofwat explained that it did not agree with the water companies' arguments that it should use the direct arithmetic average returns, since this is vulnerable to distortion from exchange rate effects and is an upwardly-biased estimator of returns for holding periods of longer than one year and in the presence of serial correlation. Rather, Ofwat focussed on the estimator that it considered would give the most accurate estimate in constructing its 'ex-post' range. This was the 'JKM efficient estimator' as described by Jacquier et al (2005).¹³⁹⁴
- 9.171 In response to parties' submissions that the Cooper estimator¹³⁹⁵ was more appropriate for averaging historic returns in a regulatory determination, Ofwat told us that it saw the ex-post approach as a thought experiment in which investors expect the future to look like the past, such that the appropriate approach to averaging historic data was to consider all the historic 15-year periods and make an inference based on a reasonable expectation for the return you could expect in future. Ofwat explained that it did not recognise the need to see things through the lens of capital budgeting, highlighting that if one were to use the whole period arithmetic estimate to compound returns over a 15-year period, the result would be a terminal value which would be much higher than the terminal value actually achieved by investors over each of the 15-year periods in the historic data. This indicates that the arithmetic average is an upwardly biased estimator.
- 9.172 Ofwat submitted that its approach in this respect was supported by several academic studies,¹³⁹⁶ which found that for holding periods of more than one

¹³⁹⁴ Ofwat, [Reference of the PR19 final-determinations: Cross-cutting-issues](#), paragraph 5.36; and Ofwat, [Risk and return: response to common issues in companies' statements of case](#), paragraph 3.25

¹³⁹⁵ Cooper, I (1996), *Arithmetic versus geometric mean estimators: Setting discount rates for capital budgeting*, European Financial Management, Vol. 2, No. 2.

¹³⁹⁶ Indro, D & Lee, W (1997), *Biases in Arithmetic and Geometric Averages as Estimates of Long-Run Expected Returns and Risk Premia*, Financial Management, Vol. 26, No. 4 and Jacquier, E, Kane, A, & Marcus, AJ (2005),

year, particularly in the case of serial correlation, the use of the arithmetic average would produce an upward bias. Conversely, unless one were using the entire historical span as the holding period, the geometric estimator will understate the required return. Therefore, Ofwat has taken into account horizon-weighted averages in the form of the JKM and Blume estimators, with greater weight given to the former because it focuses on efficiency; it provides a more precise estimate of the true terminal value, which Ofwat considers to be more important than unbiasedness.

- 9.173 Ofwat considered its 5 to 10-year assumption of holding periods to be reasonable, being consistent with a 5-year control with a fixed TMR assumption, as well as with the advice to regulators from the UKRN Study (which endorses a 10-year holding period), investor surveys, and regulatory decisions.¹³⁹⁷
- 9.174 Anglian,¹³⁹⁸ Bristol, Northumbrian submitted that Ofwat should not have focussed on a single estimator (the JKM efficient estimator) to such an extent but rather should have taken into account average returns calculated using a range of estimators, in line with previous CMA and regulatory practice.
- 9.175 In addition, Anglian, ENA and Heathrow submitted that investors would require a discount rate at least as high as the arithmetic mean, highlighting the work of Cooper (1996)¹³⁹⁹ in proving analytically that an unbiased estimate of the discount rate to use in capital budgeting will be at least as high as the arithmetic average. ENA submitted two expert reports from Professor Schaefer (together with Oxera) in support of this view.¹⁴⁰⁰

Averaging historic returns – CMA assessment

- 9.176 We consider that the theoretically correct measure of a return to use in deriving the cost of capital is the arithmetic mean, assuming there is a constant underlying return and the return in each year is independent of that in other years. However, where returns are serially correlated and investors have a holding period of more than a year, the arithmetic mean return for a single year will be an upwards biased estimator of returns.

Optimal Estimation of the Risk Premium for the Long Run and Asset Allocation: A Case of Compounded Estimation Risk, Journal of Financial Econometrics, Vol. 3, No. 1

¹³⁹⁷ Ofwat, [Reference of the PR19 final-determinations: Cross-cutting-issues](#), paragraphs 5.36-5.37.

¹³⁹⁸ [Anglian SoC](#) pages 271 to 279

¹³⁹⁹ Cooper, I (1996), *Arithmetic versus geometric mean estimators: Setting discount rates for capital budgeting*, European Financial Management, Vol. 2, No. 2

¹⁴⁰⁰ Schaefer SM *Using Average Historical Rates of Return to set Discount Rates*, (submitted together with Oxera report)

9.177 We consider that it is appropriate to consider returns over a relatively long time-horizon, reflecting both the relatively long holding periods of investors in UK water companies, as well as to ensure consistency with the other elements of the cost of capital, such as the tenor of debt finance and the maturities of ILGs used to benchmark the risk-free rate. Therefore, we have considered returns over a 10 to 20 year holding period.

9.178 We noted that there are two broad approaches that have been taken to averaging historic returns:

- (a) A variety of estimators have been developed, which estimate arithmetic returns over a longer holding period (overlapping and non-overlapping averages), and/or which calculate a horizon-weighted average return (of the arithmetic and geometric means). Examples of these include the Blume and JKM unbiased estimators (and the JKM efficient estimator). In previous regulatory decisions, the CMA has considered a range of average returns over longer holding periods using these estimators. In the NIE redetermination, the CC concluded that a TMR range of 6-7% (RPI real) was appropriate based on this evidence.
- (b) Mason, Miles & Wright ('MMW') argue for a methodology of looking at evidence from compound average returns, ie geometric returns, and then making an adjustment for the impact of arithmetic averaging, which takes into account the volatility of returns, rather than measuring arithmetic returns directly.¹⁴⁰¹ In the 2018 UKRN report, the authors estimate the geometric return on the UK (and World) market to have been (just over) 5% and consider an uplift of 1% to 2% for arithmetic averaging to be reasonable given that long-horizon returns have lower volatility than would be the case in a random walk stock market. Using this approach, they estimate a TMR of 6-7% (CPI real).¹⁴⁰²

9.179 We considered parties' submissions regarding the 'Cooper' estimator. We noted Professor Schaefer's comments that (emphasis added):

'...the rate of return set by regulators is not only used to calculate the expected future value of an investment, but also to calculate present values in capital budgeting decisions made by regulated companies...

¹⁴⁰¹ Mason, Miles & Wright (2003), *A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K (MMW)*

¹⁴⁰² UKRN Report (2018), *Estimating the cost of capital for implementation of price controls by UK Regulators* pE-125

Since the adjustments in the expected return that are required to correct the biases for compounding and discounting are different, it is not possible to provide an expected return that is correct for both but, fortunately, this is not necessary... all the CMA needs to do is to provide an unbiased estimate of (say) the expected annual return. Compounders and discounters will then make their own adjustments to this number to adjust for the bias introduced by estimate error. Compounders will use rates [below the arithmetic average]..., discounters will use higher rates.'

9.180 We recognise that investors and capital budgeters have differing perspectives and that no single rate of return will be appropriate for both (where average returns are estimated). However, in that context, we do not agree that the most weight should be given to the capital budgeting perspective when setting a WACC for regulatory purposes. We consider that the main role of the cost of capital is to ensure that investors in a regulated business are given a sufficient incentive to invest (but not given a return in excess of that level). When making capital budgeting decisions, regulated firms can, as Schaefer notes, adjust the discount rates they use in order to ensure that they only invest in projects that increase value for shareholders. In contrast, were a regulator to embed an upwards-biased (from the point of view of investors) measure of returns in the cost of capital, this would result in the over-compensation of those investors at the expense of customers. Therefore, we consider the perspective of the investor to be the more relevant one for a regulator when setting the cost of capital.¹⁴⁰³

9.181 Next, we considered which estimators were relevant in coming to a view on TMR. In light of our provisional view that a holding period of around 10 to 20 years is appropriate for setting the TMR for a price control, we consider that the simple (1 year) arithmetic average is likely to be an upwards biased estimator of returns, while the geometric mean (over the 120 years of data) is likely to be a downwards-biased estimator. We find that the trade-off between the unbiasedness and efficiency of an estimator is not a clear-cut matter and therefore, on balance, consider it preferable to continue to take into account the range of averaging estimators¹⁴⁰⁴ set out in Table 9-3, rather than focussing on a single estimator.

¹⁴⁰³ In addition, we note that while Cooper's paper indicates that an unbiased estimate of the discount rate will exceed the arithmetic average under the assumption of the serial independence of returns, once serial correlation is taken into account unbiased estimates decline. As set out in paragraph 9.184, the impact of adjusting for serial correlation can be fairly large.

¹⁴⁰⁴ Excluding the 1-year arithmetic average and the (120-year) geometric average.

9.182 In Table 9-3, we set out estimated average returns using different estimators for 10 and 20-year holding periods.

Table 9-3: CMA estimates of real returns, 1900 to 2019

	Holding period	Inflation series	
		CED/CPI	CED/RPI
Arithmetic mean	1 year	7.0%	6.7%
Geometric mean	120 years	5.2%	5.0%
	10 years	6.8%	6.6%
Blume (1974)	20 years	6.7%	6.4%
JKM (2005) unbiased estimator	10 years	6.9%	6.6%
	20 years	6.7%	6.5%
	10 years	6.6%	6.3%
JKM (2005) MSE	20 years	6.1%	5.9%
	10 years	6.6%	6.4%
Overlapping	20 years	6.7%	6.4%
	10 years	6.8%	6.5%
Non-overlapping	20 years	7.2%	6.8%

Source: CMA analysis

Note: With a holding period of 10 years, the non-overlapping average comprises 12 observations, which reduces to 6 observations for a holding period of 20 years. Due to the small sample size, we have put less weight on these results.

9.183 Table 9-3 suggests a TMR range of around 6.1% to 6.9% (CPI-real) based on CPI-deflated returns, and around 5.9% to 6.6% (RPI-real) based on RPI-deflated returns. Using the OBR's most recent estimate of the forward-looking wedge between RPI and CPI of 90 basis points, converting the CPI-deflated figures into RPI suggests an RPI-real range of between 5.2% and 5.9%.

9.184 Drawing on the MMW approach, PwC used the actual variance in UK returns to estimate the extent of serial correlation and, therefore, a more precise estimate of the uplift required to the geometric mean. It estimated this to be between 0.3% and 1.2%.¹⁴⁰⁵ Applying the upper end of this range to the geometric estimates set out in Table 9-3 gives a TMR range of 5.5% to 6.2% (RPI real).¹⁴⁰⁶

Historic 'ex-ante' approach

9.185 The historical ex-post method has drawn significant criticism in finance literature and many studies have concluded that it does not provide a reliable indication of the ERP. Mehra and Prescott (1985) observed that the high historical returns provided by equities relative to government bonds are inexplicable in the context of standard economics models that describe risk. Similarly, Blanchard, Shiller and Siegel (1993) concluded that the ex-

¹⁴⁰⁵ PwC (2019) *Estimating the cost of capital for H7 – Response to stakeholder views*, pp41-45. We note that this range is broadly consistent with the conclusions of MMW that: 'the gap between the arithmetic mean return and geometric return would fall to only around one percentage point over a five-year horizon, and even less over a ten-year horizon.' MMW, p26

¹⁴⁰⁶ The 5.5% figure is based on a CPI-deflated geometric mean of 5.2% uplifted by 1.2% to an arithmetic mean, and then adjusted for the 90 basis points (OBR) forecast difference between RPI and CPI. The 6.2% figure is based on an RPI-deflated geometric mean of 5.0% uplifted by 1.2% to give the arithmetic mean.

post ERP appears far in excess of what is justified by standard asset-pricing models with reasonable levels of risk aversion.

- 9.186 The historic ex-ante approach seeks to identify investors' reasonable TMR expectations by using historic data but making adjustments to take into account one-off good or bad 'luck' that investors might not expect to be repeated in the future.
- 9.187 There are two commonly used approaches to deriving the expected total market return on a historic ex-ante basis:
- (a) Fama and French¹⁴⁰⁷ use a dividend growth model to break-down historic returns into an underlying expected return, equal to the average dividend yield plus the average dividend growth rate, and an unexpected return, (comprising capital gain in excess of the rate of dividend growth);
 - (b) Similarly, Dimson, Marsh and Staunton seek to infer the TMR by breaking down the historical equity premium¹⁴⁰⁸ into elements that correspond to investor expectations and elements of non-repeatable good or bad luck. These elements are the mean dividend yield, the growth rate of real dividends, the expansion of the price/dividend ratio, and change in real exchange rate. The latter two elements are considered to be 'non-repeatable', at least in expectation, while the first two elements are taken to inform investors' expectations.

Parties' views

- 9.188 Ofwat adopted two historic ex-ante approaches and, on the basis of these, concluded that an appropriate range of TMR estimates was 5.5% to 6.6% (CPI-real). Ofwat did not apply a volatility adjustment in coming to this range.
- 9.189 Ofwat explained that the need for a volatility adjustment to the output of its dividend discount model (DDM) is usually justified by the historically higher volatility of capital price growth over volatility in dividend growth. Analysis provided by PwC¹⁴⁰⁹ and EE¹⁴¹⁰ suggested such an adjustment was not necessary because (a) PwC analysis shows that the volatility of the income yield has exceeded that of capital price over the period 2006 – 2017,

¹⁴⁰⁷ Fama and French (2002), [The Equity Premium, Journal of Finance Vol 57, No 2](#)

¹⁴⁰⁸ This is calculated as the geometric difference between the equity return achieved over the period and the risk-free rate over that same period. Credit Suisse Global Investment Returns Yearbook 2019, page 28.

¹⁴⁰⁹ PwC (2017), [Updated analysis on the cost of equity for PR19](#), p16

¹⁴¹⁰ EE (2017), [PR19 — Initial Assessment of the Cost of Capital](#), pp31-32

reversing the historical relationship which justifies making the adjustment; and (b) EE submits there is no reason why GDP growth should not be considered as a direct proxy for capital growth (instead of just dividend growth).¹⁴¹¹

9.190 The Disputing Companies did not challenge the basic historic ex-ante approaches adopted by Ofwat. However, Anglian¹⁴¹² and Bristol submitted that Ofwat has incorrectly – and in a departure from precedent – removed the bias-adjustment (of 1.0-1.3%) to historical average dividend yields to account for the higher volatility of share price growth relative to dividend growth.

9.191 Anglian noted that KPMG’s analysis applying the historic ex-ante approach with this bias adjustment, gives a range of TMR estimates of between 6.35% and 6.9% (RPI, real).

CMA assessment

9.192 We have considered both of the approaches set out in paragraph 9.187.

9.193 Fama and French highlight that the average stock return is equal to the average dividend yield plus the average rate of capital gain. They then note that, assuming that the price-dividend ratio is stationary, (mean-reverting) over a long period of time the compound rate of dividend growth can be expected to approach the compound rate of capital gain, such that the expected stock return would be equal to the average dividend yield plus the average growth rate of dividends.¹⁴¹³ They use this model to break-down historic returns into an underlying expected return, equal to the average dividend yield plus the average dividend growth rate, and an unexpected return, (comprising capital gain in excess of the rate of dividend growth).

9.194 Using data from the 2018 Barclays Equity Gilt Study¹⁴¹⁴ suggests that the average dividend yield has been 4.5% over the period 1900 to 2017 in the UK, with average real dividend growth rates of around 1.2% (arithmetic mean). On this basis, the Fama & French model suggests a TMR of around 5.7%. We note that these figures have been deflated using RPI inflation.

¹⁴¹¹ Ofwat, [Reference of the PR19 final determinations: Cross cutting issues](#), p43

¹⁴¹² [Anglian SoC](#), pp259-260.

¹⁴¹³ Fama & French (2002), *The Equity Premium*, Journal of Finance Vol 57, No 2

¹⁴¹⁴ Barclays (2018) *Equity Gilt study*

- 9.195 Gregory estimates a 'Fama and French bias-adjustment' from Barclays Equity Gilt Study data, which effectively converts a geometric mean to an arithmetic mean of 1.3%.¹⁴¹⁵
- 9.196 Using DMS' approach and data for the UK from 2019¹⁴¹⁶ indicates a geometric mean dividend yield of 4.58% and a growth rate of real dividends of 0.83%, which would indicate an expected return of 5.41%. We note that these figures have been calculated using a composite price index, comprising the 'Retail Price Index'¹⁴¹⁷ up until 1949 and then CPI data (actuals and the 'backcast') from then onwards.
- 9.197 DMS uplifted their geometric mean returns by 150bps to give an arithmetic mean risk premium, which they explain is their estimate of the expected long-run ERP for use in asset allocation, stock valuation, regulatory and capital budgeting applications.¹⁴¹⁸

Inclusion of volatility adjustment

- 9.198 We considered the evidence from PwC and EE regarding the need (or not) for including a volatility adjustment. However, we do not agree that such an adjustment should be excluded from our estimate of the TMR. The historic approaches to estimating the TMR (both ex-post and ex-ante) are based on the assumption that investors expect that the future will look (more or less) like the past. In applying this approach, it has been standard to follow DMS' advice to use the longest run of available data (usually returns since 1900) in order to balance out periods of good and bad luck. As DMS explains:

'To understand risk and return, we must examine long periods of history. This is because asset returns, and especially equity returns, are very volatile... The 21st century began with one of the most savage bear markets in history. The damage inflicted on global equities began in 2000 and, by March 2003, US stocks had fallen 45%, UK equity prices had halved, and German stocks had fallen by two-thirds. Markets then staged a remarkable recovery, with substantial gains that reduced, and in many countries eliminated, the bear market losses.

'World markets hit new highs at the end of October 2007, only to plunge again in another epic bear market fuelled by the Global

¹⁴¹⁵ Gregory A (2011), *Expected Cost of Equity and the Expected Risk Premium in the UK*, Review of Behavioural Finance, p3.

¹⁴¹⁶ Credit Suisse Global Investment Yearbook 2019, p34, Table 10

¹⁴¹⁷ We understand that this is the Cost of Living Index referred to in Appendix E, paragraphs 19 to 23.

¹⁴¹⁸ Credit Suisse Global Investment Yearbook 2019, p37

Financial Crisis. Markets bottomed in March 2009 and then staged another impressive recovery... Global equities then rose, with relatively few set-backs for almost nine years, while volatility remained remarkably low. However, 2018 saw several volatility spikes... The enduring picture, however, is one of volatility. When markets are calm, we know there will be a return to volatility, and more challenging times; we just cannot know when.¹⁴¹⁹

- 9.199 Therefore, while the relative volatility of income yield and capital prices may have been different in the last 20 years, we do not think it is appropriate to assume that such a pattern will continue in the future, rather than this relative volatility reverting to a longer-term norm. Therefore, we believe that a volatility adjustment should be included.

Adjusting for inflation

- 9.200 The historic ex-ante TMR estimates set out above are not directly comparable to the historic ex-post estimates in Table 9-3 due to differences in the series used to deflate historic nominal returns in each case.
- 9.201 In both cases, the figures quoted are based on the use of COLI, rather than CED, in the first half of the twentieth century. The impact of this is that the estimates will be overstated by around 35 basis points.¹⁴²⁰
- 9.202 In the case of the Fama & French model estimated with data from the Barclays Equity Gilt Study, the adjusted RPI-real TMR estimate would be around 5.35% (geometric) and 6.65% (arithmetic).¹⁴²¹
- 9.203 Adjusting the DMS estimate similarly, gives a CPI-real average of 5.05% (geometric) and 6.55% (arithmetic). Applying the forward-looking wedge of 90 basis points between RPI and CPI converts these figures to 4.1% and 5.6% RPI-real, respectively.

Forward-looking approach

- 9.204 There are two commonly used approaches to deriving the expected total market return on a forward-looking basis: 1) estimating a DDM using a range of current and forward-looking financial information, and 2) using

¹⁴¹⁹ Credit Suisse Global Investment Returns Yearbook 2019, p11

¹⁴²⁰ KPMG's submission on behalf of Northumbrian Water set out a variety of TMR estimates using the COLI/RPI and CED/RPI data series.

¹⁴²¹ The 5.35% is equal to the geometric mean of 5.7% less 35bps for the difference between COLI inflation and CED inflation in the first half of the twentieth century. The 6.65% is equal to 5.7% (geometric mean) plus 1.3% (volatility adjustment) less 35bps for the COLI/CED difference.

survey evidence and/or practitioner forecasts which capture investors' expectations of returns over the next few years.

Dividend discount models

9.205 Under the DDM approach, the expected market return is the discount rate at which the present value of future dividends is equal to the current market price.¹⁴²² The key inputs to the model are the current dividend yield,¹⁴²³ which is known, and expectations of short-term and long-term dividend growth rates, which must be assumed.

Parties' views

9.206 Ofwat considered forward-looking evidence of DDM outputs from PwC and EE, which indicated a range of 6.1% to 6.9%, CPI-real (or 5.2% to 5.9%, RPI-real). The models used to inform these ranges variously used income yield growth (ie average yield including both dividends and buybacks) as well as (UK) GDP growth to inform estimates of TMR.¹⁴²⁴

9.207 The water companies and Third Parties' submitted that:

- (a) Ofwat's own advisors' models supported TMR estimates up to 7.2% (CPI-real), and that Ofwat has been selective in choosing values from the lower end of the ranges;¹⁴²⁵ and
- (b) Ofwat should have placed more weight on the Bank of England DDM, which implies a TMR estimate of 8.8% in CPI terms (or 7.8% in RPI-real terms), based on a 5-year rolling average.

CMA assessment of DDM approach

9.208 A limitation of the DDM approach is that it is wholly dependent on assumptions and produces a broad range of TMR estimates depending on the assumptions used. As the Parties' views above demonstrate, different assumptions on short and longer-term, growth rates can produce materially different TMR estimates.

9.209 In considering the assumptions put forward by the Parties, we note that:

¹⁴²² This assumes that investors value listed companies based on the present value of discounted future cashflows (in the form of dividends).

¹⁴²³ We note that the dividend yield is affected by share buy backs and these should be accounted for in a DDM.

¹⁴²⁴ Ofwat, [Reference of the PR19 final-determinations: Cross-cutting issues](#), paragraph 5.39

¹⁴²⁵ [Anglian SoC](#), pp253-260

- (a) historic real dividend growth (at 0.83% per year based on the DMS dataset) has been significantly lower than historic GDP growth (at around 2% in the UK)¹⁴²⁶ over the longer term; and
- (b) the academic literature generally finds that analysts' forecasts are overly optimistic.¹⁴²⁷

9.210 This suggests that the Bank of England's DDM, which incorporates both analysts' forecasts and a weighted international GDP growth forecast (which exceeds UK GDP growth forecasts), may overstate the expected TMR. We note that the Bank of England highlights that:

'As the ERP cannot be observed, any estimate of it is necessarily subject to uncertainty. Part of the uncertainty associated with model-based estimates of the ERP reflects uncertainty about the measurement of the model's inputs. For example, investors' true dividend expectations cannot be observed, so any proxy for these used in a DDM, whether derived from analyst surveys or GDP forecasts, is necessarily only an approximation. The inherent uncertainty about the true value of the ERP is reflected in the wide dispersion of ERP estimates in the literature. Given the uncertainty associated with measuring the ERP, the Bank's analysis tends to focus less on the precise level of the ERP and more on changes in the ERP over time or on the level of the ERP relative to historic averages.'¹⁴²⁸

9.211 On balance, therefore, we find that Ofwat's advisors' estimates of the TMR (of around 6-7% CPI-real) are likely to be more robust than the Bank of England model outputs.

9.212 However, due to the sensitivity of these estimates to assumptions, we place limited weight on the results derived from this approach.

Survey evidence and practitioner forecasts

9.213 Another possible source for forward-looking estimates of the ERP is surveys of investors, market participants and academics. We note the following evidence:

¹⁴²⁶ Bank of England (2017), [A millennium of macroeconomic data for the UK](#)

¹⁴²⁷ For example, see De Bondt & Thaler (1990), Do security analysts overreact, *The American Economic Review*, Vol 80, No. 2 and Chan et al (2003) 'The level and persistence of growth rates' *The Journal of Finance*, Vol LVIII, No 2

¹⁴²⁸ Bank of England (2017) [Quarterly Bulletin: An improved model for understanding equity prices](#)

- (a) Fernandez et al.¹⁴²⁹ results suggest a nominal TMR for the UK Kingdom of 8.3% in nominal terms, which corresponds to a CPI-deflated TMR of 6.2% (and an RPI-deflated return of 5.3%).
- (b) Ofwat took into account nine practitioners' forecasts in coming to a view on investors' expectations for TMR.¹⁴³⁰ These provide a range of TMR estimates of between 4.5% and 6.8% (CPI-deflated) or 3.6% to 5.8% (RPI-deflated). In addition, Ofwat noted that some forecasts were substantially lower than this range. For instance, Franklin Templeton expect UK equities to achieve an annualised 5.8% nominal return over the next 7 years, and Blackrock predict an annualised nominal return of for UK equities of 5.5% over the next 15 years.¹⁴³¹

9.214 Investor surveys and practitioner forecasts tend to produce a broad range of estimates, which as a result usually provide limited guidance on a reasonable range for the TMR. The breadth of the range will generally reflect the fact that such surveys / forecasts are subjective; the results may depend on the identity and outlook of the respondents and how they interpret the questions being asked.

9.215 However, we note in this case that all the survey/practitioner forecast evidence suggests that experienced investors are expecting returns towards the lower end of, or even below, the ranges estimated using historic data.

CMA assessment of evidence on TMR

9.216 We consider that the most robust approach to estimating TMR is to use historical ex-post returns (from 1900 to the present day) as a proxy for investors' forward-looking expectations as this method is the least reliant on assumptions and forecasts of those available to us. However, we believe that both historic ex-ante approaches and forward-looking evidence can provide a useful cross-check in some cases.

9.217 The historic 'ex-post' evidence suggests a range for TMR of between 5.2% and 5.9% (RPI-real) using CED/CPI to deflate returns and 5.9% to 6.6% (RPI-real) using CED/RPI to deflate returns, based on the various averaging approaches set out in Table 9-3. Alternatively, adopting the MMW approach of uplifting the geometric mean by PwC's estimated 1.2

¹⁴²⁹ Fernandez, Martinez, & Acin (2019), [Market Risk Premium and Risk-Free Rate used for 69 countries in 2019: a survey](#)

¹⁴³⁰ EE (2019), [The Cost of Capital for the Water Sector at PR19](#), pp34-35

¹⁴³¹ Ofwat, [Reference of the PR19 final-determinations: Cross-cutting issues](#), paragraphs 5.44-5.45

percentage points volatility adjustment, suggests an RPI-real TMR range of 5.5% to 6.2%.

9.218 As discussed in paragraph 9.161, we consider that the TMR range derived from the CED/RPI inflation series is likely to over-estimate the real TMR on a forward-looking basis due to the increases in the formula effect over time. On this basis, we consider that less weight should be placed on the upper end of the overall range (of 5.2% to 6.6%).

9.219 The historic 'ex-ante' evidence provides a range of RPI-real TMR estimates of 5.6% to 6.65%, including volatility adjustments. However, we note that the upper end estimate in this range will also be affected by the potential inconsistencies in the RPI data series, indicating that less weight should be placed on it. Furthermore, we note that we have included the full estimated volatility adjustments but that serial correlation in returns can be expected to reduce the required size of this adjustment in the context of a 10 to 20 year holding period.

9.220 While we do not believe that weight should be placed on the forward-looking dividend discount/growth models due to their sensitivity to the various assumptions that can be made, we find the survey evidence we have reviewed strongly suggests that even the most optimistic investors are currently expecting returns that are no higher than 5% to 6% (RPI real), and many are expecting returns significantly below this level.

TMR - CMA provisional determination

9.221 Taking all this evidence in the round, we consider that a reasonable TMR range is 5.25% to 6.25% (RPI-real), which covers most of the estimates produced from the historic evidence but excludes the upper end of the CED/RPI-deflated estimates due to concerns about inconsistencies in the RPI series over time. We note that this range is comfortably at the top end of investors' current expectations regarding market returns over the next few years. This range is slightly above the 5-6% range used by the CMA in its recent CAA/NATS decision, which reflects the further evidence and reasoning provided by parties to the CMA regarding the uncertainty over the accuracy of the available inflation data series. In particular, in these provisional findings, we have chosen not to make specific adjustments to the RPI-deflated figures to reflect the change in the formula effect in 2010, albeit we continue to place less weight on the upper end of the RPI-deflated range.

9.222 Our 5.25% to 6.25% TMR range, in RPI real terms, is equivalent to 6.20% to 7.21% CPIH real terms.

Table 9-4: TMR Estimate

<i>CPIH Real</i>	<i>Low Estimate</i>	<i>High Estimate</i>	<i>Ofwat PR19 final determination</i>
Total Market Return	6.20%	7.21%	6.50%

Source: CMA Analysis

Beta

Introduction

- 9.223 Beta within the Capital Asset Pricing Model (CAPM) framework reflects an asset's (or a portfolio of assets') exposure to systematic (or common) risks relative to the broader market.
- 9.224 A commonly referenced systematic risk is the performance of the overall economy. Systematic risks are distinct from idiosyncratic risks, which may impact only a small number of assets, or may simultaneously impact different assets positively and negatively. The models we use to estimate the cost of equity assume that idiosyncratic risks are diversified away, and so we only concern ourselves with exposure to systematic risks.
- 9.225 We use the Capital Asset Pricing Model as the primary way to calculate the cost (or allowed return) on equity for regulated businesses. The basic formulation of this model is shown below:

$$K_E = R_{rf} + \beta(R_m - R_{rf})$$

Where K_E is the return on equity being estimated, R_{rf} is the risk-free rate, β (beta) is the specific company's exposure to systematic (undiversifiable) risks and R_m is the total return on the stock market.

- 9.226 The beta which would be faced by investors in a company's assets is often called the asset beta. However, investors normally invest in securities (which are able to call on returns earned on those assets), rather than directly investing in the assets themselves. Where this is the case, the asset beta (β_A) can then be split into equity beta (β_E), the exposure of shareholders to systematic risk, and debt beta (β_D), the exposure of bondholders to systematic risk. In calculating asset beta, debt and equity betas are weighted by the proportion of debt(g) and equity($1 - g$) within the capital structure, as shown below.

$$\beta_A = g \cdot \beta_D + (1 - g) \cdot \beta_E$$

9.227 We can see from this equation that for a given value of asset beta (β_A) a positive debt beta reduces the (re-levered) equity beta, as a portion of systematic risk is assumed to be borne by debt investors, and so does not require compensation in equity returns.

9.228 The equity beta, and therefore the cost of equity, in the CAPM framework will also generally rise as gearing rises, because increasing gearing means that shareholders are exposed to increasing levels of systematic risks per share. As a result of this relationship between gearing and equity beta, an approach of calculating an asset beta is often used in regulators' WACC decisions. This approach allows firms with different capital structure to be brought onto a comparable basis. This comparator asset beta is then adjusted using the formula above to estimate the equity beta of the regulated firm.

Calculating equity betas

9.229 Equity beta is typically the easiest to observe and calculate, and asset betas can be inferred from equity betas by adjusting for gearing. Equity beta is usually derived by regressing share price returns directly on equity market returns. When a firm's shares are not listed, and therefore the equity beta cannot be measured directly, the betas of comparator companies with similar levels of systematic risk are used as a proxy for that firm's equity beta.

9.230 A share price that generally moves up and down in an exaggerated way relative to the market moving up and down will have an equity beta higher than one. A share price that generally moves in a muted way relative to the market will have an equity beta lower than one. A share price that generally moves in line with the market will have an equity beta close to one.

Calculating debt betas

9.231 Debt beta is generally more difficult to measure than equity beta, as bonds are less well traded than equities and so the quality of bond returns data is likely to be lower than that of share price data. We received a submission

from ENA which included a report from the economic consultancy firm, Oxera, that specified four ways to estimate debt beta¹⁴³²:

- (a) The **Direct** approach involves regressing bond returns directly on equity market returns. This method has been used in the determination of allowed debt beta for H7 (Heathrow) and RP3 (NERL) by the CAA and for PR19 by Ofwat;
- (b) The **Indirect** approach requires a two-step methodology. The first step involves regressing a company's bond returns against returns on an index of government bonds and the returns on the shares of the same company. The second step is to multiply the coefficient on the company's equity returns (this is the elasticity of debt with respect to equity) obtained from the regression in the first step, by the company's equity beta. This is the method adopted by Oxera in its report for ENA on estimating the appropriate equity and debt betas for RIIO-2 price control;
- (c) The **Structural** approach involves viewing equity as a call option on the firm's assets, and debt a put option¹⁴³³, with a strike price equal to the face value of debt. Under particular assumptions, the Black-Scholes formula¹⁴³⁴ can be used to value those options. In turn, the debt beta can be calculated from these resulting values; and
- (d) The **Decompositional** approach involves decomposing the debt spread (the spread between yields on corporate and government bonds) into three components—default premium, default risk premium and liquidity premium. The decomposition method was the main method relied on to derive the debt beta for the recent price controls for PR19 and RP3.

9.232 We agree that this is a comprehensive summary of the potential approaches to estimating debt beta. We have considered these approaches in our assessment of debt beta below.

Ofwat PR19 Decision

9.233 This section summarises Ofwat's decisions on the choice of beta. We present more detail on Ofwat's reasoning in the discussion of parties' arguments below.

¹⁴³² [ENA submission](#) 19 June 2020, Annex 05

¹⁴³³ A call option is a 'right to buy' at a certain price. A put option is a 'right to sell' at a certain price.

¹⁴³⁴ See Black, F and Scholes, M (1973) '[The pricing of Options and Corporate Liabilities](#)', *The Journal of Political Economy* pp637-654

Unlevered equity beta

9.234 Ofwat retained its ‘early view’ approach of using the ‘Harris Pringle’¹⁴³⁵ approach to calculate an estimate of equity beta for the notional company. This approach involved a 3-step process:¹⁴³⁶

- (a) Taking a direct regression-based estimate of equity beta (‘raw equity beta’) using returns data for listed water companies and the FTSE All Share Index.
- (b) Adjusting this estimate to strip out the impact of listed company gearing (‘unlevering’)
- (c) Adding back the impact of gearing up to the notional level of 60% (‘re-levering’).

9.235 In support of its final determination, Ofwat commissioned EE to provide analysis of equity beta using data with a cut-off date of 30 September 2019. EE focused on a weighted average composite of betas from Severn Trent and United Utilities and made the following estimates of unlevered beta:¹⁴³⁷

Figure 9-5: Ofwat’s estimates of unlevered asset beta in PR19 Final Determination, based on EE analysis

Table 5.8: Comparison of OLS and GARCH unlevered beta (Severn Trent – United Utilities composite, September 2019)

	Estimator	1 year	2 year	5 year
Daily	OLS	0.20	0.25	0.32
	GARCH	0.21	0.26	0.31
Weekly	OLS	n/a	0.18	0.30
	GARCH	n/a	0.23	0.30
Monthly	OLS	n/a	n/a	0.34
	GARCH	n/a	n/a	0.31

Source: Europe Economics analysis of Refinitiv data

Source: Ofwat PR19 Allowed return on capital technical appendix

9.236 Based on this data, Ofwat used a point estimate of unlevered beta of 0.29 for its final determination.¹⁴³⁸ This point estimate was unchanged from its draft determination.

¹⁴³⁵ For more information on the Harris Pringle approach, please see Robert S Harris and John J Pringle (1985), *Risk-adjusted discount rates – extensions from the average-risk case*.

¹⁴³⁶ Ofwat (2019), *Allowed return on capital technical appendix*, section 5.4.1

¹⁴³⁷ Ofwat (2019), *Allowed return on capital technical appendix*, section 5.4.3 including Table 5.8

¹⁴³⁸ Ofwat (2019), *Allowed return on capital technical appendix*, section 5.4.3

Debt beta

9.237 Ofwat used two different methods to estimate debt beta, both based on the decomposition approach. Ofwat used a debt beta point estimate close to the bottom of the range suggested by this data of 0.125, which was also consistent with debt beta from its draft determinations.¹⁴³⁹

Figure 9-6: Ofwat's estimates of debt beta considered within PR19 final determination

Table 5.9: Summary statistics for debt beta decompositional analysis, October 2018 to September 2019

Source of equity risk premium data		Spot	2 year trailing average
PwC GDP DDM	Range	0.12 – 0.20	0.13 – 0.14
	Average	0.15	0.14
Europe Economics GDP DDM	Range	0.12 – 0.23	0.13 – 0.17
	Average	0.17	0.15

Source: Ofwat PR19 Allowed return on capital technical appendix

Notional equity beta

9.238 Ofwat used its unlevered asset beta estimate of 0.29 and debt beta estimate of 0.125, in conjunction with its observed gearing of 54.2% and notional gearing of 60%, to calculate a notional equity beta of 0.71. Ofwat's calculations are shown in the Figure 9-7 below:¹⁴⁴⁰

¹⁴³⁹ Ofwat (2019), *Allowed return on capital technical appendix*, section 5.4.3 including *Review of approaches to estimate reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization* Table 5.9

¹⁴⁴⁰ Ofwat (2019), *Allowed return on capital technical appendix*, section 5.4.3 including Table 5.10

Figure 9-7: Ofwat's calculation of notional equity beta at draft and final determination

Table 5.10: Notional equity beta for final determinations, September 2019

		Europe Economics view	Updated view for final determinations	Draft determination view
Raw equity beta	A	0.60	0.63	0.64
Observed gearing	B	56.4%	54.2%	54.7%
Unlevered beta	$C = A \times (1 - B)$	0.26	0.29	0.29
Debt beta	D	0.15	0.125	0.125
Asset beta	$E = C + D \times B$	0.34	0.36	0.36
Notional gearing	F	60%	60%	60%
Re-levered beta	$G = (E - (D \times F)) / (1 - F)$	0.64	0.71	0.71

Source: Ofwat PR19 Allowed return on capital technical appendix

Key arguments

9.239 Parties presented arguments in two main areas relating to estimating the notional equity beta:

- (a) arguments relating to the measurement of equity betas (the source of unlevered beta estimates).
- (b) arguments relating to the measurement of debt beta.

We address each of these issues in turn.

Submissions relating to the measurement of equity betas

Ofwat

9.240 Supported by the recommendation of its consultant, EE, Ofwat decided to focus on two-year daily betas, as it considered that two years amounted to a sufficient window to minimise the distorting impact of short-term volatility,

but short enough to capture more recent data that was likely to be more relevant to 2020–25.¹⁴⁴¹

9.241 Ofwat stated that it had considered multiple sources of beta estimates in selecting its point estimate for unlevered beta, including:¹⁴⁴²

- (a) EE's original estimated range of 0.18 to 0.34.
- (b) EE's final advice estimated range of 0.25 to 0.31.
- (c) 0.25 to 0.32, based on the implied range given by Ofwat's raw beta plausible range of 0.58–0.66
- (d) The CMA's Bristol PR14 Determination unlevered beta range of 0.27 to 0.3.
- (e) The desirable properties of 2-year daily betas (range 0.25–0.26) in terms of their predictive power and an appropriate balance between focusing on relevant data while retaining statistically robust and stable estimates.
- (f) Ofwat's view that it may be appropriate to assign more weight to 5-year data (range 0.30–0.34) relative to draft determinations, taking account of its approach at PR14, stakeholder representations, and other recent regulatory decisions.
- (g) The close tracking of 0.29 by the GARCH estimate of 2-year daily betas over the first half of the last year.

9.242 Ofwat stated that having due regard to all of these considerations, it retained 0.29 as its final determination point estimate for unlevered beta. Ofwat stated that it reflected caution over placing too much weight on recent 2-year daily data (given a pronounced recent fall), and hence it placed some weight on 5-year data.¹⁴⁴³

9.243 Ofwat considered its estimate to be subject to considerable uncertainty and did not discount the possibility that 2 year daily unlevered betas could subsequently move lower given the recent 0.20–0.21 range of 1-year betas. Ofwat expected that the evolution of market data would provide confirmation on the appropriateness of 2-year betas as a guide to the unlevered beta likely to prevail over 2020–25.¹⁴⁴⁴

¹⁴⁴¹ Ofwat (2019), [Allowed return on capital technical appendix](#), section 5.4.1

¹⁴⁴² Ofwat (2019), [Allowed return on capital technical appendix](#), section 5.4.3

¹⁴⁴³ Ofwat (2019), [Allowed return on capital technical appendix](#), section 5.4.3

¹⁴⁴⁴ Ofwat (2019), [Allowed return on capital technical appendix](#), section 5.4.3

9.244 In response to representations following Draft Determinations, Ofwat said that, since a forward-looking beta is required, it is relevant to consider which betas have the greatest predictive power over similar timeframes. Ofwat said that analysis carried out by EE had demonstrated that shorter beta measurement periods (of 1-year and 2-years) derived using a data cut-off close to the point at which final determinations are made had been better predictors of the average 2-year beta over the subsequent price control period than longer durations of beta measurement. However, Ofwat agreed with placing more weight on 5-year data in its point estimate than at draft determinations, but did not consider it appropriate to reflect 10-year betas due to the inclusion of very old data from previous price controls which it considered to be of little relevance to a forward-looking estimate for 2020-25.¹⁴⁴⁵

9.245 In its response to the companies SoCs, Ofwat noted that the appropriate length of estimation window is uncertain, principally because there is no conclusive view on the length of estimation window which investors use to form expectations of beta. Therefore, Ofwat considered that decisions over the length of estimation window inevitably require a degree of regulatory judgment. Ofwat agreed with the CMA on placing weight on 2- and 5-year estimation windows as estimated in its most recent water redetermination. However, Ofwat did not favour a 'rolling average' approach to estimating betas as that approach would result in assigning weight to data as far back as 2009, which it did not consider to be especially relevant to informing investor expectations.¹⁴⁴⁶

9.246 Ofwat did not consider that 2-year betas should be excluded from the scope of the re-determination. Its advisors, EE, firmly endorsed this length of trailing window, finding evidence that 2-year daily betas have more predictive power than other lengths of trailing window, when comparing levels at the time of a final determination and subsequent average level over the following 5 years.¹⁴⁴⁷

9.247 Ofwat commissioned EE to investigate whether United Utilities and Severn Trent¹⁴⁴⁸ daily betas are downward biased as suggested by the water companies. EE concluded through its statistical analysis (the 'Dimson

¹⁴⁴⁵ Ofwat (2019), [Allowed return on capital technical appendix](#), section 5.4.2

¹⁴⁴⁶ Ofwat (May 2020), [Risk and return – response to common issues in companies' statements of case](#), paragraphs 3.57 & 3.58

¹⁴⁴⁷ Ofwat (May 2020), [Risk and return - response to common issues in companies' statements of case](#), paragraph 3.59

¹⁴⁴⁸ Severn Trent and United Utilities were analysed by the Parties and the CMA as these are the two publicly listed water companies that do not have substantial non-water businesses.

test')¹⁴⁴⁹ that there was no evidence of this type of bias at the 1% significance level, when using daily data.¹⁴⁵⁰

9.248 Ofwat also stated that, given that United Utilities and Severn Trent are liquid and highly-traded FTSE 100 shares, it disagreed with KPMG's assertion that it was plausible that delays of over one day could exist in reflecting market data in their share prices. This followed the observation of Mason et al. (2003) in advice to UK economic regulators: 'For large stocks it is very likely that any impact of general market conditions is reflected in transaction prices and quoted prices'.¹⁴⁵¹

9.249 EE updated its analysis of water sector betas using a data cut-off of end February 2020. It concluded that applying an approach similar to that employed by the CMA in its provisional findings for the NATS/CAA RP3 redetermination would result in an unlevered beta range of 0.21 to 0.33 or (excluding outliers) 0.26 to 0.32, giving a midpoint of 0.27 and 0.29, respectively. Ofwat therefore considered that its final determination point estimate of 0.29 for unlevered beta remains appropriate.¹⁴⁵²

9.250 Ofwat disagreed with Yorkshire's statement that share price 'noise' should be excluded from the CMA's beta estimate and argued that while moving back the end of the 5 year estimation window could in principle avoid the period alleged by the company to contain PR19 'noise', it would then pick up more of the 'noise' from the PR14 price control determinations. Ofwat therefore considered that this approach does not seem consistent with the company's criterion.¹⁴⁵³

9.251 Ofwat said that KPMG's proposed Vasicek adjustment¹⁴⁵⁴ was not well-evidenced or necessary and did not provide evidence supporting KPMG's

¹⁴⁴⁹ Betas could be biased if the information-updating process that leads to movements in the stock price is materially slower than the information-updating process that leads to movements in the market index (eg it takes more than a day for new information to be fully reflected in the stock price). In order to test this hypothesis, EE used the 'Dimson Test'. For more information please see Dimson, E (1979) '*Risk measurement when shares are subject to infrequent trading*',

¹⁴⁵⁰ Ofwat (May 2020), [Risk and return – response to common issues in companies' statements of case](#), paragraphs 3.65 to 3.67

¹⁴⁵¹ Ofwat (May 2020), [Risk and return – response to common issues in companies' statements of case](#), paragraph 3.68, quoting Mason et al (2020), '*A study into certain aspect of the cost of capital for regulated utilities in the UK*'.

¹⁴⁵² Ofwat (May 2020), [Risk and return – response to common issues in companies' statements of case](#), paragraphs 3.60 to 3.61

¹⁴⁵³ Ofwat (May 2020), [Risk and return – response to common issues in companies' statements of case](#), paragraphs 3.62 to 3.64

¹⁴⁵⁴ The Vasicek/Bayesian adjustment is a statistical method that takes account of measurement uncertainty by employing a weighted average between the beta estimate for the company and a constructed average beta for the market as a whole that would be equal to one. The weights are based on the relative uncertainty in measurement — the higher the uncertainty in the company beta estimates relative to the variance of all betas in the market, the less weight is placed on the company beta.

assumption that investors in water companies have the same exposure to systematic risks as investors in the overall market. Ofwat viewed this assumption as doubtful given numerous protections against systematic risk provided by the regulatory regime in water. Furthermore, Ofwat considered that KPMG's conclusion that the volatility associated with 5-year monthly beta estimates supported the need for Vasicek adjustment overlooked a much neater solution – which was to rely on daily betas.¹⁴⁵⁵

9.252 In response to the CMA's cost of capital roundtable, Ofwat submitted updated evidence disputing the view expressed by Professor Gregory that his analysis (AGRF 2020) of structural breaks matched earlier work by Indepen (see paragraph 9.264 below). Ofwat submitted that Indepen found structural breaks for Severn Trent in 2002–03, 2004–05, 2008, 2012–13, while the Gregory papers had found breaks in 2000, 2003, 2007, 2010 and 2014. Ofwat submitted that these are clearly different years, demonstrating that different specifications of test can identify different breakpoints.

9.253 Ofwat stated that they were concerned that the approach to structural breaks lacks a coherent set of criteria for favouring particular formulations of test over others, raising the risk that tests may be specified in order to engineer an advantageous length of estimation window rather than on the grounds of good statistical properties.

9.254 Ofwat also expressed concern about the design of Gregory's test, specially the use of 2-year daily betas to estimate statistical breaks while deriving estimate based on a different formulation of beta (roughly 5-year daily and monthly betas).

9.255 EE submitted updated data to the CMA which suggested an increase of weekly betas by 0.02–0.04 compared to EE's previous estimates. These new estimates suggested that Ofwat's 0.29 estimate would only be appropriate if considering 2-year daily and weekly betas. If we were to apply Ofwat's approach (placing weight on 2-year and 5-year spot daily betas) to EE's updated data, we would estimate a range between 0.28 (2-year daily) and 0.32 (5-year daily) with a mid-point of 0.30.

Disputing Companies

9.256 Anglian, Bristol, Northumbrian, and Yorkshire all submitted that an estimation window of at least 5 years should be used. Yorkshire said that it

¹⁴⁵⁵ Ofwat (May 2020), [Risk and return – response to common issues in companies' statements of case](#), paragraphs 3.69 to 3.70

was most appropriate to place all weight on a 5-year estimation window by reference to previous CMA decisions,¹⁴⁵⁶ while Anglian,¹⁴⁵⁷ Bristol,¹⁴⁵⁸ and Northumbrian¹⁴⁵⁹ cited analysis and arguments set out by KPMG, including:

- (a) KPMG submitted, citing Indepen (2018)¹⁴⁶⁰ for Ofgem's RIIO-2 framework decision, that it is appropriate to use the longest run of data since the last structural break. KPMG proposed the end of the PR14 price review as the appropriate structural break in this case.
- (b) KPMG submitted that findings by Gilbert et al (2014) for the US and Gregory et al (2018) for the UK, implied that high frequency beta estimates are more likely to be biased downwards than low frequency estimates. Therefore, most weight should be placed on monthly (ie low frequency) betas.
- (c) KPMG submitted that estimates of beta are well-known to be uncertain and may suffer from a degree of statistical instability. KPMG noted that in order to address this instability, EE (on behalf of Ofwat) investigated the use of a Vasicek (Bayesian) adjustment in its report 'PR19 – Initial Assessment of the Cost of Capital' (December 2017). This Vasicek adjustment is designed to deal with the fact that beta is estimated with error. It weights the firm beta and the market average beta by their relative variances. The idea is to place relatively more reliance on the firm beta when estimation variance is low, and less reliance when estimation variance is high.
- (d) KPMG estimated a raw equity beta range of 0.66 to 0.72, based on daily (lower end) and monthly observations over 5-year time horizons, with the 0.72 estimate being Vasicek-adjusted. KPMG said that, given that daily estimates ordinarily include a downward bias, more weight should be placed on monthly estimates, which lie at the top of this range, with the 'raw' 5-year monthly beta being 0.70.

9.257 Yorkshire requested that the CMA ensure that share price 'noise' as a result of Ofwat's draft determination, final determination, as well as the threat of renationalisation before and after the 2019 general election, did not enter and distort its beta estimates. Yorkshire's analysis of United Utilities' and Severn Trent's betas over a five-year window to February

¹⁴⁵⁶ Yorkshire SoC, paragraphs 221 to 227

¹⁴⁵⁷ Anglian SoC, section 5.3

¹⁴⁵⁸ Bristol SoC, section 8.3

¹⁴⁵⁹ Northumbrian SoC, section 8.10.2

¹⁴⁶⁰ Indepen (2018), *Ofgem Beta Study – RIIO-2, Main Report*

2019 indicated that the ‘unlevered beta’ of a water and sewerage company is around 0.33, which equated to an equity beta of around 0.80 at 60% gearing.¹⁴⁶¹

9.258 Bristol also referenced KPMG’s view that the use of time horizons of 1, 2 or 5 years is inconsistent with the recommendation of Wright et al (2018) to the UKRN to use long-run time horizons of 10 years or more.¹⁴⁶²

9.259 In their reply to Ofwat, Anglian¹⁴⁶³ and Northumbrian¹⁴⁶⁴ argued that the beta estimate should be based on a robust approach and reliable data and cited a Gregory, Harris and Tharyan (GHT) paper which argued that for regulatory price control purposes, betas should be estimated using Ordinary Least Squares (OLS)¹⁴⁶⁵ over the longest time window since the last structural break. The GHT authors ran statistical tests which they claim demonstrated that structural breaks¹⁴⁶⁶ took place in 2014 and March 2020, hence a 63-65-month time horizon (just over 5 years) from 2014 to February 2020 should be adopted. GHT analysis of Severn Trent and United Utilities betas for the period to February 2020 betas across daily and monthly frequencies supported a raw equity beta of 0.72.

9.260 Anglian disagreed with EEs analysis and argued that two stocks are insufficient to test the theory of whether daily estimates are biased downwards. Anglian suggested that detailed empirical evidence in Gregory (2018) and Gilbert (2014), and with the use of larger sample sizes, demonstrates that a downward bias exists. In addition, the EE analysis applied an aggressive 1% significance level and only tests the impact of a one-day lag.¹⁴⁶⁷

9.261 Bristol and Yorkshire cited an EE report, which presents updated evidence on betas from listed comparators using the CMA methodology in the NATS/CAA provisional findings report. Bristol and Yorkshire claimed that Ofwat used a very narrow window of share price data in the final

¹⁴⁶¹ [Yorkshire SoC](#), paragraphs 226 to 227

¹⁴⁶² [Bristol SoC](#), paragraph 298

¹⁴⁶³ [Anglian's Reply to Ofwat's Response](#), Part F, p6

¹⁴⁶⁴ [Northumbrian's Reply to Ofwat's Response](#), paragraph 58

¹⁴⁶⁵ In statistics, ordinary least squares (OLS) is a type of linear least squares method for estimating the unknown parameters in a linear regression model. OLS chooses the parameters of a linear function of a set of explanatory variables by the principle of least squares: minimizing the sum of the squares of the differences between the observed dependent variable (values of the variable being observed) in the given dataset and those predicted by the linear function. In lay terms, OLS is often used to provide the line of best fit in a scatter graph.

¹⁴⁶⁶ In econometrics and statistics, a structural break is an observable change over time in the parameters of regression models, which can lead to forecasting errors and unreliability of the model. In the case of beta measurement, the most obvious structural break would come from a distinct and meaningful change to the gearing at companies being measured.

¹⁴⁶⁷ [Anglian's Reply to Ofwat's Response](#), Part F, p6

determination in order to justify an unlevered beta value that was lower than 0.30. Specifically, the companies submitted that Ofwat had focused its attention on estimates of betas calculated with no more than four years of data while knowing that more robust and conventional estimation approaches that used a minimum of five years of share price data gave a range for the unlevered beta of 0.30 to 0.34.^{1468,1469}

Submissions relating to the measurement of equity betas – CMA assessment

The appropriate horizon and frequency to estimate beta

9.262 Ofwat's use of 2-year daily betas is consistent with regulatory practice and has been used by the CMA in the past. 2-year daily betas were used in the recent NATS/CAA case, but this was also influenced by the short trading history available for some key comparator data.¹⁴⁷⁰ However, as raised by the water companies, we acknowledge the potential presence of 'noise' in short term estimates, and therefore consider that this estimation method should be used along with longer periods and frequencies to provide the most robust data from which to estimate equity betas. This approach is similar to CMA's analysis in the Bristol PR14 Determination, NATS/CAA Provisional Findings¹⁴⁷¹ and Ofgem's RIIO-2 Draft Determinations.¹⁴⁷²

9.263 We note this multi-period/frequency approach is one of the three approaches suggested by the Indepen report for the measurement of equity beta. This method considers 'the distribution of results from estimates using different time windows and frequencies of returns (this can include using OLS and other estimation approaches) and apply judgements derived from the consultation process to arrive at the preferred estimate of the equity beta within the distribution'.¹⁴⁷³

9.264 In addition, we considered the use of 10-year betas. This was suggested in the UKRN report¹⁴⁷⁴ and in particular by Wright, Mason, and Pickford, who noted that the maturity of betas should be consistent with the maturity chosen when selecting other parameters in the price control.¹⁴⁷⁵ Given that

¹⁴⁶⁸ [Bristol's Reply to Ofwat's Response](#), paragraphs 198–200 including Tables A5 and A6

¹⁴⁶⁹ [Yorkshire's Reply to Ofwat's Response](#), paragraphs 7.2–7.2.3 including Table 18

¹⁴⁷⁰ [NATS/CAA](#), paragraphs 13.56 to 13.64

¹⁴⁷¹ In [Bristol Water PR14](#) (paragraph 10.148) and [NATS/CAA](#) (paragraph 12.89), we used a range of horizons (2 year, 5 year) and frequencies (daily, weekly and monthly) to estimate equity beta. We then presented our estimates using spot betas and different rolling averages (1 year, 2 year and 5 year).

¹⁴⁷² Ofgem (2020), [RIIO-2 Draft Determinations reference](#)

¹⁴⁷³ Indepen (2018), [Ofgem Beta Study – RIIO-2, Main Report](#), p42

¹⁴⁷⁴ UKRN (2018), [Estimating the cost of capital for implementation of price controls by UK Regulators](#)

¹⁴⁷⁵ UKRN (2018), for example Recommendation 2

the risk free rate and the total market returns are estimated over a long period, we consider it reasonable to include 10-year betas within the scope of our beta analysis. We note this was also suggested by Professor Gregory in his paper for Northumbrian, Wessex and Anglian.¹⁴⁷⁶ This approach was also discussed in the NATS/CAA Provisional Findings but given that some of the comparators had only been listed for a few years, this estimation method could not be applied.¹⁴⁷⁷

9.265 We do not consider there to be conclusive evidence that monthly betas should be used because daily betas are downward biased. For example, a study by Donald Robertson for Ofgem did not identify any general concerns with daily data.¹⁴⁷⁸ We investigated this issue further by conducting our own analysis on betas using daily and monthly frequencies for Severn Trent and United Utilities and found that for the vast majority of the 2006–2020 period daily betas were actually higher than monthly betas.¹⁴⁷⁹ This pattern was also noted in the Bristol PR14 Determination.¹⁴⁸⁰

9.266 We note that Northumbrian cited a GHT paper which states that weekly betas should not be used because this frequency is subject to ‘reference day’ risk. This means that depending on the selection of the day of the week, the analysis will yield different equity beta values. However, rather than discarding the entire weekly data, we find it more appropriate to estimate weekly betas using each day of the week and calculate the average weekly beta.

9.267 Based on the evidence we have assessed we continue to see merit in considering as wide a range of evidence as is practical and useful when calculating beta. Therefore, a range of periods (2-year, 5-year and 10-year) and frequencies (daily, weekly and monthly) were included in our analysis.

The appropriate measurement period

9.268 Ofwat/EE used end of September 2019 as cut-off date to estimate equity betas in its final decisions. EE then updated its analysis and used data up to end of February 2020.

9.269 We note that Indepen and GHT argued for the presence of structural breaks, although we also acknowledge Ofwat’s counterargument that the lack of alignment in identifying structural breaks seriously questions the

¹⁴⁷⁶ Gregory, (2020), [Setting the Cost of Equity in UK Price Controls](#)

¹⁴⁷⁷ NATS/CAA, paragraph 13.89

¹⁴⁷⁸ Robertson, D (2018), [Estimating beta](#)

¹⁴⁷⁹ CMA analysis using Thomson Reuters data.

¹⁴⁸⁰ [Bristol PR19 Determination](#), Appendices 5.1 to 11.1, A10(1)–22, Paragraph 91.

reliability of such analysis. As a result, while in paragraphs 9.285 to 9.287 below we do include analysis of the period between 2014 and February 2020 (the period between the ‘structural breaks’ of PR14 and the outbreak of COVID-19, we note that the results fall within our estimates using long-term data and thus do not have an impact on our finding.

9.270 In assessing the potential impact of COVID-19 on our analysis, we analysed Severn Trent, United Utilities and FTSE price data. We can observe that events in March 2020 did lead to a sharp move in the prices of the water company shares and the overall market index level. However, as we consider the COVID-19 impact to be predominately an example of systematic risk, we do not think it is automatically appropriate to exclude data from this period. As a result, we measure beta to both February 2020 and June 2020 before deciding on an appropriate range. We will be able to use more recent data to inform our estimates for our final determination and will be able to assess the most appropriate cut-off data again at this point.

9.271 We do not accept Yorkshire’s arguments that recent share price ‘noise’ should be excluded from our analysis. As with the structural break arguments above, it would be difficult to accurately identify what factors are noise and what are legitimate examples of the impact of systematic risks on share prices. We prefer an approach of considering long-term data over a number of periods and measurement frequencies and use our judgement to manually adjust for outlying data where appropriate.

The use of Vasicek adjustments

9.272 KPMG for Bristol, Anglian, and Northumbrian considered that Vasicek adjustments should be applied. EE investigated this further and concluded that Vasicek should not be used because the adjustment would be insignificant when using daily prices. EE stated that even if the impact had not been insignificant, this adjustment is unsound as it assumes a mean beta of 1.0 for the regulated water companies. Given our understanding of water companies exposure to systematic risks we do not consider it credible to assume that investors in water companies have the same systemic exposure to systematic risks as investors in the overall market.

9.273 We note that beta estimates within the GHT paper show a greater impact of Vasicek adjustments in the monthly estimates compared to the daily estimates. Rather than prove the need for a Vasicek adjustment, we consider this more likely to support our preferred approach of using 5-year monthly betas alongside a range of frequencies and horizons. Given our preferred assessment method, we do not consider that we have been

presented with sufficient evidence that using Vasicek adjustments is likely to improve our estimates.

9.274 Similarly, we did not receive evidence that GARCH statistical calculations would materially improve our estimates versus traditional OLS methodology, and so we did not use this tool in our analysis.

EE data

9.275 We note that EE updated beta estimates would support the view that systematic risk has increased compared to September 2019 data. We consider that on this basis, Ofwat's unlevered beta of 0.29 would likely lie towards the low end of its own estimates range.

Equity betas – CMA analysis

9.276 Our provisional approach to estimating the unlevered equity beta follows the broad approach used by Ofwat in PR19. For our calculations we measure the betas of UU and SVT across a range of periods and frequencies. Our analysis is based on:

- (a) 2-year, 5-year and 10-year betas;
- (b) daily, weekly and monthly frequency;¹⁴⁸¹
- (c) data from February 2005 to end of June 2020;
- (d) OLS calculations;
- (e) spot betas and 1-year, 2-year, 5-year rolling averages; and
- (f) does not employ a Vasicek adjustment or use the GARCH method.

9.277 We first apply this approach to the entire period of data. This gives us the following measures of raw equity beta (weighted average for Severn Trent (SVT) and United Utilities (UU)):¹⁴⁸²

Table 9-5: CMA analysis of Severn Trent and United Utilities raw equity betas June 2005 to June 2020

<i>Data to June 2020</i>	<i>Spot 30/06/2020</i>	<i>1-year average</i>	<i>2-year average</i>	<i>5-year average</i>
SVT/UU 2y daily Raw beta	0.56	0.60	0.61	0.66

¹⁴⁸¹ We average each weekday-derived estimate of weekly data in order to remove any potential measurement day impact. Wednesday data was excluded in June 2020 data due to the presence of outliers. Note, we do not use 2-yr monthly estimates due to a lack of datapoints for robust analysis.

¹⁴⁸² See Appendix C, Figures 7-13 for the graphical representations of our findings

SVT/UU 2y weekly Raw beta	0.58	0.59	0.63	0.71
SVT/UU 5y daily Raw beta	0.60	0.66	0.67	0.65
SVT/UU 5y weekly Raw beta	0.63	0.69	0.70	0.68
SVT/UU 5y monthly Raw beta	0.59	0.69	0.73	0.71
SVT/UU 10y daily Raw beta	0.58	0.57	0.57	0.59
SVT/UU 10y weekly Raw beta	0.60	0.59	0.58	0.58
SVT/UU 10y monthly Raw beta	0.55	0.51	0.47	0.43

Source: CMA analysis using Thomson Reuters data

9.278 Consistent with Ofwat, we applied the Harris-Pringle approach and obtained the following estimates for unlevered beta:

Table 9-6: CMA analysis of Severn Trent and United Utilities unlevered equity betas June 2005 to June 2020

<i>Data to June 2020</i>	<i>Spot 30/06/2020</i>	<i>1-year average</i>	<i>2-year average</i>	<i>5-year average</i>
SVT/UU 2y daily Unlevered beta	0.25	0.26	0.27	0.32
SVT/UU 2y weekly Unlevered beta	0.26	0.26	0.28	0.34
SVT/UU 5y daily Unlevered beta	0.28	0.31	0.32	0.32
SVT/UU 5y weekly Unlevered beta	0.30	0.33	0.34	0.33
SVT/UU 5y monthly Unlevered beta	0.28	0.33	0.35	0.34
SVT/UU 10y daily Unlevered beta	0.28	0.27	0.27	0.28
SVT/UU 10y weekly Unlevered beta	0.29	0.28	0.27	0.28
SVT/UU 10y monthly Unlevered beta	0.26	0.24	0.22	0.21

Source: CMA analysis using Thomson Reuters data

9.279 The different frequency/sampling approaches give a wide range of beta estimates, ranging from 0.21 to 0.35. We consider that some of the monthly estimates are outliers and therefore should be removed. Excluding this data gives a minimum of 0.25 and maximum of 0.35. As all daily and weekly lie within the range, we consider the range appropriate.

9.280 We then calculate the minimum, average and maximum for each of the spot and rolling periods. This gives an average range of 0.27–0.32. This approach places weight on all estimation methods though the exclusion of certain outliers gives less weight on 2-year and 10-year monthly betas.

Table 9-7: Mix, Max and Average of outlier-adjusted CMA analysis of Severn Trent and United Utilities unlevered equity betas June 2005 to June 2020

<i>Data to June 2020</i>	<i>Spot 30/06/2020</i>	<i>1-year average</i>	<i>2-year average</i>	<i>5-year average</i>
Min	0.25	0.26	0.27	0.28
Average	0.27	0.29	0.30	0.32
Max	0.30	0.33	0.35	0.34

Source: CMA analysis using Thomson Reuters data

9.281 We then considered data up to the February 2020 cut-off date suggested by the parties. This gives us the following measures of raw equity beta (weighted average for SVT and UU):

Table 9-8: CMA analysis of Severn Trent and United Utilities raw equity betas Feb 2005 to Feb 2020

<i>Data to February 2020</i>	<i>Spot 30/06/2020</i>	<i>1-year average</i>	<i>2-year average</i>	<i>5-year average</i>
SVT/UU 2y daily Raw beta	0.65	0.61	0.62	0.67
SVT/UU 2y weekly Raw beta	0.63	0.57	0.64	0.70
SVT/UU 5y daily Raw beta	0.69	0.67	0.68	0.64
SVT/UU 5y weekly Raw beta	0.71	0.69	0.71	0.66
SVT/UU 5y monthly Raw beta	0.71	0.73	0.80	0.69
SVT/UU 10y daily Raw beta	0.59	0.56	0.57	0.59
SVT/UU 10y weekly Raw beta	0.60	0.56	0.57	0.57
SVT/UU 10y monthly Raw beta	0.53	0.48	0.46	0.42

Source: CMA analysis using Thomson Reuters data

9.282 Consistent with Ofwat, we applied the Harris-Pringle approach and obtained the following estimates for unlevered beta:

Table 9-9: CMA analysis of Severn Trent and United Utilities unlevered equity betas Feb 2005 to Feb 2020

<i>Data to February 2020</i>	<i>Spot 30/06/2020</i>	<i>1-year average</i>	<i>2-year average</i>	<i>5-year average</i>
SVT/UU 2y daily Unlevered beta	0.28	0.27	0.28	0.33
SVT/UU 2y weekly Unlevered beta	0.28	0.25	0.29	0.34
SVT/UU 5y daily Unlevered beta	0.33	0.32	0.33	0.31
SVT/UU 5y weekly Unlevered beta	0.34	0.33	0.34	0.32
SVT/UU 5y monthly Unlevered beta	0.34	0.35	0.39	0.34
SVT/UU 10y daily Unlevered beta	0.28	0.26	0.27	0.29
SVT/UU 10y weekly Unlevered beta	0.28	0.26	0.27	0.28
SVT/UU 10y monthly Unlevered beta	0.25	0.22	0.22	0.20

Source: CMA analysis using Thomson Reuters data

9.283 The different frequency/sampling approaches with a February cut-off gave a wider range of unlevered beta estimates, ranging from 0.20 to 0.39. We again note that monthly estimates, which suffer from higher standard errors, provide the lowest and highest numbers. We consider that some of the 5-year and 10-year monthly estimates are outliers and therefore should be removed. Excluding these estimates gives a minimum of 0.25 and maximum of 0.35. As all daily and weekly readings lie within this range, we consider the range appropriate for our analysis.

9.284 As previously, we then calculate the minimum, average and maximum for each of the spot and rolling periods. This gives us an average range of 0.29–0.31.

Table 9-10: Mix, Max and Average of outlier-adjusted CMA analysis of Severn Trent and United Utilities unlevered equity betas Feb 2005 to Feb 2020

<i>Data to February 2020</i>	<i>Spot 30/06/2020</i>	<i>1-year average</i>	<i>2-year average</i>	<i>5-year average</i>
Min	0.25	0.25	0.27	0.28

Average	0.30	0.29	0.30	0.31
Max	0.34	0.35	0.34	0.34

Source: CMA analysis using Thomson Reuters data

9.285 Finally, we considered ‘structural break’ data from September 2014 to February 2020. As a result of the shortened timeframe, only spot data across 2 and 5-year data was appropriate to this analysis.¹⁴⁸³

Table 9-11: CMA analysis of Severn Trent and United Utilities raw equity betas Sept 2014 to Feb 2020

<i>Structural Break Data to February 2020</i>	<i>Spot 28/02/2020</i>
SVT/UU 2y daily Raw beta	0.65
SVT/UU 2y weekly Raw beta	0.63
SVT/UU 5y daily Raw beta	0.69
SVT/UU 5y weekly Raw beta	0.69
SVT/UU 5y monthly Raw beta	0.70

Source: CMA analysis using Thomson Reuters data

9.286 Consistent with Ofwat, we applied Harris-Pringle approach and obtained the following estimates for unlevered beta:

Table 9-12: CMA analysis of Severn Trent and United Utilities unlevered equity betas Sept 2014 to Feb 2020

<i>Structural Break Data to February 2020</i>	<i>Spot 28/02/2020</i>
SVT/UU 2y daily Unlevered beta	0.28
SVT/UU 2y weekly Unlevered beta	0.28
SVT/UU 5y daily Unlevered beta	0.33
SVT/UU 5y weekly Unlevered beta	0.33
SVT/UU 5y monthly Unlevered beta	0.33

Source: CMA analysis using Thomson Reuters data

9.287 The structural break range of 0.28 to 0.33 is tighter than the ‘whole period’ data, while the average spot figure of 0.31 sits toward the top of the whole period average range of 0.27 to 0.32 (described in paragraph 9.280). This approach incorporates all estimation methods, but again places less weight on monthly betas. For reference, for the same period Gregory et al suggest that a range for beta of between 0.67 and 0.69¹⁴⁸⁴ (based on raw beta not Vasicek-adjusted, to allow comparability with to our approach). This

¹⁴⁸³ We note that Indepen and GHT suggest using betas based on the longest run of data since the last structural break, but here continue with our preferred approach of considering all measurement horizons and frequencies that are applicable to a data range. Here this includes analysis of 2-year daily and weekly data.

¹⁴⁸⁴ Gregory et al results adjusted from raw to unlevered beta by CMA based on observed gearing of 54.2%. Gregory references both Sept and Oct start dates. An October start date would not have a material impact on our results.

suggests an unlevered beta range of 0.31 to 0.32, which would sit within but to the top of our own range using this data:

Table 9-13: Mix, Max and Average of outlier-adjusted CMA analysis of Severn Trent and United Utilities unlevered equity betas Sept 2014 to Feb 2020

<i>Structural Break Data to February 2020 Spot 28/02/2020</i>	
Min	0.28
Average	0.31
Max	0.33

Source: CMA analysis using Thomson Reuters data

9.288 Bringing these various estimates together gives us the following data:

Table 9-14: Summary of CMA analysis of Severn Trent and United Utilities unlevered equity betas by timeframe

<i>AVERAGE BY TIMEFRAME</i>	<i>Spot</i>	<i>1-year average</i>	<i>2-year average</i>	<i>5-year average</i>
Feb 2005 to Feb 2020	0.30	0.29	0.30	0.31
June 2005 to June 2020	0.27	0.29	0.30	0.32
September 2014 to Feb 2020	0.31			

Source: CMA analysis using Thomson Reuters data

9.289 On the basis of the data above, we provisionally use a low estimate of the unlevered beta of 0.27 and a high estimate of the unlevered beta of 0.32. Using this range would place weight on daily and weekly estimates of 2-year, 5-year and 10-year data, but less emphasis (due to the removal of outliers) on monthly data.

Table 9-15: Unlevered Beta Estimate

	<i>Low Estimate</i>	<i>High Estimate</i>	<i>Ofwat OR19 final determination</i>
Unlevered Beta	0.27	0.32	0.29

Source: CMA Analysis and Ofwat PR19 final determination

Submissions relating to the measurement of debt beta

Ofwat

9.290 In its draft determination, Ofwat's point estimate for debt beta was based on analysis by EE, which used a decompositional approach to derive an estimate of debt beta from the risk premium in the iBoxx A/BBB 10yrs+ non-financials index. Ofwat picked a point estimate which was at the low end of the range of a 2-year rolling average of results from this decompositional approach. Ofwat said that this cautious approach

recognised the volatility of debt beta estimates, and the uncertainty around whether current estimates of debt beta would persist into 2020–25.¹⁴⁸⁵

9.291 Following publication of Ofwat’s Draft Determination, South East Water suggested that Ofwat’s point estimate of 0.125 should be lower or zero, citing a paper by Zalewska (2019) that produced debt beta estimates which were negative or close to zero over several estimation periods. Ofwat considered the Zalewska paper’s conclusion of a zero or negative debt beta for iBoxx index was incongruous with wider evidence, as it implied that all the debt premium could be accounted for in the company-specific risk of default. Ofwat also claimed the Zalewska paper’s estimates of debt beta using the iBoxx A/BBB indices focuses entirely on estimates of debt beta using daily and weekly data, whereas using monthly data produces results which are more consistent with positive estimates produced by the decomposition approach. Ofwat was concerned that the relatively more infrequent trading of debt instruments relative to equity indices such as the FTSE could bias downwards the estimates of debt betas using daily data (‘Epps effect’) and therefore, Ofwat justified using a monthly sampling frequency.¹⁴⁸⁶

9.292 In its final determination, EE for Ofwat updated its decompositional approach to estimating debt beta. This approach decomposed excess returns for the iBoxx A/BBB debt index after making a 15bps adjustment for new debt outperformance and a liquidity premium. The 5-year rolling average of the equity risk premium from EE GDP growth DDM was then used to infer a debt beta estimate. EE’s analysis produced an estimate range of 0.12–0.23 on spot data and 0.13–0.17 using a 2-year trailing average.

9.293 As a sensitivity check, Ofwat also asked EE to consider how its outputs might vary if it used outputs from PwC’s GDP growth DDM instead. This produced a range of 0.12–0.20 on spot data and 0.13–0.14 using a 2-year trailing average.

9.294 After considering this analysis, Ofwat retained its point estimate of 0.125 from draft determinations. While Ofwat considered that higher numbers could be supported using outputs from both the PwC and EE DDMs – and despite EE recommending a point estimate of 0.15 – it chose to adopt a

¹⁴⁸⁵ Ofwat (2019), [Allowed return on capital technical appendix](#), section 5.4.1, p55

¹⁴⁸⁶ Ofwat (2019), [Allowed return on capital technical appendix](#), section 5.4.2, p57

figure at the bottom of the 2-year trailing average ranges over the past year.¹⁴⁸⁷

- 9.295 In its response to the Disputing Companies statements of case, Ofwat stated that if the gearing of the listed company comparator and the notional company are similar, the addition of a debt beta has a very small effect on the final notional equity beta estimate. Ofwat said that it did not use a debt beta in PR14 because it used a net debt/RCV gearing measure to unlever and re-lever beta, which resulted in the respective gearing estimates being similar. As a result, the use of a debt beta would have made minimal difference to the allowed return on equity.¹⁴⁸⁸
- 9.296 Ofwat said that it did not place weight on direct econometric estimates for its final determinations due to the inconclusive results returned by that approach at draft determinations (positive as well as negative estimates and wide confidence intervals). Ofwat stated that the Competition Commission, in its 2007 redetermination of Heathrow's price control, also preferred the decompositional approach, citing 'poor statistical properties of regressions' and 'thin trading' in the direct econometric approach. Ofwat observed however, that the use of monthly data (which could be justified for debt beta due to the thinner trading of debt instruments) also supported figures towards the higher end of the 0.10–0.17 range.¹⁴⁸⁹
- 9.297 Ofwat also said that it had considered the impact of notional gearing on notional equity beta, noting that the CMA's provisional findings for the NATS/CAA PR3 determination had raised an important question around whether its de-gearing and re-gearing methodology was the correct approach. In its draft determination, Ofwat had noted that the definition of gearing when un-levering and re-levering beta had an impact on the level of equity beta estimated. Ofwat noted that for its chosen approach of using enterprise value gearing, it was notable that the estimate of re-levered beta was significantly higher than the raw equity beta, despite the relatively similar book value gearing between Severn Trent Water and the notional 60%. This concern had been highlighted by Wright et al (2018). Ofgem (2019) also identify that the greater the difference between notional gearing and the gearing of listed comparators, the greater the impact of changes in notional gearing on re-levered beta.

¹⁴⁸⁷ Ofwat (2019), [Allowed return on capital technical appendix](#), section 5.4.3, p68

¹⁴⁸⁸ Ofwat, [Risk and return – response to common issues in companies' statements of case](#), paragraphs 3.74 to 3.75

¹⁴⁸⁹ Ofwat, [Risk and return – response to common issues in companies' statements of case](#), paragraph 3.76

9.298 Ofwat suggested that there are several potential responses to this issue:

- (a) the 'do nothing' approach - simply retain the existing regulatory model;
- (b) the use of a positive debt beta; or
- (c) the use of a non-constant asset beta.¹⁴⁹⁰

9.299 Ofwat said that it did not consider any of these options to provide a perfect solution. Using the existing regulatory model produces a WACC which strictly increases with gearing at a constant rate, contradicting a large body of financial theory which suggests otherwise. There was a risk therefore of overcompensating investors for the actual risk implied by changes in gearing. A positive debt beta would need to be improbably high to achieve a constant WACC, while an asset beta which varies with gearing may achieve a WACC which is constant but may not be a good approximation for the circumstances of the water sector, due to the presence of important features of the regulatory framework which are not captured in the Modigliani-Miller theorem.

9.300 In the context of these complex and unresolved issues, Ofwat suggested that a pragmatic solution may be to adopt the gearing of the listed water companies United Utilities and Severn Trent as the notional gearing for the purposes of estimating the allowed return. Ofwat stated that this approach would be consistent with arguments put forward by the four, who had all argued that the WACC is not affected by gearing changes.¹⁴⁹¹

9.301 At the cost of capital round table with the CMA, EE told us that it is important to focus on the purpose of the debt beta in our calculations. EE said that the debt beta's main use is to provide the correct equity beta after re-levering to the chosen nominal level of gearing, and that failing to properly account for the debt beta is a cause of the WACC generally rising with gearing (as identified in the NATS/CAA provisional findings).

Disputing Companies

9.302 Anglian stated that the decomposition approach is subject to considerable uncertainty, as acknowledged by the CMA in its NATS (2020) provisional findings, where the CMA used a debt beta of 0.05 – in line with

¹⁴⁹⁰ The CMA's NATS/CAA 2019 report did suggested that an asset beta that changed with gearing could achieve a constant WACC (although the CMA did not use this approach in setting the cost of equity for the NERL case).

¹⁴⁹¹ Ofwat, [Risk and return – response to common issues in companies' statements of case](#), paragraph 3.77 to 3.83

econometric evidence. Anglian noted the empirical estimates relied upon by Ofwat exhibit a high degree of variability, ranging from -0.11 to 0.40 depending on the methodology and the sample size employed, suggesting underlying problems with the regressions. Anglian said that additional empirical research on debt beta suggested that a debt beta of no more than 0.05 is appropriate for the water sector.¹⁴⁹²

9.303 Bristol stated that Ofwat unreasonably assumed a debt beta of 0.125, which is considerably higher than the debt beta of zero applied in PR14 and in the CMA's Bristol PR14 Determination. Bristol stated that Ofwat had assumed a high level of systematic risk of debt across the industry and the approach taken by Ofwat was entirely speculative, being without robust evidential basis. Bristol proposed an unlevered debt beta of 0.10.¹⁴⁹³

9.304 In addition, Bristol stated that Ofwat should not only have relied on the decomposition method. Relying on direct methods, as well as a corrected decomposition method, would have derived a lower debt beta. Economic Insight refer specifically to the 'direct' econometric estimates of the debt beta put forward by Professor Zalewska in relation to the NATS price redetermination, which indicated that the debt beta was at, or below, 0.1.¹⁴⁹⁴ In addition, Economic Insight also show that Ofwat's estimate of 0.125 is the highest debt beta (excluding an indicative range given by Ofgem for RIIO-2 of 0.10 to 0.15) across a number of regulatory determinations since 2012.¹⁴⁹⁵

9.305 Northumbrian considered that the lender protections built into the ring fence and special administration regimes would indicate a lower debt beta estimate than 0.10.¹⁴⁹⁶

Third Parties

9.306 The ENA submitted a report from Oxera, who it had commissioned to review CEPA's December 2019 report¹⁴⁹⁷ on estimating debt beta (produced for the UKRN). Oxera noted that as a result of its review of CEPA's work and its own analysis, it had reached four conclusions:

¹⁴⁹² [Anglian Reply](#), Part F, page 7

¹⁴⁹³ [Bristol SoC](#), paragraph 21

¹⁴⁹⁴ We note that Professor Zalewska's report for NERL states that 'results strongly support the thesis that the NATS-bond's beta is statistically significantly negative for most of the investigated period, and statistically insignificantly different from zero in the last few years.' See Zalewska, A. (2019), [Estimate of the debt beta of the bond issued by Nats \(En Route\) plc](#), summary.

¹⁴⁹⁵ [Bristol SoC](#), paragraphs 312–314

¹⁴⁹⁶ [Northumbrian SoC](#), section 8.10.1

¹⁴⁹⁷ CEPA (2019), [Consideration for UK regulators setting the value of debt beta – Report for the UKRN](#)

- (a) That methods based on regressions (the direct and indirect methods) and structural models have the advantage of measuring the systematic exposure of debt to market risk. In contrast, the spread decomposition method lacks robust theoretical support and depends on multiple uncertain parameters. The degree of uncertainty over the assumptions required by the spread decomposition approach suggest that it provides little or no incremental evidential value relative to the other approaches. Therefore, regulators should rely on regression-based and structural methods when setting debt beta for a price control.
- (b) That methods based on regressions must follow best econometric practice in terms of data inspection and cleaning, model specification, diagnostic testing, and interpretation of results. This was particularly important when working with bond return data, which presents additional challenges compared to equity return data (eg heterogenous securities and infrequent trading).
- (c) That controlling for interest rate risk was important when estimating debt beta using a regression-based method. Otherwise, the resulting debt beta estimate will capture risks over and above credit risk, resulting in a biased estimate. This was not reflected by CEPA when it compared the methodology used by Schaefer and Strebulaev (2008) ie the indirect regression-based approach to the direct regression-based methodology used by PwC and EE.
- (d) That based on the estimates from the direct and indirect regressions with the corrected version of CEPA's structural method, a debt beta assumption of 0.05 for regulated industries would be appropriate.

Arguments relating to the measurement of debt beta – CMA assessment

- 9.307 The evidence above illustrates that the debt beta is difficult to measure and has a relatively small effect on the overall WACC. In our view, the choice of the debt beta should be set at a level which is consistent as far as possible with the overall framework for the WACC, without acting contrary to financial market evidence.
- 9.308 We agree with CEPA's conclusion to its December 2019 report for the UKRN, which argues that there is no one approach to estimating debt betas that dominates all others, as evidenced by the different methods used in studies and the different weights regulators have given to different evidence sources. This means that it is not possible to be prescriptive at a general level about what weight to attach to the different approaches – regulators have to exercise their judgement, and their decisions will depend

on the details of each case.¹⁴⁹⁸ Where different approaches suggest very different levels for the debt beta, our approach is to propose a measure which can be used in a way which reflects these differences, and is unlikely to result in an overall cost of equity which materially diverges from the actual cost of equity.

9.309 This approach is consistent with our findings in the recent NATS/CAA case, where we concluded that the evidence presented in that case to calculate the level of the debt beta was largely speculative. We also noted that the reasons for the current level of debt premiums, in particular why it is much higher than the premiums implied by the debt beta and risk of default, were largely unexplained.¹⁴⁹⁹

9.310 We note Bristol's argument that Ofwat's estimate of 0.125 is the highest regulatory estimate of debt beta to data, with the modal estimate over the last 5 years being 0.10.¹⁵⁰⁰ We also note that the CMA used a zero figure in Bristol 2015 and a 0.05 figure in the NATS/CAA PFs.^{1501, 1502}

9.311 We also note Schwert and Strebulaev's work, highlighted in CEPA's paper, that suggests that companies with an A credit rating would expect to have a debt beta of 0.05, while companies with a BBB credit rating would expect to have a debt beta of 0.10.¹⁵⁰³ While we acknowledge that there may be issues with Schwert and Strebulaev's methodology, this is a useful cross-check given our use of A and BBB benchmarks within our assessment of the cost of debt.¹⁵⁰⁴

9.312 We have first considered the lowest potential value for debt beta, having regard to previous precedent that the debt beta could be zero, but also recognising that most regulators have now moved to a positive debt beta. We agree that Oxera's evidence suggests that the debt beta for some companies may be statistically insignificantly different from zero, and that this may be a plausible value given the significant regulatory protections

¹⁴⁹⁸ CEPA (2019), *Consideration for UK regulators setting the value of debt beta – Report for the UKRN*, p25

¹⁴⁹⁹ NATS/CAA, paragraph 13.121. Debt premiums reflect the cost of debt in excess of the risk free rate and should be a function of debt beta and the increased risk of default, but current 'spreads' are significantly in excess of the levels that would be expected on the basis of these metrics.

¹⁵⁰⁰ CEPA (2019), *Consideration for UK regulators setting the value of debt beta – Report for the UKRN*, Table 3.1

¹⁵⁰¹ Bristol PR14 Determination, paragraph 10.150

¹⁵⁰² NATS/CAA, paragraph 13.122

¹⁵⁰³ In considering Schwert and Strebulaev's findings, we consider the credit rating metrics are likely to be more applicable than the gearing metrics. Given the significant regulatory protections enjoyed by UK water companies, we would expect them to achieve strong credit ratings at higher levels of gearing than could be achieved by the average, non-regulated company in the economy.

¹⁵⁰⁴ CEPA (2019), section 2.2.1 including Table 2.3, referencing Schwert and Strebulaev (2014), *Capital Structure and Systematic Risk*, Table A1

the debt and bondholders in the water sector benefit from and the lack of debt default events in the water sector since privatisation.

- 9.313 By contrast, Ofwat/EE set a debt beta of 0.125 entirely based on decompositional method arguing that regression approaches have high level of volatility of results and inability to distinguish robustly from zero. Overall, we agree with Oxera's analysis that a finding that the debt beta is not statistically indifferent from zero is as a result of high standard errors around what is likely to be a low debt beta, not because this form of modelling is unsuitable as a matter of principle. Rather than discarding this or any other methods, our preferred approach would be to consider all the evidence available when setting an appropriate range for the debt beta.
- 9.314 For similar reasons, we have reviewed the decomposition approaches presented by Ofwat, and conclude that while they also have a wide range of uncertainty, they provide a compelling case that the regulatory model should include a positive debt beta. The consequence of an ultra-low debt beta is likely to be an unrealistic rate of increase in the cost of equity and therefore the WACC as gearing increases. Ofwat's analysis suggests that this may in practice be addressed by assuming that debt investors are taking more 'equity-like' beta risk in the context of the relatively high gearing of water companies. We agree that this is a sensible theoretical approach – but we also have some concerns that it does not appear to reflect the reality of low debt premia and low observed debt betas combined with the relatively modest gearing levels of both the notional and the listed water companies.
- 9.315 Given the significant calculation uncertainties associated with debt beta, and the relatively small consequence for the WACC of changing the level of debt beta, we have provisionally decided to set a range which reflects these different potential approaches by setting the low estimate of the debt beta at zero and the high estimate of the debt beta at 0.15.
- 9.316 As a sense check to the debt beta that we have calculated using this range, we recalculate the appointee WACC using the observed 54.2% gearing used within our beta calculations as the notional level of gearing – thus removing the need to consider a debt beta.¹⁵⁰⁵ Using all component metrics at the midpoint of their range, we note that this produces an estimate of the appointee WACC that is only 3bps lower than the estimate using a debt

¹⁵⁰⁵ As a function of this example we estimate that the proportion of new debt range falls to 3-10% from our original 13-21%.

beta at the middle of our range (with the middle of the range debt beta value being 0.075).

9.317 While this does suggest that WACC rises with gearing in our model, the impact is relatively small. In the absence of evidence justifying an alternative level of notional gearing, we believe that 60% notional gearing and 13-21% new debt better match the reality of a notional company within this sector, and that these are the factors which should be considered in the WACC analysis and financeability assessment. As such, we choose to retain 60% notional gearing and the de-gearing, re-gearing method of calculating the equity beta.

Table 9-16: Debt Beta Estimate

	<i>Low Estimate</i>	<i>High Estimate</i>	<i>Ofwat OR19 final determination</i>
Debt Beta	0	0.15	0.125

Source: CMA Analysis and Ofwat PR19 final determination

Summary and CMA provisional determination

9.318 In order to set an appropriate equity beta range, we must combine our estimates of unlevered beta and debt beta with our notional gearing level of 60%¹⁵⁰⁶. This process results in a provisional low notional equity beta estimate of 0.65 and a high notional beta estimate of 0.80.

9.319 We note that Ofwat's estimate of 0.71 is within our range.

Table 9-17: Summary of Beta Estimates

	<i>Low Estimate</i>	<i>High Estimate</i>	<i>Ofwat OR19 final determination</i>
Unlevered beta	0.27	0.32	0.29
Debt Beta ¹⁵⁰⁷	0.15	0	0.125
Notional Gearing	60%	60%	60%
Notional Equity Beta	0.65	0.80	0.71

Source: CMA Analysis and Ofwat PR19 final determination

¹⁵⁰⁶ Our estimate is converted into an asset beta by adding a figure equal to the debt beta multiplied by the observed gearing of 54.2%. Our estimate of the asset beta is converted into the notional equity beta using the following formula: $\beta_e = (\beta_a - (\beta_d \times \text{notional gearing})) / (1 - \text{notional gearing})$

¹⁵⁰⁷ Note, as it is equity beta we are trying to estimate in this exercise, our high estimate of debt beta estimate is associated with our low estimate of equity beta and our low estimate of debt beta is associated with our high estimate of equity beta.

Cost of Debt

Introduction

- 9.320 The cost of debt component of the WACC estimate reflects the return required to compensate debt investors for lending to a business.
- 9.321 The approach taken Ofwat in PR19 is to estimate a reasonable level of debt costs for a company with the notional financing structure, with shareholders retaining benefits and incurring costs of any differences between the assumed reasonable level of debt costs and the companies' actual debt costs. We agreed that this is the correct approach and have also adopted it in this provisional determination
- 9.322 The cost of debt in PR19 comprises: the cost of embedded (existing) debt, which should be observable at the company, sector or benchmark level; an estimate of the cost of new debt over the price control period; an estimate of the relative weights of embedded and new debt; and an allowance for issuance and liquidity costs.
- 9.323 The total cost of debt is calculated using the following formula:¹⁵⁰⁸

$$K_d = (w_{ED} \times K_{ED}) + (w_{ND} \times K_{ND}) + K_{IL}$$

- 9.324 In this section we assess each element of the cost of debt.

The cost of embedded debt

Ofwat PR19 Decision¹⁵⁰⁹

- 9.325 Ofwat considered evidence from two approaches:
- (a) The balance sheet approach – analysing the actual cost of 'pure' debt on company balance sheets. Ofwat considered 'pure' to mean fixed, floating rate or index-linked instruments, but not 'non-standard' instruments and swaps.
 - (b) The benchmark index approach – calculating an estimate using the average of the A and BBB-rated IHS Market (iBoxx) GBP non-financials

¹⁵⁰⁸ Where K_d is the total cost of debt, w_{ED} is the weight of embedded debt, w_{ND} is the weight of new debt, K_{ED} is the cost of embedded debt, K_{ND} is the cost of new debt and K_{IL} is issuance and liquidity costs.

¹⁵⁰⁹ Ofwat (2019), [Allowed return on capital technical appendix](#), section 6.3.1

10yrs+ indices, adjusted for market-implied interest rate rises embedded in the term structure of nominal gilts and reduced by a calculated 'outperformance wedge'.

9.326 Ofwat focused on the benchmark index approach to calculate its estimate and used the balance sheet approach as a cross check.

9.327 For the benchmark index approach, Ofwat calculated 10- and 15-year trailing averages of the 10+ A and BBB-rated indices¹⁵¹⁰ and increased these estimates for the 0.25% market-implied interest rate rise embedded in the term structure of nominal gilts.¹⁵¹¹ This process suggested figures of 4.07% and 4.75% respectively. Ofwat then applied a 25bps 'outperformance wedge' to reflect its assessment that water companies have shown the ability to issue debt at prices lower than suggested by Ofwat's chosen A/BBB benchmark. Applying this outperformance wedge reduced Ofwat's estimates to 3.82% and 4.50% respectively. Ofwat picked the latter figure as its point estimate.

9.328 Ofwat checked this 4.50% estimate against the weighted average pure debt cost in the sector (4.25%), and the company-level median (4.65%). It concluded that as the benchmark approach was close to the median for WASCs and large WOCs, and lay within the overall range, it represented a sufficient allowance for an efficient company while maintaining incentives for companies to raise finance in a cost-efficient manner over the long term.

Key arguments

9.329 Parties presented arguments in several areas relating to estimating the cost of embedded debt, including:

- (a) the overall estimation methodology (benchmark/bottom-up/actual costs);
- (b) the use of an outperformance wedge;
- (c) the length of trailing average used; and
- (d) matching the allowance to actual debt costs.

¹⁵¹⁰ These are two iBoxx indices of debt, one consisting of debt issued by A-rated companies and organisations the other consisting of debt issued by BBB rated companies and organisations. Both indices only include debt with maturity of greater than 10 years (10+).

¹⁵¹¹ A further explanation of the theory and process involved in such forward rate adjustments can be found in the risk-free rate section, paragraphs 9.130–9.133

We address each of these issues in turn, before highlighting our overall provisional estimate of the cost of debt.

Overall estimation methodology

Benchmark approach – Parties’ views:

9.330 There was general agreement^{1512, 1513, 1514} that Ofwat’s use of the iBoxx £ A and BBB 10+ indices were an appropriate benchmark for the measurement of the cost of debt (Yorkshire’s request for the estimate to be based on actual costs is covered in paragraph 9.337 to 9.338).

Bottom-up approach– Parties’ views

9.331 There is significant debate about the methodology involved in calculating a bottom-up estimate of the industry’s costs of embedded debt.

9.332 Ofwat’s approach was to focus on its definition of ‘pure’ debt, which excluded most derivative instruments (such as interest rate or inflation swaps) within its calculations. Ofwat stated that such instruments were company-specific risk management tools, rather than actual debt. In addition, Ofwat stated that the specific nature of swaps made it difficult to make comparisons and assess if they have been efficiently incurred, and that swaps may be used to mitigate risks associated with levels of gearing higher than the notional financial structure. Ofwat also stated subordinated (junior ranking) debt should not be included in the notional financing costs as it was unlikely to be used by an efficiently financed company with Ofwat’s notional capital structure.¹⁵¹⁵

9.333 Ofwat also stated that it would not be appropriate for customers to bear the costs of these swap instruments as they received no benefits (rather, shareholders benefited). It also stated that it did not believe that including swaps was liable to give a better estimate of the cost of raising embedded debt for the notional company. Ofwat said that its decision to exclude swaps was consistent with its separate assumption that companies raise 33% of debt using index-linked instruments. In response to comments from the Disputing Companies that these positions were inconsistent, Ofwat said that if the CMA decided to include the cost of swaps in its analysis, it would

¹⁵¹² [Anglian SoC](#), paragraph 1208

¹⁵¹³ [Bristol SoC](#), paragraph 320

¹⁵¹⁴ [Northumbrian SoC](#), paragraph 873

¹⁵¹⁵ Ofwat (2019), [Allowed return on capital technical appendix](#), section 6.3.2b

be fair for the CMA to base its financeability decisions on use of swaps. This would result in 55% of debt having index-linked properties, rather than the notional 33%.¹⁵¹⁶

9.334 Anglian¹⁵¹⁷ and Yorkshire,¹⁵¹⁸ as well as a third party, Electricity North West Limited (ENWL),¹⁵¹⁹ disagreed with this approach and variously stated that:

- (a) swaps are an intrinsic part of the financing strategy for efficient companies and are a tool that has been widely used in recent decades;
- (b) the contractual terms of a swap are far more standardised than any other financial instrument and can be benchmarked against public and widely available information;
- (c) the intention of swaps is to reduce risk and align cashflow with debt service requirements, which should benefit customers; and
- (d) that failing to incorporate derivative costs will materially underestimate the true debt costs faced by companies.

Actual cost – Parties' views

9.335 Ofwat stated that its notional rather than actual cost approach represented a long-standing regulatory practice which offered better incentives to issue debt cost-effectively compared to a pass-through of actual debt costs. Ofwat stated that its approach strongly incentivised companies to outperform while preventing customers from bearing all the risks associated with company financing decisions.

9.336 Submissions requesting that actual debt costs should be the basis for debt cost allowance predominately came from Yorkshire and ENWL.¹⁵²⁰

9.337 Yorkshire¹⁵²¹ stated that setting a one-size-fits all approach was not appropriate regulatory policy as it implied that the differences between companies' borrowing costs must always be attributable to differences in efficiency, when in reality costs of debt were always going to depend on factors such as differences in companies' capital programmes, the date of

¹⁵¹⁶ Ofwat, [Risk and return – response to common issues in companies' statements of case](#), paragraphs 3.101–3.102

¹⁵¹⁷ [Yorkshire SoC](#), paragraphs 229–232

¹⁵¹⁸ [Anglian SoC](#), chapter I, section 6.3.3

¹⁵¹⁹ [ENWL submission](#)

¹⁵²⁰ Ofwat's Response suggested that Anglian had also requested that their actual costs be included in the calculation. Anglian refuted this suggestion in their Reply to Ofwat, Ref: Anglian Water PR19, Executive Summary: Reply to Ofwat's Response to Anglian's SoC, Table 1

¹⁵²¹ [Yorkshire's Reply to Ofwat's Response](#), section 7.5

issues, and the tenor of borrowing. It stated that companies' capital programmes and the date of issues caused a natural degree in variation in interest costs across the sector, whereas only the tenor of borrowing was a function of active treasury decisions.

- 9.338 Yorkshire stated that unless Ofwat and/or the CMA suggested that there was a single correct schedule of debt-raising and a single correct tenor at any given point in time, then a regulatory approach that completely ignored company-specific costs of debt was irrational and resulted in Ofwat failing to have regard to relevant considerations, 'inconsistent with standard public law norms'. Yorkshire also stated that it then became important to consider whether a company's historical borrowing choices passed a test of 'prudence'.
- 9.339 ENWL¹⁵²² stated that under the Financing Duty it was not enough for Ofwat to assess financeability with reference to a notionally efficient company (even if this was a sensible starting point). Rather, it 'must therefore assure itself that each company with efficiently incurred costs is financeable...taking into account company-specific information and characteristics.' ENWL also stated that as a result company specific costs, including derivatives, should be recovered through the price control and that it was not appropriate to rely upon equity returns to cross-subsidise underfunded debt returns.

Overall estimation methodology – CMA assessment

- 9.340 On the balance of evidence, we see a strong rationale for reliance on a benchmark index approach to estimating the cost of embedded debt. Even as a cross check, there appear to be significant difficulties and complications with using actual debt costs to arrive at an estimate of the cost of embedded debt.
- 9.341 We consider that an average of the A and BBB index 10+ represents a reasonable range of credit ratings for a company with the notional capital structure. Moreover, the long-term average length of maturity of the instruments in these indices (21.7 years for the A and 17.2 years for the BBB) is appropriate for assessment of debt costs in a regulated sector with long investment programmes and very long-lived assets.
- 9.342 We see various benefits associated with a benchmark-derived approach to estimating the cost of embedded debt, including:

¹⁵²² ENWL submission

- (a) allowing a reasonable and independent assessment of the costs likely to be faced by a company deploying the notional level of gearing. This is not necessarily represented by the average of actual debt costs when the substantial majority of water companies have gearing levels higher than the notional structure;
- (b) avoiding the need for complex analysis of individual debt instruments to assess whether they were issued 'efficiently' (a process that would be impossible for the CMA to conduct within the redetermination timeframe). As we can see from the main party submissions, there is significant disagreement about what constitutes a reasonable debt instrument for the measurement of debt cost. Even the Disputing Companies' analysis excludes certain instruments on the basis that they appear inappropriately expensive
- (c) the ability to set one reasonable cost of embedded debt for the industry, while allowing companies to apply for individual allowances for specific circumstances (such as a size-based Company Specific Adjustment).

9.343 We do not see strong evidence for Yorkshire's submission relating to the adoption of actual costs as the basis for our estimate and in our view there would be little to no incentive for companies to ensure that their debt costs were as low as possible if there were a 'cost-pass-through' mechanism in place. Again, independently assessing the 'efficiency' of every debt instrument used by every company in the sector would not seem to represent the effective use of a regulator's time and resources.

9.344 We also accept that it is reasonable for an individual company's actual costs of embedded debt to be higher than the benchmark during a single price control period. We agree with Yorkshire's view that the date of issue is likely to be a significant factor in actual company debt costs, and that due to falling market rates in recent years this has meant that companies with a disproportionately older debt book will have higher costs. Rather than suggesting that this means companies should be compensated for their actual debt costs, we take the view that this simply means that these companies can, at some point in the future, roll their debt book at lower than average costs and will move (potentially significantly) below the benchmark used to calculate the notional cost of debt.

9.345 We acknowledge that future interest rates are not guaranteed to be at or below historic levels but suggest that by deploying a consistent and long-term treasury strategy, efficiently run companies should not spend inappropriately long periods of time on the 'wrong side' of the benchmark level.

Out-performance wedge

Out-performance wedge - Parties' views

- 9.346 As discussed in paragraph 9.327, Ofwat's analysis of nominal debt of at least 10 years to maturity at issuance indicated material and sustained outperformance relative to its benchmark iBoxx A/BBB over the period 2000-2018. As a result of this analysis, Ofwat applied a downward 'outperformance wedge' of 25bps to its cost of embedded debt allowance. Ofwat stated that this approach matched the CMA's approach in the 2015 British Gas Trading appeal and the Bristol PR14 Determination.¹⁵²³
- 9.347 Ofwat¹⁵²⁴ stated that, while in principle controlling for tenor and credit rating would be appropriate if the aim were to isolate the debt pricing benefit of being a regulated water utility (the halo effect), this is not what it was trying to do. Rather, Ofwat's approach was to set an allowance for the cost of new debt which was reflective of efficient borrowing costs and which did not materially overcompensate companies for these costs.
- 9.348 Ofwat,¹⁵²⁵ Ofgem,¹⁵²⁶ and Citizens Advice¹⁵²⁷ submitted that, rather than being too harsh, recent debt issuance might suggest that the 25bps performance wedge was too lenient. Ofwat submitted that United Utilities, with gearing of 64.8% (close to the notional 60%), had stated that it typically outperformed Ofwat's final determination on cost of new debt by 50-100bps.
- 9.349 Anglian, Northumbrian and ENA disputed the use of a performance wedge in the cost of embedded debt calculation, stating that analysis by NERA¹⁵²⁸ and KPMG showed that once the credit rating and tenor of water company bonds is controlled for, there was no evidence of material outperformance by company bonds. Specifically, KPMG's analysis demonstrated that there was no outperformance on yields at the issuance date for bonds with tenor within five years of the weighted average tenor of the relevant index.
- 9.350 Anglian¹⁵²⁹ stated that the 25bp adjustment made by Ofwat was based on an average tenor that was significantly shorter than the average weighted tenor of the relevant iBoxx index. As a result, the adjustment was internally inconsistent with Ofwat's statement that the iBoxx indices with a tenor of

¹⁵²³ Risk and return – response to common issues in companies' SoC, paragraph 3.112

¹⁵²⁴ Risk and return – response to common issues in companies' SoC, paragraph 3.111

¹⁵²⁵ Risk and return – response to common issues in companies' SoC, paragraph 3.113

¹⁵²⁶ Ofgem submission

¹⁵²⁷ Citizens Advice further submission

¹⁵²⁸ NERA (2019), *Halo effect and additional costs of borrowing at RIIO-2: A report for ENA*

¹⁵²⁹ Anglian SoC, chapter I, section 6.3.1

ten or more years were reflective of the average debt maturity profile of the sector. In addition, the 25bp deduction was also based on bonds that had higher average credit ratings at issuance than BBB+/Baa1 and was therefore inconsistent with the credit rating being targeted at PR19.

- 9.351 Northumbrian¹⁵³⁰ stated that the presence of any sustained halo effect¹⁵³¹ was in effect an inference that the rating agencies' methodologies were inconsistent with the market view of the credit risk in water company debt relative to other sectors at the same rating level. Northumbrian suggested that rating agency methodologies were not mechanistic, included significant subjective assessments and were not fixed in time. Further, rating agencies would be expected to refine their methodologies as required to maintain the quality and consistency of their ratings, and therefore there should not be any persistent halo effect.

Performance wedge – CMA assessment

- 9.352 We do not consider there to be evidence to support the use of a performance wedge. The evidence provided by the appellant companies strongly suggests that once tenor and credit rating are adjusted for, there is no evidence of water company outperformance.
- 9.353 In our assessment, comparing individual issuance yields without taking account of tenor or credit rating seems inconsistent with the benchmark-led approach of estimating the costs achievable by a company with the notional level of gearing and appropriate credit rating. In addition, the performance wedge approach risks encouraging companies to shorten the tenor of their debt, which may not be in the best interests of customers over the long-term.

Length of trailing average

Length of trailing average – Parties' views

- 9.354 Ofwat tested 10- and 15-year trailing averages of the 10+ A and BBB-rated indices and concluded that a 15-year trailing average was sufficient as it covered approximately 80% of outstanding bonds compared to only 40% for the 10-year trailing average.¹⁵³²

¹⁵³⁰ Northumbrian SoC, paragraph 8.11

¹⁵³¹ The ability of water companies, due to some perceived superior credit characteristics, to issue debt at rates lower than other companies with comparable credit ratings.

¹⁵³² Ofwat (2019), *Allowed return on capital technical appendix*, paragraph 6.3.3

9.355 Anglian stated that 20% of sector debt and 25% of their debt was issued prior to 2005, and therefore was not captured by the 15-year trailing average used by Ofwat. Anglian argued that as Ofwat's allowance was based on a benchmark that covered only 75% of Anglian's debt, the allowance was structurally below the cost of debt efficiently incurred.¹⁵³³

Length of trailing average – CMA assessment

9.356 In our view, it is appropriate to extend the trailing average period for measurement above 10 years but conclude that a period of 15 years is not sufficient. Given the average maturity of the benchmark indices (approximately 19.4 years when combined), as well as the long-term nature of debt financing within the water industry, we agree with Anglian's view that 20 years would be a more appropriate measurement period.

9.357 We acknowledge that 20-years is longer than the average current maturity of debt within the sector but note Anglian's and Ofwat's analysis suggests that 20% of industry debt was issued longer than 15 years ago. In addition, the use of shorter lookbacks could provide an inappropriate signal to companies that the regulator is encouraging them to shorten the tenor of their debt in order to reduce costs, potentially trading lower short-term costs for increased financing risk.

9.358 The use of a 20-year investment horizon also matched the investment horizon used throughout our calculation of other WACC metrics.

Cost of embedded debt - summary of CMA assessment

9.359 To summarise our assessment:

- (a) we agree with Ofwat that an overall benchmark-led approach to estimating the cost of embedded debt is appropriate, and we adopt this approach. We disagree with Yorkshire's view that actual debt costs should be the basis of each company's estimate, and we do not include actual costs within our estimate;
- (b) we disagree with Ofwat and do not consider there to be evidence to support the use of a performance wedge; and
- (c) we choose to use a 20-year trailing average, which is longer than the 15-year trailing average used by Ofwat.

¹⁵³³ [Anglian SoC](#), chapter I, section 6.3.2 Please also see Appendix C, Figure 15 for Anglian's graphical representation of this issue

Cost of embedded debt – provisional determinations

9.360 We apply our preferred methodologies to the iBoxx data to calculate our cost of embedded debt allowance. Our provisional estimate:

- (a) Uses a lower bound equal to the 20-year trailing average of the iBoxx A-rated 10+ index. On end-July 2020 data, this would be 4.81%.
- (b) Uses an upper bound equal to the 20-year trailing average of the iBoxx BBB-rated 10+ index. On end-July 2020 data, this would be 5.23%
- (c) Deflates these figures by our 2.00% CPIH estimate, to give a range of 2.76% to 3.16%, compared to Ofwat's PR19 figure of 2.42%.

Table 9-18: Provisional Determinations of Costs of Embedded Debt

<i>CPIH Real</i>	<i>Low Estimate</i>	<i>High Estimate</i>	<i>Ofwat PR19 final determination</i>
Cost of embedded debt	2.76%	3.16%	2.42%

Source: CMA analysis based on iBoxx data and Ofwat PR19 final determination

The cost of new debt

Ofwat PR19 Decision:¹⁵³⁴

9.361 Ofwat based its allowance for the cost of new debt on recent evidence of the yield of its benchmark index, adjusted to account for the market implied increase in the 15-year nominal risk-free rate over 2020-25 embedded in the term structure of nominal gilts.

9.362 Ofwat lowered its view of the 'outperformance wedge' applicable to this data from its draft determination estimate of 25 basis points to 15 basis points in its final determination. This reduction reflected its view that the lower overall allowed return on capital in PR19 could potentially reduce outperformance against the iBoxx A/BBB over 2020–25.

Key arguments

9.363 Parties presented arguments in several areas relating to estimating the cost of new debt, including:

- (a) the use of an outperformance wedge and the index used as a benchmark;

¹⁵³⁴ Ofwat (2019), [Allowed return on capital technical appendix](#), section 6.2.3

- (b) implications from the estimate of the risk-free rate;
- (c) the use of forward rate adjustments; and
- (d) indexing the cost of debt.

We examine each of these issues in turn.

Outperformance wedge and the index used as a benchmark

Outperformance wedge and the index used as a benchmark – Parties' views

- 9.364 As with the issues highlighted in relation to the outperformance wedge applied to the cost of embedded debt (see paragraphs 9.346–9.353), Anglian¹⁵³⁵ and Northumbrian¹⁵³⁶ submitted that there was no evidence of an outperformance wedge once tenor and credit rating were taken into account.
- 9.365 In addition, Anglian and Yorkshire¹⁵³⁷ submitted that Ofwat's approach assumed that companies would be able to issue at yields lower than those that would be paid on Baa1 bonds, and that this was inconsistent with the credit rating that efficient companies were likely to be able to achieve as a result of the PR19 price control. Yorkshire referenced Economic Insight's analysis that suggested a low probability of a notionally efficient firm being able to secure a Baa rating based on Ofwat's final determination and submitted that the cost of new debt should be based on the iBoxx BBB with no performance wedge deduction.

Performance wedge and the index used as a benchmark – CMA assessment

- 9.366 Our approach in this area is consistent with that applied to embedded debt (see paragraphs 9.352–9.353). We do not see evidence for an outperformance wedge once tenor and credit rating are accounted for.
- 9.367 As with our approach to embedded debt in paragraph 9.341, we consider the A/BBB 10+ index to be the best proxy for the notional costs faced by an efficiently financed and notionally capitalised company in this sector. As we discuss in Section 9, we consider our determination to be financeable on the basis of our overall cost of capital allowance.

¹⁵³⁵ Anglian SoC, chapter I, section 7.2

¹⁵³⁶ Northumbrian SoC, section 8.11

¹⁵³⁷ Yorkshire SoC, paragraphs 233–240

Implications from the risk-free rate

Implications from the risk-free rate – Parties' views

- 9.368 Bristol stated¹⁵³⁸ that the cost of new debt was based on the risk-free rate, plus an adjustment for credit risk, and that Ofwat's 0.58% nominal risk-free rate was too low (with 1.00% being a more thorough but conservative estimate). Bristol stated that, as Ofwat had determined that the cost of new debt was 2.54%, this should now be uplifted by 42bps (1.00%-0.58%), suggesting a revised industry cost of new debt of 3%.

Implications from the risk-free rate – CMA assessment

- 9.369 As with the estimate of the cost of embedded debt, we focus our efforts on the index benchmark approach rather than a bottom-up methodology as this is likely to provide a simpler and more accurate measure over time. We do not consider there to be sufficient evidence to justify an uplift to a broad range of market prices on the basis that one metric (the risk-free rate in this case) was considered to be 'too low' by a party.

Forward rate adjustments

Forward rate adjustments – Parties' views

- 9.370 Ofwat used a forward rate adjustment of 25bps to reflect market-implied rate rises.¹⁵³⁹ No parties raised the use of this adjustment as an issue.

Forward rate adjustments – CMA assessment

- 9.371 Neither Ofwat nor the companies raised the use of this tool as an issue. However, as noted in our discussion of the risk-free rate (paragraphs 9.130– 9.133), we consider there is insufficient evidence that making such an adjustment leads to a better estimate of the future spot rate. As a result, we do not apply a forward rate adjustment to our estimate.
- 9.372 We note that, given moves in the forward curve since Ofwat calculated its adjustment, any adjustment that would be applied on current data would be small.¹⁵⁴⁰

¹⁵³⁸ Bristol SoC, paragraphs 322–324

¹⁵³⁹ Ofwat (2019), *Allowed return on capital technical appendix*, Table 6.1

¹⁵⁴⁰ Current expectation hypothesis calculations would suggest a forward rate adjustment of c.10bps. See Appendix C, paragraph 7 for this calculation.

Indexing the cost of debt

Indexing the cost of debt – Parties' views

9.373 In its PR19 methodology document for PR19¹⁵⁴¹ Ofwat stated that it had decided to have separate approaches to embedded debt and new debt, with a fixed approach to embedded debt and an indexation mechanism for new debt. It stated that at the end of the period it would compare the revenue allowance (based on the PR19 spot rate chosen), against a trailing average of the iBoxx A/BBB index over the same period; any difference in revenues would be reflected in future revenues or RCV. Ofwat stated that its policy on how the true-up would be reflected in company revenues would be decided as part of the next price review, PR24.

9.374 The indexing/true-up of new debt was not raised as an issue by the Parties.

Indexing the cost of debt – CMA assessment

9.375 We received no evidence to challenge Ofwat's decision to apply a true-up mechanism to the cost of new debt, and we agree that this is also the correct approach for our determination. We would expect Ofwat to measure the path of new debt costs over the period on a like-for-like basis for the Disputing Companies (eg no performance wedge applied when calculating the true-up).

Cost of new debt - summary of assessment

9.376 To summarise our assessment:

- (a) we agree that Ofwat's overall benchmark-led approach to estimating the cost of new debt is appropriate, and we adopt this approach;
- (b) we do not consider there to be evidence to support the use of a performance wedge;
- (c) we disagree with Bristol and Yorkshire's suggested alternative approaches; and
- (d) we agree with the use of a true up mechanism for the cost of new debt in the PR24 process and would expect this to be conducted on a like for like basis (eg no performance wedge applied when calculating the true up).

¹⁵⁴¹ Ofwat (2017), [Delivering Water 2020: Our methodology for the 2019 price review. Appendix 12: Aligning Risk and Return](#), section 6.3

Cost of new debt – provisional determination

9.377 We apply our preferred methodologies to the iBoxx data to calculate our cost of embedded debt allowance. Our provisional estimate:

- (a) uses a lower bound equal to the 6-month trailing average yield on the iBoxx A-rated 10+ index, equating to 2.22%;
- (b) uses an upper bound equal to the 6-month trailing average yield on the iBoxx BBB-rated 10+ index, equating to 2.53%; and
- (c) deflates these figures by our 2.00% CPIH estimate, to give a range of 0.21% to 0.52%, compared to Ofwat's PR19 figure of 0.53%.

Table 9-19: Provisional Determination of Costs of New Debt

<i>CPIH Real</i>	<i>Low Estimate</i>	<i>High Estimate</i>	<i>Ofwat PR19 final determination</i>
Cost of new debt	0.21%	0.52%	0.53%

Source: CMA analysis based on iBoxx data and Ofwat PR19 final determination

The proportion of embedded and new debt used in our WACC calculation

Background

9.378 To estimate an overall cost of debt we must make an assumption about the amount of new debt that a notionally capitalised company will be required to raise during the price control period.

Ofwat PR19 Decision:

9.379 For its final determination,¹⁵⁴² Ofwat conducted its analysis using notional, company-led and notional-actual hybrid approaches to estimating the required proportion of embedded and new debt. Ofwat noted that the company-led approach gives an estimate of around 15% new debt as a percentage of total debt, while the more notional approaches give estimates between 17-21%. Ofwat stated that, as revised business plans' debt issuance forecasts did not reflect higher final Totex allowances, it was not convinced that the average share of new debt should be as low as 15%. Noting that the other two methods give a range that is very similar to the draft determination range of 17-22%, Ofwat decided that there were

¹⁵⁴² Ofwat (2019), [Allowed return on capital technical appendix](#), section 6.1.3

insufficient grounds to move its point estimate and retained 20% for its final determination.

Proportion of embedded and new debt

Proportion of embedded and new debt – Parties' views

- 9.380 Yorkshire¹⁵⁴³ asked the CMA to factor in its actual embedded debt percentage (88%) into the cost of debt calculation to ensure consistency with Yorkshire's arguments on actual embedded debt costs (discussed in paragraphs 9.337–9.338) Yorkshire submitted that Ofwat's 'one size' approach suggested that there was one optimum approach to debt issuance, that this was irrational and that it resulted in Ofwat failing to give regard to relevant considerations.
- 9.381 Ofwat received more representations on this issue as part of the PR19 process than were submitted to the CMA through the redetermination process, with eight stakeholder representations suggesting that 20% was too high an estimate to use, with the following specific arguments:¹⁵⁴⁴
- (a) Northumbrian stated that Ofwat's 20% estimate implied a 40% end-of-period share and average tenor of 12.5 years, which was at odds with the Annual Performance Report data. Northumbrian also argued that Ofwat's figure did not reflect an 11% cost assessment challenge at draft determinations which could be expected to reduce new debt issuance further by reducing allowed Totex.
 - (b) Various stakeholder responses used updated business plan data to calculate a new estimate, with some adapting Ofwat's approach. Frontier Economics (in a report for three companies) calculated a range of 14% to 18.3%, with a midpoint of 16.3%, which was similar to estimates from Anglian (15%) and United Utilities (17%).
- 9.382 South East Water suggested that Ofwat's use of a sector-wide new debt share assumption penalised companies with lower investment programmes, with the company estimating that its actual share of new debt was likely to be around 4% over the period.
- 9.383 As referenced in paragraph 9.379, Ofwat conducted detailed analysis to inform its estimate, considering three approaches:¹⁵⁴⁵

¹⁵⁴³ Yorkshire SoC, paragraph 232 and Yorkshire's Reply to Ofwat's Response, section 7.5

¹⁵⁴⁴ Ofwat (2019), *Allowed return on capital technical appendix*, section 6.1.2

¹⁵⁴⁵ Ofwat (2019), *Allowed return on capital technical appendix*, section 6.1.3

- (a) notional;
- (b) company-led; and
- (c) notional-actual hybrid.

- *Notional*

9.384 The notional approach assumed that a new debt issuance profile can be inferred from data on the years to maturity of companies' existing embedded debt. Here the proportion of new debt at the end of the control period should be the number of years in the control period divided by the weighted average years to maturity of debt.

$$N = T/M$$

Where:

N = Proportion of new debt at the end of the control period

M = The weighted average years to maturity of debt

T = The number of years in the control period

9.385 Under this approach, Ofwat calculated the sector average years to maturity to be 14.2 years, and the weighted average to be 13.9 years, which suggests an end-of-period range of new debt share of 36-37%.

9.386 Ofwat noted that this range underestimated end-of-period share as it did not account for new RCV formation financed by debt. Assuming that real RCV growth is financed 60% by new debt (to maintain 60% notional gearing), this suggests an adjusted end-of-period new debt share range of 40-42%. Dividing these figures by 2 gives an average for the period of 20-21%.

9.387 Ofwat noted that while this approach has the benefit of simplicity, it does not capture company proposals around the paydown of embedded debt or the profiling of new debt.

- *Company-led*

9.388 Ofwat stated that the company-led approach helped to deal with these issues, calculating the rolling mid-year balances of new debt and embedded debt over 2020–25 by assuming that new debt balances evolved according to company forecast debt issuance and that embedded debt balances evolved according to company forecast inflation-linked indexation and paydown of debt.

9.389 Ofwat noted that applying this approach resulted in an average share of new debt of 14-17% (weighted average), a range that was similar to that proposed by companies in pre-final determination representations to Ofwat.

- *Notional-actual hybrid*

9.390 Ofwat stated that the notional-actual hybrid approach built on revised business plan data, while including the latest evidence on Totex allowances and its assessment of equity's contribution to new RCV. This approach assumed embedded debt balances evolved according to company forecast inflation-linked indexation and planned paydown of debt (as in the company-led approach), but for new debt used a bottom-up profile of issuance generated for each company. This assumed that 'pure' debt falling due over 2020–25 was refinanced as new debt and that growth in RCV was financed by new debt minus the contribution of equity. This resulted in an average share of new debt in the range of 17-18%.

9.391 Ofwat¹⁵⁴⁶ stated that companies' actual share of new debt would tend to fluctuate based on historic and current investment patterns, and would, at times, out- and under-perform its notional assumption. However, Ofwat submitted that these deviations should broadly balance out over time, and that this did not necessitate a bespoke approach of setting an allowance for each company.

9.392 In addition, Ofwat stated that setting an allowance for each company could drive inefficient behaviour, such as incentivising companies to issue most of their debt towards the end of a price control (to ensure that it is remunerated as embedded), outweighing considerations of whether the price achieved for such issuance was efficient.

Proportion of embedded and new debt – CMA assessment

9.393 We acknowledge that this is an area with limited disagreement between the parties, with Yorkshire the only company with significant objections.¹⁵⁴⁷ As there is no definitive measure of the notional company's proportions of embedded and new debt, we consider it to be reasonable to consider evidence from both the notional benchmark used to estimate the costs of debt and the actual average debt maturity of companies within the industry

¹⁵⁴⁶ Ofwat, [Risk and return - response to common issues in companies' SoC](#), paragraphs 3.103–3.108

when calculating our estimate. We have focused on the notional approach using these two sets of data sources.

9.394 Basing the notional approach calculation on the 19.4¹⁵⁴⁸ years average maturity of the benchmark iBoxx A/BBB 10+ index, then using the $N=T/M$ equation above would suggest $N = 5/19.4$, or 26% end of period new debt and an average for the period of only 13%. This figure is significantly lower than Ofwat's notional approach calculation based on actual water company debt maturities and RCV growth discussed in paragraph 9.386, which would suggest an estimate of average new debt for the period of 20–21%

9.395 We note that Ofwat's company-led and notional-hybrid approaches suggest figures within the 13% to 21% range generated by the notional approach using the benchmark and actual datasets.

9.396 As with the costs of debt, we do not agree with Yorkshire's view that it is either desirable or practical to set the proportion of embedded and new debt according to individual circumstance.

Proportion of embedded and new debt – provisional determination

9.397 On the basis of the methodologies discussed above, our provisional estimate of the proportion of embedded and new debt:

- (a) Uses a lower bound equal to a 13% proportion of new debt, based on our notional approach calculation using the average maturity in our A/BBB benchmark debt indices.
- (b) Uses an upper bound equal to a 21% proportion of new debt, based on Ofwat's notional approach calculation using the average maturity of debt currently held by companies in the sector (including adjustment for RCV growth).
- (c) We note that as new debt is 'cheaper' than embedded debt at current market levels, a higher proportion of new debt is associated with the low end of our overall cost of debt estimate, whilst a lower proportion of new debt is associated with the high end of our overall cost of debt estimate.

Table 9-20: Provisional Determination of Proportion of New Debt

	<i>Low Estimate</i>	<i>High Estimate</i>	<i>Ofwat PR19 final determination</i>
Proportion of New Debt	13%	21%	20%

¹⁵⁴⁸ CMA analysis using iBoxx data

Issuance and liquidity costs

Background

9.398 Companies incur costs in order to issue debt in addition to interest costs. Debt issuance fees to financial intermediaries (for example, banks syndicating a debt issue) represent one significant source of such costs. In addition, the terms of some loans may also oblige firms to maintain liquidity, which can be achieved through holding cash or maintaining short-term lending facilities, which is a cost to companies.

Ofwat PR19 Decision:¹⁵⁴⁹

9.399 Ofwat allowed 10bps for issuance and liquidity costs in its PR19 final determination, in line with its draft determination.

Issuance and liquidity costs – parties’ views

9.400 In its draft determinations, Ofwat retained its ‘early view’ point estimate of 10bps for issuance and liquidity costs. This was based on EE analysis that:

- (a) issuance fees, based on 72 issuances over the period 1993-2017, had an assessed range of 3-6bps; and
- (b) liquidity facilities, based on a cost of 35-45bps fee and assumed to be required for 10% of total outstanding debt, suggested liquidity fees of 3.5-4.5bps.

9.401 EE concluded that a total of around 10bps was sufficient to cover issuance and liquidity fees. Ofwat noted that this figure matched the CMA’s estimate in our Bristol PR14 Determination.

9.402 Yorkshire¹⁵⁵⁰ stated that, whilst Ofwat’s proposed allowance of 10bps for issuance and liquidity costs was consistent with its prior determinations, a closer examination of regulatory precedent indicated that, typically, this was insufficient to recover the combined (efficient) costs of issuance and liquidity. Yorkshire referenced an Economic Insight paper,¹⁵⁵¹ which was

¹⁵⁴⁹ Ofwat (2019), [Allowed return on capital technical appendix](#), section 6.4.3

¹⁵⁵⁰ Yorkshire SoC, paragraph 241

¹⁵⁵¹ Economic Insight (2019), [Assurance review and assessment of the evidence on the WACC at RP3, a report for NATS](#), pp116–119.

prepared for NATS as part of the RP3 process, as support for their argument.

Issuance and liquidity costs - summary of assessment

9.403 To summarise our assessment:

- (a) We acknowledge that Yorkshire has questioned Ofwat's 10bps allowance as being insufficient but note that it has not explicitly suggested an alternative estimate.
- (b) We note that no other Disputing Company raised this as an issue.
- (c) We note that Ofwat's estimate of 10bps is supported by analysis by EE and is in line with our approach to issuance costs in our Bristol PR14 Determination.

As a result, we agree that Ofwat's overall approach to estimating the cost of issuance and liquidity costs is appropriate.

Issuance and liquidity costs – provisional determination

9.404 Based on the methodologies discussed above, our provisional estimate uses 10bps as an estimate for the allowed issuance and liquidity costs.

Table 9-21: Provisional determination of allowance for issuance and liquidity costs

	<i>Low Estimate</i>	<i>High Estimate</i>	<i>Ofwat PR19 final determination</i>
Issuance and Liquidity Costs	0.1%	0.1%	0.1%

Source: Ofwat PR19 final determination data, based on analysis by EE

Cost of debt – summary and CMA provisional determinations

9.405 Our estimate of the cost of embedded debt uses a lower bound equal to the 20-year trailing average yield of the iBoxx A-rated 10+ index equating to 4.1%, and an upper bound equal to the 20-year trailing average of the iBoxx BBB-rated 10+ index equating to 5.23%.

9.406 We deflate these figures by our 2.00% CPIH estimate, to give a range of 2.76% to 3.16%, compared to Ofwat's PR19 figure of 2.42%.

9.407 Our estimate of the cost of new debt uses a lower bound equal to the July 2020 yield on the iBoxx A-rated 10+ index, equating to 1.86%, and an upper bound equal to the July 2020 yield on the iBoxx BBB-rated 10+ index, equating to 2.12%.

9.408 We deflate these figures by our 2.00% CPIH estimate, to give a range of 0.21% to 0.52%, compared to Ofwat's PR19 figure of 0.53%.

9.409 Our estimate of the proportion of new debt to total debt uses a lower bound equal to 13% new debt and an upper bound equal to 21% new debt, compared to Ofwat's PR19 figure of 20%.

9.410 Our estimate of issuance and liquidity costs is 10bps, in line with Ofwat's PR19 estimate.

9.411 As a result of the above estimates, we estimate the total CPIH-real cost of debt range to be between 2.32% and 2.92%.

Table 9-22: Components of Total Cost of Debt Estimate

<i>CPIH Real</i>	<i>Low Estimate</i>	<i>High Estimate</i>	<i>Ofwat PR19 final determination</i>
Cost of embedded debt	2.76%	3.16%	2.42%
Cost of new debt	0.21%	0.52%	0.53%
Proportion of new debt	21%	13%	20%
Issuance and liquidity costs	0.1%	0.1%	0.1%
Total Cost of Debt	2.32%	2.92%	2.14%

Source: CMA Analysis and Ofwat PR19 final determination

Note: As new debt is cheaper than embedded debt, a higher proportion of new debt is associated with our low estimate of the overall cost of debt while a lower proportion of new debt is associated with our high estimate of the overall cost of debt.

Bristol's Request for a Company Specific Adjustment to their Cost of Capital Allowance

Background

9.412 A Company Specific Adjustment (CSA) is an adjustment to one or more metrics within a water-only company's cost of capital to reflect structurally higher costs faced by smaller companies within the industry.

9.413 Bristol's claim for a CSA uplift to their cost of debt was rejected by Ofwat in the PR19 final determination.

9.414 Bristol is claiming a CSA as part of the CMA's redetermination of the price control. In its SoC, Bristol requested that the CMA apply a CSA in the form of a 37.35bps uplift to the cost of debt allowance and a 13% uplift to the asset beta used in Bristol's cost of equity allowance.¹⁵⁵²

¹⁵⁵² [Bristol SoC](#), paragraph 207 & 255

9.415 Ofwat used a three-stage approach to assessing requests for a company-specific adjustment to the cost of capital, asking:

- (a) levels assessment: Is there compelling evidence that the level of the requested adjustment is appropriate;
- (b) benefits assessment: Is there compelling evidence that there are benefits that adequately compensate customers for the increased cost; and
- (c) customer support assessment: Is there compelling evidence of customer support for the proposed adjustment?

9.416 Three companies (Bristol, Portsmouth, and SES) originally applied for a company-specific adjustment to their cost of capital in their initial business plans. In January 2019, Ofwat decided that Portsmouth Water had passed all three assessments, with sufficient evidence in support of its proposed uplift to its allowed cost of capital. Ofwat decided that Bristol and SES had not passed all three assessments, there being insufficient evidence supporting their application.

9.417 In July 2019, as part of draft determinations, Ofwat considered new evidence provided by Bristol and SES in support of their applications. It again decided that these companies did not pass all three assessments.

9.418 In their responses to Ofwat's draft determinations, both Bristol and SES notified Ofwat that they wished it to reconsider their case for a company-specific adjustment at final determinations. They were joined by South Staffs, which indicated in its representation that it was now seeking a company-specific adjustment.

9.419 In the final determination process, Portsmouth and South Staffs passed all three assessments that are required to be allowed a CSA. Bristol failed the customer benefits test and so was not allowed a CSA. SES failed the customer benefits and customer support tests and so was not allowed a CSA.

9.420 Ofwat's analysis of small company borrowing costs indicated that the appropriate uplift for a notional small company relative to their industry-level allowance was 35 basis points on embedded debt and 25 basis points on new debt, or 33 basis points on the overall cost of debt, at its notional

¹⁵⁵³ Ofwat (2019), [Allowed return on capital technical appendix](#), annex 1.1

20% share of new debt. This CSA was applied to Portsmouth and South Staffs.

Key arguments

9.421 In considering Bristol's application for a CSA as part of our redetermination we consider arguments presented by the Parties in the following areas:

- (a) Whether it is appropriate to apply a customer benefit test to an application for a CSA.
- (b) Whether, and to what extent, a CSA uplift is warranted to Bristol's cost of embedded debt (including the appropriate proportion of new debt).
- (c) Whether, and to what extent, a CSA uplift is warranted to Bristol's cost of equity.

9.422 In the following paragraphs we consider Bristol's request for a CSA, assessing whether it is appropriate for the CMA to apply a customer benefit test to its decision, the appropriate size of any cost of debt uplift (including the proportion of new debt) and the appropriate size of any cost of equity uplift. We will conclude on each of these issues in the relevant section before briefly summarising our provisional decision.

Whether it is appropriate to apply a customer benefit test to an application for a CSA – Parties' Views

Ofwat

9.423 Ofwat stated that customers are not able to choose their service provider, but investors are able to seek financing efficiencies, including as a result of mergers, and by pooling financing arrangements. As customers cannot choose their supplier (nor the corporate or ownership structure of the company that supplies them), it applied a high bar to accepting CSAs to the allowed return on capital. Ofwat argued that where it accepted an adjustment, it must be satisfied that the allowances made were reasonable and served the interests of customers.¹⁵⁵⁴

9.424 A significant feature of Ofwat's 3-part test for awarding a CSA was the customer benefits test. Ofwat used the customer benefits test to consider whether there was compelling evidence of benefits that would adequately

¹⁵⁵⁴ Ofwat (2019), [Allowed return on capital technical appendix](#), annex 1.1

compensate customers for the increased cost of the CSA. In doing this, Ofwat assessed benefits in three areas:¹⁵⁵⁵

- (a) Assessment of beneficial impact on Ofwat's cost benchmarks – where Ofwat calculated the upper-quartile challenge in the absence of the small company concerned and compared the new Totex allowance with the baseline allowance.
- (b) Assessment of beneficial impact on Ofwat's service benchmarks – where Ofwat re-calculated the upper quartile/median challenge without the small company concerned and compared 'stretch' in resulting service levels with the baseline.
- (c) Assessment of benefits in other areas – where Ofwat reviewed company submissions on benefits.

9.425 Ofwat stated that its customer benefits test indicated negative net benefits in the case of Bristol.¹⁵⁵⁶ Ofwat stated that it placed most weight on a forward-looking approach, as it considered that any decisions on CSAs would only have causal effect on their benchmarks in future price controls and to reflect that the benchmarking benefit of a company may change over time. On this basis, Bristol was the only company applying for a CSA that was estimated to have a negative forward-looking benefit of providing an uplift.¹⁵⁵⁷

9.426 Ofwat also included sensitivity analysis on its results which assessed the impact of varying the forecast horizon used in its estimations. It provided an estimate of Net Present Values (NPV) including all benchmarking benefits as the number of price controls included increased. Again, Bristol was the only company where results suggested a negative NPV over a horizon of five price controls.¹⁵⁵⁸

9.427 Ofwat noted Bristol's objections to its approach and the claim that Ofwat's analysis had failed to capture harder to quantify benefits provided by Bristol such as: loss of precision in Totex modelling; water refill stations; customer stated preference of remaining independent; and dissemination of best practice. However, Ofwat stated that, assessed in the round, it did not consider that the collective value to customers of these benefits could be

¹⁵⁵⁵ Ofwat (2019), [Allowed return on capital technical appendix](#), annex 1.3

¹⁵⁵⁶ Ofwat (2019), [Allowed return on capital technical appendix](#), annex 1.3 including Table A1.6 Of the other companies applying for a CSA, the test for Portsmouth Water and South Staffs suggested strongly positive net benchmarking impacts, while SES's test suggested negative benefits.

¹⁵⁵⁷ Ofwat (2019), [Allowed return on capital technical appendix](#), annex 1.3 including Table A1.7

¹⁵⁵⁸ Ofwat (2019), [Allowed return on capital technical appendix](#), annex 1.3 including Figure A1.1

expected (with a high degree of confidence) to exceed the negative £14 million of NPV that their benefit assessment analysis had suggested.¹⁵⁵⁹

9.428 Ofwat decided that, of the companies who applied for a CSA, Portsmouth and South Staffs had demonstrated large and positive net benchmarking benefits which were likely to exceed the cost of providing Ofwat's proposed 33bps CSA uplift, and both companies passed this assessment. Ofwat considered it unlikely that Bristol or SES would provide net benefits that were positive, and so neither company passed this element of the assessment.¹⁵⁶⁰ In failing one of the three tests, Bristol was denied any CSA within the PR19 price control.

9.429 Ofwat submitted that on three separate occasions during the PR19 process it had reviewed evidence provided by Bristol to assess whether the company provides benefits which adequately compensate for the additional cost of providing its requested uplift, and that in all three instances it did not find evidence of sufficient benefits. Ofwat claimed that in reviewing the company's SoC and the significantly increased costs of its requested uplift, its confidence in its final determination conclusion was strengthened.¹⁵⁶¹

9.430 Ofwat noted that Bristol had claimed various alleged errors and omissions in Ofwat's approach to modelling the benefits that would be provided if the company received a 33bps uplift to the allowed cost of debt. Ofwat submitted that any revised benefits assessment would have to feature the cost impact of its updated small company premiums on the cost of debt and equity, which would jointly add 73bps to the sector return on capital rather than the 20bps assumed by Ofwat or the 22bps proposed by Bristol (at the WACC level) during the PR19 process. As Ofwat calculated a negative NPV of benefits based on a 20bps additional costs, it was 'especially doubtful' that a near quadrupling of the uplift would result in a different outcome.¹⁵⁶²

9.431 In its response to Bristol's SoC, Ofwat acknowledged that the CMA did not apply a benefits test in the CMA's Bristol PR14 Determination. However, Ofwat stated it had responded to the issues raised by the CMA in this previous determination within its initial assessment of CSA requests during the PR19 process. Ofwat stated that it had set out its rationale explaining the link between awarding the cost of debt uplift to decreasing merger probability. Ofwat stated that mergers would tend to affect future customer

¹⁵⁵⁹ Ofwat (2019), [Allowed return on capital technical appendix](#), annex 1.3

¹⁵⁶⁰ Ofwat (2019), [Allowed return on capital technical appendix](#), annex 1.3

¹⁵⁶¹ [Ofwat's Response to Bristol's SoC](#), paragraph 1.24

¹⁵⁶² [Ofwat's Response to Bristol's SoC](#), paragraphs 6.45–6.46

benefits through their impact on the strength of its benchmarks used to challenge the sector to improve efficiency and service levels.¹⁵⁶³

Bristol

9.432 Bristol noted that Ofwat recognised that Bristol had provided compelling evidence supporting its request for a CSA by way of an adjustment to the cost of debt, but that Ofwat had declined to apply the CSA on the basis that Bristol did not meet its ‘customer benefits’ assessment. Bristol believed that in taking this approach, Ofwat has acted contrary to its Financ Duty, in particular its duty to ensure that water companies are able to secure reasonable returns on their capital to finance the carrying out of their functions. Bristol stated that Ofwat’s decision was also contrary to clear CMA precedent concerning Bristol.¹⁵⁶⁴

9.433 Bristol noted that it had received an uplift on the industry-allowed cost of capital since 1995, reflecting its higher cost of raising capital as a result of company-specific circumstances which have applied historically and continue to apply. Bristol suggested that Ofwat and the CMA have previously recognised that these higher costs resulted from Bristol’s scale and have nonetheless been efficiently incurred, and that this was the case at PR94, PR99, PR04, PR09 and PR14 (following our Bristol PR14 Determination).¹⁵⁶⁵

9.434 Bristol also said that the relevance of a benefits assessment has already been rejected by the CMA in our Bristol PR14 Determination, where we argued that:

- (a) There was no causal link between the cost of debt required by small WOCs and the customer benefits assessed by Ofwat.
- (b) Ofwat’s benefits assessment was not necessary to meeting the CMA’s duty to protect the interest of customers, and that there are many reasons why customers of small companies may have different bills.
- (c) Given the long-term nature of financing, departing from regulatory precedent without evidence of changing market conditions raised the risk of stranded costs.

¹⁵⁶³ [Ofwat’s Response to Bristol’s SoC](#), paragraph 6.44 including Table 6.2.

¹⁵⁶⁴ [Bristol SoC](#), paragraphs 158–159

¹⁵⁶⁵ [Bristol SoC](#), paragraph 154

- 9.435 Bristol pointed out that Ofwat acknowledged these concerns in its PR19 Final Methodology, but that it did not agree with the CMA's Bristol PR14 Determination conclusions.¹⁵⁶⁶
- 9.436 Bristol claimed that in PR19 Ofwat has departed from the CMA's precedent despite being subject to unchanged statutory duties and having accepted that Bristol has a higher cost of capital than larger companies.¹⁵⁶⁷
- 9.437 Bristol noted that it had passed Ofwat's Levels and Customer Support assessments but did not pass the benefits assessment. Bristol characterised this as having provided compelling evidence that the level of CSA sought was appropriate and that customers were content to 'unconditionally' fund the cost of the CSA, but that Ofwat had decided not to provide a CSA on the basis of its view that the benefits of providing a CSA did not adequately compensate customers for the increased costs (despite their willingness to fund it).¹⁵⁶⁸
- 9.438 Bristol said that the application of the CSA test is flawed for at least two reasons. First, that the assessment test is irrelevant to determining whether a CSA should be applied, that it is inconsistent with Ofwat's statutory duties and that it departs from CMA precedent without justification. Second, that even if the CMA were to decide that Ofwat's benefits test is appropriate, Bristol would have passed the assessment if it were correctly applied.¹⁵⁶⁹
- 9.439 Bristol suggested that Ofwat's view is that if an efficient small WOC cannot finance its functions as a result of not being provided with a CSA, it can reduce its cost of capital by pooling financing arrangements (similar to the Artesian¹⁵⁷⁰ arrangements which led to the higher cost of embedded debt) or by merging. Bristol pointed out that whilst merging is an option for smaller companies, they are not required to do this.
- 9.440 Bristol also submitted that the PR19 Final Methodology states that 'failure to meet our test does not imply mergers must happen, but that the return investors receive should be commensurate with the efficient cost and quality of service customer receive'. Bristol submitted that in this statement, Ofwat clearly acknowledged that it was not setting the cost of capital based on the level of a notional company comparable to Bristol, rather it is setting the industry cost of capital at a level that is below that of a notional

¹⁵⁶⁶ Bristol SoC, paragraph 166, referencing [Bristol PR14 Determination](#), paragraph 10.72

¹⁵⁶⁷ Bristol SoC, paragraph 157

¹⁵⁶⁸ Bristol SoC, paragraph 158

¹⁵⁶⁹ Bristol SoC, paragraph 159

¹⁵⁷⁰ See paragraph 9.451 and associated footnote for more detail on the Artesian debt programme

company relevant to Bristol's circumstances. As a result, Ofwat had recognised that Bristol would not be able to raise capital at the level set by Ofwat.¹⁵⁷¹

9.441 Bristol stated that Ofwat's approach had left it with a stark choice – either seek to reduce its cost of capital through a merger or find other means to finance its functions notwithstanding a cost of capital allowance that does not reflect – and is acknowledged to be below – Bristol's actual, efficiently-incurred costs. Bristol stated that this is a clear breach of Ofwat's Financing Duty.¹⁵⁷²

9.442 Bristol stated that Ofwat's benefit test result showing a negative NPV of £14 million was erroneous due to six material errors:¹⁵⁷³

- (a) Ofwat omitted relevant customer benefits from its benefit assessment;
- (b) Ofwat did not consider the effect a merger would have on model precision;
- (c) Ofwat's approach did not align with its final determination benchmarking methodology;
- (d) Ofwat understated the benefits of service comparisons due to an unbalanced use of incentive rates;
- (e) Ofwat's estimates of future comparative non-Totex benefits were arbitrary and understated the benefit; and
- (f) Ofwat had wrongly assessed Bristol's efficiency.

9.443 Bristol stated that if these errors had been corrected, Bristol would have satisfied Ofwat's assessment – showing that Ofwat did not have a cogent reason for deciding not to provide a CSA, even on its own (inappropriate) test.¹⁵⁷⁴

9.444 Bristol stated that Ofwat was wrong to apply a benefit assessment and wrongly assessed that Bristol had not passed such an assessment. Bristol requested that the CMA should either not apply the customer benefit test, or alternatively should correct the errors in Ofwat's approach. It was

¹⁵⁷¹ Bristol SoC, paragraphs 163–164

¹⁵⁷² Bristol SoC, paragraph 165

¹⁵⁷³ Bristol SoC, paragraph 173

¹⁵⁷⁴ Bristol SoC, paragraph 174

Bristol's view that the CMA was not required to consider the evidence on the test itself as previous precedent on this still applied.¹⁵⁷⁵

Whether it is appropriate to apply a customer benefit test to an application for a CSA – CMA assessment

- 9.445 As a starting point, the discussion around the need for a CSA and the relevance of a customer benefits test appears to be similar to that in previous determinations. As with other aspects of the determination, there is a benefit from regulatory consistency, and investors in smaller companies would expect that Ofwat would consider applying a CSA for as long as there is a higher cost of financing those companies.
- 9.446 Ofwat has assessed that the smaller companies, including Bristol, will continue to have higher financing costs during AMP7. As discussed below, we have provisionally found that the size of the cost differential is not as large as calculated by Ofwat. Nevertheless, for the purpose of the assessment of whether a CSA is appropriate, both our review and Ofwat's review of the level of the CSA include an assumption that there is a higher cost of financing smaller water-only companies.
- 9.447 We note that Ofwat's rationale for the customer benefits test is consistent with the general competitive market benchmark approach applied at times in other areas of economic regulation. However, Ofwat's approach appears to be inconsistent with that applied elsewhere in the price control. There are many areas of operational expenditure where the efficiently incurred costs for one group of customers are higher than industry average due to a company's specific circumstances. These are typically recovered without the need for a customer benefits test.
- 9.448 In addition, the CMA clearly addressed the appropriateness of a customer benefits test in our Bristol PR14 Determination, where we chose not to apply such a test. In that determination the CMA stated that we did not consider that there was a clear link between the relative position of small companies within benchmarking and the efficient level of the cost of capital.¹⁵⁷⁶ The level of the cost of capital should be set at a level which allows a notional company to finance its activities. Having identified that the notional small water company will incur higher costs to finance its activities, we continue to expect that this should be reflected in the notional cost of capital for such a small company.

¹⁵⁷⁵ Bristol SoC, paragraph 205

¹⁵⁷⁶ Bristol PR14 Determination, paragraph 10.72

9.449 As a result, we do not apply a customer benefits test within our assessment of Bristol's request for a CSA.

Whether, and to what extent, Bristol requires a CSA uplift to their cost of debt – Parties' views

Ofwat

- *Background to final determination decision*

9.450 Ofwat's final determination noted that of the four companies¹⁵⁷⁷ seeking an uplift to their cost of capital, only Bristol provided detailed analysis in support of their requested figure. Bristol based its submission on estimates by KPMG of the spread-to-iBoxx for bonds with comparable credit rating, from which Bristol identified the following plausible ranges for the small company premium:

(a) Embedded debt: 41-45bps

(b) New debt: 33-34bps

9.451 Ofwat noted that it had raised concerns about KPMG's analysis in its draft determination and restated these concerns in its final determination. Specifically:

(a) KPMG used a number of bonds that was too few to support confidence in the information provided.

(b) KPMG cited analysis suggesting Bristol's 'Artesian'¹⁵⁷⁸ borrowing as exhibiting spreads to gilts in the range of 156-206bps, while the same analysis in 2015 suggested spreads of only 52-85bps (with KPMG explaining that the 2015 work quoted direct estimates of the spread at issuance while the recent analysis built on effective real interest rate work

¹⁵⁷⁷ Bristol, Portsmouth, SES and South Staffs

¹⁵⁷⁸ As described in [Bristol's Reply to Ofwat's Response](#), annex 5, Bristol gave the following description of their Artesian financing: Artesian Finance plc was conceived by Royal Bank of Scotland (RBS) in November 2001, ostensibly in anticipation of demand for more flexible and index-linked funding from water companies, and in particular from smaller water companies that might otherwise find it more difficult to access debt capital markets on favourable terms. Artesian Finance II plc was subsequently established in May 2003, followed by Artesian Finance III plc in 2005. The latter is not relevant to Bristol. RBS created these special purpose vehicles (SPVs) to issue bonds or notes, guaranteed by monoline insurers, on behalf of WOCs and/or WASCs that wished to access the capital markets at a more competitive and efficient cost than they could have accessed if they were to issue directly. The monies raised were then issued to WOCs and/or WASCs via RBS through fixed rate or index-linked loans. Bristol issued five tranches of Artesian debt between 2003 and 2005, with the tenors ranging from 27.4 years to 30.4 years. The 2003 issuances extend to 2032, and the 2004 and 2005 issuances extend to 2033

by PwC). Ofwat believe that basing analysis on PwC's work should have suggested lower not higher spreads.

- (c) KPMG did not accurately reflect the drawdown times of different tranches of Artesian debt. KPMG revised its analysis, which Ofwat considered an improvement. However, Ofwat identified a further material error in KPMG's measurement of WOC spreads to the iBoxx, with KPMG basing its analysis on PwC's work on spread to the iBoxx minus 15bps, but interpreting it as spreads to the unadjusted iBoxx A/BBB. This error had the effect of overstating the spread to iBoxx for Artesian debt by 15bps.

As a result, Ofwat chose to place no weight on KPMG's analysis in deriving its final decision on the level of uplift.

- 9.452 Ofwat also noted Bristol and its consultants, Economic Insight's, argument that Ofwat's decision to increase the 'outperformance wedge' from 15bps to 25bps should be reflected in their plausible range for the appropriate level of uplift. Here Ofwat agreed that the approach to the outperformance wedge and the CSA should be aligned, and that this implied setting an allowance based on the difference between this sector benchmark spread to the iBoxx A/BBB and the average yield-at-issuance for small WOC bonds.
- 9.453 Ofwat found a historical yield-at-issuance spread to the iBoxx A/BBB of 10bps on average for small WOCs, which was very close to the premium of 11bps identified by the CMA's Bristol PR14 Determination. As Ofwat's cost of embedded debt allowance was set as the iBoxx A/BBB minus 25bps for embedded debt and 15bps for new debt, this analysis would imply a small company cost of debt premium of 35bps and 25bps on embedded and new debt respectively. At Ofwat's notional share of 20% new debt, this would imply an uplift of 33bps to the overall cost of debt.
- 9.454 Ofwat flagged that this 33bps figure was consistent with analysis by PwC in 2014 and the CMA in 2015, which had informed the 25-40bps range used in previous iterations of Ofwat's 'levels' assessment. Ofwat suggest that the fact that these exercises estimated a different small company cost of debt premium to their 33bps did not undermine its approach, but was rather a function of PwC and the CMA picking a different 'outperformance wedge' assumption.
- 9.455 Ofwat noted that its notional uplift of 33bps was close to the 38bps uplift proposed by Bristol so decided that Bristol's request was appropriate. Ofwat stated that the companies would not have been able to anticipate Ofwat's decision to reduce the outperformance wedge on new debt to

0.15% in its final determination. Consequently, Bristol passed Ofwat's Levels Adjustment test, but would receive Ofwat's 33bps uplift (rather than their own estimate) if it passed the remaining tests.¹⁵⁷⁹

- *Updated assessment of Bristol and the required CSA*

9.456 In its response to Bristol's SoC, Ofwat changed its assessment and questioned Bristol's requirement for a cost of debt adjustment. Ofwat stated that Bristol's higher cost of debt was a function of its financing choices, not its size. Ofwat noted that as a water only company, Bristol is smaller than the other Disputing Companies, but that with an RCV of £530 million it is not a small company in absolute terms, that it was the largest of the companies requesting a CSA in PR19 and that, unlike some other small companies, Bristol had been able independently to access finance from listed bond markets – most recently in 2011. Ofwat noted that Bristol's cost of embedded debt is lower than three (larger) WASCs (Southern, Dŵr Cymru and Yorkshire). Ofwat noted that in its Bristol PR14 Determination the CMA recognised that improved access to financing over time could imply that any change in the company specific adjustment would likely be downwards rather than upwards.¹⁵⁸⁰

9.457 Ofwat also suggested that Bristol's issue related to its decision to issue significant quantities of long-dated debt in the early 2000s (through the Artesian programme), that for several years the cost of this debt was 'significantly below' the regulatory allowance and that it was only subsequent falls in market interest rates that mean that this was no longer the case. Ofwat submitted that, given that the cost of the Artesian debt was previously lower than the price control allowance, it was not clear that the company was set to under-recover debt interest costs on average over the debt's 30-year term.¹⁵⁸¹

9.458 Ofwat noted that Bristol claims that its actual cost of debt was 4.94% in nominal terms but argued that this higher cost of debt is a function of the tenor of its Artesian debt rather than size. Ofwat suggested that if the term on Bristol's Artesian bonds had been around 15 years instead of 30, and the borrowing had been refinanced at the average iBoxx rate of 3.05% over 2017–2019 (plus a 10bps small company premium), the company's resultant nominal cost of embedded debt would have been 3.16% versus the PR19 final determination of 4.47%. Ofwat further submitted that this

¹⁵⁷⁹ Ofwat (2019) [Allowed return on capital technical appendix](#), Annex 1.2, including Tables A1.2, A1.3 and A1.4

¹⁵⁸⁰ [Ofwat's Response to Bristol's SoC](#), paragraphs 1.29, 6.35-6.36

¹⁵⁸¹ [Ofwat's Response to Bristol's SoC](#), paragraphs 6.37-6.40

example illustrated that its embedded cost allowance is achievable in principle for a small company and that choices over tenor of issuance rather than size disadvantages are the relevant issue.¹⁵⁸²

9.459 Ofwat submitted that, regardless of the arguments above, Bristol's proposed 38bps uplift was overstated, unconvincing and poorly evidenced.¹⁵⁸³ Ofwat also believed that its own 33bps uplift to the cost of debt may be an overestimate. Ofwat submitted that any uplift should be based on the additional costs incurred due to the company's small size, and that tenor of issue is not a function of company size. As a result, the uplift should control for the impact of tenor on yield. Evidence from subsequent work by EE suggest that once this is factored in, the small size premium on the cost of debt could be as low as 5bps.¹⁵⁸⁴

- *View on proportion of new debt*

9.460 Ofwat dismissed Bristol's claim for only 5% of new debt, suggesting that it recognised that lumpy investment/debt issuance may cause a company's share of new debt to deviate from the sector-wide assumption and that this may lead to under or outperformance in any period. However, Ofwat expected that these deviations would balance out, with underperforming positions becoming outperforming positions and vice versa. Ofwat submitted that a redetermination based on actual company circumstances would distort incentives as financing decisions would have a material impact on the allowed return. It would also encourage companies to refer their determinations to the CMA only when their actual ratio disadvantages them relative to the notional, which would clearly not benefit customers in the long-term.¹⁵⁸⁵

- *View on Bristol's current position in debt markets*

9.461 Ofwat noted that if the CMA does choose to base its cost of debt allowance on Bristol's actual debt costs, it should note that Bristol's £40 million listed bond that is due in 2041 has yielded 25bps lower than the average value of the iBoxx A/BBB over the last year. The yield of 2.37% was below the Ofwat final determination allowance for new debt, suggesting it would be possible for the company to issue new debt with a coupon that implies outperformance against Ofwat's sector wide allowance. Ofwat stated that

¹⁵⁸² Ofwat's Response to Bristol's SoC, paragraphs 6.41-6.42

¹⁵⁸³ Ofwat's Response to Bristol's SoC, paragraph 1.31

¹⁵⁸⁴ Ofwat's Response to Bristol's SoC, paragraph 6.50

¹⁵⁸⁵ Ofwat's Response to Bristol's SoC, paragraph 6.51

Bristol claims that it cannot outperform the iBoxx A/BBB due to being unable to issue debt with short-duration tenor, which Ofwat claimed was 'puzzling' given that Bristol took out a 10-year term loan in May 2018 and that its listed bonds have traded at yields below the iBoxx despite similar average years to maturity.¹⁵⁸⁶

Bristol

- *Basis of request for a CSA on cost of debt*

9.462 Bristol stated that Ofwat has erred in its final determination by setting the notional level of the CSA uplift too low. Bristol noted that in our Bristol PR14 Determination, the CMA applied a 40bps CSA to the cost of debt for Bristol. This was in line with the cost of debt CSA applied by Ofwat in PR09. However, in the PR19 final determination Ofwat concluded that if a CSA were applied, the relevant company's cost of debt should be increased by only 33bps. Bristol used KPMG analysis which suggested that the cost of debt CSA should be 37.35bps, based on:¹⁵⁸⁷

(a) a cost of embedded debt uplift of 38bps;

(b) a cost of new debt uplift of 25bps;

(c) a ratio of new to embedded debt of 5:95.

9.463 In response to Ofwat's dismissal of Bristol's supporting analysis provided by KPMG, Bristol noted that KPMG had updated its analysis and concluded that the evidence continued to support a CSA on embedded debt in the range of 30-47bps. Bristol suggested that KPMG preferred estimation methodology supported a CSA on embedded debt of 38bps.¹⁵⁸⁸

9.464 Bristol noted that the CMA had in the past considered that when setting the appropriate allowance for the cost of debt via a benchmark methodology, this estimate should be cross-checked against a company's actual cost of debt, and that this was the approach taken by the CMA in its Bristol PR14 Determination.¹⁵⁸⁹

9.465 Bristol suggest that its weighted average cost of embedded debt across fixed, floating and index-linked debt in nominal terms is 5.09%, and that this is significantly higher than the allowed cost of debt in the final determination

¹⁵⁸⁶ Ofwat, [Response to Bristol's SoC](#), paragraph 6.52

¹⁵⁸⁷ [Bristol SoC](#), paragraph 207 including Table B2

¹⁵⁸⁸ [Bristol SoC](#), paragraphs 210–213

¹⁵⁸⁹ [Bristol SoC](#), paragraph 217

of 4.47%. Bristol also noted that in the final determination, Ofwat quoted Bristol's cost of debt in 2018/19 as 4.73%. Bristol suggested that whilst this was the case in 2018/19, it did not take into account that the average RPI inflation indexation on Bristol's index linked debt was 2.4%. Bristol claimed that it is an error for Ofwat not to adjust the long-term inflation rate in line with the final determination, which used a long-run RPI rate of 3%. Correcting for this increased Bristol's nominal interest costs from 4.73% to 5.09%.¹⁵⁹⁰

9.466 Bristol submitted that there were 'good grounds' to apply for a CSA for debt of 62bps based on a nominal cost of debt of 5.09%. However, it had taken a 'conservative approach' of applying the lower CSA of 37bps on the basis that a nominal cost of debt of 4.85% for a relevant notional company like Bristol is supported by the evidence.¹⁵⁹¹

9.467 Bristol had two concerns with Ofwat's industry level of 20% new debt. First, this level was itself higher than the 17% shown by industry-wide data. Second, it did not take account of smaller companies requiring far lower proportions of new debt. Bristol's anticipated percentage of new debt during AMP7 was 5%. In setting a cost of capital that fails to reflect the financing structure of a relevant notional company, Ofwat has set a cost of capital which is not achievable by an efficiently run small WOC.

9.468 In arguing against Ofwat's view that over and underperformance on the basis of mix of new debt will equalise over time, Bristol stated that this does not hold true for smaller WOCs. Bristol suggested that, due to their size, small WOCs' debt issuance will always be more concentrated and will result in a significantly higher proportion of embedded or new debt relative to the average WASC. Bristol noted that in our Bristol PR14 Determination we applied Ofwat's notional new debt ratio in its calculation but argued that its circumstances had significantly changed since then, and that the lower returns afforded under PR19 and bigger differences between embedded and new debt allowances undermined Bristol's ability to finance its operations.¹⁵⁹²

9.469 Bristol stated that Ofwat and the CMA have previously applied a cost of debt CSA of 40bps, and that given that Bristol has a significant portion of efficiently incurred embedded debt, there is no reasonable ground to depart from the approach taken in our Bristol PR14 Determination.¹⁵⁹³

¹⁵⁹⁰ Bristol SoC, paragraph 221

¹⁵⁹¹ Bristol SoC, paragraph 227

¹⁵⁹² Bristol SoC, paragraphs 228-236

¹⁵⁹³ Bristol SoC, paragraphs 237-238

- *Response to Ofwat's updated view that Bristol's uplift request is unreasonable*

9.470 Bristol stated that the updated arguments suggested in Ofwat's response to its SoC were inconsistent with Ofwat's historic approach of accepting the presence of higher debt costs for smaller companies (acknowledged in price controls from PR04 to PR14).¹⁵⁹⁴ Bristol stated that Ofwat excluded both Bristol's Artesian debt and their publicly listed debt (from the CSA calculation) 'precisely for the reason that small companies face higher financing costs', while all of Ofwat's consultants calculate the applicable CSA by including Bristol's Artesian debt in the 'small WoC samples'.¹⁵⁹⁵

9.471 Bristol submitted that Ofwat's change in view on Bristol's required uplift was particularly surprising given that its portfolio of debt was largely unchanged since the last price review, and specifically that the higher cost Artesian debt had been in place since the early 2000s. In addition, Ofwat's updated view contrasted with the views expressed by the CC and CMA in Bristol's last two redeterminations that provided a 40bps small company premium (equivalent to a CSA) having considered the additional costs of debt financing, including the Artesian debt.¹⁵⁹⁶

9.472 Bristol submitted that Ofwat's response suggested that the tenor and timing of issuance are management choices and that as a result companies should bear the risk of these choices. Bristol submitted that water companies regularly issue long-term debt to part finance their assets, which have very long economic lives (and longer than most of the corporate sector). Water companies have some choices in issuing debt (typically the tenor and the balance of fixed vs floating), but unlike other sectors have limited choice as to when to issue debt and in what quantum. Bristol submitted that as a small company it would be inefficient to tap financial markets on a regular basis as this would incur significant transaction costs which would not be economically efficient. Bristol stated that Artesian issuance was raised at the time to enable Bristol to finance substantial forward Capex requirements as part of the PR99 review.¹⁵⁹⁷

9.473 Bristol also stated that Ofwat's claim that it may recover (or over-recover) the cost of the Artesian debt over the debt's 30-year term was misleading and based on flawed analysis. Bristol suggested that the evidence presented by Ofwat included additional non-cash indirect costs in the

¹⁵⁹⁴ [Bristol's Reply to Ofwat's Response](#), paragraphs 56–58

¹⁵⁹⁵ [Bristol's Reply to Ofwat's Response](#), paragraph 59

¹⁵⁹⁶ [Bristol's Reply to Ofwat's Response](#), paragraphs 61–65

¹⁵⁹⁷ [Bristol's Reply to Ofwat's Response](#), paragraphs 82–84

allowance but not in the 'effective yield' on Artesian debt. Such all-in costs present in the allowance but not in the Artesian yield included:

- (a) Transactions cost allowance of 10bps.
- (b) Liquidity cost allowances – in the past the CMA has made explicit provisions for covenants that require Bristol to hold minimum cash balances. The CMA has in the past allowed 20bps for such costs (on both existing and new debt).
- (c) Non-cash costs included in the CSA.

9.474 Bristol stated that the cost of financing for small companies was not reflected in full in Ofwat's analysis and that Ofwat presented the overall cost of debt allowance with particular Artesian yields in a way that is not comparable. By comparison, in 2009 the CC stated that Bristol's actual, weighted average real cost of debt was 3.53%, which was higher than the effective yields presented by Ofwat. The CC's best estimate of the all-in cost of debt at that point was 3.9% real.¹⁵⁹⁸

- *More recent debt raising and comparability to larger WASCs*

9.475 Bristol refuted Ofwat's claim that its traded debt issued in 2011 was cheap relative to the iBoxx index, stating that the bond was issued at a significant premium to the iBoxx A/BBB index at the time of issuance. This bond was also known to Ofwat in the final determination and was considered by the CC in 2010 and the CMA in 2015. In these instances, the instrument did not prevent the CC or the CMA from allowing a CSA. Bristol believed that it was incumbent on Ofwat to prove why this approach should now be reversed.¹⁵⁹⁹

9.476 Bristol also rejected the view that its cost of debt is broadly similar to large WASCs, claiming that the 4.73% overall cost of Bristol debt in 2018/19 referenced by Ofwat was significantly affected by low inflation in that year (impacted the index-linked debt portfolio). Bristol continued to believe that 5.09% is a more appropriate measure of its total debt cost but note that Ofwat refused to update its figure in this debate.

9.477 Bristol also rejected Ofwat's view that Bristol was not small in absolute terms, arguing that this is not a relevant issue and cannot be used as a

¹⁵⁹⁸ [Bristol's Reply to Ofwat's Response](#), paragraphs 97–102

¹⁵⁹⁹ [Bristol's Reply to Ofwat's Response](#), paragraphs 116–118

reason not to allow a CSA. In Bristol's view the relevant question was whether it faced a higher cost of debt than the industry allowance as the result of its size.¹⁶⁰⁰

Whether, and to what extent, Bristol requires a CSA uplift to their cost of debt – CMA assessment

- 9.478 At the Final Determination stage of the process, there was broad agreement between Ofwat and the companies requesting a CSA on the cost of debt, as well as regulatory precedent from the CMA, that smaller companies do have higher costs of debt on average and that this should be compensated by a CSA allowance.
- 9.479 Ofwat approved the uplift level requested by Bristol in its 'Levels' test at both the draft and final determination stages of the PR19 process and appears to have begun questioning this only during the redetermination process.
- 9.480 The CMA has previously considered this issue and has allowed a cost of debt uplift greater than Bristol's current request (40bps versus 37bps) but did note that it expected the required uplift would fall over time as access to debt markets improved.¹⁶⁰¹
- 9.481 We note that investors should not expect a cost pass-through approach within the regulatory framework, but we do acknowledge that the consistent application of regulatory approach may encourage continued investment in the sector and therefore is in the public interest. In the case of embedded debt, Bristol's position is essentially unchanged from the situation present when it has previously been awarded a CSA. As a result of our decision to extend the trailing average period for calculating embedded debt within the industry cost of debt allowance, Bristol's higher cost Artesian debt is still in scope of consideration for this price review. This also means that Ofwat's views on tenor as a management choice are not relevant to our decision.
- 9.482 After assessing the evidence presented by the parties, we provisionally consider it appropriate to apply a CSA uplift to Bristol's embedded debt allowance versus the industry's embedded debt allowance. However, we note that as the bulk of the structurally higher-cost Artesian issuance will be outside of our 20-year trailing average window by the time of the next price

¹⁶⁰⁰ [Bristol's Reply to Ofwat's Response](#), paragraphs 119–125

¹⁶⁰¹ [Bristol Water 2014 Determination](#), paragraphs 10.71 - 10.80

control, we anticipate significantly less need for Bristol to request a CSA on embedded debt in future price controls.

9.483 When it comes to Bristol's ability to raise new debt, there does appear to be new evidence that suggests Bristol is able to access debt markets on a suitably flexible and competitive basis. Bristol arranged £25 million and a £50 million 10-year bank facilities in 2018, at rates of 2.61% and 1.58% respectively.¹⁶⁰² The average 10+ A/BBB index value in 2018 was 3.31%.¹⁶⁰³ While Bristol told us that, as part of a larger project of refinancing, it had 'better leverage' to secure attractive financing rates, we do not believe that this detracts from the fact that Bristol is now clearly able to raise small scale (by industry standards) financing at shorter terms and at lower prices than suggested by our proposed cost of new debt benchmark.

9.484 After assessing the evidence presented by the parties and taking into account our provisional decision not to include a performance wedge in our calculation of new debt, we do not consider it appropriate to apply a CSA to Bristol's new debt allowance versus the industry's new debt allowance.

9.485 We acknowledge that it is difficult to set a proportion of new and embedded debt that will satisfy all companies, or even a sub-set of companies (such as WOCs versus WASCs). We note Ofwat's argument that 'winners and losers' versus the notional level should even out over time but consider in our view this is largely dependent on interest rates not rising significantly from their current levels. We also note Bristol's submissions that it had low refinancing needs within this price control. However, Bristol's evidence in its hearing was that it had refinanced 'about a third' of its debt during PR14, well above the notional proportion of new debt used in that price control (25%), suggesting that its new debt requirements are not structurally lower than the wider industry on average and over time.

9.486 In our Bristol PR14 Determination we stated that the amount of new debt taken in any particular period remains a decision for management, and hence not for the regulator to second-guess. Therefore, any risk associated with this decision should also lie with management. This would support using a notional level of new versus embedded debt.¹⁶⁰⁴ In the absence of new evidence that suggests a different approach, we continue to believe that the notional level of new versus embedded debt should apply.

¹⁶⁰² See [Bristol Water 2018/19 Annual Report and Financial Statements](#), notes to the accounts 19. iBoxx data.

¹⁶⁰³ iBoxx data

¹⁶⁰⁴ [Bristol PR14 Determination](#), paragraph 10.132

- 9.487 In deciding the level of CSA to apply to Bristol's cost of embedded debt, we note that Ofwat's calculation of 10bps above the A/BBB benchmark was almost identical to the 11bps identified in the CMA's Bristol PR14 Determination. We note that in Ofwat's final determination this figure was added to the 25bps outperformance wedge that Ofwat used when setting the industry cost of embedded debt allowance. This gave an uplift of 35bps to an industry allowance of 2.42% (CPIH real) to give a CSA-based cost of embedded debt of 2.77% (CPIH-real).
- 9.488 We also note Bristol's preferred estimate of the required uplift to the cost of embedded debt was 38bps, when added to Ofwat's 2.42% (CPIH-real) industry cost of embedded debt allowance would have suggested a CSA-based cost of embedded debt of 2.80% (CPIH-real).
- 9.489 We do not apply a performance wedge to our industry cost of debt calculation and believe that Ofwat's 10bps increased allowance (excluding the performance wedge) was in line with the CMA's 2015 analysis and remains appropriate to reflect the additional embedded debt costs that may be faced by a notional smaller company. Applying this 10bps increase to our point estimate of the industry cost of embedded debt (2.76% CPIH-real) suggests a CSA-based cost of embedded debt allowance for Bristol of 2.86% (CPIH-real).
- 9.490 We note that, in combination with our higher industry allowance, this is higher than the absolute cost of embedded debt allowance originally requested by Bristol (4.85% nominal¹⁶⁰⁵, equating to approximately 2.80% on a CPIH-real basis), but note that, in line with the approach taken by both Ofwat and Bristol, this CSA adjustment is based on the notional smaller company not Bristol's specific circumstances.
- 9.491 We do, however, compare this figure to Bristol's actual embedded debt costs as a sense check. In nominal terms, our CSA-based cost of embedded debt estimate would be 4.92%, a figure that sits between and close to both Ofwat's estimate of Bristol's actual cost of debt of 4.73% and Bristol's estimate of 5.09% (see paragraph 9.465). As such, we consider this estimate to be a reasonable allowance for embedded debt for both a notional smaller company and Bristol specifically.
- 9.492 On the basis of a CSA-based cost of embedded debt of 2.86%, an industry-based cost of new debt of 0.37% and a proportion of new debt of 17%, we

¹⁶⁰⁵ Bristol SoC, paragraph 24

provisionally apply a 2.53% cost of debt allowance within Bristol's redetermined price control.

Whether, and to what extent, Bristol requires a CSA uplift to their cost of equity – Parties' views

Ofwat

- 9.493 Ofwat stated that, despite Bristol claiming that Ofwat's approach of not including a cost of equity CSA within its final determination was flawed, Bristol did not apply for a CSA to the cost of equity at any point during the PR19, that Bristol conducted no customer engagement in relation to any cost of equity proposal and that no other water company, including those smaller than Bristol, requested a company specific adjustment to the cost of equity at PR19.¹⁶⁰⁶
- 9.494 In its response to Bristol's SoC, Ofwat highlighted that, in its April 2019 revised business plan, Bristol had stated that 'in the context of a relatively small and potentially declining value, and the overall weak evidence and difficulties in calculating it, we conclude that as a part of a package of assumptions in our business plan that it is not required for 2020-2025'.¹⁶⁰⁷ However, it should be noted that in its final determination, Ofwat had noted that Bristol had argued that evidence supported an uplift to the cost of equity, and had signalled that it could in the future seek such an uplift, dependent on the outcome of Ofwat's final determination.¹⁶⁰⁸
- 9.495 Ofwat disputed the need for any cost of equity uplift and claimed that Bristol's arguments could also be used to suggest that the company had relatively low risk exposure. Ofwat suggested that with substantially fixed revenues, it is not clear why having a higher share of fixed costs should increase rather than decrease the volatility of profits.¹⁶⁰⁹
- 9.496 Ofwat also disputed Bristol's claim that a relatively low RCV results in lower profit margins. While it admitted that the size of RCV informed the size of RCV run-off and allowed return, Ofwat stated that these revenue streams correspond to costs (depreciation and finance costs) that are also linked to the size of the RCV. It would then be incorrect to treat them as pure profit margins. In addition, Bristol's relatively low RCV resulted in a higher return

¹⁶⁰⁶ Ofwat's Response to Bristol's SoC, paragraph 6.10

¹⁶⁰⁷ Ofwat's Response to Bristol's SoC, paragraph 6.13

¹⁶⁰⁸ Ofwat (2019), *Allowed return on capital technical appendix*, annex 1.2

¹⁶⁰⁹ Ofwat (2019), *Allowed return on capital technical appendix*, annex 1.2

on regulatory equity than water and sewerage companies because it was higher as a proportion of notional equity.¹⁶¹⁰

9.497 Ofwat also expressed concerns with evidence from Economic Insight's operational gearing analysis (used by Bristol) on the basis that:¹⁶¹¹

- (a) Economic Insight had not adequately measured operational gearing. Ofwat assumed that the CMA would seek to apply its definition of operational gearing from the NATS/CAA ¹⁶¹² price control: 'relative exposure of profits to changes in cost', whereas Economic Insight's measures focused only on revenue mix and does not adequately consider costs.
- (b) Economic Insight provided revenue ratios that could equally support the conclusion that Bristol has lower operational gearing, and that Bristol may in fact have lower rather than higher exposure to systematic risk.
- (c) Economic Insight's analysis ignored the fact that there are also systematic risks associated with financing costs, and that EE noted that a relatively high RCV carries its own risk (such as changes in the market cost of equity and cost of debt driven by macroeconomic events). As a result, companies with higher operating costs and lower financing costs (as a result of a lower RCV) do not necessarily have higher risk exposure overall.
- (d) The Bristol 2010 Determination view that an uplift applied to the entire asset beta overstated the exposure to systematic risk and risked ignoring non-cyclical sources of systemic risk such as political risk.

9.498 Ofwat stated that evidence that small water only companies are more exposed to risks is weak, and that it did not observe systematically lower market-to-asset ratios (MARs)¹⁶¹³ in equity transactions. Ofwat highlighted recent transactions and MARs as demonstrating a lack of evidence of a required uplift.¹⁶¹⁴

- (a) Affinity Water being purchased for a 53% premium to RCV in 2017.
- (b) Dee Valley being purchased for a 50% premium to RCV in 2016.

¹⁶¹⁰ Ofwat's Response to Bristol's SoC, paragraph 6.27

¹⁶¹¹ Ofwat's Response to Bristol's SoC, paragraph 6.28

¹⁶¹² See NATS/CAA, paragraph 13.58 for discussion of operational leverage

¹⁶¹³ The Market to Asset Ratio (MAR) is the ratio between the market value of a regulated business and its regulatory capital value (RCV).

¹⁶¹⁴ Ofwat (2019), *Allowed return on capital technical appendix*, annex 1.2, footnote 126

(c) The average premium over RCV between 2016 and 2017 for the two daily traded water companies, Severn Trent and Untied Utilities, was 22%.

9.499 Ofwat also disputed Bristol's claim that it is more exposed to cost shocks, suggesting that the volatility of Bristol's Totex RoRE was not markedly different to the two listed comparators over the past four years, and submitted that uncertainties associated with Canal & River Trust costs are already covered by uncertainty mechanisms elsewhere in the determination.¹⁶¹⁵

9.500 Ofwat further submitted that if it were true that the company's higher operational gearing implies a higher asset beta, that the appropriate response would be to lower the notional gearing level on which the determination is based, not adjust the cost of equity. This approach would increase the notional company's resilience to systematic shocks and reduce the volatility of returns on regulatory equity, and would be consistent with the approach at PR09, where Ofwat applied different gearing assumptions for water only companies to take account of the fact that WoCs tended to exhibit lower gearing at the time.¹⁶¹⁶

9.501 Ofwat stated that it had not seen evidence of water only companies having difficulty raising finance in the absence of an uplift to the allowed cost of equity in previous price reviews. Ofwat submitted that Bristol referenced the depth of investor appetite in the market for financing utilities within its SoC, stating that 'there has been no evidence of restricted investor appetite for UK water corporate debt and companies have continued to have unrestricted access to both debt and equity capital, as evidenced by continuous corporate debt issuance and equity transactions'.¹⁶¹⁷

Bristol

- *Basis of request for a CSA on cost of equity*

9.502 Bristol stated that Ofwat did not recognise any cost of equity CSA in its final determination, and that this approach was flawed as it failed to recognise that small WoCs such as Bristol had higher operational gearing and were subject to higher asset beta risk, and therefore required an uplift in their equity beta.

¹⁶¹⁵ Ofwat's Response to Bristol's SoC, paragraphs 6.29-6.31

¹⁶¹⁶ Ofwat's Response to Bristol's SoC, paragraph 6.32

¹⁶¹⁷ Ofwat's Response to Bristol's SoC, paragraph 6.33, referencing Bristol SoC paragraph 685

- 9.503 Bristol acknowledged that at the time it submitted its revised business plan, it did not seek a CSA for the cost of equity. While its advisers' analysis had demonstrated that there should be such a CSA, Bristol considered that due to difficulties in calculating the value of the CSA for the cost of equity and the relatively low impact of this element of the CSA, it would not request it for AMP7. However, this position changed following Ofwat's draft determination. Bristol considered that the balance of risk in its plan had changed as a result of Ofwat's position on cost of capital and the cost and incentive challenges arising from Ofwat's WASC-weighted analysis.¹⁶¹⁸
- 9.504 Bristol submitted that operational gearing was a measure of the balance between fixed and variable costs within a company's cost structure. Higher operational gearing (higher fixed costs) increased systematic risk (which is reflected in asset beta) as companies with higher fixed costs had greater profit volatility in response to demand shocks (since most of their costs are unavoidable). Bristol believed that this principle is well established and, as a general principle, is recognised by Ofwat.¹⁶¹⁹
- 9.505 Bristol noted that in PR19 Ofwat had rejected the link between operational leverage and increased systemic risk due to regulated utilities not being exposed to demand risk. Bristol countered this view by suggesting that operational gearing resulted in higher profit volatility due to cost and outcome incentives having a disproportionately higher impact on profit margins for small companies. Therefore, any cost or ODI shock represented a greater proportion of profits for small WoCs compared to WaSCs.¹⁶²⁰
- 9.506 Bristol stated that the principle of adjusting beta for operational gearing was well recognised in economic regulation, including in the CCs Bristol 2010 Determination and the Bristol PR14 Determination, where an uplift to beta was allowed in both cases, due to higher operational gearing relative to WaSCs, which resulted in higher profit volatility and beta risk.¹⁶²¹
- 9.507 Bristol suggested that Ofwat's position in PR19 is materially the same as it was in PR14, and that this was not accepted by the CMA in its Bristol PR14 Determination which had stated that the CMA recognised that not all of the operation gearing would necessarily reflect systematic risk, and not all beta risk will result from operational factors. Bristol noted the CMA's view then

¹⁶¹⁸ Bristol SoC, paragraph 247

¹⁶¹⁹ Bristol SoC, paragraph 239-240

¹⁶²⁰ Bristol SoC, para 243-244

¹⁶²¹ Bristol SoC, paragraph 242

was that it was not persuaded that zero was a suitable point estimate for the uplift, and that the CMA had chosen to apply a beta uplift of 13%.¹⁶²²

9.508 Bristol based their cost of equity uplift level request on analysis by Economic Insight which compared Bristol's operational gearing to WaSCs, particularly those that are publicly listed (as Ofwat uses these to set the industry asset beta). Economic Insight's analysis focused on the following ratios:

(a) Totex to RCV

(b) Operating Cash Flows to Revenue

(c) RCV run-off and return on capital to final allowed revenues.

9.509 Bristol noted that despite Ofwat's claim that Economic Insight had not used an appropriate set of metrics when assessing operational leverage, the metrics used were consistent with the approach taken by the CMA in its 2015 and 2009 redeterminations.¹⁶²³

9.510 Economic Insight's analysis concluded that Bristol's Totex/RCV is more than twice that of the listed WaSCs, that operating cashflows/revenue was 5% higher than the listed WaSCs (noting that a lower ratio indicated higher leverage) and that RCV run-off and return on capital/final allowed revenues was 26% higher than the listed WaSCs. Economic Insight generally favoured the latter two measures, which supported an uplift to beta of 5-26% compared to the CMA's previous finding that a 13% uplift was appropriate.¹⁶²⁴

9.511 Bristol also conducted its own analysis using measures of operational gearing that had been considered by the CMA in the past. Bristol stated that this evidence suggested a higher figure for operational gearing, but this was in part driven by the disallowance of the CSA on debt and other parts of the SoC, which had reduced operational cash flows compared to other companies. Bristol stated this analysis demonstrated that the impact from operational leverage was exacerbated under the PR19 framework due to notable downside risk on ODIs and Totex in the framework, which Bristol bears as a small company. Specifically, Bristol highlighted the skew between the upside and downside RoRE analysis in the final determination,

¹⁶²² Bristol SoC, paragraphs 245-246

¹⁶²³ Bristol's Reply to Ofwat's Response, paragraph 163

¹⁶²⁴ Bristol SoC, paragraphs 248-250

which that for each of costs, ODIs and financing, provided a larger downside skew for Bristol than for listed companies.¹⁶²⁵

9.512 In relation to Ofwat's argument that thinner margins at smaller WoCs reduces systematic risks, Bristol suggested that this implied that the revenues allowances for small WoCs are more stable across regulatory resets and therefore they face lower systematic risk. Bristol stated that this view of operating leverage was inconsistent with the definition endorsed by Ofwat - which related to the 'relative exposure of profits to changes in cost'.¹⁶²⁶

9.513 Bristol noted that Ofwat and EE offered a separate set of arguments against the theoretical underpinnings of the cost of equity adjustment, focusing on the view that the risks that operational leverage exacerbates are either:

- (a) Not systematic or are within management control; or
- (b) Are counter-cyclical, to the extent that they arise due to costs being cyclical.

9.514 Bristol stated that these were not new arguments, and that these points were considered by the CMA in our Bristol PR14 Determination. The CMA nevertheless allowed an uplift on the cost of equity for Bristol, explicitly stating that operational gearing adjustment is needed when where the risks that generate this excess volatility in cashflows are not fully systemic.¹⁶²⁷

9.515 Bristol also disputed Ofwat's argument that if operational gearing were an issue, the data should show small companies having lower leverage and lower MARs. Bristol believed that the data on MARs provided by Ofwat is misleading as the MAR for any given company can be driven by a number of factors other than operating leverage, including potential for outperformance on Totex, financing and ODI, non-regulated activities and assumptions on the overall market WACC relative to allowance in current and subsequent periods. It was therefore impossible to tell whether a particular MAR in a small sample was influenced by operating leverage.¹⁶²⁸ Bristol suggested to us that other transaction examples, such as Bournemouth-South West, occurred with a much lower premium.

¹⁶²⁵ Bristol SoC, paragraphs 251-255

¹⁶²⁶ Bristol's Reply to Ofwat's Response, paragraphs 169-170

¹⁶²⁷ Bristol's Reply to Ofwat's Response, paragraphs 165-167

¹⁶²⁸ Bristol's Reply to Ofwat's Response, paragraphs 174-175

- 9.516 On gearing, Bristol noted that gearing is again affected by a number of factors, and that in both samples of WoCs vs WaSCs there is significant variation in gearing across the companies, making any observed differences in the average gearing of the two samples susceptible to a significant margin of error.¹⁶²⁹
- 9.517 Bristol noted Ofwat's argument that Totex RoRE at Bristol was not markedly different from that of other listed companies over the last four years. Bristol claimed that its SoC presented evidence that, on a forward-looking basis (and because of its small RCV), the impact from financing and downside risk was greater for Bristol by comparison to the listed comparators. Bristol stated that Ofwat had not responded to this evidence in its Response.¹⁶³⁰
- 9.518 Bristol stated that the evidence supported its requested operational gearing adjustment of 13% on asset beta, which was below the 16% midpoint suggested by Economic Insight, was the minimum suggested by Bristol's analysis of Ofwat final determination data and is the amount we applied in our Bristol PR 14 Determination.¹⁶³¹
- *Response to Ofwat's view on customer support*
- 9.519 Bristol disputed Ofwat's assertion that it did not consult customers on their willingness to fund a CSA, claiming that three pieces of customer research were undertaken in support of the inclusion of a company specific adjustment in its original plan. Bristol stated that its research found that most customers would prefer Bristol to remain their supplier as long as the additional cost is kept below £3, and for this to be reflected in visible service benefits. Customers would prefer to pay a little more to be served by a smaller company due to the better customer service and a preference to be supplied by a local company. Customers did not see a potential £3 reduction in their bill as enough of an incentive to be served by a larger company.¹⁶³²
- 9.520 Bristol also stated that quantitative research carried out by ICS Consulting found overwhelming support for the small company cost of financing for Bristol, particularly if there were offsetting benefits and a reinvestment mechanism should borrowing costs be lower than expected or fundamental

¹⁶²⁹ [Bristol's Reply to Ofwat's Response](#), paragraph 176

¹⁶³⁰ [Bristol's Reply to Ofwat's Response](#), paragraphs 179-182

¹⁶³¹ [Bristol SoC](#), paragraph 256. Further details of Bristol's customer support evidence and calculated acceptable bill uplift can be found in Appendix C, paragraphs 16-19

¹⁶³² [Bristol's Reply to Ofwat's Response](#), paragraphs 141-144

service delivery in support of the benefits not transpire. 78% of customers were supportive of paying higher costs of finance, with 38% supporting paying £3 even if there were no offsetting benefits. Only 12% of customers were opposed to paying the additional cost of finance.¹⁶³³

9.521 Bristol noted that it undertook further customer research for its revised April 2019 business plan following Ofwat's criticism of its previous research. Ofwat suggested specific wording for this additional research, in line with research undertaken by Portsmouth. This research found 88% support for the CSA equivalent to £1.73 (based on a cost of debt CSA). Bristol stated that based on this research, it concluded that customers would be happy to support a CSA of up to £3 with no direct or specific offsetting benefits, and that the total value of its proposed uplift to the WACC (including the cost of equity uplift) equated to £2.91 per customer. From this Bristol concluded that customers supported the combined value of the cost of debt and cost of equity adjustments proposed in its Statement of Case.¹⁶³⁴

9.522 Bristol highlighted that its original business plan also presented evidence of the 'loss aversion' value of how much bill reduction customers would need to receive to be supplied by an alternative supplier to Bristol. Excluding those who would not be happy with the change and valuing all other observations at the minimum of the range (e.g., less than £5 was counted as zero), Bristol calculated a value to customers of c.£20, driven by service contentment as well as local service. Only 12% of customers were price sensitive in terms of the cost of finance.¹⁶³⁵

Whether, and to what extent, Bristol requires a CSA uplift to their cost of equity – CMA assessment

9.523 As a starting point, we found that the wide range of analysis highlighted that there is no single approach to determining the level of an uplift to the cost of equity for smaller companies, or even an established approach which would demonstrate whether a higher cost of equity is correct at all. We agree with Bristol's Financeability risk and return and affordability report which states that the evidence relating to assessing the requirement for a cost of equity uplift is weak and difficult to calculate with accuracy.¹⁶³⁶

¹⁶³³ Bristol's Reply to Ofwat's Response, paragraphs 145-147

¹⁶³⁴ Bristol's Reply to Ofwat's Response, paragraphs 148-155

¹⁶³⁵ Bristol's Reply to Ofwat's Response, paragraphs 156

¹⁶³⁶ Bristol, *Financeability, Risk & Return and Affordability*, p75

- 9.524 The CMA has previously awarded Bristol a 13% uplift to asset beta as part of a CSA process, although the CMA acknowledged at the time the judgement required when making such an adjustment, and that there was no single way to measure the effect on the asset beta.¹⁶³⁷ The CMA has also considered further the case for an equity adjustment in other reviews, including firmus energy, SONI and NATS/CAA.¹⁶³⁸ All these reviews illustrate that the link between the cost of capital and operational gearing is case-specific, and depends on the risk associated with the assets in question.
- 9.525 In the case of the adjustment made by the CMA in the Bristol PR14 Determination, the use of 13% would not have worked well for the other WOCs, but was an adjustment which in that review appeared to the CMA to result in a cost of equity which reflected the risks faced by Bristol. In other words, while in the Bristol PR14 Determination we considered that the adjustment resulted in the right level of beta for Bristol in AMP6, the kind of calculations proposed by Economic Insight for Bristol would have resulted in a wide range of adjustments if applied across the small companies, some of which would have been implausibly high or had a different effect.
- 9.526 Against the backdrop of these challenges to correct measurement of any uplift to the cost of equity we consider it important to keep under review any evidence as to whether a cost of equity uplift remains appropriate. We note Ofwat's evidence that since our Bristol PR14 Determination, small companies have been purchased at a significant premium (see paragraph 9.498). We also note that even the 'low premium' example of Bournemouth-South West suggested by Bristol (see paragraph 9.515), the assets were purchased for well above RCV value.
- 9.527 On the basis that none of the companies acquired at a significant premium benefitted from a cost of equity uplift through a CSA, the transactions suggest that highly informed purchasers do not consider there to be a material uncompensated systematic risk present in price controls for smaller water companies. We find this to be compelling new evidence against the need for an uplift to the cost of equity allowance. We also note that Bristol is towards the larger end of the WOCs but is the only company to have requested any type of cost of equity uplift through the PR19 process.

¹⁶³⁷ [Bristol PR14 Determination](#), paragraph 10.155

¹⁶³⁸ See CMA (2017), [Energy licence modification appeal: Firmus Energy](#), Section 7, [CMA – SONI Limited v Northern Ireland Authority for Utility Regulation](#), paragraph 7.6 - 7.246, [NATS/CAA](#) 2019 paragraph 12.123 – 12.125

- 9.528 Bristol did not originally apply for a cost of equity CSA as part of the PR19 process, stating that as a part of a package of assumptions in their business plan that it was not required for 2020-2025¹⁶³⁹, but told us it felt that it was forced to do so as a result of understanding the impact of the actual industry-level cost of equity allowed in Ofwat's final determination.
- 9.529 We acknowledge that a cost of equity adjustment might be warranted if smaller companies such as Bristol needed a higher return to meet financeability tests. Our provisional cost of equity estimate of 5.08% (CPIH-real) is significantly higher than cost of equity within Ofwat's final determination of 4.19%. While this figure is lower than Bristol's suggested figure of 5.88%¹⁶⁴⁰, it is significantly higher than Ofwat's 4.47% draft determination allowance which was the basis on which Bristol decided a cost of equity uplift was not required.
- 9.530 While the allowed cost of equity may not have been the only element of Ofwat's final determination that encouraged Bristol to update its CSA request to include a cost of equity uplift, it is likely to have been an important factor (see paragraph 9.503). As our allowance is materially higher than the Ofwat's draft determination, we consider this significantly to reduce the strength of Bristol's case for an equity uplift.
- 9.531 We have provisionally concluded that:
- (a) the use of operational gearing-based evidence is subject to a wide range of uncertainty, and should be considered on a case-by-case basis;
 - (b) in this case, market data appears to be inconsistent with the presence of any meaningful uncompensated systematic risk at smaller water companies and a materially higher industry-level cost of equity; and
 - (c) Bristol is financeable at our proposed cost of equity, which is higher than Ofwat's final determination.
- 9.532 On that basis, we do not believe that a cost of equity uplift is warranted and provisionally decide not to apply a cost of equity uplift to our Bristol CSA award.

¹⁶³⁹ Ofwat, [Ofwat's Response to Bristol's SoC](#), paragraph 6.13

¹⁶⁴⁰ Deflated by 2% from the 8% figure stated in [Bristol SoC](#), paragraph 24

Summary and CMA provisional determination

9.533 To summarise, on the basis of the evidence we have considered in relation to Bristol's application for a CSA, we have provisionally decided to award Bristol a 10bps uplift to the cost of embedded debt.¹⁶⁴¹

9.534 We have provisionally decided not to award any uplift to Bristol's cost of new debt or to the cost of equity allowances and have not changed the ratio of new to embedded debt versus our notional 17%.

Retail Margin Adjustment

Background

9.535 Prior to PR14, the water companies earned an allowed cost of capital on the total assets of the integrated water business. At PR14, Ofwat adopted a new approach when it decided to set separate price controls for wholesale and retail businesses for AMP6.

9.536 One of the challenges of separating the two price controls was the allocation of the RCV from the start of PR14. Ofwat decided that existing fixed assets used to provide retail activities would remain in the wholesale RCV. The effect of this was that return on retail investments made by the companies prior to the start of PR14 were paid for through PR14 wholesale revenues.

9.537 Ofwat said that, over time, the retail business would build up its own assets, and the legacy retail assets in wholesale would depreciate away.¹⁶⁴² The period of this depreciation would be shorter for retail assets as unlike a wholesale business which had significant long-lived tangible assets, a retail business was more asset light.

9.538 Ofwat calculated its PR14 retail controls by adding operating costs and a net margin. The allowed margin was calculated by benchmarking against other retailers and was determined to be 1.0% for household.¹⁶⁴³

9.539 Ofwat explained that, since the retail business generated positive margins, this represented a return on the RCV which should be netted off the WACC to give a wholesale water WACC. Ofwat said this would ensure that returns

¹⁶⁴¹ This is broadly consistent with the Ofwat approach once our decision not to use an embedded debt outperformance wedge is taken into consideration.

¹⁶⁴² Ofwat (2014), [Setting price controls for 2015-20 – risk and reward guidance](#), p34

¹⁶⁴³ Ofwat (2014), [Setting price controls for 2015-20 – risk and reward guidance](#), Table 2

on notional retail assets were not included twice (in both the margins, and the WACC).^{1644 1645}

PR19 Decision

9.540 Ofwat stated that the allowed return for the retail control was set by reference to a retail net margin of 1.0% (the same as PR14). Ofwat explained that in order to determine the allowed return for wholesale controls an adjustment must be made to the appointee allowed return to remove the impact of the allowed retail margin. This is called the retail margin adjustment.

9.541 Ofwat said that the retail margin could be conceived of as covering three financing cost items:¹⁶⁴⁶

- (a) Required return on fixed assets;
- (b) Required return on working capital; and
- (c) Required return to compensate for additional systematic risk.

9.542 Ofwat explained that it considered (a) and (b) were not double counted in the appointee-level allowed return on capital and that the wholesale RCV could now be thought of as essentially free of retail fixed assets.^{1647 1648}

9.543 Ofwat stated that in relation to point (c), the appointee allowed return on capital would reflect a blended average of systematic risks borne by the wholesale and retail business. Ofwat stated that, as the retail margin was intended to cover these costs to the extent that they related to retail activities, as a result the higher systematic risks were compensated within the retail margin. Ofwat explained that higher retail systematic risks meant that the wholesale systematic risks were lower.

9.544 Ofwat explained that as a result, cost item (c) would be double counted as there would be an appointee return on capital on both the wholesale RCV and the residential retail margin. Ofwat said that it therefore reduced the appointee allowed return on capital by 4bps to achieve a wholesale allowed

¹⁶⁴⁴ Ofwat (2014), [Setting price controls for 2015-20 – risk and reward guidance](#), p34

¹⁶⁴⁵ In its PR14 final determination, Ofwat made a 14bps deduction from the allowed return on the wholesale RCV to avoid double counting.

¹⁶⁴⁶ Ofwat (2019), [Allowed return on capital technical appendix](#), p14

¹⁶⁴⁷ Ofwat said that as part of PR14, retail fixed assets were transferred to the wholesale RCV, but that the short asset lives of these investments (~ 9 years) and age on date of transfer meant that, at PR14, Ofwat assumed the assets transferred would be fully depreciated by 2020.

¹⁶⁴⁸ Ofwat said that all retail assets and retail working capital are now contained within the retail business.

return on capital that reflected the lower level of systematic risk in the wholesale business.¹⁶⁴⁹

Submissions on the Retail Margin Adjustment

Ofwat

- 9.545 Ofwat said that as the 1.0% retail margin separately provided the allowed return for the retail control, there would be double recovery without adjusting for this via a deduction from the appointee allowed return.¹⁶⁵⁰ Ofwat explained that this was because the beta used to set the appointee allowed return was estimated using listed comparators which were integrated across both wholesale and retail activities.¹⁶⁵¹
- 9.546 In response to an RFI query, Ofwat said that it had made an oversight in its Final Determination retail margin adjustment calculation, specifically in its calculation of average annual debtor days in its required revenue for return on working capital calculations. Ofwat explained that working capital requirements for the retail control should reflect creditors as well as debtors. Ofwat stated that adjusting for this error would result in a higher retail margin adjustment of 7bps or 9bps.
- 9.547 Ofwat explained that the difference in its 7bps or 9bps retail margin adjustment calculation was due to two different approaches it used to calculate working capital:¹⁶⁵²
- (a) 7bps - Ofwat calculated the sector average creditor days (25 days) and sector average debtor days (39 days) over the price control period. It then subtracted sector average creditor days from sector average debtor days to calculate a working capital requirement of 14 days of turnover.
 - (b) 9bps - Ofwat calculated the average of each company's net creditor/debtor days for the sector giving an average of -3 days over the price control period.

¹⁶⁴⁹ To avoid the double count, Ofwat stated that it calculates cost item (c) using business plan data and draft determinations models. See Appendix C, Figure 21 for Ofwat's calculation methodology

¹⁶⁵⁰ Ofwat, *Risk and return - response to common issues in companies' SoC*, p88-89

¹⁶⁵¹ Ofwat's reasoning was that where the retail margin fully compensates investors for the risks in the retail business, this could include a margin allowance greater than the margin allowance inferred by using the integrated cost of capital.

¹⁶⁵² Both Ofwat approaches to its working capital calculation use the following: Current assets: Residential unmeasured trade receivables and Residential measured trade receivables. Current liabilities: Residential unmeasured advance receipts and Residential measured advance receipts.

Disputing Companies

9.548 Northumbrian stated that there were several errors in Ofwat's approach to the retail margin adjustment. Northumbrian explained that Ofwat highlighted in its final determinations that the RCV was now essentially free of retail assets. Therefore, in applying the appointee WACC to the RCV there was no double count of the retail margin unless: ¹⁶⁵³

- (a) the appointee beta reflected the systematic risk of an integrated wholesale/retail firm; and
- (b) the systematic risk of retail activities was materially higher than wholesale activities; and
- (c) the risks attributable to retail activities were fully remunerated by the permitted retail margin.

9.549 In its reply to Ofwat's response, Northumbrian stated that making an adjustment to the WACC by carving out a portion of systematic risk that was driven by the inclusion of retail activities in the comparator firms may be spurious accuracy. ^{1654 1655}

9.550 In its post hearing submission, Northumbrian noted that Ofwat's 0.04% retail margin adjustment represented spurious accuracy and failed to account for several important considerations:

- (a) Northumbrian said that Ofwat's assumption for the working capital financing rate (of 3.06%, nominal) was based on a simple average of the working capital rates taken from company business plans. It noted that there was considerable variation across the sector¹⁶⁵⁶ and that there were sound theoretical arguments which supported an application of the WACC to all capital employed.
- (b) Northumbrian argued that Ofwat's WACC used for fixed assets (5.02%) underestimated the market WACC and that the retail margin allowance was pre-tax so a pre-tax WACC should be applied.

9.551 Yorkshire told us that the retail margin adjustment was an unnecessary legacy from PR14, when the circumstances Ofwat was dealing with were

¹⁶⁵³ [Northumbrian SoC](#), para 883-884. See also Appendix C, Figure 22 for KPMG's calculations submitted by Northumbrian.

¹⁶⁵⁴ [Northumbrian Reply](#), paragraph 472.

¹⁶⁵⁵ The company explained that the beta estimate is inherently imprecise, so it is unlikely that it is possible to accurately isolate the systematic risk of retail activities versus the activities of an integrated supplier.

¹⁶⁵⁶ The financing rates range from 0.21% to 5% excluding outliers of 0% and 7% (three companies did not report a working capital financing rate).

materially different than PR19. The company highlighted that the original logic for the retail margin adjustment at PR14 was a transfer of retail assets to the wholesale RCV and that this rationale was no longer relevant as these assets have been fully depreciated.

9.552 Yorkshire explained to us that they disagreed with Ofwat's assertion about the relative riskiness of wholesale and retail activities and highlighted that:

- (a) household retail was a regulated monopoly business, just like wholesale activities. Investors' basic perceptions of risk would therefore be shaped first and foremost by the fundamentals of regulation;
- (b) the underlying systematic risks that investors were exposed to in the provision of retail services to customers were not obviously different from the systematic risks that investors are exposed to in the provision of network service, bioresources and water resources; and
- (c) insofar as there were overarching systematic risks that were not related to demand (e.g. political risks), it was not at all clear why these risks were any lower for the wholesale business than they were for the retail business.

9.553 Yorkshire stated that the 1% retail margin did not over-reward the retail business. The company observed that:¹⁶⁵⁷

- (a) the 1% figure came from benchmarking to the margins earned by other low-risk retail businesses;
- (b) Ofwat's calculations omitted key factors that create a requirement for retail profits;¹⁶⁵⁸ and
- (c) Ofwat also completely omitted tax from its calculations – i.e. the 1% margin paid in part for retail corporation tax.

Citizens Advice

9.554 In its submission to the CMA, Citizens Advice said that Ofwat's retail margin of 1% was arguably too low and resulted in an unnecessarily low retail margin adjustment. Furthermore, it stated that Ofwat assumed that debtors were the only relevant working capital item for a retail business and

¹⁶⁵⁷ Yorkshire SoC, Annex 12 p4

¹⁶⁵⁸ For example, there is no recognition of the capital that is required for retailers' security deposits, the cash buffers/facilities that retail businesses need to deal with unexpected cost/revenue shocks or the contingent support that shareholders provide more generally to retail businesses.

that this failed to recognise that a substantial proportion of retail customers paid in advance for water services. Citizens Advice stated that adjusting for Ofwat's working capital calculation error changed the retail margin adjustment from 4bp to 9bp.¹⁶⁵⁹

Retail Margin Adjustment – CMA assessment

- 9.555 In our Bristol PR14 Determination¹⁶⁶⁰ we decided that financial theory would indicate that dividing a company into parts (retained under the same ownership) should not affect either its profitability or the returns it generates. Therefore, we were not convinced that the implementation of separate controls should in itself require any increased returns.
- 9.556 We made one adjustment to Ofwat's wholesale-appointee adjustment based on the new investments being made during AMP6.¹⁶⁶¹ We assumed that the retail business was able to generate a similar return on capital (3.7%) to the appointee business and for Bristol this would imply a return equivalent to 0.03% on the wholesale WACC. We therefore found that a wholesale-appointee adjustment of 0.11% was appropriate.
- 9.557 For PR19, we note that Ofwat's proposal of a 7bps or 9bps retail margin adjustment represents a small adjustment to the overall WACC and, ultimately, customer bills. We also note that estimating opaque metrics such as relative exposure to systematic risk to this level of accuracy risks any sensible range of estimates being larger than the central estimate (thus making zero a realistic possibility).
- 9.558 At the same time, the approach of focussing on the appointee returns that we followed in our Bristol PR14 Determination would suggest that a retail margin adjustment of zero would significantly over-reward the companies. In the real-world scenario where the financing of the appointee is still fully integrated, we are not persuaded that there is a benefit for customers for paying a higher profit to reflect the higher financing costs associated with a notional separation which has been put in place for other purposes.
- 9.559 For our retail margin adjustment calculation, we start with the principle that there should be an allowed return reflecting a reasonable return on capital across the appointee businesses. If the notional retail margin of 1% for a separated retail business is different to the required allowance for a retail business as part of an integrated appointee, then this approach requires an

¹⁶⁵⁹ [Citizens Advice submission](#) (June 2020) pp8 & pp48 – 51

¹⁶⁶⁰ [Bristol PR14 Determination](#), pp340-342

¹⁶⁶¹ Bristol estimated that the average capital in the retail business will be £3.4 million over the period, consisting of around £2 million of new assets, and around £1.4 million of working capital.

adjustment to wholesale revenues. The size of the adjustment is calculated by starting with the notional retail margin (1%) and subtracting the actual required return for the retail business (based on ROCE – return on capital employed).

9.560 The ROCE for the retail business comprises both:

- (a) **Return on fixed assets.** We assume a nominal cost of financing of 5.57% (in-line with our appointee allowed return on capital) for the return on fixed assets. We note Northumbrian's argument that the retail margin is a pre-tax figure and we should therefore use a pre-tax WACC. However, we do not make a tax adjustment to the financing costs of fixed assets as we will analyse tax as part of our broader modelling analysis for our final determination.
- (b) **Return on working capital.** We looked at a bottom up analysis of the household retail working capital requirements for the sector and noted a marked disparity between companies' creditor days. Specifically, the majority of companies maintain a neutral or favourable working capital balance in terms of creditor days being similar to, or higher than, debtor days. On balance we see no need to assume that a notionally efficient company should have an additional return to manage the costs of financing working capital balances.

9.561 Table 9-23 below illustrates our retail margin adjustment calculation at the sector level.

Table 9-23: CMA calculation of industry-level retail margin adjustment in % of RCV terms

<i>Component</i>	<i>Formula</i>	<i>Units</i>	<i>Calculation Result</i>
Fixed Assets	A	£m	386
Cost of financing fixed assets	B	%	5.57
Required revenue for return on retail fixed assets	$C = A * B$	£m	22
Net debtor days (net of creditor days)	D	Days	0
Required revenue for return on working cap	E	£m	0
Total retail-specific capital costs	$F = C + E$	£m	22
Retail margin allowed revenue apportioned to Household	G	£m	93
Required return for additional systematic risk	$H = G - F$	£m	71
Average RCV	I	£m	84,125
Retail Margin Adjustment	$J = H / I$	%	0.08

Source: CMA analysis using Ofwat data

Retail Margin Adjustment – CMA provisional determination

- 9.562 As a result of our approach to financing fixed asset and working capital, our calculations suggest that the required retail margin for the sector is approximately £22 million.
- 9.563 By comparison to the £93 million retail margin awarded by Ofwat, £22 million equates to a required retail margin of only 0.24% and suggests that water companies would be overcompensated for additional systematic risk by an aggregate £71 million (£93 million minus £22 million) if no adjustment is made.
- 9.564 This suggests that it is appropriate to make a sector-level downwards adjustment of £71 million to wholesale revenue, which is equivalent to an 8bps retail margin adjustment using Ofwat's approach. In our final determination, we will apply a downwards adjustment to wholesale revenues to each of the Disputing Companies equivalent to 8bps of RCV.

Gearing Outperformance Sharing Mechanism

Introduction and PR19 Decision

- 9.565 Ofwat introduced the concept of a Gearing Outperformance Sharing Mechanism (GOSM) as part of its 'Putting the sector in balance: position statement'¹⁶⁶² and introduced it into the water price control regime for the first time in PR19. Ofwat stated that equity investors benefit from higher equity returns that are associated with their increased risk, but that there is no substantive benefit passed to customers. In addition, Ofwat stated where companies adopt high levels of gearing, they may reduce financial resilience and transfer some risk to customers and/or potentially taxpayers in the event that a company fails. To address this, Ofwat introduced a mechanism that it said would share the benefits of higher gearing with customers.¹⁶⁶³
- 9.566 For PR19, Ofwat updated the proposal laid out in its 'putting the sector in balance: position statement' by including a glide path for the gearing level which will trigger sharing payments.
- 9.567 Under the PR19 GOSM mechanism, companies with gearing higher than specified trigger points will have to 'share' the presumed benefit of gearing

¹⁶⁶² Ofwat (2018), [Putting the sector in balance: position statement on PR19 business plans](#), section 6

¹⁶⁶³ Ofwat (2019), [Aligning risk and return technical appendix](#), section 9.3

over 65% with customers through a payment based on the following equation:

$$\text{Sharing payment amount} = (\text{Gearing} - 65\%) \times 50\% \times (\text{Allowed Nominal Cost of Equity} - \text{Actual Cost of Debt}) \times \text{Closing RCV Nominal}$$

With the trigger points for involvement in the mechanism starting at 74% gearing in 2020-21 and reducing by 1% each year until 70% gearing for the year 2024-25.¹⁶⁶⁴

9.568 The GOSM aims to identify the excess returns to shareholders (Allowed Nominal Cost of Equity – Actual Cost of Debt) earned through the excess levels of gearing (Gearing – 65%) and share these excess returns equally (x50%) with customers. Multiplying the figure by the nominal RCV gives the pound sterling figure to be paid.

Key Arguments

9.569 Parties made submissions in several areas relating to the introduction of the GOSM, including:

- (a) the effectiveness and appropriateness of the GOSM as a tool to reduce financial risk within the water industry;
- (b) the presence and quantum of benefits available to be shared; and
- (c) Ofwat's methodology for implementing the GOSM.

The effectiveness and appropriateness of the GOSM as a tool to reduce financial risk within the water industry – Parties' views

Ofwat

9.570 In the final determination, Ofwat argued that while companies and their investors are responsible for the decisions they make about their actual financial structure, companies that adopt high levels of gearing may reduce financial resilience and transfer some risk to customers and/or potentially taxpayers in the event that a company fails. Higher gearing may also

¹⁶⁶⁴ Ofwat (2019), [Aligning risk and return technical appendix](#), Section 9.3 See Appendix C Figure 23 for Ofwat's graphical representation of the gearing trigger points.

reduce the ability of companies to adapt to changes in the regulatory framework that would be in customers' interests.¹⁶⁶⁵

9.571 In its response to companies' statements of case, Ofwat stated that increasing gearing transfers risks to customers, who may suffer from service interruption and/or underinvestment if bondholders restrict future cash outlays during periods of financial stress. High gearing may also increase the perceived likelihood of companies triggering a re-opening mechanism of the regulatory price determination to increase funding where a firm is in financial distress.¹⁶⁶⁶ Ofwat argued that in a competitive market, customers may react to this shifting of risk by moving supplier, but that in the context of monopoly service provision it is the regulator who must provide constraints to replicate competitive market forces.¹⁶⁶⁷

9.572 Ofwat stated that 'some commentators' had suggested that the failure of one or more highly geared company could impact on investor sentiment for the sector, which could manifest in a higher cost of capital and higher bills for customers. Ofwat stated that this could mean that its previous policy on capital structure has been insufficient.¹⁶⁶⁸ Ofwat quoted a Department for Trade and Industry report¹⁶⁶⁹ which argued that customers suffer when regulated companies are highly geared, as regulators may feel that they are unable to enforce a challenging regulatory settlement while still ensuring financeability. The DTI report also stated that even the suggestion of a government 'backstop' (in other words, support for investors otherwise facing financial distress) may decrease the cost of capital to investors (improving returns) while transferring risk to customers or the taxpayer.¹⁶⁷⁰

9.573 Ofwat acknowledged that the highly geared companies were resilient during the 2008 credit crunch (even if some required injections of equity to maintain covenant ratios) but argued that 'concerns arise' over companies' ability to maintain resilience over a longer period of downward pressure on return'.¹⁶⁷¹

¹⁶⁶⁵ Ofwat (2019), *Aligning risk and return technical appendix*, section 9.3.3

¹⁶⁶⁶ Ofwat, [Reference of the PR19 final determinations: Risk and Return – Response to common issues in companies' 27 May submissions to the CMA](#), paragraph 5.16

¹⁶⁶⁷ Ofwat, [Risk and return - response to common issues in companies' SoC](#), paragraph 5.18

¹⁶⁶⁸ Ofwat, [Risk and return - response to common issues in companies' SoC](#), paragraph 5.4 including box and Figure 5.1

¹⁶⁶⁹ Department of Trade and Industry and HM Treasury (2004), *The drivers and public policy consequences of increased gearing*

¹⁶⁷⁰ Ofwat, [Risk and return - response to common issues in companies' SoC](#), paragraph 5.11

¹⁶⁷¹ Ofwat, [Risk and return - response to common issues in companies' SoC](#), paragraph 5.4 including box and Figure 5.1

- 9.574 Ofwat stated that since PR14 it has signalled that companies with less resilient structures should consider taking steps to improve financial resilience in the context of an expected lower allowed return at PR19, and that credit agencies have noted companies with less resilient structures might be unwilling or unable to maintain credit quality.¹⁶⁷²
- 9.575 Ofwat stated that existing market and regulatory protections, such as debt covenants, the regulatory ringfence¹⁶⁷³ and special administration¹⁶⁷⁴, are imperfect and may leave customers facing unnecessary risks. In particular, special administration involves costs as longer-term planning and investment can be disrupted by the process, meaning that even if customers are shielded from the immediate risk of business failure, some costs may ultimately fall on customers. Ofwat quoted former Rail Regulator, Tom Winsor, as having suggested that the decision to renationalise Railtrack had cost the taxpayer £11-14 billion while the failure of Metronet was estimated to have cost £170-410 million.¹⁶⁷⁵
- 9.576 Ofwat disagreed with Anglian's view that highly covenanted securitised structures have brought benefits to customers, arguing that these are in place simply to mitigate the increased risks associated with these structures.¹⁶⁷⁶
- 9.577 Ofwat told us that existing regulatory protections such as the ring-fence were well placed to deal with problems once they had occurred but were not sufficient to prevent the bad decision-making that could bring a company into financial distress.
- 9.578 Ofwat also told us that it chose to implement a sharing mechanism within the price control rather than alternative risk controlling measures such as a

¹⁶⁷² Ofwat, [Risk and return - response to common issues in companies' SoC](#), paragraph 5.4 including box and Figure 5.1

¹⁶⁷³ The regulatory ring-fence consists of licence conditions which place specific obligations on a company, such as ensuring that it has sufficient financial and managerial resources to carry out its regulated activities (including the investment programme necessary to fulfil its regulatory obligations).

¹⁶⁷⁴ The process for special administration is set out in the Water Industry Act 1991. It can be used where a company either fails to meet its legal obligations and does not or cannot take remedial action or is unable to finance its functions due to, for example, poor decisions by its management, significant unexpected changes to its costs (a 'cost shock') or an inability to raise or refinance its capital as required. In these circumstances, the Secretary of State, Welsh Ministers or (with appropriate consent) Ofwat can ask the High Court to appoint a special administrator to oversee the running of the company. The purpose of the special administration arrangements is to transfer the company's business as a going concern (and to carry out the functions of the company in the interim). This differs from the standard administration regime, which applies to all companies, where other options are available including the company's assets being sold and the operations of the company terminated. Special administration is also different from standard administration in that it can be used where a company has not met its principal duties as well as for financial reasons.

¹⁶⁷⁵ Ofwat, [Risk and return - response to common issues in companies' SoC](#), paragraphs 5.19–5.23, including footnote 336

¹⁶⁷⁶ Ofwat, [Risk and return - response to common issues in companies' SoC](#), paragraph 5.24

limit on gearing as such alternatives would require a license change for which agreement from companies would be required. Ofwat did not think that it was realistic that it would achieve agreement on such changes. Ofwat also suggested that the incentive properties of the GOSM still allowed an element of choice by management and avoided the need for Ofwat to set exact limits on gearing.

The Disputing Companies:

- 9.579 All four Disputing Companies questioned the GOSM's suitability and suggested that the GOSM should be removed from the price control.¹⁶⁷⁷
- 9.580 Anglian and Bristol stated that there is no evidence that customers or the taxpayer face a greater risk due to high gearing.¹⁶⁷⁸ Northumbrian stated that, counter to Ofwat's claim, the introduction of a single capital structure on a diverse range of companies may actually increase financing risk if Ofwat fails to select the most optimal level of gearing for all companies. In addition, the GOSM would effectively stop the process of discovery through competitive efforts of companies to reduce their financing costs and optimise their governance arrangements. This would be to the long-term detriment of consumers.¹⁶⁷⁹
- 9.581 Northumbrian cited the example of COVID-19 as a shock which may require a business to temporarily increase gearing in the interests of customers. This increase in gearing may now be discouraged by the presence of the GOSM, potentially to the detriment of customers.
- 9.582 Anglian and Yorkshire stated that customers actually benefit from the highly covenanted structures at companies with high levels of gearing, and that the GOSM threatens this. Anglian and Yorkshire suggested that highly-covenanted companies have de-risking features such as additional ring-fencing measures, enhanced rights for secured creditors, automatic standstill periods and contractual dividend restrictions¹⁶⁸⁰. Although Anglian acknowledged that these benefits offset the increased risks associated with higher gearing rather than provide a net reduction in risk compared to a

¹⁶⁷⁷ [Anglian SoC](#), paragraph 1402; [Bristol SoC](#), paragraph 709; [Northumbrian SoC](#), paragraph 910; [Yorkshire SoC](#), paragraph 246

¹⁶⁷⁸ [Anglian SoC](#), chapter K, section 3.1.2; [Bristol SoC](#), paragraph 685

¹⁶⁷⁹ [Northumbrian SoC](#), paragraph 906–908

¹⁶⁸⁰ [Anglian SoC](#), paragraphs 1323–1324, 1332–1335 and chapter K, section 5.2; [Yorkshire SoC](#), paragraph 274; [Yorkshire's Reply to Ofwat's Response](#), section 8.2.10

company at lower levels of gearing but without such additional protections and are neutral from a customer point of view.

9.583 Anglian noted that Ofwat had previously acknowledged the benefit of highly covenanted structures and that their benefits are recognised by credit ratings agencies who allow a 1-notch uplift above comparable unsecured and uncovenanted water and sewerage companies.¹⁶⁸¹ Anglian quote a Moody's report¹⁶⁸² that states that highly covenanted financial structures mitigate a range of risks, including those associated with higher leverage. The same report suggested that companies like Anglian and Yorkshire had consistently been among the strongest performers in the sector.

9.584 Anglian and Northumbrian stated that the GOSM was inappropriately applied to all companies, regardless of financial risk or operational performance, and that for both companies there was no risk or performance issue to be addressed by this mechanism. Northumbrian told us that it would be more sensible for Ofwat to target improvements in financial resilience only at companies it recognises as presenting problems, noting that gearing was unlikely to be the only element of financial resilience at a company that may cause Ofwat concern.¹⁶⁸³ Bristol had suggested to Ofwat (during the PR19 process), that it would be more effective to pursue a targeted approach following assessment of individual company needs.¹⁶⁸⁴

Third Party submissions:

9.585 South East Water submitted that Ofwat already has measures in place to sufficiently safeguard resilience and protect customers, and that the GOSM would actually undermine financial resilience by reducing the allowed return for highly geared companies.¹⁶⁸⁵ Thames Water disagreed that gearing above 65% implies a lack of financial resilience, citing a lack of evidence from Ofwat.¹⁶⁸⁶

9.586 South West Water stated that it was 'very supportive' of Ofwat's GOSM proposals, that it had introduced a voluntary sharing mechanism in PR14 and that a benefit sharing mechanism was an important element in building trust and confidence in the sector. South West stated that it had long

¹⁶⁸¹ [Anglian SoC](#), paragraph 1321–1325

¹⁶⁸² [Anglian SoC](#), paragraph 1327

¹⁶⁸³ [Anglian SoC](#), chapter K section 4.4

¹⁶⁸⁴ [Bristol SoC](#), paragraph 671

¹⁶⁸⁵ [South East Water CMA submission](#)

¹⁶⁸⁶ [Thames Water submission](#)

believed that high levels of gearing were not good for the sector and do not offer customers the right level of protection.¹⁶⁸⁷

The effectiveness and appropriateness of the GOSM as a tool to reduce financial risk within the water industry – CMA Assessment

9.587 We accept that Ofwat may have legitimate concerns regarding the overall financial resilience of certain companies within the water industry. We also agree with Ofwat that there are important risks associated with poor financial resilience prior to reaching a default event and that these are an appropriate consideration as part of the financial framework. As noted by Ofwat (paragraph 9.571) such risk may manifest as management/board distraction or reductions in customers service as companies increase their focus on cash generation in order to satisfy the needs of bondholders. Risk may also materialise as a result of issues other than gearing levels, such as a company's exposure to riskier debt instruments or inappropriately short maturities. Whilst the risk may not be of the scale of Railtrack, customers may face increased risk of poorer performance over time from these more highly-g geared firms, and, under the notional financing model, shareholders are free to choose a risk/return profile that suits their private preferences, without needing to account fully for external costs that might ultimately fall on customers.

9.588 However, we note that there are a range of regulatory protections already explicit within the licence conditions. We also acknowledge that water companies have large physical asset bases and, by their nature, suffer from little variability in demand. This suggests relatively high levels of gearing are likely to be sustainable. The valuable asset base combined with a suitable cost of capital also suggests that there should be sufficient demand from alternative investors if individual company owners were to go into a special administration process.

9.589 We also note that the quantification of financial risks is difficult and the evidence supporting a particular scale of effect from high gearing is limited. We do not consider the Railtrack or Metronet examples cited by Ofwat (see paragraph 9.575) as particularly compelling given the significantly different regulatory framework in place for water companies versus these entities. In the more relevant examples of Enron's distressed sale of Wessex Water in 2002 or Dwr Cymru's sale by parent Hyder in 2001, there does not appear to be evidence that risk was transferred to either customers or taxpayers. In addition, as agreed by Ofwat (see paragraph 9.573), even highly geared

¹⁶⁸⁷ [South West Water submission](#)

companies were able to navigate the global financial crisis of 2008/09, arguably the most difficult financing environment in modern history, without evidence of financial distress or impact on either customers or the taxpayer.

- 9.590 On this basis, whilst we agree that some form of intervention to increase protection of customers may be appropriate in certain scenarios, we are concerned that a GOSM mechanism which targets the whole sector with penalties for gearing above a certain threshold may not be the most effective approach for addressing Ofwat's legitimate concerns.

The presence and quantum of benefits available to be shared – Parties' Views

Ofwat

- 9.591 In its Reply to Companies' statements of case, Ofwat stated that the gearing outperformance mechanism aims to address a long-held concern that companies and their investors enjoy all the benefits of adopting financial structures where gearing levels are well in excess of the notional level, with little evidence of benefits to customers. It considered that in the absence of benefit sharing, the regulatory arrangements could distort company incentives on choosing financing structures without full consideration of the potential impacts on customers and wider stakeholders.¹⁶⁸⁸
- 9.592 Ofwat submitted that investors in some companies have withdrawn significant amounts of equity from the sector by restructuring to include a greater proportion of debt finance. In 2011 it estimated the amount of equity extracted by such means to have exceeded £9 billion by 31 March 2010, equivalent to over 18% of the RCV.¹⁶⁸⁹
- 9.593 Ofwat stated that it disagreed with Modigliani-Miller-based¹⁶⁹⁰ objections to its mechanism, suggesting that in its view the cost of capital is not invariant to gearing levels.¹⁶⁹¹ Ofwat suggested that the Modigliani Miller theorem is underpinned by a set of highly restrictive assumptions which do not hold

¹⁶⁸⁸ Ofwat, [Risk and Return – Response to common issues in companies' 27 May submissions to the CMA](#), paragraph 5.4

¹⁶⁸⁹ See Appendix C, Figure 24 for Ofwat's graph on the trend in financial restructuring across the water industry.

¹⁶⁹⁰ The Modigliani-Miller Theorem suggests that as gearing rises shareholders of a company are exposed to more systematic risks (there is less of an equity buffer to deal with shocks), often measured as a rise in beta. This increasing risk to equity holders is described as a rising 'cost' of equity, in that higher returns are required to offset these higher risks. In the Modigliani-Miller-based WACC model used by regulators, overall WACC remains roughly flat, even as rising gearing increases the proportion of cheaper debt into the capital structure, as the remaining equity portion becomes increasingly expensive.

¹⁶⁹¹ Ofwat, [Risk and return - response to common issues in companies' SoC](#), paragraph 5.13

true of the water sector – specifically that there are no taxes, no costs of financial distress, no asymmetry of information and that there are perfect capital markets. Rather than invalidating the GOSM approach, Ofwat claimed that the absence of these simplifying assumptions proves that theorem does not hold in the water sector, supporting the case for the GOSM.¹⁶⁹²

- 9.594 Ofwat noted that to discourage companies from adopting excess gearing to benefit from the tax shield on debt it remunerated tax on the basis of the actual capital structure of each company (and claws back tax gains driven by financial restructuring).¹⁶⁹³ Ofwat disputed claims that this provides a benefit to customers, stating that tax is a small component of allowed revenues.¹⁶⁹⁴

The Disputing Companies

- 9.595 All four Disputing Companies stated that the GOSM is not compatible with the Modigliani-Miller approach to WACC used by regulators and commonly used by investors and corporate finance professionals. Specifically, the companies submitted that it is inappropriate to suggest that shareholders can benefit from increasing the gearing at a company, and that the Modigliani-Miller WACC model suggests a broadly flat WACC across gearing levels because the associated cost of equity (the return required to offset increased risks borne by shareholders) rises as the weight of equity falls, offsetting any potential benefit for shareholders.¹⁶⁹⁵
- 9.596 Anglian and Bristol stated that Ofwat's GOSM was a significant departure from regulatory practice, which traditionally set a WACC according to a notional level of gearing and then allowed companies to pick an actual level of gearing that suits their specific needs.¹⁶⁹⁶ Anglian noted that in the Bristol PR14 Determination, the CMA stated that it was for the shareholders and the management of the company to determine the most efficient financial structure and not for the regulators to second guess.¹⁶⁹⁷
- 9.597 Anglian stated that many parameters drive managers' financing decisions and thus a company's capital structure depends on a range of managerial choices rather than a theoretical optimum that could be determined in

¹⁶⁹² Ofwat, [Risk and return - response to common issues in companies' SoC](#), paragraph 5.14

¹⁶⁹³ Ofwat, [Risk and return - response to common issues in companies' SoC](#), paragraph 5.15

¹⁶⁹⁴ Ofwat, [Risk and return - response to common issues in companies' SoC](#), paragraph 5.23, including Table 5.1

¹⁶⁹⁵ [Anglian SoC](#), paragraph 1372, [Bristol SoC](#), paragraph 688, [Northumbrian SoC](#), paragraph 898, [Yorkshire SoC](#), paragraph 251

¹⁶⁹⁶ [Anglian SoC](#), paragraph 1311, [Bristol SoC](#), paragraph 683, [Northumbrian SoC](#), paragraph 899,

¹⁶⁹⁷ [Anglian SoC](#), paragraph 1314

advance. It also stated, referencing Brealey, Myers and Allen¹⁶⁹⁸, that ‘trade-off’ theory suggests that a firm’s financial structure results from a trade-off between tax benefits derived from gearing up and costs of financial distress associated with higher debt. According to this theory, firms with safe and tangible assets will tend to gear up as their debt is backed up by safer assets.¹⁶⁹⁹

9.598 Northumbrian stated that the multiple drivers of gearing levels help to explain why there is such diversity of gearing levels across the industry, with only Dwr Cymru sitting below 60% gearing on Ofwat’s 2019 numbers. Northumbrian submitted that this diversity is a healthy feature of an incentive-driven sector.¹⁷⁰⁰

9.599 The four Disputing Companies pointed out that tax is accounted for separately within the price control, and that they do not receive any tax benefit from gearing (which may have been a justification for assuming increased returns to shareholders from increased gearing under a certain version of the Modigliani-Miller theorem), and that this ultimately benefits customers through lower bills.¹⁷⁰¹

Third Parties

9.600 South East Water stated that there was no financial benefit that needed to be shared with customers. It also stated that there are many potential reasons for an increase in average gearing within the sectors, including to impose discipline on management, to seek higher equity risk and to take advantage of lower debt costs.¹⁷⁰²

9.601 Southern Water and Thames Water stated that the GOSM was not consistent with financial theory, and that its introduction effectively abandons a long-standing regulatory principle that financial arrangements are a matter for individual companies – severely penalising companies with capital structures that deviate materially from the notional gearing assumption. Thames also pointed out that the GOSM specifically penalises highly geared companies who have achieved more efficient debt costs, as the spread is based on the actual costs of debt (rather than the notional cost of debt allowance).¹⁷⁰³

¹⁶⁹⁸ Allen, F, Brealey, RA and Myers, SC (2011), *Principles of Corporate Finance*, Chapter 18, Section 4

¹⁶⁹⁹ [Anglian SoC](#), chapter K, section 3.3.2

¹⁷⁰⁰ [Northumbrian SoC](#), paragraph 902–903

¹⁷⁰¹ [Anglian SoC](#), chapter K, section 3.2.2, [Bristol SoC](#), paragraph 690, [Northumbrian SoC](#), paragraph 904, [Yorkshire SoC](#), paragraph 254

¹⁷⁰² [South East Water submission](#)

¹⁷⁰³ [Southern Water submission](#); [Thames Water submission](#)

9.602 Conversely, South West Water stated that it was ‘very supportive’ of Ofwat’s GOSM proposals, noting that It had introduced its own voluntary sharing mechanism in PR14. It submitted that gains made by companies that are essentially ‘unearned’ and sit outside of the regulatory framework should be returned to customers at 100% (not the 50% in the GOSM). South West Water submitted that at 50%, shareholders may still be incentivised to either retain a higher level of gearing or, perversely, companies with lower levels of gearing may be incentivised to increase gearing.¹⁷⁰⁴

The presence and quantum of benefits available to be shared – CMA assessment

9.603 We note that the bulk of the dispute in this area has centred on the application of the Modigliani-Miller approach to WACC, which suggests that overall WACC is largely invariant to the level of gearing deployed, outside of tax, which is addressed separately through the tax clawback mechanism.

9.604 Within this framework, Ofwat appears to have focused on the higher returns earned per unit of equity at higher levels of gearing, while the Disputing Companies have focused on the largely invariant WACC element of the calculation, suggesting that any increase in returns earned by equity holders is matched by increased risks to shareholders.

9.605 We accept the broad tenets of the Disputing Companies’ interpretation of the Modigliani-Miller theory, specifically that increased per-unit returns earned by shareholders in a highly-g geared structure come with associated and offsetting risks to those returns. We also accept that, as rising gearing leads to increasingly expensive equity being replaced with lower-cost debt, the assumption which is most consistent with the generally accepted approach to the cost of capital is that the WACC should be broadly unaffected by gearing.

9.606 In principle, we support the view that outperformance of the WACC set by regulators due to financial outperformance is a matter for management and shareholders, as long as the associated risks of deviation from the notional capital structure are also borne by managers and shareholders. This is in line with our Bristol PR14 Determination, where we stated that ‘it is for companies, their shareholders and management to determine the most efficient financing structure (including gearing level) to meet their circumstances’.¹⁷⁰⁵

¹⁷⁰⁴ [South West Water submission](#)

¹⁷⁰⁵ [Bristol PR14 Determination](#), paragraph 10.27

- 9.607 We also note that there is a range of gearing levels deployed by companies in the sector, and that all but one have a debt/RCV gearing level greater than Ofwat's 60% notional gearing level. We would suggest that this diversity of approach to gearing gives investors the option to adopt the risk/reward trade-off that best matches their requirements, which should be positive for the overall attractiveness of the sector to investors. Higher average gearing at privately-owned firms may reflect that individual investors in the privately-owned firms prefer to take additional risks, which will normally be reflected in higher equity returns for more highly geared assets.
- 9.608 There may also be some opportunities as part of this increase in gearing to reduce the cost of capital, where firms have opportunities to gear up at attractive rates, or where companies can attract equity investors which are attracted to the risk associated with these inflation-linked long term equity investments. The Modigliani-Miller theory does not preclude that groups of investors may have a preference for certain assets, which can result in 'optimal gearing' at a level which minimises the cost of capital for those investors.
- 9.609 However, Ofwat's approach of a 'sharing mechanism' with 50 per cent of the difference between the cost of equity and the cost of debt being passed to customers assumes that the cost of equity is invariant with gearing once borrowing increases above the trigger level of 70%. This assumption is difficult to reconcile with standard finance theory. For Ofwat's approach to reflect 'outperformance' at all, it would imply that for higher gearing, the cost of equity increases at half of the rate implied by the Modigliani-Miller theorem.¹⁷⁰⁶ We have seen no evidence to support why this is a reasonable assumption about the relationship between the cost of equity and the gearing of the water companies.
- 9.610 Overall, we provisionally conclude that there is insufficient evidence in support of the GOSM as implemented by Ofwat. Specifically:
- (a) In addition to failing to provide evidence of potential customer harm, Ofwat has not provided evidence that highly-geared companies have achieved overall WACCs substantially lower than the notionally geared

¹⁷⁰⁶ For Ofwat's mechanism to be rational, it would have to suggest that a) WACC definitely falls with gearing (without the impact of taxes), and b) that the fall in WACC is the result of the cost of equity rising slower than would be suggested by the Modigliani-Miller WACC model (that shareholders were earning 'free' returns without additional risk, potentially as a result of the ability to secure cheaper debt even at high levels of gearing). More specifically, for their 50% benefit sharing ratio to be justified, the actual cost of equity would have to rise by at least 50% less than is suggested by the model. If this is not the case, Ofwat's GOSM would be extracting 'core' rather than 'excess' returns', effectively reducing the price control's allowed cost of capital only for highly geared companies

company, such that their shareholders are extracting sufficient excess returns on an ongoing basis to justify the benefit sharing functions of the GOSM as calibrated for PR19; and

- (b) Ofwat has not provided any analysis of what the associated risks with miscalibrating this mechanism may be.

9.611 We are also unclear as to how the benefit sharing elements of the mechanism interact with the risk mitigation elements. If a highly geared company chooses to remain highly geared and share the presumed benefit, this appears to do nothing to reduce the risk of leverage while diminishing the cash that the company will have available to deal with financial shocks. Conversely, if a company chooses to reduce gearing as a result of the introduction of the GOSM, that would suggest that there was no excess benefit to be shared with customers.

Ofwat's methodology for implementing the GOSM – Parties' views

Ofwat

9.612 Ofwat stated that since PR14 it had signalled that companies with less resilient structures should consider taking steps to improve financial resilience in the context of an expected lower allowed return at PR19, and that credit agencies have noted companies with less resilient structures might be unwilling or unable to maintain credit quality.¹⁷⁰⁷

9.613 Ofwat stated that in its 'Putting the sector in balance: position statement'¹⁷⁰⁸, it had set out that companies with high levels of gearing should share benefits with customers. Ofwat pointed out that at the draft determination stage, fourteen companies accepted its default mechanism in their business plans. Three companies, Thames, Bristol and South Staffs, did not accept Ofwat's mechanism, proposing their own mechanisms or amendments. Ofwat suggested that most companies did not comment on the GOSM in their representations.¹⁷⁰⁹

9.614 Ofwat noted that its initial plan was that companies with gearing levels that are 10 percentage points above its notional assumption (notional assumption is 60%) should share benefits with customers, but that in its

¹⁷⁰⁷ Ofwat, [Risk and return - response to common issues in companies' SoC](#), paragraph 5.4 including box and Figure 5.1

¹⁷⁰⁸ Ofwat (2018), [Putting the sector in balance; position statement on PR19 business plans](#), p37

¹⁷⁰⁹ Ofwat (2019), [Aligning risk and return technical appendix](#), section 9.3

final determination it incorporated a glidepath to the trigger point, starting at 74% and reducing to 70% by 2025.¹⁷¹⁰

9.615 Ofwat stated that its position change with regard to a GOSM (versus its position as part of the 'Putting the sector in balance' consultation) arose from the realisation that customer protection may not be as strong as it had previously considered and features of the regulatory framework distorted incentives which may allow companies and their investors to transfer some risk to taxpayers and/or customers.¹⁷¹¹

Disputing Companies

9.616 Anglian stated that Ofwat, in its 2016 consultation on the approach to cost of debt for PR19, specifically rejected a similar sharing mechanism for securitised structures based on three observations:

- (a) a sharing mechanism runs against the principle that shareholders should bear the costs associated with the securitised arrangements and, hence, might 'confuse the responsibility for bearing [such] costs';
- (b) a sharing mechanism renders the customer benefits dependent on the specific capital structures of the water companies;
- (c) a sharing mechanism creates unnecessary confusion while at the same time introduces 'additional complexity into setting the cost of capital'¹⁷¹²

9.617 Anglian stated that despite the introduction of a glidepath over PR19, the introduction of a GOSM does not take into account the costs and impracticality of reducing gearing in a short period of time. In order to repay debt to a point below the trigger point, Anglian would have to incur break costs which it considered to be exorbitant in the current low interest rate environment.¹⁷¹³

9.618 Bristol stated that as Ofwat's final determination revenue allowance was substantially lower than required to finance its plans, it was far more likely that the company would require increased gearing over the period. It also noted that it believes that its preference shares should be considered as equity for the purposes of considering gearing levels.¹⁷¹⁴

¹⁷¹⁰ Ofwat, [Risk and return - response to common issues in companies' SoC](#), paragraph 5.5

¹⁷¹¹ Ofwat, [Risk and return - response to common issues in companies' SoC](#), paragraph 5.6

¹⁷¹² [Anglian SoC](#), chapter K, section 2.3.2,

¹⁷¹³ [Anglian SoC](#), paragraph 1401

¹⁷¹⁴ [Bristol SoC](#), paragraphs 696–708

Third Parties

9.619 Southern Water stated that it has taken 30 years for companies to get to their current capital structures, and it would be hugely expensive to make changes, particularly when low interest rates are exacerbating mark-to-market values.¹⁷¹⁵

9.620 Thames Water stated that the GOSM is ‘at the very least’ an act of retrospective regulation, as it penalises companies for past decisions without allowing an appropriate time period in which to adjust. Thames Water does not think the mechanism should have been applied before 2025 to allow companies time to react to the new incentives.¹⁷¹⁶

Ofwat’s methodology for implementing the GOSM – CMA assessment

9.621 The GOSM does appear to introduce a significant change to the regulatory framework without sufficient opportunity for companies to make the required changes in a cost-effective manner. The evidence provided by the Parties suggests that the 74%-70% glidepath would not be adequate mitigation against the relatively abrupt implementation of the mechanism.

9.622 As a result, in addition to the concerns we have raised above about the form of the GOSM, we also consider that if a GOSM or other mechanism is to be implemented with the intention of encouraging firms to reduce gearing, it would be appropriate to do a further assessment of the time required to achieve those reductions and the cost involved in doing so.

GOSM - CMA provisional determination

9.623 We consider that Ofwat has legitimate concerns that customers face costs where the water companies have gearing well above notional levels, and this increase in gearing could have an adverse effect on financial resilience. In line with the position laid out in its ‘Putting the sector into balance’ document, Ofwat is also right to focus on ensuring that consumer confidence in the sector is maintained.¹⁷¹⁷

9.624 However, there are a range of existing regulatory tools in place that should help mitigate financial risks and their consequences. The examples of Wessex and Dwr Cymru discussed in paragraph 9.589 show that these tools have been successfully deployed without obvious harm to either

¹⁷¹⁵ [Southern Water submission](#)

¹⁷¹⁶ [Thames Water submission](#)

¹⁷¹⁷ Ofwat (2018), [Putting the sector in balance: position statement on PR19 business plans](#), section 1.7

customers or taxpayers. In addition, recent downgrades to credit ratings may already be exerting pressure on management and shareholders to reduce gearing. We therefore propose that the case for further interventions to promote financial resilience should be targeted at risks which are not effectively addressed by the existing regime.

9.625 In that context, we have concerns about the GOSM implemented by Ofwat at PR19. Our concerns relate to both the effectiveness of the GOSM and its design.

9.626 On effectiveness, the GOSM is triggered by the level of gearing, whereas in practice there are other factors that can influence the financial resilience of a water company and would therefore not be addressed by a GOSM. We are also concerned as to how the benefit sharing elements of the mechanism interact with the risk mitigation elements. If a highly geared company chooses to remain highly geared and share the benefit of this with its customers, this appears to do nothing to reduce the risks associated with leverage while diminishing the cash that the company will have available to deal with financial shocks that may occur.

9.627 On design, the GOSM has been implemented in a way which assumes that there is a certain level of outperformance from higher gearing which can be paid to customers. Ofwat provided limited evidence in support of the mechanism on the actual effects of higher gearing on financing costs or the relationship between gearing and the cost of equity. It is consistent with corporate finance theory that the cost of equity will increase with gearing, and the GOSM that Ofwat has implemented, which assumes the cost of equity is broadly stable with gearing above a certain level, is not consistent with this theory.

9.628 We are also concerned that a GOSM as proposed by Ofwat would represent a significant break from a well-established regulatory approach and may be seen by investors as punishing companies for previously sanctioned capital structures without offering sufficient evidence, clarity of justification or time to make cost-effective adjustments.

9.629 As a result, we have provisionally decided not to include a GOSM in our redetermined price control.¹⁷¹⁸

9.630 However, our decision should not be seen as a comment on the desirability of high levels of gearing or as downplaying the range of risks that may

¹⁷¹⁸ As a result of this provisional decision, we have not considered whether Bristol's preference shares should be considered as equity or debt for the purpose of the GOSM

impact long-term financial resilience within the sector. If Ofwat consider their existing regulatory tools to be insufficient to address this issue, we would encourage it to consider alternative remedies targeted more directly at specific financial resilience issues, and also to undertake a full assessment of the benefits and costs of the different options for intervention.

WACC range and our provisional assessment of the appropriate cost of capital allowance

9.631 As described in the paragraphs above, we have estimated a provisional range for each component of the WACC calculation (with gearing and issuance and liquidity costs having only point estimates) and have made provisional decisions on the application of a retail margin adjustment and a GOSM. We now take these individual ranges and decisions and convert them into an overall range for our provisional estimate of the cost of capital allowance as follows:

Table 9-24: CMA high and low WACC component estimates versus Ofwat PR19 decision

<i>CPIH-Real</i>	<i>Ofwat PR19</i>	<i>CMA Low</i>	<i>CMA High</i>
TMR	6.50%	6.20%	7.21%
RFR	-1.39%	-1.40%	-0.81%
Equity Risk Premium	7.89%	7.59%	8.00%
Unlevered Beta	0.29	0.27	0.32
Debt Beta	0.125	0.00	0.15
Equity Beta	0.71	0.65	0.80
Cost of New Debt	0.53%	0.21%	0.52%
Cost of Embedded Debt	2.42%	2.76%	3.16%
Proportion of New Debt	20%	21%	13%
Issuance and Liquidity Costs	0.10%	0.10%	0.10%
Pre-tax Cost of Debt	2.14%	2.32%	2.92%
Post-tax Cost of Equity	4.19%	3.56%	5.60%
Gearing	60%	60%	60%
Appointee-level Vanilla WACC	2.96%	2.82%	3.99%

Source: CMA analysis and Ofwat PR19 final determination

Note: The range for the equity beta is based on the lower and higher end of the measured equity betas, regressed to 60% based on the range of the beta betas. The lower end of the equity beta range is based on 0.27 unlevered beta and 0.15 debt beta, the

9.632 Table 9-24 illustrates that the CMA's estimated WACC range is wide, reflecting the uncertainty involved in estimating the required cost of capital. Ofwat's estimate of 2.96% sits within, but towards the bottom of our range¹⁷¹⁹. The companies' estimates also sit within our range, although closer to the top on average.

9.633 As part of our redetermination we must pick a point estimate for key components of the WACC as well as an overall cost of capital allowance. In doing so, the CMA is required to balance all of its relevant duties when setting an appropriate cost of capital allowance¹⁷²⁰. Ofwat, the Disputing Companies and Third Parties submitted evidence relating to where regulators should 'aim' their point estimates within their estimated ranges in order to best meet these duties. These submissions focused primarily on the finance and the customer duties. In the following paragraphs we consider the evidence that was submitted to the CMA on 'aiming' within the range of cost of capital estimates.

Arguments in favour of 'aiming straight' (picking the midpoint of the range as the point estimate):

Ofwat

9.634 Ofwat chose to present point estimates for each cost of capital metric and then calculated an overall WACC. Behind this process was analysis by EE that estimated a (nominal) range for the cost of capital of 4.49% to 5.48%. Ofwat's calculated nominal WACC of 5.02% sat at the 54th percentile (just above the midpoint) of this range. Ofwat noted that this allowed return was significantly lower than the ranges proposed by Economic Insight (5.6% to 6.6%) and Frontier Economics (5.4% to 6.1%) on behalf of the water companies.

9.635 Ofwat noted that (in CPIH-deflated terms), its appointee return of 2.96% was broadly at the middle of the range of 2.73% to 3.38% proposed by

¹⁷¹⁹ Ofwat's point estimate can be considered with reference to the 2.44% to 3.41% range proposed by their advisors, EE (converted from EE's 4.49% to 5.48% nominal range). See Ofwat (2019), [Allowed return on capital technical appendix](#), section 1.1 for further details

¹⁷²⁰ Please see Section 2 for an explanation of the duties the CMA must meet in this determination

Economic Consulting Associates in its 2019 report for CCWater¹⁷²¹. Ofwat also noted that its point estimate lies roughly in the middle of financial analyst expectations published between August and November 2019, which ranged from 2.9%, to 3.3%, and averaged 3.0%.¹⁷²²

- 9.636 In a written submission following discussion at Ofwat's hearing with the CMA on 22nd July, and in direct reference to the 'Oxera' arguments discussed in paragraphs 9.654 to 9.658, Ofwat informed the CMA that in its view its statutory duties require that water companies are able to earn a reasonable return on their capital, and that setting a return above the 'reasonable' level is not a form of 'super-compliance' with that requirement but amounts to non-compliance. Ofwat stated that the duty requires that an efficient company is able to secure a reasonable return – nothing less, but also nothing more. In addition, the duty must be applied together with the (related and consistent) duty to protect the interests of consumers. As such, aiming-up would be a poorly targeted and ineffectual use of consumers' funds, and would therefore operate against their interests.
- 9.637 Ofwat did not consider the Oxera approach to be defensible, in the light of the statutory framework within which it (and the CMA) must operate, and the requirement placed on both to satisfy the statutory duties in the round. Ofwat stated that for PR19 it had focused on choosing point estimates which were most likely to be representative of the cost of capital faced by the notionally geared company over 2020-25, investing in predominantly long-lived assets. While not precluding the practice of picking from the high end of the plausible range for individual parameters, their starting point was to pick from the midpoint – deviating only where there was evidence that this would be liable to result in a more accurate forecast. Ofwat considered that this policy best supports its objective of a reasonable allowed return over 2020-25.
- 9.638 Ofwat was not convinced that aiming up would tend to increase welfare for water consumers, for the following reasons:
- (a) MARs implied by listed company share prices since the announcement of PR19 have been significantly higher than the historic average of 1.09x RCV, and that observed valuations are difficult to explain without a contribution from cost of equity outperformance.

¹⁷²¹ Economic Consulting Associates (2019), [Update to our Recommendations for the Cost of Capital 2020-2025, Final Report](#). We note that this report suggests a CPIH real range of 2.65 to 3.31%, with the difference to the figures suggested by Ofwat presumed to reflect the 7bps of difference in inflation assumption

¹⁷²² Ofwat (2019), [Allowed return on capital technical appendix](#), section 1.1

- (b) Other incentives matter more to investment decisions than aiming-up in determining the allowed return. Under the PR19 framework, companies are strongly incentivised to minimise Totex subject to achieving satisfactory services levels. The financial incentives to companies of underspending (through Totex cost sharing rates) are more high-powered than earning an 'aiming-up wedge' on new investment, while the risk of consumer detriment from underinvestment is mitigated by the performance commitment regime, its outcome delivery incentives, and the statutory enforcement regime. This suggests that aiming-up would be ineffective at increasing investment and is not required from a consumer welfare perspective.
- (c) The order of magnitude of any reasonable 'aiming-up wedge' is in the low tens of basis points on the WACC. In its advice to Ofwat for final determinations, EE proposed a nominal range of 4.49% - 5.48%, with a point estimate of 4.83%. Ofwat calculated applying a similar approach to the UKRN's case study concerning the New Zealand Commerce Commission (which used the 67th percentile), would therefore give an alternative point estimate of 5.15%, or an 'aiming-up wedge' of around 30 basis points. Ofwat said that the costs of providing a return of that scale over the life of the assets would be fully offset by the financial incentives in place in PR19 through Totex cost sharing rates, and therefore that there was no need to aim up to promote investment.
- (d) The regime around service levels also protects customers from in-period underinvestment. If this causes failure to achieve targets, it will tend to result in underperformance payments to customers, and possibly enforcement action with a range of potential penalties which could even lead to license termination. In respect of certain schemes (for example, Northumbrian's water resilience enhancement programme) non-delivery ODIs have also been set which return to customers the value of Totex cost sharing which would otherwise accrue to firms for underspending. This ensures that companies must use the Totex funding for these projects or lose it. Overall, these disincentives heavily limit the extent to which it would be profitable to cut back planned new investment in the context of a too-low WACC.
- (e) Finally, applying any 'aiming-up' wedge to the entirety of the RCV is not relevant to the perceived credibility of any commitment to apply such an uplift over the economic life of new investments. This is because it does not address the key issue of convincing investors that regulators can bind the hands of their successors at future price reviews. Applying an uplift that is meant to incentivise new investment to sunk investment would

therefore seem to imply a transfer from customers to investors for no discernible customer benefit at all.

Market-Asset-Ratio analysis

9.639 In its response to common issues in companies' 27 May submission to the CMA document¹⁷²³, Ofwat updated its MAR assessments following criticisms (from the Disputing Companies) of its previous analysis. Ofwat stated that on the basis of any of the approaches set out in Table 9-25, the residual MARs above 1.0 indicate that the final determination allowed cost of equity was at or slightly above the market's required cost of equity.

Table 9-25: Ofwat estimates of SVT and UU MARs

Table 3.1: Residual MAR after adjusting for non-cost of equity outperformance:

	Severn Trent	United Utilities
'Europe Economics 2017 approach'	1.07	1.02
'Barclays Approach with EE values'	1.04	1.04
'Barclays approach'	1.05	1.02

Source: Ofwat and Europe Economics Analysis of Refinitiv data

Source: Ofwat, Response to common issues in companies' 27 May submissions to the CMA

9.640 Northumbrian, in its reply to Ofwat's response, analysed MAR between February and March 2020. This data implied a MAR of 1.27x for Severn Trent and 1.23x for United Utilities, which Northumbrian stated was consistent with Ofwat's statement that analyst reports point to a MAR of 20% for United Utilities and well in excess of 20% for Severn Trent.

9.641 Northumbrian argued that decomposition analysis showed that a significant amount of the outperformance could be readily explained by taking into account evidence from several sell side analyst reports analyst reports into company specific factors for share price performance. However, given the

¹⁷²³ Ofwat, [Risk and return – response to common issues in companies' 27 May submissions to the CMA](#), paragraph 3.7 including Table 3.1

exercise of judgement involved, there was a degree of variation in analyst assumptions on outperformance and the proportion of non-regulated and non-wholesale activities. Taking all the evidence in the round, Northumbrian estimated the adjusted MAR range for Severn Trent and United Utilities to be 0.93 – 1.08%, suggesting that it was ‘far from clear’ that there was premium to MAR after outperformance.¹⁷²⁴

9.642 Yorkshire stated that Ofwat’s original analysis did not adjust headline MARs for non-regulated businesses and should have included United Utilities. Yorkshire provided new analysis which it argued corrected for these factors and, using data from April and May instead of February, gave a residual MAR of 0.98 to 1.02 for Severn Trent and 0.95 to 0.97 for United Utilities.¹⁷²⁵

9.643 Northumbrian, Bristol, and Anglian submitted that Ofwat’s analysis did not control for other non-cost of equity factors affecting share and so cannot be used to draw conclusions about the required cost of equity for the sector.¹⁷²⁶

Citizens Advice

9.644 In its Monopoly Money report¹⁷²⁷, Citizens Advice argued that customers of essential services provided by regulated monopolies have overpaid by billions of pounds since privatisation. Citizens Advice claimed that its ‘conservative’ estimate is that the overpayment in water has been £11 billion.

9.645 Citizens Advice directly addressed the issue of aiming up and submitted that there is no evidence of the problem that aiming up is trying to solve. It stated that companies rarely, if ever, have difficulty raising necessary investment, while all company owners have license requirements to provide this investment. Citizens Advice stated that if the existing owners are not forthcoming with required investment, regulators may take enforcement action.

9.646 Citizens Advice suggested that this could be more of an issue if demand for infrastructure assets was reducing, as capital flight could lead to serious under-investment in vital essential services. However, it argued that the

¹⁷²⁴ Northumbrian’s Reply to Ofwat’s Response, paragraphs 428-430

¹⁷²⁵ Yorkshire’s Reply to Ofwat’s Response, paragraph 7.6.2

¹⁷²⁶ Northumbrian’s Reply to Ofwat’s Response, section 6.3, Bristol Reply to Ofwat Response, paragraph 175, Yorkshire’s Reply to Ofwat’s Response, section 7.6

¹⁷²⁷ Citizens Advice (2019), *Monopoly Money – How consumers overpaid by Billions*

opposite is the case, and cited JP Morgan data suggesting rising appetite for infrastructure investment.

- 9.647 Citizens Advice also noted that the desire for regulatory consistency can also lead regulators, and specifically the CMA, to err on the side of caution. It noted that in our Bristol PR14 Determination, we allowed Bristol a higher debt allowance partly due to worries about ‘the risk of regulatory inconsistency with the overall approach to the cost of capital’. Citizens Advice said it believed that regulators’ decisions on cost of capital may in part be informed by a fear that the CMA may disallow new approaches that might better estimate the cost of capital.

Arguments in favour of ‘aiming up’ by picking a point estimate above the midpoint of the range:

UKRN Report

- 9.648 In the often referenced 2018 UKRN report, Estimating the cost of capital for implementation of price controls by UK Regulators, by Wright et al¹⁷²⁸, the authors noted that in the original version of this report (2003, Mason, Miles and Wright¹⁷²⁹) they had argued that, in the face of asymmetric risks of over- versus under-estimating the true WACC, there may be a case for regulators to set the regulatory allowed return (RAR) in such a way that the regulator’s regulatory expected return is above the best estimate of the WACC.
- 9.649 The authors noted that this ‘aiming up’ has been regulatory practice in a number of countries, and in New Zealand has been formalised to require the 67th percentile to be used. Other regulators have exercised their judgement in choosing from within the range.
- 9.650 The report noted that there has been considerable variation across UK-based regulators as to where in the range the regulatory allowed return (RAR) is set.¹⁷³⁰ The range in the data above goes from the 2014 Ofgem

¹⁷²⁸ Burns P, Mason R, Pickford D, Wright S (2003), [Estimating the cost of capital for implementation of price controls by UK Regulators](#), Section 8.2

¹⁷²⁹ Mason R, Miles D, Wright S (2003), [A study into certain aspects of the cost of capital for regulated utilities in the UK](#)

¹⁷³⁰ The authors differentiate between the regulatory allowed return (RAR) and the regulatory expected return (RER). By the authors definitions, RAR corresponds to ‘what in the past has typically been referred to as allowed WACC’. The authors state that this is a misnomer and that the RAR is the return on the regulatory asset base before allowing for the impact of outperformance or underperformance on cost of service level. The RER is defined as the RAR, plus any expected increase in returns mostly for outperforming the cost and service targets set by the regulator. For our purposes we focus here on the RAR. For further details see Burns P, Mason R, Pickford D, Wright S (2003), [Estimating the cost of capital for implementation of price controls by UK Regulators](#), section 1.2

decision, which chose a RAR of 3.80% from a range 3.79%- 4.21%; to the 2014 CC decision, which chose a RAR at the top of the range (a value of 4.10% from a range 3.30%-4.10%).

9.651 The authors noted that, for any particular regulator, there was considerable variation across decisions as to where in the range the RAR is set. For example, across 10 Ofgem decisions in their database, the degree of aiming up has varied from very close to the lowest point in the range to the 83rd percentile.

9.652 The authors differentiated between the risks that are applicable when considering new investment versus sunk investment:

- (a) In their analysis the authors assume that for new investment (that is investment which has not yet taken place), setting the WACC estimate below the 'true' WACC leads to an entire loss of investment by the companies and a significant negative impact on customer welfare. In the opposite scenario, setting the WACC too high (leading customers to overpay) leads to a relatively small negative impact on customer welfare. The implication of this asymmetry is that for regulated firms, where the elasticity of demand¹⁷³¹ is low, the optimal WACC point estimate for new investment routinely lies above the 90th percentile of the range.
- (b) By contrast, once an investment is sunk, there is (obviously) no risk that investment will not occur if the WACC point estimate is too low. At the same time, regulators are required to ensure financeability of regulated firms. The report concludes that the correct WACC estimate for old (sunk) investment is therefore the expected WACC; this is the mid-point of the estimated range.

9.653 The authors acknowledged that they do not have a precise answer for how large this 'aiming up' should be, and note several objections to their approach, including that the metrics being estimated are volatile, that we are dealing with forecasts that cannot be measured and that any required adjustments would be complicated and would lead to volatile customer bills. They argued that if the regulator was only interested in incentivising new investment, the RAR would be set at a value such that the RER was above the 90th percentile of the regulator's range of estimates of the true WACC. However, the report also argued that for sunk investment future financeability simply requires that existing capital earns the expected WACC - of which the best estimate is the midpoint of the range. So, the

¹⁷³¹ Defined as changes in customer demand in relation to changes in prices

target value of the RER should reflect the balance between new and sunk investment.

Heathrow Airport Limited

- 9.654 Heathrow Airport Limited resubmitted analysis by consultants, Oxera, originally submitted to the CMA as part of the NATS/CAA appeal.¹⁷³² In its report¹⁷³³, Oxera pointed out that the UKRN's assessment that setting a WACC that was too low would lead to a complete loss of investment is arguably an extreme assumption. It investigated whether the overall conclusions of the UKRN paper still held if this assumption was relaxed.
- 9.655 Oxera's analysis assumed that in setting the allowed return, regulators were implicitly seeking to minimise expected losses to customers that materialise as a function of:
- (a) if the regulator sets the allowed return above the 'true' WACC, the loss to customers is the difference in welfare between the current and lower price they should have paid; or
 - (b) if the regulator sets the allowed return below the 'true' WACC, there is a risk of underinvestment and the loss to customers is equal to a fraction of the welfare that they would have enjoyed if the optimal level of investment had incurred.
- 9.656 Oxera noted that since the true WACC is unobservable, the regulator cannot expect its best estimate of WACC to be exactly equal to the true value of WACC. Given this uncertainty, the regulator seeks to minimise the expected loss that can occur to customers.
- 9.657 Oxera also addressed the issue of sunk investments, where the UKRN argued that as this investment has already been carried out, it is optimal to ensure the lowest possible regulated price and therefore the highest possible customer surplus. In the UKRN's view noted above, this would mean setting the WACC at the 'expected' (often midpoint) level. Oxera argued that this approach may not be correct, suggesting that in a world where companies are considering potential capacity expansions to their existing assets or construction of greenfield assets, regulatory treatment of sunk investment can affect future projects as well. All else equal, if investors learn that the regulator intends to aim up during the first regulatory period only, they will expect lower cash flows over the lifetime of

¹⁷³² [Heathrow Airport Limited Submission](#)

¹⁷³³ Oxera (2020), [Is aiming up on the WACC beneficial to customers?](#)

the project. This, in turn, decreases the attractiveness of the project and could in some cases jeopardise its economic viability.

9.658 Oxera concluded that (with reference to airport charges):

- (a) even with a low proportion of investment at risk, aiming up on the WACC is still likely to be in the customer's interests;
- (b) the lower the price elasticity of demand, the higher the 'safety cushion' between the allowed return and the central estimate of WACC should be; and
- (c) for realistic values of price elasticity, customer welfare is maximised by setting the allowed return at or above the 96th percentile of the WACC distribution.

ENA

9.659 As part of their submission, ENA included a report by Frontier Economics that included views on aiming up. Frontier Economics also presented these views at the CMA's cost of capital roundtable. While the UKRN and Oxera arguments above focus on the objective of securing capital for specific investment projects within the sector, Frontier Economics submitted that the dependence of all parts of the economy on robust utility supplies (energy in the case of their report for Ofgem's price control), mean that the potential disruption to service is considered unambiguously more harmful to customer interests than marginally higher-than-necessary charges. This creates a rational preference for regulators to 'aim up' when selecting their point estimate for the cost of capital from their estimated range. FE submitted that this fact has meant that it has become common regulatory practice for regulators to 'aim up' within the reasonable range, when setting the allowed rate of return.

9.660 Frontier Economics concluded that aiming up is an optimal regulatory response to the uncertainty inherent in estimating the cost of equity and the asymmetry of the consequences arising from setting the allowed return too high or too low.

CMA – SONI 2017

9.661 In the SONI case, the CMA faced the challenge of whether the regulator's price control implied an asymmetric risk profile and whether by extension

this meant that the expected return on capital would be below the midpoint of the WACC. The CMA noted that¹⁷³⁴:

‘12.102 We recognise that the circumstances in this case are unusual, and that regulators do not usually set allowances to reflect asymmetric risk. Our remedy reflects the unusual circumstances of this case, and in particular the proportion of SONI’s costs which are recoverable through the capped cost recovery mechanism is so high, comprising £37 million of costs over the Price Control Period. The application of asymmetric risk to such a large proportion of SONI’s costs without a corresponding return would be inconsistent with the expectations of investors that, on average, returns would be expected to be consistent with the cost of capital.

12.103 We therefore have decided that an adjustment to reflect the existence of asymmetric risk within the capped cost recovery mechanisms applied to Dt and PCNPs is appropriate.

12.109 Taking into account the issues discussed above, we consider that an uplift of 3% is appropriate.

12.110 Our judgment on the evidence is that at this level, there is a credible balance of risk for SONI, including that it may incur greater losses than this if it is inefficient. In other words, if SONI is efficient, it will earn a small premium to its cost of capital, and if it is inefficient, it will earn below its cost of capital. This ensures financeability, and these outcomes are consistent with normal regulatory practice.

12.111 We also consider that the decision is proportionate as the effect on customers is very small: this adjustment is equivalent to less than 10 pence per annum on customer bills. In that context, we consider that the existence of an adjustment which explicitly supports SONI’s financeability and the need to be efficient in respect of what are some of the most important parts of the TSO’s role is appropriate.’

9.662 We would note that this adjustment for asymmetry was specifically considered as appropriate for SONI as a function of a very small asset base. This may not be applicable for the water sector in which any

¹⁷³⁴ CMA (2017), *SONI Limited v Northern Ireland Authority for Utility Regulation - Final Determination*, paragraphs 12.102–12.103 & 12.109–12.111

asymmetric risks arising from the skew in performance metrics may be adequately mitigated by the presence of a large RCV. In the NATS/CAA appeal, the CMA acknowledged that, in the long run, customers' interests may be served by a premium to the cost of capital. However, given that the premium would apply to assets already in place as well as promoting new investments, it might only need to be small to be effective. In the case of NATS/CAA, such a premium was not considered necessary.¹⁷³⁵

Aiming up/down – CMA analysis

9.663 As a starting position, we are satisfied that our estimates of the components of the WACC are reasonable, and that by implication the overall WACC range above constitutes our best estimate of the actual cost of capital over the price control (given the information we have available when making the estimates). We have not tried to aim up or down when setting the individual metric estimates.

9.664 We note that, however satisfied we are with the reasonableness of our estimates, they are estimates and thus are subject to uncertainty. This uncertainty is not uniform across the metrics. For example, we know that:

- (a) the cost of embedded debt that has been raised over the previous 20 years is likely to fall in the near future as we can observe that interest rates have definitively fallen over that period (and even longer). On average, a notionally structured company could be expected to have older and more expensive debt replaced by newer, cheaper debt as we progress through the price control;¹⁷³⁶
- (b) the cost of new debt will be subject to a true-up mechanism as part of the PR24 process (see paragraph 9.375); and
- (c) conversely, the cost of equity estimate is intrinsically based on assumptions about the future which we cannot observe in advance. Here we have to estimate an RFR, ERP and beta that will apply in future years based on the best evidence we have today.

9.665 However effective our forecasting techniques, our estimate of the cost of equity will be subject to greater error than our estimate of the cost of debt, and the actual cost of equity for investors may ultimately be higher or lower than our forecast. We have therefore considered in particular the need to

¹⁷³⁵ CMA (July 2020), [NATS/CAA](#), paragraphs 13.295-13.296

¹⁷³⁶ See Appendix C, Figure 16 for a graph showing falling benchmark lending rates over the last 20 years

‘aim up’ to reflect this uncertainty in the level of the cost of equity. We considered:

- (a) Aiming up to promote investment in new assets in AMP7;
- (b) Aiming up to promote investment in the water sector more broadly;
- (c) Asymmetry of returns; and
- (d) Other cross-checks on the overall level of the WACC.

9.666 We are not persuaded that there is a sufficiently strong case for ‘aiming up’ solely to ensure that the firms have incentives to undertake specific new asset investments in AMP7. Ofwat and Citizens Advice have identified a range of measures in place that should help to ensure that sufficient investment takes place and that adequate levels of customer service are maintained throughout the price control.

9.667 The broader concept of ‘promoting investment’ covers the overall willingness of investors to commit capital to the sector, and therefore to ensure that there is continuing investment in the water sector, not just in the specific investments identified in AMP7. Should the cost of capital be set too low and this led to an exit of capital from the sector, this would have an adverse effect on the sector’s longer-term attractiveness to investors. This would, in practice, be likely to result in a higher medium-term cost of capital and/or a risk to availability of finance for future investment. There are well-established arguments that underinvestment caused by a cost of capital being set too low damages the overall welfare of consumers (and potentially the wider economy) materially more than the welfare lost through bills that may be slightly too high.

9.668 We also are aware that there is a long history of regulatory decisions highlighting the asymmetry of risk from setting the cost of capital too high or too low. Regulators have taken a variety of approaches to this issue, and each decision should be based on the evidence relating to the case in question. However, we note that the most common decision has been that some ‘aiming up’ has been merited in order to promote investment in the sector, and that there may be benefits to consistency – including ensuring investor confidence in the sector.

9.669 We consider this analysis in response to Ofwat’s submissions that it is only appropriate to aim straight, and that aiming up would be the incorrect way to balance the finance and consumer duties within this price control. We recognise that the case for ‘aiming up’ is balanced, with market-asset ratios

suggesting that investors would continue to provide capital at Ofwat's WACC.

- 9.670 We also consider that there are broader reasons for considering a WACC above the mid-point in this determination, relating to financeability and asymmetric risk.
- 9.671 On PCs and ODIs, we have taken a similar approach to Ofwat and have provisionally proposed a package of penalty-only and asymmetric ODIs which expose companies and their investors to asymmetric risk. The addition of downside-only risks to an otherwise balanced package of incentives means that the expected return for an average investor will be slightly below the cost of capital. The scale of this shortfall is difficult to measure accurately, but our analysis in Section 7 suggests that an average performing company could face a potential loss of around 0.1% to 0.2% impact on RoRE on penalty-only and asymmetric ODIs, with no potential for directly offsetting rewards¹⁷³⁷. Whilst a company that hits all its targets will face no penalties, a consequence of setting challenging targets is that there is an expectation that an average company is likely to have a range of performance against the different targets. Where that company faces penalty-only incentives, that will result in an expected return to customers.
- 9.672 For the reasons highlighted in relation to our SONI decision (see paragraph 9.662), we consider that if the expected return is below the allowed return, this also provides justification for a small adjustment to the allowed WACC.
- 9.673 We have also considered as a cross-check on the WACC the ratios that arise from our financeability assessment. We have not taken the same comfort as Ofwat that accelerating revenue, for example through higher PAYG ratios, can be relied upon to improve credit ratings for the reasons outlined in Section 10. The WACC is the main driver of expected financial ratios. There is a legitimate concern that, if the WACC is set too low, notionally geared companies would not be able to retain strong investment-grade credit ratings.

WACC – CMA provisional determination

- 9.674 After careful consideration, we have decided that some aiming away from the mid-point within our ranges is appropriate. There is significant investment required within the sector over AMP7 and beyond, in particular on projects that help to control and prevent the impacts of climate change.

¹⁷³⁷ See paragraphs 7.235 – 7.239 for more details on the RoRE impact from penalty-only and asymmetric ODIs

In that context we have provisionally decided that it is appropriate to reflect the risk of error in our cost of capital component metric estimates when choosing a point estimate for the WACC, given the potential costs of setting the cost of capital too low. We also consider that there are reasons specific to this determination, related to asymmetry and financeability, which justify a degree of caution against setting the cost of capital too low. As a result, we have decided to take the following approach to aiming within our range of metrics:

- (a) On the cost of embedded debt, we have taken a point estimate at the bottom of the range to reflect the fact that average embedded costs of debt for the notionally-capitalised company are likely to fall mechanically over the price control. Our point estimate is 2.76%.
- (b) On the cost of new debt, we pick a point estimate at the mid-point of the range. We consider this allowance to be appropriate for the notionally-capitalised company today, and note that risks to the company and the consumer have been reduced due to this measure being subject to a true up mechanism based on subsequent moves in our A/BBB benchmark indices. We also take the midpoint of our range on the proportion of new debt. Our point estimate for new debt is 0.37% while our point estimate for the proportion of new debt is 17%.
- (c) On the cost of equity, we acknowledge that our estimates are significantly more likely to suffer from error. We adjust for this by picking a point estimate of the cost of equity midway between the midpoint and the top of the range.¹⁷³⁸

9.675 In our judgement, this approach acknowledges the varying potential for error in our estimates whilst also appropriately adjusting for any asymmetric risks to customers from underinvestment without being unnecessarily generous to shareholders.

9.676 As a result, we estimate a cost of debt allowance of 2.45% and a cost of equity allowance of 5.08%. Weighted by 60% gearing, this gives an overall appointee level cost of capital allowance for the price control of 3.50%, 0.54% higher than Ofwat's PR19 decision of 2.96% and just above the top of the range suggested by their advisors, EE. Our 3.50% appointee level estimate of the cost of capital allowance sits at the 58th percentile of our WACC range, so is 'aimed' slightly above the midpoint.

¹⁷³⁸ We apply this methodology to each appropriate component metrics of the cost of equity (rather than at the overall level of the cost of equity, which would give a fractionally different result).

9.677 The results of this approach are shown in Table 9-26.

Table 9-26: CMA point estimates of WACC components versus Ofwat PR19

<i>CPIH-Real</i>	<i>Ofwat PR19</i>	<i>CMA Point Estimate</i>
TMR	6.50%	6.95%
RFR	-1.39%	-0.96%
Equity Risk Premium	7.89%	7.91%
Unlevered Beta	0.29	0.31
Debt Beta	0.125	0.04
Equity Beta	0.71	0.76
Cost of New Debt	0.53%	0.37%
Cost of Embedded Debt	2.42%	2.76%
Proportion of New Debt	20%	17%
Issuance and Liquidity Costs	0.10%	0.10%
Pre-tax Cost of Debt	2.14%	2.45%
Post-tax Cost of Equity	4.19%	5.08%
Gearing	60%	60%
Appointee-level Vanilla WACC	2.96%	3.50%

Source: CMA analysis and Ofwat PR19 final determination

9.678 For ease of comparison, we present our estimates in nominal, CPIH-real and RPI-real below:

Table 9-27: CMA WACC component estimates in nominal, CPIH-real and RPI-real terms

<i>WACC Components</i>	<i>Nominal</i>	<i>CPIH-Real</i>	<i>RPI-Real</i>
TMR	9.09%	6.95%	5.99%
RFR	1.02%	-0.96%	-1.85%
Equity Risk Premium	8.07%	7.91%	7.84%
Unlevered Beta	0.31	0.31	0.31
Debt Beta	0.04	0.04	0.04
Equity Beta	0.76	0.76	0.76
Cost of New Debt	2.38%	0.37%	-0.54%
Cost of Embedded Debt	4.81%	2.76%	1.83%
Proportion of New Debt	17%	17%	17%
Issuance and Liquidity Costs	0.10%	0.10%	0.10%
Pre-tax Cost of Debt	4.50%	2.45%	1.53%
Post-tax Cost of Equity	7.18%	5.08%	4.14%
Gearing	60%	60%	60%
Appointee-level Vanilla WACC	5.57%	3.50%	2.57%

Source: CMA analysis

9.679 As a result of our approach, and in conjunction with the other decisions within this determination, customer bills at the four Disputing Companies will fall by an average of 9.3% in this price control. If we had picked the midpoint of our cost of capital range as our estimate, customer bills would have fallen by approximately a further 0.50%.

9.680 Using Ofwat's PR19 cost of capital allowance would have resulted in customer bills at the four Disputing Companies falling by approximately 12.6% on average. However, due to the issues discussed above and in the coming Financeability section, we consider our cost of capital allowance achieves the right balance for customers, who benefit not only from lower bills but also from continued investment in the water and sewerage networks

Our Cost of Capital allowance in context

Our decision in the context of PR19 and PR14

9.681 In the following paragraphs we compare our cost of capital allowance to Ofwat's PR19 decision and the cost of capital allowance at Ofwat's previous price control, PR14. For ease of comparison across time periods, we compare all figures in RPI-real terms, not the CPIH-real we have used elsewhere in this section.¹⁷³⁹

Table 9-28: CMA cost of capital estimates versus PR19 and PR14 allowances

<i>RPI-Real</i>	<i>CMA</i>	<i>Ofwat - PR19</i>	<i>Ofwat - PR14</i>
TMR	5.99%	5.5%	6.75%
RFR	-1.85%	-2.35%	1.25%
ERP	7.84%	7.8%	5.50%
Unlevered beta	0.31	0.29	0.30
Debt beta	0.04	0.125	0.00
Equity beta	0.76	0.71	0.80
Cost of new debt	-0.54%	-0.45%	2.00%
Cost of embedded debt	1.83%	1.43%	2.65%
Proportion of new debt	17%	20%	25%
Issuance and Liquidity costs	0.10%	0.10%	0.10%
Pre-tax cost of debt	1.53%	1.15%	2.59%
Post-tax cost of equity	4.14%	3.18%	5.65%
Notional Gearing	60%	60%	62.5%
Appointee Allowed Return on Capital (Vanilla)	2.57%	1.96%	3.74%

Source: CMA analysis and Ofwat PR14 final determination and Ofwat PR19 final determination

9.682 As demonstrated in Table 9-28, our cost of capital allowance of 2.57% (RPI-real) is 0.61% higher than Ofwat's PR19 decision but represents a significant 1.17% reduction in comparison to the allowance awarded to companies in PR14.

¹⁷³⁹ Calculated as our CPIH-based estimates, deflated by 0.90%

- 9.683 In terms of the cost of debt, our allowance is 0.38% higher than Ofwat's PR19 decision. This higher estimate is the result of measuring benchmark costs for embedded debt over 20 rather than 15 years, market price falls in the benchmark for the cost of new debt and our decision to lower the proportion of new debt to 17% (versus Ofwat's 20%). While we do not use the 0.25% outperformance wedge on embedded debt or the 0.15% outperformance wedge on new debt that Ofwat applied to its PR19 decision, neither do we uplift our estimate for any market implied rise in future interest rates. These two differences to Ofwat's methodology largely cancel each other out in terms of our cost of debt allowance.
- 9.684 Our cost of debt allowance is 1.06% lower than Ofwat's PR14 decision, predominately on the basis of a longer trailing average from embedded debt and a reduction in overall borrowing costs since 2014.
- 9.685 Our cost of equity allowance is 0.96% higher than Ofwat's PR19 decision. 0.50% of this difference is accounted for by our decision to aim up to the 75th percentile on cost of equity metrics in order to recognise the higher potential for error within our cost of equity assumption. Comparing midpoint estimates, we also estimate slightly higher TMR and equity betas and lower debt betas.
- 9.686 Our cost of equity allowance is 1.51% lower than the allowance companies received in PR14. This is a result of a structurally lower estimate of TMR on the basis of new thinking about historic inflation data, the inclusion of a debt beta in our estimates and falls in the market level of the RFR.

10. Financeability

Introduction

10.1 In this section we assess the financeability of the four Disputing Companies under our determinations. One of the five principal duties under Section 2(2A) of the WIA91 requires Ofwat, and therefore the CMA, to decide the reference in accordance with its duty to ensure that a company is able to finance the proper carrying out of its functions (in particular, by securing reasonable returns on its capital). This is often referred to as the Finance Duty or ensuring 'financeability'. In this section, we highlight the financeability approach taken by Ofwat and the key arguments from the Main Parties, before undertaking our own assessment of the financeability of each of the companies.

Background and Ofwat's approach at PR19¹⁷⁴⁰

- 10.2 Ofwat interprets its financing duty as a duty to secure that efficient companies that meet their service and performance commitments will earn the allowed return. Ofwat stated that it conducts a financeability assessment to check that, when all the individual components of their determination are taken together (including Totex, allowed return and retail margin, as well as its proposals for Pay As You Go (PAYG) and Regulatory Capital Value (RCV) run-off¹⁷⁴¹), an efficient company can finance its functions.
- 10.3 Ofwat set its cost of capital using a notional gearing of 60%, which is generally lower than the actual gearing of the regulated water companies. Ofwat assessed whether allowed revenues, relative to efficient costs, were sufficient for a company to finance its investment on reasonable terms and to deliver its activities in the long term, while protecting the interests of existing and future customers.
- 10.4 Ofwat's PR19 Methodology stated that it expected each company to provide Board assurance that its plan is financeable on both its actual capital structure and on the notional capital structure. Ofwat expected these Board statements to set out the steps taken to provide the required assurance and explain the credit rating that they have targeted and the associated level of financial ratios which are required. If companies needed to take action to address issues of actual financeability, then Ofwat would expect companies to set out how they

¹⁷⁴⁰ Ofwat (2019), *PR19 final determinations: Aligning risk and return technical appendix*, section 6

¹⁷⁴¹ PAYG and RCV run off both involve advancing revenues from future price controls in order to cover cashflow deficits in the current price control.

have addressed these issues and provide compelling evidence of their financeability at the time they submit their business plan.

- 10.5 Ofwat considered that companies facing a financeability constraint under the notional capital structure would need to demonstrate in their business plans how this would be addressed, including the underlying cause, and actions to mitigate the constraint. Ofwat identified a range of actions that it considered companies could take to address a financeability constraint including the use of PAYG/RCV run-off, restriction of dividends and equity injections.
- 10.6 Ofwat stated that the financeability challenge was particularly acute at PR19 because the return related to the RPI-linked part of the RCV was low in real terms. Ofwat stated that the ratio of cash return to inflation return for the RPI-linked part of the RCV, at 39%, was materially lower than at any previous determination.
- 10.7 Ofwat stated that for PR19, the transition to inflate part of the RCV by CPIH mitigates the financeability challenge to some extent. Ofwat stated that, assuming the average transition to CPIH by the end of the period was 63.6% of RCV, the real return on a blended RPI/CPIH basis would result in an implied adjusted interest cover ratio (AICR)¹⁷⁴² for PR19 consistent with PR14, though this would vary between companies depending on the relative proportions of RCV that are inflated by RPI and CPIH.¹⁷⁴³
- 10.8 In assessing how to improve the financial ratios in its financeability assessment, Ofwat considered increasing its assumption on the use of index-linked debt. However, Ofwat noted that changes to such an assumption could have a material impact on the financeability assessment, which in its view showed that 'guidance' (from credit rating agencies) on the level of adjusted interest cover should not be interpreted as a strict minimum requirement.
- 10.9 Ofwat also considered a quicker transition to CPIH within its final determination, but concluded that its planned transition managed the needs of companies, investors and the impact on customer bills.¹⁷⁴⁴
- 10.10 In its financeability assessment, Ofwat focused on what it considered to be the key measures of indebtedness and ability to service and repay debt which were: gearing, interest cover, and funds from operations (FFO) to net debt ratios. This was consistent with the approach taken by companies in their

¹⁷⁴² The Adjusted Interest Cover Ratio (AICR) is sometimes referred to by Parties as the Adjusted Cash Interest Cover Ratio (ACICR). Within this section we will refer to it as AICR to avoid confusion and in line with the terminology used by Ofwat.

¹⁷⁴³ Ofwat (2019), *PR19 final determinations: Aligning risk and return technical appendix*, section 6.3 including table 6.2

¹⁷⁴⁴ Ofwat (2019), *PR19 final determinations: Aligning risk and return technical appendix*, section 6.3

business plans and by credit rating agencies that apply higher weightings to similar financial measures. Ofwat took into consideration the financial ratios deemed most significant by companies and the level of those ratios upon which the company has provided Board assurance of financeability and long-term financial resilience.

- 10.11 In addition, Ofwat made an adjustment to the adjusted interest cover ratio for companies that recover capitalised infrastructure renewal expenditure (IRE)¹⁷⁴⁵ through PAYG revenue. Ofwat did this to ensure that the cash flow included in the calculation of funds from operations was more comparable across companies. It also excluded pension deficit repair costs that were not funded by customers.
- 10.12 Ofwat stated that if financeability challenges resulted from insufficient levels of cash flow headroom, then the appropriate response was to alter cash flows through the use of NPV-neutral changes to PAYG or RCV run-off rates, provided that the use of these levers did not lead to a material depletion of the RCV.
- 10.13 In addition, Ofwat assumed that a notional company with higher RCV growth should finance some of that growth with retained earnings. Where companies had material RCV growth (real growth greater than 10% over 2020–25) and gearing increased above the opening notional assumption of 60%, Ofwat made an adjustment to the dividend yield to target 60% gearing at 31 March 2025.¹⁷⁴⁶

Ofwat's decisions on PAYG and RCV run-off rates

- 10.14 The PAYG rate is the proportion of a company's Totex allowance that is funded through revenue, rather than added to the RCV. The related concept, the 'RCV run-off rate', represents the rate at which the RCV is depreciated.
- 10.15 In PR19 Ofwat said that each company's choice of rates should reflect the company's own expenditure and investment plans within each control. Ofwat said that its methodology required companies to explain the assumptions that underpinned their PAYG and RCV run-off rates and any proposed departure

¹⁷⁴⁵ IRE maintains the serviceability of underground assets. Companies had different approaches to how this expenditure was reported in their statutory accounts and how it was recovered through PAYG or through RCV runoff. For draft determinations Ofwat accepted companies' specific approaches to recovering any capitalised infrastructure renewal expenditure through PAYG revenue or over the longer term through RCV run-off. Ofwat accepted that this could have an impact on certain financial ratios where there is a mismatch between PAYG revenue and operating expenditure, and so made adjustments to ensure that financial ratios were more comparable across companies.

¹⁷⁴⁶ Ofwat (2020), [PR19 final determinations: Aligning risk and return technical appendix](#), section 6.3

from natural rates.¹⁷⁴⁷ Ofwat did not set out a definition of natural rates for PAYG or RCV run-off rates,¹⁷⁴⁸ but during its assessment of business plans Ofwat noted that it may require more evidence if companies proposed PAYG rates in excess of the ratio of operating expenditure and infrastructure renewal expenditure to Totex.

10.16 Ofwat has not made changes to the RCV run-off rates submitted by companies in their business plans, and the companies have not raised challenges about these assumptions.

10.17 During its assessment, Ofwat increased PAYG rates for 12 companies, including three of the Disputing Companies. Ofwat considered that its adjustments were modest and did not affect intergenerational fairness and it submitted a report from its advisor that estimated prospective credit ratios in PR24 in support of this view.

10.18 The following PAYG adjustments were made to the PAYG rates of three Disputing Companies: Anglian £80 million (1.3% of allowed revenue); Northumbrian £25 million (0.7% of allowed revenue); Yorkshire £85 million (1.6% of allowed revenue) as set out in Table 10-1. No adjustment was made with respect to Bristol.

Table 10-1: PAYG adjustments applied by Ofwat

<i>Company</i>	<i>Amount £m</i>	<i>% allowed revenue</i>
Anglian	£80m	1.3%
Northumbrian	£25m	0.7%
Yorkshire	£85m	1.6%

Source: Ofwat

Financeability – Disputing Companies’ Views

10.19 Each of the Disputing Companies stated that its business plan is not financeable under Ofwat’s final determination.

Anglian

10.20 Anglian stated that under PR19 it would fall ‘well short’ of meeting the thresholds to maintain a Baa1 rating under key AICR and FFO/Net Debt credit metrics on the basis of the notional capital structure.¹⁷⁴⁹

¹⁷⁴⁷ Ofwat (2017), [Ofwat PR19 methodology](#), p82

¹⁷⁴⁸ Ofwat (2020), [PR19 final determinations: Aligning risk and return technical appendix](#), p31

¹⁷⁴⁹ [Anglian SoC](#), Chapter J, Overview

- 10.21 Anglian stated that Ofwat had used a number of ‘artificial and unjustified’ adjustments and assumptions in order to conclude that Anglian was financeable on a notional basis. These included advancing £80 million of revenues through a PAYG adjustment that would be discounted by credit agencies in their assessment. Anglian also stated that Ofwat had misallocated c.£157 million of Opex as Capex in its final determination, thus overstating the revenues that would be available to Anglian in AMP7.
- 10.22 Anglian stated that even if Ofwat’s assumptions and adjustments were correct, there was insufficient headroom in relation to key credit metrics to conclude that Anglian was financeable on the basis of the notional capital structure. Specifically, under Ofwat’s calculations, Anglian would have a AICR of only 1.5x (the lowest end of the 1.5x–1.7x range required for a Baa1 rating) while its FFO/Net Debt of c.9.5% was already below the 10% threshold needed for a Baa sub factor rating on the Moody’s scale.
- 10.23 Anglian also stated that the significant increase in the Totex efficiency challenge relative to PR14, and the asymmetric downward skew in Anglian’s regulatory incentives and cost-sharing ratios, meant that there was a significant risk of underperformance which would trigger a downgrade (and worsen the terms on which Anglian could borrow). Anglian stated that it was not credible for Ofwat to contend that any outperformance or underperformance is ‘neutral’ given where Ofwat had ‘put the bar’ in the final determination.

Bristol

- 10.24 Bristol stated that Ofwat had failed to meet its financing duty as the result of cost of capital errors, cost allowance errors and balance of risk errors.¹⁷⁵⁰
- 10.25 Bristol stated that Ofwat’s notionally efficient company had a notional financing structure which bore little resemblance to that of a small water only company, contrary to the CC’s Bristol 2010 Determination and the CMA’s Bristol PR14 Determination precedents. In addition, Bristol stated that Ofwat’s financeability assessment relied on mitigation strategies that are not applicable or available to Bristol. Notably, Ofwat assumed that problems with financial ratios likely result from the timing of investment or a mismatch between company actual financing and their notional assumptions. As such, Ofwat suggest that companies should adjust their financing, for instance

¹⁷⁵⁰ [Bristol SoC](#), Executive Summary, section 5

reducing and paying off debt and increasing equity to resolve this mismatch between real returns and their actual cost of debt.

- 10.26 Bristol stated that its gearing had fallen in recent years due to its shareholders retaining equity in the business, and its debt level was consistent with the notional gearing assumptions. Additionally, it was not efficient under any scenario to repay early and replace its long-term debt known as Artesian debt,¹⁷⁵¹ which was efficiently incurred at the time it was raised. Bristol stated that the only debt that was capable of being repaid is short-term debt, a minority of its capital structure, which has the cheapest cost and thus offers little benefit to ratios.
- 10.27 Bristol stated that Ofwat had failed to properly check that the Baa1 credit rating it set for its determination of the cost of capital was achievable. Bristol stated that when the tests were correctly applied, it was evident that the core ratios used by Moody's AICR and Standard & Poor's (FFO/net debt) to support this rating were not achieved.
- 10.28 Bristol also stated that insufficient cost of capital allowances meant that Ofwat had failed to secure sufficient financial headroom over debt service requirements to allow Bristol to withstand foreseeable adverse events, while Ofwat's cost of equity allowance was insufficient to allow Bristol to secure equity funding.

Northumbrian

- 10.29 Northumbrian stated that Ofwat had failed in its financing duty as a result of a combination of cost allowances which were unrealistically low, challenging and stretching performance targets, an asymmetric and downwardly skewed package, and an unprecedentedly low cost of capital.¹⁷⁵²
- 10.30 Northumbrian stated that because of these issues, it could not, on average, expect to earn a reasonable level of return in the base case, achieve a credit rating that was consistent with the rating assumed in the cost of debt allowance, or have sufficient financial headroom, as reflected in projected credit metrics, to be resilient to plausible downside scenarios including those prescribed by Ofwat. It stated that, overall, this would impact on its ability to finance its functions at the allowed level of financing costs (both for equity and debt).

¹⁷⁵¹ See paragraph 9.451 and associated footnote for more details on Bristol's Artesian debt

¹⁷⁵² [Northumbrian SoC](#), section 10

- 10.31 Northumbrian stated that Ofwat's attempts to address the financeability concerns at PR19, specifically the adjustment of PAYG rates to bring forward revenues from future price controls, were not a sustainable solution and would risk the future financial resilience of the company by reducing the RCV and associated returns in the future. Northumbrian also noted that ratings agencies do not take PAYG or run-off rate adjustments into account, and that excess (above natural rate) PAYG is stripped out from revenues when calculating coverage metrics.
- 10.32 Northumbrian stated that adjusting projected metrics to strip out bringing cash forward resulted in a negative impact on the key credit ratios and implied that, on the basis of a notional financial structure, Northumbrian would only achieve a Baa2 rating (at best) based on the latest Moody's rating methodology. This resulted in an inconsistency between the projected credit rating for the company with a notional financial structure based on the final determination and Ofwat's own allowed cost of debt based on an average of 'A' and 'BBB' bonds i.e. BBB+/Baa1. This meant that (1) credit quality of the notional company would decline, reducing financial resilience; and (2) the company would incur higher costs of financing than assumed by Ofwat in setting the allowed cost of new debt.

Yorkshire

- 10.33 Yorkshire stated that Ofwat's financing duty requires that a notionally efficient firm should be able to earn profits in line with its cost of capital and the efficient firm's cash flows should enable it to raise finance on reasonable terms, including by maintaining an investment grade credit rating.¹⁷⁵³
- 10.34 Yorkshire stated that its decision to reject Ofwat's Final Determination was driven by Ofwat's failure to assemble a price control package which, in the round, offered investors a reasonable chance of earning a profit in line with the cost of capital. Yorkshire stated that multiple features of Ofwat's Final Determination contributed to a likely shortfall in return, including the under-estimation of expenditure of an efficient company, the overstatement of the performance levels that an efficient company could achieve, and a rate of return on the RCV that fell short of the required WACC. Combined these issues resulted in inadequate interest cover and a financeability problem.
- 10.35 Yorkshire stated that Ofwat's use of revenue acceleration would not allow it to access the long-term debt finance required for AMP7, as its covenant definitions specifically exclude the benefit of any accelerated revenues when

¹⁷⁵³ [Yorkshire SoC](#), paragraphs 260–281

calculating interest cover ratios. In addition, Moody's would disregard Ofwat's use of revenue acceleration in their ratings assessments.

- 10.36 Yorkshire suggest that its AICR under PR19, when calculated as per Moody's approach, would be well below the minimum 1.5x threshold that Moody's has indicated a company needs in order to obtain a Baa1 rating. Yorkshire stated that it falls to the CMA's determination to ensure that Yorkshire's appointed business has sufficient cashflows to obtain and maintain investment-grade credit ratings, pursuant to the statutory duty to secure that companies are able to finance their activities.

Financeability – Third Party Views

- 10.37 Citizens Advice submitted that it strongly agreed with Ofwat that financeability should be based on the structure of a notional capital-efficient company. Citizens Advice considered the fact that 13 of the 17 water companies had accepted the price control and allowed rates of return indicated that Ofwat's approach was reasonable.
- 10.38 Citizens Advice submitted that there was significant evidence that investor appetite for UK water industry assets remains very high even after the allowed level of return in the PR19 price controls, and that it should be beyond dispute that Ofwat's allowed rates of return were adequate for all water companies to finance themselves.
- 10.39 Citizens Advice submitted that all the water companies, including the four Disputing Companies, continue to be able to raise investment grade debt. Citizens Advice did not agree with the Disputing Companies' submissions suggesting that they would not be able to finance their on-going activities or new investment, or even that there is a risk they will now be unable to. Citizens Advice stated that it had seen no convincing evidence in support of the Disputing Companies' views, and that if they were right we should have been able to see financial markets reacting by 'slashing the prices' for debt and equity.¹⁷⁵⁴
- 10.40 CCWater submitted that it supported Ofwat's financeability assessment based on a notional capital structure. It also submitted that it agreed that Ofwat's financeability assessment should reflect no out/under performance, and that companies and their investors should bear the consequences of inefficiency and underperformance in delivery of their obligations and commitments to customers.

¹⁷⁵⁴ [Citizens Advice first submission](#)

- 10.41 CCWater submitted that it recognised that Ofwat's use of PAYG and RCV run-off ratios is similar to approaches that other regulators use. CCWater stated that it had previously advised Ofwat that the PAYG ratio should reflect the balance of long- and short-term cost recovery, relative to a company's balance of operational activity and long-term capital investment. CCWater stated that it was important that revenues that were advanced were done so on an NPV neutral basis.^{1755, 1756, 1757, 1758}
- 10.42 Conversely, ENA submitted that, in addition to errors made in the calculation of the WACC, Ofwat had erred in its financeability assessment in several ways. ENA suggested that the financeability assessment must consider beyond the AMP7 and AMP8 periods as well as the short term. ENA submitted that financeability must be assessed using current credit rating agency methodologies including their focus on core financial metrics, and that there should be consistency between the credit ratings achieved and the benchmarks used to set debt funding allowances. ENA also submitted that a margin above the minimum credit ratings thresholds should be included in the financeability assessment.¹⁷⁵⁹
- 10.43 Water UK submitted that the degree of stretch being placed on the financeability of the sector was demonstrated by the near uniformity of company responses to the Draft Determinations that without change those Determinations would be unfinanceable (while recognising there was some movement in the Final Determinations), and by the extensive use of PAYG rates that are disregarded by credit ratings agencies.
- 10.44 Water UK submitted that this stretch was driven by the combination of simultaneous pressure on costs, outcomes, risks and returns. Water UK submitted that Ofwat's approach at PR19 risked eroding the long term investability of the sector as one with a reasonable prospect of an appropriate balance of risk and returns, potentially resulting in shorter-term perspectives from investors.
- 10.45 Water UK submitted that avoiding this outcome was all the more important given the scale of investment that will be needed over the coming decades to address the challenges from climate change and population growth, and which is expected to be privately funded. Water UK also submitted that a further risk was the erosion of the headroom needed for the sector to be

¹⁷⁵⁵ [CCWater response to Anglian SoC](#)

¹⁷⁵⁶ [CCWater response to Bristol SoC](#)

¹⁷⁵⁷ [CCWater response to Northumbrian SoC](#)

¹⁷⁵⁸ [CCWater response to Yorkshire SoC](#)

¹⁷⁵⁹ [ENA second submission](#)

resilient to shocks, such as the significant effects of the COVID-19 pandemic on the sector.¹⁷⁶⁰

- 10.46 Southern Water submitted that it considered that Ofwat's PR19 final determination had weakened the sector's financeability and financial resilience, and that this could be seen very clearly through the 'notional' company's credit rating as assessed by Moody's, Fitch and Standard & Poor's. Southern Water submitted that this was, in part, a consequence of Ofwat's mechanistic approach to assessing the cost of capital, along with the introduction of material downside ODI risks, with the aim of significantly reducing potential equity returns over the period
- 10.47 Southern Water submitted that the need to rely on the acceleration of cashflow from future periods in order to meet the thresholds for Ofwat's target credit rating of BBB+ pointed to the need for a broader analytical perspective in setting required returns.¹⁷⁶¹
- 10.48 Wessex Water submitted that the final determination has seen a material reduction in its credit quality, and that of the wider industry, leaving ongoing financial resilience at the margins of acceptability. Wessex Water submitted that this will leave future generations to bear the increased financing costs.¹⁷⁶²

Financeability – CMA approach

- 10.49 The assessment of a water company's ability to finance its functions takes into account a number of factors in the price redetermination, in particular the assessment of the WACC, the wholesale Totex allowances and RCV adjustments. This financeability assessment provides a cross-check on the effect of these decisions. In this section we summarise our approach, in the following sections:
- (a) background and effect of our provisional decisions on financeability;
 - (b) treatment of PAYG and RCV run-off rates when assessing financial ratios;
 - (c) approach to measuring and interpreting credit ratios;
 - (d) modelling of the Disputing Companies' credit ratios and implications for the companies' financeability; and

¹⁷⁶⁰ [Water UK submission](#)

¹⁷⁶¹ [Southern Water submission](#)

¹⁷⁶² [Wessex Water submission](#)

- (e) provisional decision on financeability and PAYG/RCV run-off rates.

Background and effect of our provisional decisions on financeability

- 10.50 As discussed above, Ofwat considered that its final determination was financeable. Ofwat's decision was based on a combination of Board assurance statements, modelling of key financial ratios, and, where appropriate, PAYG adjustments. Ofwat noted that Board assurance statements and company representations were made in the context of Ofwat's draft determinations, but that its financeability assessment was made in the context of changes made in its final determination.
- 10.51 Overall, our decisions should benefit the Disputing Companies in comparison to Ofwat's final determination. In assessing financeability, the main changes we have reflected are:
- (a) Cost of capital assumption – Section 9 sets out our redetermination of the cost of capital, and accordingly our financeability assessment assumes a vanilla WACC of 3.5% in CPIH terms.¹⁷⁶³ The increase in WACC relative to Ofwat's determination contributes favourably towards financeability.
 - (b) Totex – Our provisional determination results in an increase in the Disputing Companies' Totex allowance for each of the Disputing Companies. If the companies would have incurred this cost in any case, our decision means that they will recover these additional allowances from customers, rather than the additional costs over the final determination allowances representing a shortfall in returns for investors. Our decisions are summarised in Table 10-2.

Table 10-2: Four Disputing Companies' Totex wholesale allowances

<i>Company</i>	<i>Ofwat</i>	<i>CMA</i>	<i>Variance</i>
	<i>£m</i>	<i>£m</i>	<i>£m</i>
Anglian	5,065	5,209	144
Bristol	405	410	5
Northumbrian	2,630	2,651	22
Yorkshire	4,053	4,145	92

Source: CMA

- (c) **Cost sharing rates.** As set out in Section 6, we have also adjusted the cost-sharing rates for the Disputing Companies, which improves financeability because it distributes the costs of underperformance more evenly between customers and investors. This reduces the size of the

¹⁷⁶³ 3.5% is the industry-level appointee WACC. Our assessment for Bristol assumes a 3.55% WACC on the basis of a 10bps company specific adjustment to Bristol's cost of embedded debt allowance. See paragraphs 9.411 – 9.533 for further details on Bristol's request for a company specific adjustment to their cost of capital allowance.

exposure of the companies to worsening financial ratios as a result of potential Totex overspend. We also made some changes to the penalty-only ODIs which Ofwat put in place, although these have only a small effect on the overall balance of risk in ODIs.

Treatment of PAYG and RCV run-off rates when assessing financial ratios

- 10.52 The PAYG rate is the proportion of a company's Totex allowance that is funded through revenue, rather than added to the RCV, and is therefore comparable to operating expenditure, which companies will normally seek to recover from customers in the period in which it is incurred. The related concept, the 'RCV run-off rate', represents the rate at which the RCV is depreciated. The rate of depreciation of an asset also reflects a cost which firms have to recover from current customers if they are to make a profit.
- 10.53 Each of the Disputing Companies for which Ofwat implemented a higher PAYG rate stated that increasing the PAYG rate would not improve their credit ratings. In support the companies referred to statements from Moody's.
- 10.54 The reason for this is that the Moody's calculation removes capital charges when it defines cash flow, thus eliminating any benefit of advancing revenue. Moody's has stated that it does not consider PAYG advancement as credit-enhancing and excludes such adjustments from its calculation of credit metrics while making rating decisions.¹⁷⁶⁴
- 10.55 By contrast, Standard & Poor's has indicated that adjusting PAYG can increase cash flow in the near term¹⁷⁶⁵ which can temporarily boost credit metrics although this means the company will forgo some of the growth it forecasts in RCV.
- 10.56 We note the agencies' stance on whether or not advancing revenue by adjusting PAYG rates (or equivalently, RCV-run off rates) would affect a credit ratings assessment. Accordingly, in our financeability assessment we have calculated credit ratios consistent with the approach taken by both Moody's and Standard and Poor's credit ratings agencies.

Approach to measuring and interpreting credit ratios

- 10.57 In this section, we describe our approach to the use of credit ratios in the financeability assessment.

¹⁷⁶⁴ Moody's Investors Service (2018), [Regulated Water Utilities: RATING METHODOLOGY](#)

¹⁷⁶⁵ Standard & Poor's (2020), [Ofwat's Final Determination Leaves U.K. Water Companies' Credit Quality Under Duress](#)

- 10.58 We start by recognising that the WACC is the primary factor in the redetermination ensuring that an efficient firm can finance its functions. As a matter of principle, if the WACC is set at a reasonable level, both debt and equity investors should earn sufficient returns to cover the costs of financing.
- 10.59 We also recognise that credit ratio analysis plays a supporting role: it provides cross-checks to help consider whether the allowed return is in practice high enough to be consistent with the investment-grade credit quality (as required by the licence with respect to debt financing). Credit ratio analysis is also able to assess whether other aspects of the determination, such as the amount of cash generated from regulated activities, are consistent with rating agency expectations.
- 10.60 We note that the underlying definitions of ratios and the accounting conventions used to present inputs are important. In particular we note that the interaction between regulatory concepts (such as Totex, PAYG rates and RCV run-off) and accounting concepts (in relation to whether a particular cost is expensed in a single year or capitalised and subject to a periodic depreciation charge) affects the values of credit ratios. Accordingly, we consider that the point value of a single credit ratio is not determinative of the conclusion on financeability.
- 10.61 Ratings agencies consider a range of quantitative and qualitative factors in order to place corporate debt issuers and individual financial instruments in a credit ratings band. The band represents a relative indicator of financial risk that is intended to apply across a wide range of industries to support lenders and debt investors allocating capital. The labelling schema used by two credit ratings agencies for investment grade and non-investment grade assessment, with risk profile increasing from left to right of the table are shown in Figure 10-1.

Figure 10-1: Credit ratings bands

Investment grade											Non-investment grade					
S&P	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-
Moody's	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3

Source: CMA

- 10.62 We note that Bristol¹⁷⁶⁶ and Northumbrian¹⁷⁶⁷ have referred to advice from KPMG which seeks to establish further gradation by splitting bands, to label a

¹⁷⁶⁶ Bristol SoC, p21, table A1

¹⁷⁶⁷ Northumbrian SoC, p182, paragraph 1008

‘stable’ and ‘at risk’ band in addition to the standard band, and that KPMG has ascribed values for credit ratios that it considers to be compatible with each of the ratings bands which we recognise as consistent with various credit rating agency publications.

- 10.63 We consider that the overall assessment of a credit rating requires judgement about the overall quality of credit with respect to a broad range of factors that contribute to a ratings assessment. While financial ratios play an important role in the assessment of credit ratings, these are not applied mechanistically by agencies, nor in isolation from a wide range of other relevant factors. Of the three major ratings agencies, Standard & Poor’s, Moody’s and Fitch, only Moody’s is explicit in applying a 40% weighting to the results of credit ratios with its methodology. We consider that caution is required in a financeability assessment to avoid placing undue emphasis on the value of a particular ratio.
- 10.64 Ofwat did not specify target levels for credit ratios but in its final determinations it provided a summary of representations it had received about the financeability assessment. We have reviewed these representations and concluded that there is a reasonable degree of common ground between the parties that Ofwat was targeting a BBB+/Baa1 credit band, which is two credit bands higher than the threshold for an investment grade credit rating. In its downside scenario, Ofwat was testing financeability against a threshold for interest cover ratio of 1.0, but it noted that this may not be a floor, and that in some cases a lower ratio could be compatible with a financeable company.¹⁷⁶⁸
- 10.65 We also consider that the values of two particular ratios were given particular attention in Ofwat’s assessment. It appears common ground that Ofwat was targeting a BBB+/Baa1 credit rating by testing corresponding ratios for AICR, a ratio used by Moody’s, (at least 1.5x) and FFO to net debt, a ratio used by Standard & Poor’s (at least 9%). We also noted that a BBB-/Baa2 investment grade credit rating corresponds with the following credit ratios: AICR at least 1.3x and FFO / Net Debt at least 8%; and that for BBB-/Baa3 rating, the threshold for an investment grade credit rating, the corresponding ratios are: AICR at least 1.1x and FFO / Net Debt at least 6%.
- 10.66 We note that water companies have maintained investment grade credit ratings whilst having actual gearing ratios in excess of the notional gearing that Ofwat has applied in its price determination, and a wide range of the

¹⁷⁶⁸ Ofwat (2019), [PR19 final determinations: Aligning risk and return technical appendix](#)

other credit ratios. This can be observed in Ofwat's monitoring reports that track credit ratings and a number of ratios for the water sector as a whole.¹⁷⁶⁹ In Ofwat's monitoring report published in January 2020, it observed:

- (c) Gearing for the 17 water companies averaged 70.2% over the period 2016–2019, with a minimum of 56% and a maximum of 83%. This range relates to a notional target level from the credit rating agencies of around 65-70%.
- (d) Moody's AICR for the 17 water companies has averaged 2.2 over the period 2016-2019, with a minimum 0.2 and a maximum of 3.3. The target ratio for strong investment-grade has been indicated as at least 1.5.
- (e) Standard & Poor's ratio of FFO/Net debt for the 17 water companies has averaged 11% over the period 2016-2019, with a minimum of 5% (excluding Hafren Dyfrdwy which had a nil value in 2019) and a maximum of 18%. The target ratio for strong investment-grade has been indicated as at least 9%.

10.67 Since the start of 2020, two of the credit ratings agencies have published ratings commentaries concerning each of the Disputing Companies which indicate that the companies retain investment grade credit ratings with a negative outlook and that Bristol and Northumbrian have experienced downgrades to their ratings.

- (a) In February Moody's confirmed its Baa1 rating of Anglian with a negative outlook¹⁷⁷⁰ and in July 2020 confirmed its Baa1 rating¹⁷⁷¹. In February 2020, Standard & Poor's confirmed its A- rating for Anglian's senior secured debt and its BBB rating for its senior subordinated debt and placed Anglian on 'credit watch negative'.¹⁷⁷²
- (b) In March 2020 Moody's downgraded its credit rating of Bristol from Baa1 to Baa2 with a negative outlook,¹⁷⁷³ and in July 2020 Moody's affirmed its Baa2 rating for Bristol.¹⁷⁷⁴

¹⁷⁶⁹ Ofwat, [Monitoring financial resilience](#) and Ofwat, [Financial monitoring report 2018-19 charts and underlying data](#)

¹⁷⁷⁰ Moody's, [Periodic review of ratings with negative outlook](#)

¹⁷⁷¹ Moody's, [Periodic review of ratings](#)

¹⁷⁷² Standard & Poor's, [Four U.K.-Based Water Utilities Downgraded On Tougher Regulations; Two Put On Watch Negative; Four Outlooks Negative](#)

¹⁷⁷³ Moody's, [Downgrades Bristol Water to Baa2](#)

¹⁷⁷⁴ Moody's, [Periodic review of ratings](#)

- (c) In March 2020 Moody's extended its 'review for downgrade' of Northumbrian¹⁷⁷⁵ and in July 2020 it affirmed its Baa1 rating.¹⁷⁷⁶ In February 2020 Standard & Poor's affirmed its BBB+ rating for Northumbrian and placed it on 'credit watch negative'.¹⁷⁷⁷
- (d) In March 2020 Moody's downgraded Yorkshire from Baa1 to Baa2¹⁷⁷⁸ and August Moody's confirmed its Baa2 rating for Yorkshire.¹⁷⁷⁹ In February 2020 Standard & Poor's rated Yorkshire's senior secured debt A- and its senior subordinated debt BBB and it changed its outlook to negative.¹⁷⁸⁰

- 10.68 In our credit ratio analysis we have considered the overall framework that supports an investment grade credit rating and have followed Ofwat and the Disputing Companies in measuring these ratios against the ratios consistent with investment grade credit ratings. However, as indicated by the credit ratings agencies and the evidence from the range of actual ratios, the credit rating is based on a range of relevant factors including credit ratio analysis. We have tested our provisional determination against the target values above, and then considered the results as part of an in-the-round assessment.
- 10.69 In order to calculate ratios, we have constructed a financial model that reflects our decisions on Totex allowances and cost of capital. We have retained Ofwat's assumptions in respect of other company specific items, including dividends and the ratio of Capex:Opex within Totex because these represent a reasonable starting point for the testing of ratios. We have adopted Ofwat's approach to modelling including the use of PAYG, non-PAYG and RCV run-off to calculate revenues and RCV roll-forward.
- 10.70 In modelling cash generation and funds from operations for the purposes of deriving interest coverage ratios, we have modelled operating expenses consistent with the approach that Moody's takes. PAYG is included in current expenditure and RCV additions are treated as capital expenditure. Using this approach there are no timing differences between revenue and expenditure in relation to the accounting and regulatory treatment of IRE in our base case model.

¹⁷⁷⁵ Moody's, [Periodic review of ratings](#)

¹⁷⁷⁶ Moody's, [Periodic review of ratings](#)

¹⁷⁷⁷ Standard & Poor's, [Four U.K.-Based Water Utilities Downgraded On Tougher Regulations; Two Put On Watch Negative; Four Outlooks Negative](#)

¹⁷⁷⁸ Moody's, [Downgrades Yorkshire to Baa2 and changes outlook to negative](#)

¹⁷⁷⁹ Moody's, [Periodic review of ratings](#)

¹⁷⁸⁰ Standard & Poor's, [Four U.K.-Based Water Utilities Downgraded On Tougher Regulations; Two Put On Watch Negative; Four Outlooks Negative](#)

Downside sensitivity

- 10.71 As a downside sensitivity, we have modelled the impact of a 1% RORE penalty on the credit ratios for each company, if it were incurred by the firm in each year of the price control. We consider this scenario to be a severe downside case, which is likely to overestimate potential penalties that companies under-performing against the determination may experience in each of the five years of the price control period. In practice we consider that companies may be expected to respond in order to avoid such a circumstance occurring throughout each year of the control.
- 10.72 We also found in our analysis of PCs and ODIs that an average performing company may expect to face some penalties, due to the number of asymmetric and penalty-only ODIs. We indicated that the scale of these penalties might be around 0.1%-0.2% of RORE. If this was applied to the base case as a measure of expected performance, the effect would be around 10%-20% of the total downside sensitivity. We do not consider this would change our conclusions about the financeability of the base case ratios, as the impact on all the credit ratios of including a penalty of 0.1-0.2% should not be sufficiently large to affect the implied credit ratings.

Results and interpretation of credit ratio analysis

- 10.73 This section shows the ratios calculated by Ofwat for each company and the revised ratios that stem from them, sets out the results of the financial ratio analysis that we have undertaken, and our interpretation of each set of ratios. The results are derived from five year averages of financial estimates.
- 10.74 The ratio analysis contained in the tables for each company is as follows:
- Ofwat's calculated ratios (ref.1)
 - Our ratios using our cost of capital and Ofwat Totex (ref. 2)
 - Our ratios using our cost of capital and Totex redetermination in a base case scenario (ref. 3)
 - Our ratios, cost of capital and Totex, under the downside scenario that includes a 1% RORE penalty (ref. 4)
 - Ofwat's ratio definition for FFO/Net Debt and our cost of capital and our base case scenario (ref. 5) for Bristol and for Yorkshire only
- 10.75 Given that that our approach to IRE differs from the approach that Ofwat took (see paragraphs 10.11 and 10.70) and the approach Standard & Poor's uses

in its ratings methodology, our approach produces a lower FFO/Net Debt Ratio, than would be calculated using these alternative approaches. In our ratio analysis for Bristol and Yorkshire (set out below) we have set out the results of the ratios using the Ofwat approach and Standard & Poor's ratio definition for completeness because these companies have stated that they have recovered IRE via PAYG.

Anglian

- 10.76 Ofwat said that RCV growth in Anglian's final determination prior to adjustments for financeability exceeded 10% and that it considered it was appropriate for equity to contribute to the funding of this growth, and as a consequence Ofwat assumed a dividend yield of 1.84% and dividend growth of 1.18%. Ofwat's financial modelling of the notional company suggested that Anglian faces a financeability constraint. Therefore, consistent with the approach in the PR19 methodology, its final determination increased PAYG rates to bring forward £80 million of revenue to improve cash flows and financial ratios.
- 10.77 Our analysis of Anglian's credit ratios is set out in Table 10-3. We have followed the same approach as Ofwat with respect to dividends. The revised cost of capital and Totex allowance produce a ratio for FFO/Net Debt above 9% which is consistent with a BBB+/Baa1 credit rating, and an AICR ratio of 1.5 which corresponds with Moody's target for this ratio and credit rating. The impact of the downside scenario is to reduce the value of key financial ratios, with AICR reducing to 1.3 and FFO/Net Debt to 9.0%, a level consistent with an investment grade credit rating of BBB/Baa2. Whilst this remains consistent with an investment grade credit rating, it may indicate some pressure on headroom for key credit ratios which may cause management to consider other mitigating actions if the company targets a higher rating.
- 10.78 As discussed in paragraph 10.100, we have provisionally decided to accept Anglian's submission that Ofwat had incorrectly characterised as much as £157 million opex as capex, which resulted in Anglian being able to recover less revenue through PAYG in AMP7.¹⁷⁸¹ However, the ratios presented below are based on Ofwat's assumptions in this regard. We consider that, having regard to the range of ratios that are considered by the rating agencies, and allowing for a reasonable downside scenario, that the financial ratios in Table 10-3 in the round appear consistent with an investment-grade credit rating.

¹⁷⁸¹ Anglian SoC, paragraph 170

Table 10-3: Ratio analysis for Anglian

<i>Ref</i>	<i>Ratio</i>	<i>Gearing</i>	<i>Interest cover</i>	<i>AICR</i>	<i>FFO/Net debt</i>	<i>Dividend cover</i>	<i>RCF/Net debt</i>
1	Ofwat	60.0%	4.0	1.5	9.5%	1.4	8.3%
2	CMA WACC (3.50%)	59.1%	3.8	1.5	9.9%	1.6	8.7%
3	CMA WACC inputs, but Totex increased by £144.3m	59.3%	3.9	1.5	9.8%	1.7	8.6%
4	CMA WACC, Totex £144.3 plus 1% penalty	60.5%	3.6	1.3	9.0%	1.1	7.7%

Source: CMA

Note: Ofwat ratios are consistent with its approach to the final determination and include a benefit of accelerating PAYG in each of the interest cover ratios. CMA ratios in table 10-3 were calculated using the assumption that PAYG represents current expenditure for scenarios 2 to 4.

Bristol

10.79 Ofwat said it considered that Bristol's final determination is financeable based on the allowed revenues which include a reasonable allowed return on capital, and it did not make any adjustments to PAYG rates.

10.80 Our analysis of Bristol's ratios is set out in Table 10-4. This analysis shows an AICR of 1.5 and an FFO/Net Debt ratio of 10.5%, which is compatible with an investment grade credit rating of BBB+/Baa1. In the downside scenario, Bristol's AICR ratio reduces to 1.3 and its FFO/Net Debt ratio reduces to 9.5%, consistent with a BBB/Baa2 credit rating. We have also presented the ratios using a calculation consistent with Ofwat's approach to IRE and Standard & Poor's definition of the FFO/Net Debt ratio, in which case the ratio of FFO/Net Debt ratio is 13.2%. We consider that, having regard to the range of ratios that are considered by the rating agencies, and allowing for a reasonable downside scenario, that the financial ratios in Table 10-4 in the round appear consistent with an investment-grade credit rating.

Table 10-4: Ratio analysis for Bristol

<i>Ref</i>	<i>Ratio</i>	<i>Gearing</i>	<i>Interest cover</i>	<i>AICR</i>	<i>FFO/Net debt</i>	<i>Dividend cover</i>	<i>RCF/Net debt</i>
1	Ofwat	58.8%	5.4	1.5	13.5%	2.8	11.4%
2	CMA WACC (3.55%)	57.8%	3.9	1.6	10.5%	1.4	8.3%
3	CMA WACC and increase in Totex by £5.2m	57.9%	3.9	1.6	10.5%	1.4	8.3%
4	CMA WACC and Totex £5.2 plus 1% penalty	59.1%	3.6	1.3	9.5%	1.0	7.4%
5	CMA WACC and increase in Totex by £5.2m and IRE	57.9%	4.9	1.6	13.2%	3.1	12.1%

Source: CMA

Note: Ofwat ratios are consistent with its approach to the final determination and include a benefit of accelerating PAYG in each of the interest cover ratios. CMA ratios in table 10-4 were calculated using the assumption that PAYG represents current

expenditure for scenarios 2 to 4. In scenario 5 FFO/Net Debt ratio was calculated taking into account company's approach to IRE for the period.

Northumbrian

10.81 Ofwat said its financial modelling of the notional company suggested that Northumbrian faced a financeability constraint. Northumbrian sets out in its representations that certain rating agencies look through PAYG adjustments in calculating adjusted interest cover ratios. Ofwat's final determination increased PAYG rates to bring forward £25 million of revenue to improve cash flows and financial ratios in 2020–25.

10.82 Our analysis of Northumbrian's credit ratios is set out in Table 10-5. The revised cost of capital and Totex allowance produces an AICR ratio of 1.6 and a FFO/Net Debt ratio of 10.3% which are consistent with a BBB+/Baa1 credit rating. The impact of the downside scenario is to reduce the value of key financial ratios, with AICR reducing to 1.3 and an FFO/Net debt ratio of 9.4%. These ratios are consistent with an investment grade credit rating of BBB/Baa2. This remains in the investment grade credit range, but may indicate some pressure on headroom for key credit ratios which cause management to consider other mitigating actions to maintain their credit rating if the company targets a higher rating. We consider that, having regard to the range of ratios that are considered by the rating agencies, and allowing for a reasonable downside scenario, that the financial ratios in Table 10-5 in the round appear consistent with an investment-grade credit rating.

Table 10-5: Ratio analysis for Northumbrian

Ref	Ratio	Gearing	Interest cover	AICR	FFO/Net debt	Dividend cover	RCF/Net debt
1	Ofwat	59.5%	4.2	1.5	10.0%	1.8	6.9%
2	CMA WACC (3.50%)	58.7%	4.0	1.6	10.3%	2.5	8.3%
3	CMA WACC and increase in Totex by £21.6m	58.8%	4.0	1.5	10.3%	2.5	8.3%
4	CMA WACC, Totex & penalty	60.0%	3.7	1.3	9.4%	2.2	7.4%

Source: CMA

Note: Ofwat ratios are consistent with its approach to the final determination and include a benefit of accelerating PAYG in each of the interest cover ratios. CMA ratios in table 10-5 were calculated using the assumption that PAYG represents current expenditure for scenarios 2 to 4.

Yorkshire

10.83 Ofwat said its financial modelling of the notional company suggested that Yorkshire faced a financeability constraint. Therefore, its final determination increased PAYG rates to bring forward £85 million of revenue to improve cash flows and financial ratios.

10.84 Our ratio analysis shows AICR ratios of 1.5 and FFO/Net Debt at 8.3%, which straddle the two investment grade credit rating bands of BBB+/Baa1 and

BBB/Baa2. The FFO/Net Debt ratio that we have calculated is below the BBB+/Baa1 target values based on our ratio analysis and we looked further into this result.

- 10.85 We found that Yorkshire has a large forecast expenditure on IRE. In Yorkshire's business plan it states that: '...for PAYG we have recovered Opex and IRE as fast money',¹⁷⁸² and in relation to IRE Yorkshire states: 'We have reprofiled the IRE for the 2020–25 period for cost recovery in order to achieve a smoother bill profile over the period. This is in effect recovering the IRE as a smoothed charge, an infrastructure renewals charge has been common practice at previous reviews'.¹⁷⁸³ We noted that Yorkshire's treatment of IRE results in an average level of IRE per annum being recovered through PAYG rates which drive the revenue for each year within the price review period. For accounting purposes, this investment is reflected in Ofwat's models as capital expenditure, and so is not included in Ofwat's definition of operating expenditure. Ofwat's ratios are higher because its financial model includes the revenue for IRE but excludes the corresponding expenditure in the same period, alongside the adjustment that Ofwat made to PAYG rates.
- 10.86 We have also presented the ratios using a calculation consistent with Ofwat's approach to IRE and Standard & Poor's definition of the FFO/Net Debt ratio, in which case the ratio of FFO/Net Debt ratio is 10.3%. This illustrates that using the approach which we understand is followed by Standard and Poor's, Yorkshire's ratios would be well above the threshold of 9% for FFO/Net Debt.
- 10.87 In our downside scenario, Yorkshire's AICR ratio reduces to 1.3 and FFO/Net Debt to 7.3%, which straddles across the BBB/Baa2 and BBB-/Baa3 ratings bands. This remains an investment grade credit rating but indicates limited headroom for key credit ratios and suggests that management may need to consider mitigating actions to maintain their credit rating. We consider that, having regard to the range of ratios that are considered by the rating agencies, and allowing for a reasonable downside scenario, that the financial ratios in Table 10-6 in the round appear consistent with an investment-grade credit rating.

¹⁷⁸² Yorkshire (2019), [Yorkshire PR19 business plan](#), p111

¹⁷⁸³ Yorkshire (2019), [Yorkshire PR19 business plan](#), p112

Table 10-6: Ratio analysis for Yorkshire

<i>Ref</i>	<i>Ratio</i>	<i>Gearing</i>	<i>Interest cover</i>	<i>AICR</i>	<i>FFO/Net debt</i>	<i>Dividend cover</i>	<i>RCF/Net debt</i>
1	Ofwat	60.5%	4.2	1.5	10.1%	2.0	8.1%
2	CMA WACC (3.50%)	59.9%	3.3	1.5	8.2%	1.1	6.2%
3	CMA WACC and increase in Totex by £91.9m	60%	3.3	1.5	8.1%	1.1	6.1%
4	CMA WACC, Totex & penalty	61.2%	3.1	1.3	7.3%	0.7	5.3%
5	CMA WACC, Totex, and alternative modelling of IRE	60.0%	4.0	1.5	10.3%	2.2	8.3%

Source: CMA

Note: Ofwat ratios are consistent with its approach to the final determination and include a benefit of accelerating PAYG in each of the interest cover ratios. CMA ratios in table 10-6 were calculated using the assumption that PAYG represents current expenditure for scenarios 2 to 4. In scenario 5 FFO/Net Debt ratio was calculated taking into account company's approach to IRE for the period.

Overall conclusion on financeability

- 10.88 We have made an assessment of the WACC and wholesale Totex requirements, in each case providing an increased allowance compared to Ofwat's final determination. This represents a reasonable level of costs that each of the Disputing Companies could be expected to incur, and we have de-risked the determination, including moderating the cost sharing rates to rebalance risk between customers and investors. Each of these factors improves financeability.
- 10.89 In line with regulatory practice, we have completed a financial ratio analysis consistent with that which would be undertaken by the credit rating agencies (in particular regarding the level of cash flow), and concluded that this supports the view that our redeterminations are financeable. Although much of this ratio analysis focuses on interest coverage and debt servicing ratios, we note that water companies are generally able to sustain investment grade credit ratings with higher ratios of actual gearing than we assume in the notional capital structure.
- 10.90 In our ratio analysis we applied the RCV run-off selected by companies in their business plans. We have modelled PAYG using the same PAYG rates as Ofwat. In light of the Disputing Companies observations about how credit ratings agencies may consider PAYG adjustments, we have followed Moody's stated approach to the definition of interest coverage in order to consider the scenario in which changes to PAYG rates do not improve credit ratios. However, we note that Standard & Poor's recognises that increases to PAYG rates may support credit ratings.
- 10.91 Our base case ratio analysis produces ratios consistent with a strong investment grade credit rating (BBB+/Baa1) without a need to make adjustments to the timing of cash flows. Under our redetermination, the

financial ratios that we have produced for all Disputing Companies are compatible with values that correspond to investment grade credit ratios in both a base case and downside scenario. The downside scenario results in ratios that correspond with investment grade credit ratings spanning the bands from BBB+/Baa1 to BBB-/Baa3, but we think this is likely to represent an overly pessimistic scenario. We also noted that in Ofwat's assessment of downside scenarios, it had considered an interest coverage ratio of 1.0.¹⁷⁸⁴ We have also compared the ratios we have calculated relative to this threshold and given that all of our results are above this level in the base case and downside scenario, this cross-check provides us with further confidence in the financeability of our determination.

- 10.92 Companies have a licence condition to maintain an investment grade credit rating for their debt, and we consider that companies facing a financeability constraint have a responsibility to consider a range of mitigating actions to address impact, such as absorbing headroom in credit ratios, requiring a contribution from equity, eg to forego dividends or inject fresh capital.
- 10.93 Overall, we consider that the assumptions used in conducting this analysis result in a determination under which each Disputing Company is financeable and which fulfils our statutory duties.

Choice of PAYG rates

- 10.94 Our assessment above is based on the assumption that Ofwat's acceleration of PAYG does not improve interest cover ratios. We have therefore not relied on any benefit from higher PAYG rates in finding that the credit ratios are sufficient to be consistent with the Financing Duty.
- 10.95 We consider the choice of WACC, which will be directly related to the level of free cash flow generated by companies that achieve the targets in the determination, is the most important determinant of financeability.
- 10.96 Ofwat made adjustments to PAYG which, in its view, resulted in the determination being consistent with target ratios. We have some concerns about the approach of using higher PAYG to improve ratios which would otherwise indicate financeability concerns. However, this will be case-specific and depend on the timing of investment and the implications for cash generation in the period. In the case of the adjustments that Ofwat made to the PAYG rates in PR19, they were of a limited magnitude and should not

¹⁷⁸⁴ Ofwat (2019), [Aligning risk and return technical appendix](#)

have a significant effect on the overall credit profile of an individual company, nor give rise to intergenerational issues.

10.97 The Disputing Companies have not explicitly requested the CMA to redetermine PAYG rates and to reinstate their respective PAYG rates. We have assumed this is because they would prefer to recover this revenue in the current price review period rather than defer it until PR24. We understand that the Disputing Companies' main concerns were about Ofwat's interpretation that higher PAYG was sufficient to improve their credit ratios to investment-grade. As stated above, we consider that with a higher WACC, the credit ratios are in any case sufficient to be consistent with the rating agencies' target credit ratings. We do not think that there are other reasons why PAYG rates needed to be increased, such as companies having proposed PAYG rates below the natural rate.

10.98 On that basis, our provisional view is that Ofwat's adjustments to PAYG are unnecessary and could be reversed. This would reduce the allowed revenues to offset the positive adjustments described Table 10-1 above. This would have a small effect on the financial ratios, but only to the extent that there would be a small increase in RCV and net debt. There would be very limited effect on cover ratios, as we have assumed that expensed costs are equal to PAYG in calculated ratios. The PAYG rates would then be consistent with the rates proposed by the Disputing Companies.

Anglian's request to change revenues to reflect misallocation of Capex and Opex

10.99 Anglian also made request for additional revenues to address a misallocation of Capex and Opex. Due to the disallowance of various capital schemes, Anglian considers that its PAYG rate and allowed revenues are now too low.

10.100 For the same reasons as above, we agree that the PAYG rate should be set to be consistent with company proposals, subject to any evidence that these are not consistent with a reasonable assessment of the natural rate. We therefore provisionally agree with Anglian that an adjustment to the PAYG rate may be appropriate. We request that Anglian proposes, with evidence, an adjusted PAYG rate based on our provisional determination.

11. Other issues

Introduction

11.1 In this section we discuss various other issues including some raised by the Disputing Companies. The section is structured as follows:

- (a) Taxation;
- (b) PR14 Reconciliation – Revenue Forecasting (WRFIM) – Yorkshire only;
- (c) Potential Grants & Contributions Error – Northumbrian only;
- (d) Separate Price Controls.

Taxation

Introduction

11.2 As part of the redeterminations, the CMA has reviewed Ofwat's approach to taxation at PR19 and consulted with Ofwat and the four Disputing Companies about the PR19 final determination position on taxation, together with an alternative approach based on pass-through arrangements for taxation.

Ofwat's PR19 final determination Approach

11.3 Ofwat introduced a tax reconciliation mechanism, which takes account of any changes to corporation tax or capital allowance rates from those assumed at PR19. This captures significant drivers of the tax allowance, that are beyond company control. The tax reconciliation is an end-of-period reconciliation that takes the form of a revenue adjustment. This means any adjustment required will be made at PR24 and would affect companies' allowed revenue over the 2025-2030 period. Ofwat intend to recalculate the tax allowance for each year for each company, to reflect changes to either the headline corporation tax rate or to the writing down allowances available on capital expenditure. Ofwat's PR19 final determination position on taxation was a change to the policy used in the 2015-2020 period, where no ex-post tax reconciliation was undertaken.

Views of Disputing Companies

11.4 The Disputing Companies were supportive or content with Ofwat's new tax reconciliation mechanism and have not raised in their SoCs a suggestion that this should be re-considered. They did however note that the final

determination was based on assumed corporation tax rate of 17% for the period 2015-20, whereas the current rate has, to date, remained at 19%.

CMA Review of Alternative Pass-through Arrangements

- 11.5 The CMA asked the Main Parties for their views on an alternative approach to taxation that is more aligned to cost pass through. This is an approach taken in other regulated utility sectors and the NAO¹⁷⁸⁵ has suggested that Ofwat consider this as an approach to adopt at PR19.
- 11.6 The Disputing Companies were supportive of a cost pass through approach but noted that they had no major objections to the principle of Ofwat's tax reconciliation approach. They also noted that although the financial implications of any differences between the two approaches were not anticipated to be significant, it would mainly be a timing issue. Ofwat said that cost-pass through could have some additional benefits for customers and companies, and that this had been considered as an option when it was devising its methodology for PR19. However, Ofwat also expressed some concern that pass-through arrangements could reduce the incentive for water companies to be tax efficient and would make customers bear tax risks which it felt should be properly in the control of the companies. Therefore, on balance, Ofwat preferred its tax reconciliation mechanism.

CMA Assessment and Provisional Findings

- 11.7 Having considered the responses to our review of an alternative approach to taxation based more on pass-through principles, the CMA provisionally proposes to retain Ofwat's tax reconciliation mechanism for the redeterminations. Implementing an alternative pass-through approach would be an unnecessary complication, as it would lead to four companies having different taxation treatment to the other thirteen. Whilst the alternative of a full pass-through would have some potential benefits, we agree with Ofwat that this is a balanced decision, and that Ofwat's approach has some marginal benefits in terms of the incentives on companies to properly manage their tax affairs.
- 11.8 We propose to adjust the corporation tax rate to the current actual rate of 19% for the four Disputing Companies. The CMA considers that this change to 19% should be made regardless of whether the reconciliation is in-period or end-of-period given it is currently the most likely rate to prevail for the period. It would be unusual to adopt a rate other than the current rate unless there

¹⁷⁸⁵ NAO (2015), [*The Economic Regulation of the Water Sector*](#)

was strong evidence the Government was intending to change this to a specified new rate. With the prevailing financial uncertainty arising from COVID-19, it is difficult to speculate on future changes, and therefore we propose that the allowance for AMP7 is based on current rates. If the rates change to 17%, this will be captured through the reconciliation in PR24.

PR14 Reconciliation – Revenue Forecasting (WRFIM) – Yorkshire only

Introduction

11.9 In this section we review an issue relating to the Wholesale Revenue Forecasting Incentive Mechanism (WRFIM). This issue relates to Yorkshire only.

11.10 This section is structured as follows:

- (a) We first set out the background to the issue.
- (b) We set out Yorkshire's case and Ofwat's views.
- (c) We set out our assessment of the issue and our provisional decision, including the value of any adjustment required.

11.11 Yorkshire's case is set out in its SoC¹⁷⁸⁶ (including Annex 11 to Yorkshire's SoC, which is a forensic accountant's report to the CMA by Mark Ballamy FCA dated 2 March 2020 containing an independent opinion as to whether an error made by Yorkshire in preparing its PR14 submission was unambiguous), and a reply to Ofwat's response. We also obtained further written information from both Yorkshire and Ofwat and questioned both parties on this issue in the main party hearings.

Background

11.12 The WRFIM was introduced at PR14. Its purpose is to reduce the impact of deviations on customer bills arising from revenue forecasting errors by:

- (a) adjusting companies' allowed revenues each year to take account of differences between actual and projected revenues (that is, there is an adjustment to reflect previous revenue under- or over- recovery); and

¹⁷⁸⁶ See [Yorkshire SoC](#) paragraphs 204 to 215

- (b) incentivising companies to avoid revenue forecasting errors by applying a penalty to variations that fall outside the set revenue flexibility threshold (if there is more than a 2% difference between the recovered and adjusted allowed revenues, there is the potential for a financial penalty).¹⁷⁸⁷

11.13 The revenue which Yorkshire claims was erroneously excluded from its submission relates to connection charges income. Section 45 of the WIA91 provides that the owner of a building can serve a notice on a water company to make a connection for the supply of water and that where the water company does so, it is entitled to recover from the person who requested the connection to be paid an amount equal to the expenditure reasonably incurred by the water company in carrying out the works. The charges levied by water companies to recoup the costs incurred in performing connection works in compliance with their duty under section 45 of the WIA91 are referred to as 'connection charges (s45)'.

Yorkshire's reasoning

11.14 Yorkshire states that in PR14 it made a data input error in its submission to Ofwat: it mistakenly included £4.44 million per annum of s45 income as 'third party income' rather than 'infra & connection charges (revenue)'. This figure is contained in the amount of £5.612 million outlined in red at line 8 in 'Table 3.1 – PR14 data table W9 – Yorkshire's revised business plan'.¹⁷⁸⁸ Yorkshire claims that this error incorrectly reduced the amount of revenue that it was entitled to recover from its customers.

11.15 This error was uncovered while Yorkshire was preparing its annual performance report (APR) for 2015-16 during AMP6.¹⁷⁸⁹ Yorkshire told us that it immediately notified Ofwat of the error and requested guidance on how to proceed. Yorkshire told us that three options to resolve the issue were discussed:

- (a) change the wholesale price control to include the forecast for s45 income;

¹⁷⁸⁷ Ofwat (2016), [Update to the PR14 reconciliation rulebook policy document](#), p21

¹⁷⁸⁸ Ofwat (2019), [Ofwat PR19 final determinations. Yorkshire Water - accounting for past delivery additional information](#), p4

¹⁷⁸⁹ Annex 11 of Yorkshire's SoC explains that, up to and including 2014-15, Yorkshire reported income from connection charges in its statutory financial statements as a component of revenue, not as a component of capital grants and contributions. To reflect this accounting treatment, Yorkshire included its projected income from connection charges in table W9 under third party services which is a component of third party income (that is, included in line 8, not line 2). In 2015-16 Yorkshire changed its accounting treatment for income from connection charges as a component of revenue to income as a component of capital grants and contributions. This change of accounting treatment alerted Yorkshire to the fact that it had made a mistake when preparing Table W9 in its PR14 submission.

- (b) deviate from the APR methodology and exclude s45 income; or
- (c) include an amended calculation to exclude s45 income and include a note from Yorkshire's actual capital grants and contribution reporting with a narrative explaining why the performance in the 2015-16 APR was incorrect.

11.16 Yorkshire told us that Ofwat and Yorkshire discussed these options; Yorkshire told us that it was instructed by Ofwat to take option (c).

11.17 Yorkshire told us it considered that Ofwat acknowledged Yorkshire had clearly made an error as part of that review process. In the Monitoring Financial Performance reports in 2015-16 and 2016-17, Ofwat included the adjusted revenue performance. Yorkshire claims that Ofwat agreed with Yorkshire that this adjusted revenue performance would be reflected within the WRFIM in PR19.

11.18 Yorkshire told us that it made an adjustment to the WRFIM to account for the error made at PR14 and Ofwat's proposed approach to accounting for the error from the 2015-2016 APR onwards. However, Ofwat disallowed the claim in the draft determination, stating that the errors were made by the company in completing its business plan tables for connection expenditure at PR14 and considering it to be outside the reconciliation mechanism's scope.

11.19 In the final determination, Ofwat explained that it believed the error was not an 'unambiguous error' and it disallowed the claim on those grounds. In the Yorkshire-specific paper published by Ofwat in March 2020, Yorkshire told us that Ofwat submitted the following:¹⁷⁹⁰

- (a) it did not consider the error was unambiguous as the information supplied by Yorkshire was not sufficiently disaggregated;
- (b) the correction was not unambiguous because Yorkshire took no account of the potential impact on allowed Totex at PR14; and
- (c) Yorkshire's proposed approach would remove the impact of the incentive to forecast accurately.

Unambiguous error

11.20 Yorkshire claimed that its error was unambiguous. It provided evidence in the forensic accountant's report to the CMA which showed the £4.44 million of

¹⁷⁹⁰ Ofwat (March 2020), [Reference of the PR19 final determinations: Explanation of our final determination for Yorkshire Water](#)

s45 connection charges included in the £5.612 million total. Yorkshire's hearing evidence supports this view. Yorkshire stated:

- (a) 'it was made very clear that this was a data input error'
- (b) 'a number was put in a wrong line in a schedule'.

Incentive to forecast accurately

11.21 Yorkshire told us that there was no risk of creating a precedent of a company using an error reported retrospectively to avoid a forecasting penalty, as this was a simple data input error; and that there was a vast difference between a data input error in this situation and a forecasting error. Even if it were an error in forecasting, Yorkshire pointed out the error to Ofwat and explored options to address the problem at the 2015-16 APR, before the majority of the proposed adjustment's value had accrued. Yorkshire also told us that it supported Ofwat's objective of improved forecasting accuracy but did not believe this was relevant in this instance given the nature of the original error; allowing the WRFIM adjustment for a simple data input error did not negate its function as a mechanism to incentivise accurate forecasting.

Good faith

11.22 Yorkshire told us that it had 'in good faith followed Ofwat's guidance in its APR reporting for the whole of the AMP6 period' and that 'this changing of the goalposts [undermined] Yorkshire's confidence in the stability, effectiveness and fairness of the regulatory system.'

Provision of information

11.23 Yorkshire also told us that it had responded with all the information Ofwat had requested during the last four years and that it was unclear to Yorkshire what further information could be required by Ofwat.

Ofwat's views

11.24 Ofwat told us that it had not been able to find any records of correspondence that indicated any possible treatment in the WRFIM was discussed or agreed at any point during 2015-20; and that Yorkshire did not escalate this issue beyond a reporting level concern it had in completing the APR.

Unambiguous error

11.25 Ofwat told us that the error was not unambiguous. In the Yorkshire-specific paper published in March 2020, Ofwat states: ‘We did not consider that this error was unambiguous as the data the company provided at PR14 is not sufficiently disaggregated to allow us to verify the amount of connection charges it claimed to omit from the business plan.’

Provision of information

11.26 Ofwat’s reasoning for disallowing the correction of the PR14 error contained in the draft determination¹⁷⁹¹ states: ‘the claim relates to the errors the company made in completing its business plan tables for connection expenditure at PR14 and we consider this to be outside of the reconciliation mechanism’s scope’ ‘the company does not provide compelling evidence that the amendment is appropriate and so we are removing the amendment’.

11.27 Ofwat told us that Yorkshire had failed to evidence what its forecasts were in a compelling way and had not presented documents from 2014 with the forecasts it would have made.

Incentive to forecast accurately

11.28 Ofwat told us that taking the error into account removed any incentive for accurate forecasting, which was the whole reason for the WRFIM. It acknowledged that there might have been a reporting error but considered the evidence presented regarding the connection charges forecast was not compelling.

11.29 Ofwat told us that, given the risk of creating a precedent of a company using an error reported retrospectively to avoid a forecasting penalty, Ofwat did not amend the revenue recovered in the WRFIM model to correct for the error in Yorkshire’s PR14 forecasts.

Third Party Views

11.30 We received no third party views on this issue.

¹⁷⁹¹ Ofwat (2019), [Yorkshire draft determination - accounting for past delivery actions and interventions](#), pp6–7

Our assessment

- 11.31 Our assessment has two stages: we first consider whether the error should be corrected. We then consider what adjustment is required if we decide that the error needs to be corrected.
- 11.32 Yorkshire's case was that there was an implied agreement that Ofwat had accepted there was an error and that it would be corrected at PR19. Yorkshire said it had approached Ofwat and agreed an approach through telephone discussion. It told us that the informal way it approached the resolution of this error was the way it worked with its regulator to resolve matters, constructively, and acknowledging that the regulator can determine how a solution is reached.
- 11.33 Ofwat told us that there was no agreement arising from the discussions around May 2016 to correct the error at PR19. It told us that although Yorkshire may have approached Ofwat to discuss this narrative disclosure, Ofwat did not agree that Yorkshire could report differently to other companies, neither did Ofwat allow Yorkshire to include any narrative disclosures that were not already set out in the APR reporting guidance.
- 11.34 Both parties acknowledge that there was no agreement in writing, and there is no documentary evidence to allow us to determine whether or not there was any agreement. In any event our role is to determine the appropriate treatment of these costs in the context of the current determination. We do not place weight on this issue.
- 11.35 We also considered the issue of the need for a company to provide accurate forecasts. Ofwat told us that taking the error into account removed any incentive for accurate forecasting, which was the whole reason for the WRFIM. Yorkshire told us that it agreed that a water company should provide accurate forecasting and it supported Ofwat's objective of using the WRFIM to improve forecasting accuracy. It also told us that this error was a simple data input error, and not an error in forecasting; rather, it was incorrectly added into the wrong row of a spreadsheet.
- 11.36 We considered that this was a data input, not forecasting error, and therefore did not place weight on this issue.
- 11.37 We considered two issues in making our assessment: whether there was an unambiguous error, and whether sufficient information had been provided by Yorkshire.

Unambiguous error

- 11.38 Ofwat has said the error was not a data input error, although it acknowledged 'there might have been a reporting error',¹⁷⁹² and it has subsequently clarified that there is no distinction between a reporting error and a data input error. Yorkshire has been unequivocal that the error was quite simply a data input error, not a forecasting error.
- 11.39 The forensic accountant's report shows Yorkshire's projected income in respect of 'connection charges (s45)' of £4.44 million included in the amount of £7.020 million which represents the total of Yorkshire's projected income from third party sources as set out in Table W9 of Yorkshire's PR14 submission to Ofwat. We consider that Yorkshire made a data input error, and that this error is unambiguous.

Provision of sufficient information

- 11.40 Ofwat told us that Yorkshire had not provided compelling evidence that the amendment was appropriate. Yorkshire told us that it had responded with all the information that Ofwat had requested on this issue during the last four years. We have seen Yorkshire's responses to the IAP and draft determination and consider that it did provide the information Ofwat requested.
- 11.41 As noted at paragraph 11.39, the forensic accountant's report shows the £4.44 million projected revenue in respect of 'connection charges (s45)' included in the total of Yorkshire's projected income in respect of third party services of £5.612 million for water services. Although there is no breakdown, nor evidence of how the figure was arrived at, we note that Ofwat told us that it did not request a breakdown of third party services within the relevant schedule which set out the line items included in the wholesale water price control, because it was not required for the purposes of the review.

Provisional CMA decision on error

- 11.42 We have provisionally decided that the error is unambiguous and needs to be corrected. We now consider the value of the adjustment.

Value of adjustment

- 11.43 The total adjustment Yorkshire is claiming is approximately £44 million. Yorkshire told us this was made up of the difference between Yorkshire's draft

¹⁷⁹² Ofwat (May 2020), [Ofwat's Response to Yorkshire's SoC](#), paragraph 7.16

determination representations and Ofwat's final determination of the WRFIM allowance of £36.7 million and approximately £7.3 million of 'connection charges income' (s45 income) for 2019-20 which was not taken into account in Yorkshire's draft determination representations.¹⁷⁹³ This appears to be the core totex adjustment that it should have received in PR14.

11.44 Ofwat told us that there were knock-on effects throughout the PR14 final determination that Yorkshire had not considered. It calculated a £27 million¹⁷⁹⁴ revenue adjustment, and stated there was a knock-on effect on the RCV reducing it by between £6.5 million and £10 million, depending on the assumptions Ofwat made about the menu choice Yorkshire would have made in the light of differences between its final determination and revised figures taking the error into account.

11.45 Yorkshire stated in its SoC that it disagreed with Ofwat's assertion that it had been provided with a higher totex allowance at PR14 that would partially offset the claim, and that there should be no adjustment to the PAYG or RCV values. However, in later submissions to the CMA, Ofwat and Yorkshire both appeared to agree that there would be some effect on totex, with there being a difference of opinion on the consequential effect on PR14 revenues.

11.46 In this section we consider the following effects that a correction of the error might have on:

- (a) allowed revenues, due to lower third party income, and grants and contributions;
- (b) allowed PAYG revenue, resulting from higher totex allowances; and
- (c) RCV, resulting from higher totex allowances.

11.47 Our figures are in 2012-13 prices, which was the price base of PR14. Both Ofwat and Yorkshire agree that the adjustment for PR19 should be based on the relevant price base for PR19, and therefore the numbers below would be higher by approximately 20% to reflect the effect of inflation.

PR14 Revenues (gross effect)

11.48 Yorkshire included £22 million in third party income, which reduced allowed revenues. If correctly inputted, we understand that this should have been included in grants and contributions which would have increased allowed

¹⁷⁹³ Calculated using the CPIH 2017–18 average

¹⁷⁹⁴ Calculated using the 2012–13 RPI average

revenues. The direct effect on allowed revenue would therefore have been £44 million.

PR14 PAYG (effect of third party income on totex)

- 11.49 We understand from both parties that the process followed within the WFRIM where the error occurred would also have had the effect of reducing the allowed totex to reflect an amount directly related to the £22 million third party income.
- 11.50 Ofwat told us that the totex allowance should have been reduced by £25 million, which is 114% of £22 million, the 114% based on historical reported recovery rates (the ratio of third party costs to third party income). Yorkshire told us that, if there were such a reduction, it should be £20.5 million, which is 93% of £22 million, the 93% based on data submitted at PR14 (the ratio of third party costs to total other income).
- 11.51 From the submissions received, it appears to be agreed that there would have been a reduction to totex, had the error had been corrected in PR14. We considered that we should use the 93% recovery rate as it was better supported by contemporaneous data, thus there should be a reduction in totex of £20.5 million.
- 11.52 Based on Yorkshire's PAYG rates for PR14, this would have resulted in PAYG and therefore revenue being £12.9 million lower than actual PR14 allowances. It appears from Yorkshire's submissions that it has accepted these two stages of Ofwat's calculation which it calculated to be £35 million in PR19 prices. Its submission of a total adjustment of £42 million is equivalent to the calculations from these stages, plus the 'blind year' adjustment described below.

PR14 RCV (effect of third party income on totex)

- 11.53 Ofwat submitted that the higher totex allowance as a result of the error also resulted in a higher RCV. Although Yorkshire told us no RCV adjustment was necessary, the reasoning that supports a PAYG adjustment also supports an adjustment to the non-PAYG element of totex, namely the RCV.
- 11.54 With a fall in totex of £20.5 million and an average PAYG rate of circa 63%, the closing RCV falls by approximately £7.6 million. Ofwat has since told us that there is more than one way to arrive at this figure because of Yorkshire's menu choices and it calculated reductions of between £6.5 million and £10 million. We do not propose to speculate on the effect on Yorkshire's menu choices, and propose an adjustment of £7.6 million. This would be equivalent to £9 million in PR19 prices.

Blind year reconciliation

- 11.55 Yorkshire also claimed an adjustment of £7.2 million (price base 2017-18 CPIH) relating to its calculated impact of the blind year reconciliation for the WRFIM assessment, as Ofwat's model did not include forecast s45 income for 2019-20.
- 11.56 Although we understand that there are a number of potential knock-on effects of an error such as that identified by Yorkshire, it is not clear why this would have an effect over and above the direct effects we have already considered. Ofwat and Yorkshire have both provided evidence suggesting the effects above would address the consequences of the error.
- 11.57 We provisionally do not propose to make any further adjustments in PR19. If Yorkshire considers that the effects will persist into AMP7, it should either include this in the PR24 reconciliation or provide a clearer explanation of the link between an input error in PR14 and the 2019-20 reconciliation, which goes beyond the £44 million already addressed above.

Provisional CMA decision on value of adjustment

- 11.58 Based on our understanding of the direct consequences of the PR14 error, we propose to make an adjustment to Yorkshire's PR19 allowances to offset the effect of the error. The effects we have provisionally found are:
- (a) £35 million (PR19 prices) for the revenue adjustment; offset by
 - (b) £9 million (PR19 prices) for the RCV adjustment.
- 11.59 We welcome submissions on whether it would be more appropriate to net off these two adjustments to a single AMP7 revenue adjustment.

Potential Grants & Contributions Error – Northumbrian only

Introduction

- 11.60 In this section we review an issue relating to an error that Northumbrian claims was made by Ofwat during PR19 relating to grants and contributions.
- 11.61 This section is structured as follows:
- (a) We first set out the background to the issue.
 - (b) We then set out Northumbrian's case and Ofwat's views.

- (c) Finally, we set out our assessment of the issue and our provisional decision, including the value of any adjustment required.

11.62 Northumbrian's reasoning is set out in its SoC¹⁷⁹⁵ and reply to Ofwat's response.¹⁷⁹⁶ We also obtained further written information from both Northumbrian and Ofwat and questioned both parties on this issue in the main party hearings.

Background

11.63 Grants and contributions are amounts paid by developers to water companies in relation to new properties, to carry out the following works:¹⁷⁹⁷

- (a) reinforce the network as a consequence of new properties being connected;
- (b) connect a new property (e.g. the meter and connection pipe);
- (c) provide new water mains or public sewers (i.e. requisitions); and
- (d) move an existing main or sewer or other apparatus at the request of a third-party (i.e. diversions).

11.64 Ofwat's treatment of grants and contributions is set out in the draft determination.¹⁷⁹⁸ Companies receive grants and contributions from developers towards the costs of 'new developments', expenditure to reinforce the network, and 'new connections' expenditure to connect a property, for example the meter and connection pipe. Ofwat calculates the grants and contributions receivable by applying a recovery rate to its view of new developments and new connections expenditure, which ensures that developers pay a fair share towards costs to connect new properties. Ofwat uses this calculation of grants and contributions receivable from developers to ensure that the amounts billed to water and wastewater customers correctly reflect only that share of any new development spend which should be borne by them.

Northumbrian's reasoning

11.65 Northumbrian told us that at PR19 Ofwat made an adjustment to its model to add a one-off contribution of £14.4 million to the grants and contributions

¹⁷⁹⁵ See [Northumbrian SoC](#) paragraphs 963–977

¹⁷⁹⁶ See [Northumbrian's reply to Ofwat's Response](#) paragraphs 626–629

¹⁷⁹⁷ Ofwat (2019), [Northumbrian Water Final Determination](#), p64

¹⁷⁹⁸ Ofwat (2019), [Northumbrian Water Draft Determination](#), pp 46 onwards

component of the projected water network plus control. It told us that this adjustment was an error as it double counted a contribution that was already included in the infrastructure charge receipts. The grants and contributions model showed Northumbrian's projected water infrastructure charges of £13.6 million that were set to recover the £14.4 million of costs over the five years (less an underspend adjustment). This £13.6 million amount was then added to the £14.4 million which created a double-count.

- 11.66 Northumbrian told us that the £14.4 million of infrastructure network reinforcements was recovered from developers via infrastructure charges (and thus not recovered through requisition charges or any other one-off developer income), and that if the adjustment was not reflected in the CMA redetermination, then it would have to cover a £14.4 million material shortfall in revenue during 2015-20.
- 11.67 Northumbrian provided further detail as to the background to the error. In its business plan, Northumbrian added an additional line – a free form line – where it split out infrastructure network reinforcement contribution, which was a subcomponent of its total infrastructure charge income. Northumbrian thought it would be helpful to show that additional breakdown; it did this for both water and wastewater. However, Ofwat only saw that line for water and thought it should have been included in infrastructure charges; Ofwat did not realise that it had already been included. Ofwat therefore classed the £14.4 million as an addition to an infrastructure charge line which already included that sum, therefore double counting it.
- 11.68 Northumbrian also told us that it was clear in its business plan that this was a number to note; it was not an additional sum. Northumbrian told us that Ofwat did not interpret this in the way Northumbrian had intended, although for wastewater, it said that Ofwat did seem to understand Northumbrian's point.
- 11.69 Northumbrian originally stated that this error was not made in the draft determination which was why it did not comment on it before Ofwat's final determination. It later told us that it did not realise that the error had been included in the draft determination, and that there was some more text in Ofwat's final determination which drew its attention to it.
- 11.70 Northumbrian told us that this was a technical error in Ofwat's models and that it did not believe that Ofwat was contesting that this was an error.
- 11.71 Northumbrian told us that the adjustment should be removed from the grants and contributions model and that the lower grants and contribution amount for Water Networks should be fed into the Financial Model. It also told us that

there was a material impact on revenue, customer bills and RCV from the adjustment.

Ofwat's views

- 11.72 Ofwat stated that Northumbrian submitted the £14.4 million of expenditure in a free-form enhancement line within its original business plan submission rather than in the new developments line. This led Ofwat to make the 'reasonable and justifiable assumption' that the company had not captured this expenditure within grants and contributions. Ofwat told us it made its assumption clear within the draft determination and that Northumbrian did not raise any queries in relation to the assumption made. As a result, there was no obvious reason to change its approach for its final determination.
- 11.73 Ofwat originally told us, that based on the new evidence provided by Northumbrian in its SoC, it was unable to confirm if the £14.4 million adjustment made to its grants and contributions was already included in the company's grants and contributions. It told us that this added to several other instances where Northumbrian had failed to report data accurately and/or in line with other companies, which undermined Ofwat's confidence in its business plan.
- 11.74 Ofwat told us the issue was relatively immaterial due to the use of a single till approach – as a result, removing the one-off contribution would only have a relatively minor impact on PAYG revenue and RCV additions. Ofwat recommended that we should not make an adjustment given the lack of confidence in the information provided by Northumbrian.
- 11.75 Ofwat later told us (in the hearing) that it accepted the possibility that the adjustment made was an error, and if the CMA found that there was a double-count, it should be removed.

Third party views

- 11.76 We have received no third-party views on this issue.

Our assessment

- 11.77 Our assessment has two stages: the first considers whether an error has occurred. The second considers what adjustment is required if we decide that an error has occurred.

Has an error occurred

11.78 We looked at Ofwat's approach to grants and contributions in its final determination.¹⁷⁹⁹

- (a) Grants and contributions before the deduction of income offset allowances (gross grants and contributions) are used to calculate net totex for cost sharing and within the developer services reconciliation adjustment (explained in 'our approach to regulating developer services').
- (b) Grants and contributions after the deduction of income offset allowances (net grants and contributions) are used to calculate net totex for use in the financial modelling. This ensures that income offset allowances, that are funded by existing customers rather than developers, are captured within net totex that is used to calculate PAYG revenue and RCV additions. Developer services costs that are funded by developers are excluded from net totex, and are instead treated as grants and contributions within the financial model.

11.79 Ofwat stated that table 4.15¹⁸⁰⁰ showed its assumed amounts of 'gross' grants and contributions (price control) that was used to calculate net totex for cost sharing; Ofwat stated that this included a one-off contribution equal to £14.4 million that Northumbrian did not originally include within grants and contributions in its business plan.

11.80 Ofwat stated that Northumbrian included £14.4 million as supply-demand balance expenditure despite its business plan suggesting that this expenditure related to investment directly connected with housing developments; Northumbrian's business plan commentary also stated that this expenditure was paid for by developers through infrastructure charges; therefore Ofwat considered this to be growth related expenditure and assumes it was recovered from developers (Water network plus: £14.4 million).

11.81 We examined Ofwat's grants and contributions model for Northumbrian.¹⁸⁰¹ Line 93 of the worksheet InpOverride shows annual amounts of £2.88 million¹⁸⁰² for the years ended 31 March 2021 to 2025 and a total amount of £14.4 million, entitled 'One-off contribution to capex – water network – price control.' This ultimately feeds through to the worksheet Adjustments Log, where there is the following explanation against the £14.4 million: '£14.4 million reallocated to growth is stated as being recoverable from developers in

¹⁷⁹⁹ Ofwat (2019), [Northumbrian Water Final Determination](#), pp47 onwards

¹⁸⁰⁰ Ofwat (2019), [Northumbrian Water Final Determination](#), p67

¹⁸⁰¹ Ofwat (2019), [Grants and Contributions model for Northumbrian](#)

¹⁸⁰² £2.8798 million is hard-coded in the worksheet.

the NES business plan. An adjustment of £14.4 million has been added to the water network price control capex. This is added after grants & contributions have been calculated to give a final figure.’ Line 61 of the worksheet InpActive shows annual amounts of £2.72 million for the years ended 31 March 2021 to 2025 and a total amount of £13.6 million, entitled ‘Infrastructure charge receipts (s146)’.

11.82 Adding the £14.4 million for ‘One-off contribution to capex – water network – price control’ is a double-count, as the contribution is already included in the £13.6 million. Therefore we consider that this adjustment is an error and should be corrected.

11.83 Ofwat said that it had a lack of confidence in the information provided by Northumbrian. However, in respect of this matter, we do not consider that Ofwat has given us reasons not to be confident in Northumbrian’s submissions to the CMA.

Provisional CMA decision on error

11.84 We have provisionally decided that this adjustment is an error and needs to be corrected. We now consider the value of the adjustment.

Adjustment required

11.85 Northumbrian told us that, in order to remove the £14.4 million grants and contributions offset amount, adjustments needed to be made both to the RCV and to appointee total revenues across the five years 2020-25. As the grants and contributions amount was an offset against customer charges, there needed to be a corresponding increase in appointee total revenue.

11.86 Northumbrian told us that while the single till aspect of the revenue control rebalanced the majority of the reduction, there was a material impact on revenue, customer bills and RCV of the adjustment and that the impact of the changes were spread across the whole of AMP7.

11.87 Northumbrian told us in its SoC that a decrease in the revenue controls of £3.346 million across 2020-25 and an increase in the RCV of £5.293 million were required.

11.88 We note that Ofwat did not disagree with Northumbrian’s figures in its response to Northumbrian’s SoC. It did, however, later state in a request for information (RFI 014) that the grants and contributions figure would also flow into the PAYG model. This model would need to be recalculated as the input pull would be different based on the new grants and contributions figure and

natural water network PAYG rate. With the PAYG uplift in the final determination as 0.93% and brought forward £25 million in revenue, the uplift would be 0.96% with £26 million revenue brought forward.

11.89 The adjustments to revenue and RCV are shown in Table 11-1.

Table 11-1 Net adjustment to total revenue and the RCV for G&C double counting (£ million, 2017-18 CPIH deflated prices)

		2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Total
Revenue	Ofwat RFI 014	668.4	669.5	671.7	674.3	677	3360.9
	Ofwat's FD	670.98	671.86	673.87	676.33	678.8	3371.84
	Difference	-2.58	-2.36	-2.17	-2.03	-1.80	-10.94
	NES SoC (for info)	670.14	671.00	673.14	675.78	678.43	3368.49
RCV	Ofwat RFI 014	3984.6	4036.0	4100.6	4201.5	4239.3	
	Ofwat's FD	3981.97	4030.85	4093.05	4191.68	4227.3	
	Difference	2.63	5.15	7.55	9.82	12.00	12.00
	NES SoC (for info)	3983.15	4033.23	4096.54	4196.14	4232.59	

Source: Ofwat, Northumbrian, CMA analysis

11.90 This results in a decrease in the revenue controls of £10.94 million across 2020-25 and an increase in the RCV of £12.0 million. Our review of Ofwat's submissions suggests that it is correct to include the additional effects that it has indicated. The net effect on Northumbrian is small, because under both Ofwat's and Northumbrian's assumptions, there is a small net positive effect, with an RCV adjustment that outweighs the revenue reduction by £1-2 million. We provisionally propose to follow Ofwat's approach.

Provisional CMA assessment

11.91 We have provisionally decided that the adjustment is an error and it should be corrected. The adjustments required are a decrease in the revenue controls of £10.94 million across 2020-25 and an increase in the RCV of £12.0 million.

11.92 We welcome submissions on whether it would be more appropriate to net off these two adjustments to a single AMP7 revenue adjustment.

Separate Price Controls

11.93 In a change from PR14, at PR19 Ofwat set separate price controls for water resources and bioresources, wholesale water, wholesale wastewater and residential retail, and business retail in Wales. The water resources and wholesale control have been covered extensively in our provisional findings.

For retail and bioresources, we proposed to de-prioritise these in our Approaches Statement and respondents agreed this was pragmatic. A short explanation of our position on these is provided below.

Retail Price Controls

- 11.94 For retail, representing the customer service and developer services functions of water companies, Ofwat have set separate binding price controls, which they also did at PR14. Retail accounts for around 7% of water companies' expenditure. For business retail services in England (but not Wales), there is competition allowing customers to switch their supplier. This competition has led to consolidation of market providers. The four Disputing Companies have all exited the non-household retail market and so this component of price controls is not relevant to our provisional findings.
- 11.95 Ofwat applied a different approach to determine the retail price control compared to that for wholesale services. This control was based on a retail cost to serve, a unit cost approach, rather than being based on total allowed revenue. There is no RCV in retail, as depreciation of retail assets is included in the cost to serve allowance. With no RCV, the cost of capital is therefore not relevant. Instead the retail allowance includes a net margin covering tax and the return.
- 11.96 The four Disputing Companies have not raised in their SoCs a suggestion that this approach should be reconsidered.
- 11.97 For Anglian, Bristol, Northumbrian and Yorkshire, the CMA's provisional position on retail is therefore aligned to Ofwat's final determination. This includes the household retail expenditure allowance and the outcome measures relating to the customer experience and developer experience (C-Mex and D-Mex respectively).
- 11.98 Whilst we have not made any changes to Ofwat's retail margin of 1%, we have reconsidered the approach taken by Ofwat to the wholesale profit, which takes account of a potential double count at the appointee level. Ofwat described this as a retail margin adjustment. We present our analysis of the overall profit, including this adjustment, in paragraphs 9.535 to 9.564.

Bioresources (sludge)

- 11.99 For bioresources, representing sludge treatment and disposal, Ofwat has set separate binding price controls for the eleven WASCs. Bioresources accounts for around 5% of WASCs expenditure. The bioresources control was set based on the modified average revenue per unit rather than the total allowed

revenue. It also includes a forecasting accuracy incentive with an adjustment to fixed costs. This is based on an adjustment after the financeability modelling to split this allowance into a fixed and variable component. The variable component will then be (ex-post, at PR24) scaled to reconcile with actual volumes of 'sludge'. This acts as a risk mitigation mechanism around the uncertainty of actual outturn volumes. The adjustment mechanism is symmetrical, and it is anticipated to lead only to modest financial changes.

11.100 The three Disputing WASCs have not raised in their SoCs a suggestion that this approach should be reconsidered, nor has any other Party, and we have not identified apparent problems with this approach.

11.101 For Anglian, Northumbrian and Yorkshire, the CMA's provisional position on bioresources is therefore aligned to Ofwat's final determination, subject to our review of the bioresources totex levels. We review Anglian's company-specific submission on bioresources investment in section 5.

12. The provisional determination for Anglian

- 12.1 This section provides a summary of our individual provisional determination for Anglian. In this, we set out our provisional determination, but we do not fully restate the explanation or rationale for our decisions; many methodologies will be common between the individual companies, and we will cross-reference to the relevant earlier sections of our report to identify where we have explained these rationales.
- 12.2 For the purposes of this provisional determination, all the figures we are including in this section are indicative. While we have updated the key figures referenced in this document, we have not necessarily reflected all consequential changes throughout other areas of the determination. Therefore, it is likely that there will be other consequential changes in our Final Determination (such as tax implications). We have tried to identify which figures we have not currently updated in the text below.
- 12.3 We will consult with the Main Parties in parallel to our consultation on this provisional determination on the technical steps required to convert our determination to changes to the price control licence conditions. This will include any modelling required to reflect the Final Determination.
- 12.4 As a result of the above, the average bill impacts which we show are only indicative, but we consider they are useful in assessing the implications for affordability at this stage.

Introduction

- 12.5 As originally proposed in our approach to the determinations document,¹⁸⁰³ we are using the same regulatory building blocks as Ofwat used in its determinations. In particular, we have maintained:¹⁸⁰⁴
- (a) Ofwat's approach of setting four wholesale price controls (water resources, water network plus, wastewater network plus, and bioresources);¹⁸⁰⁵
 - (b) Separating our assessment into its major component parts around costs, outcomes, and financial returns;¹⁸⁰⁶

¹⁸⁰³ [CMA approach to the redeterminations](#), paragraph 29; also see paragraphs 3.16 to 3.27 in this report.

¹⁸⁰⁴ See paragraph 3.5.

¹⁸⁰⁵ See paragraph 11.93. We note that these separate controls are specified in Anglian's licence conditions.

¹⁸⁰⁶ See paragraphs 2.85 and 3.2 to 3.15.

(c) Managing bioresources as an average revenue control;¹⁸⁰⁷ and

(d) Setting a separate retail control.¹⁸⁰⁸

12.6 The rest of this section sets out the provisional decisions we have applied to Anglian, grouped into:

(a) Totex allowances;

(b) outcomes;

(c) WACC and financeability; and

(d) implied calculations of revenue, with implications on average bills in the period.

Totex allowances

12.7 In setting Anglian's Totex allowance in our provisional determination, we have considered four main cost areas:

(a) modelled base costs (including growth);

(b) unmodelled base costs;

(c) enhancement costs; and

(d) other costs.

Modelled base costs

12.8 Water companies conduct many routine activities in order to run their businesses and provide a base level of service to customers. We adopt an econometric modelling approach to assess most of the costs of Anglian's base level of service relying on data from across the sector. Comparative benchmarking of this nature allows us better to estimate the efficient costs for these day to day operations than simply relying on individual company data or forecasts. Our modelling approach is similar to Ofwat's, although we select a slightly different set of model specifications, as well as updating the forecast data for connected properties and population density.¹⁸⁰⁹

¹⁸⁰⁷ See paragraphs 3.22 and 11.99 to 11.101.

¹⁸⁰⁸ See paragraphs 3.20 and 11.94 to 11.98.

¹⁸⁰⁹ See paragraphs 4.2 to 4.252.

- 12.9 Our cost models estimate how much it would cost the average water company to cover base operations. However, we want to set cost allowances for an efficient water company, and so we apply a catchup efficiency challenge based on our assessment of the upper quartile performers. Our provisional conclusion is to apply an upper quartile benchmark which we consider sets a challenging benchmark whilst acknowledging the limitations of our econometric modelling (and the consequent risk that the company will have insufficient allowed revenue to ensure a base level of service).¹⁸¹⁰
- 12.10 Future costs are likely to differ from the historical benchmarks because of changes to productivity levels and costs. We therefore:
- (a) Apply a 'frontier shift' which reduces the modelled allowance by 1% per year to reflect expected productivity gains from improvements in technology and new ways of working;¹⁸¹¹ and
 - (b) Provide an RPE adjustment for labour costs, which are a material cost item. We also include a reconciliation mechanism for these labour costs to protect both customers and the company against forecasting error.¹⁸¹²
- 12.11 Serving new properties involves additional costs for water companies, both from the cost of installing a new connection, and more broadly from an overall increase in demand in an area necessitating reinforced or additional infrastructure (like the cost of an additional treatment works). We therefore:
- (a) allow for differences in forecast growth for the number of properties served by Anglian, by increasing its allowance due to forecast growth being above industry average (using updated ONS forecast figures);¹⁸¹³ and
 - (b) include a reconciliation mechanism to protect against inaccuracy in these forecasts, which is calibrated using total growth costs.¹⁸¹⁴
- 12.12 Ofwat's historical data collection approach contained no distinction between base Opex and enhancement Opex. Therefore, Ofwat's modelled base costs could double count Anglian's enhancement Opex if an adjustment was not

¹⁸¹⁰ See paragraphs 4.253 to 4.297.

¹⁸¹¹ We have applied this adjustment to all of Totex, not just base costs; See paragraphs 4.298 to 4.393.

¹⁸¹² We have applied this adjustment to all of Totex, not just base costs; See paragraphs 4.394 to 4.453.

¹⁸¹³ See paragraphs 4.454 to 4.532.

¹⁸¹⁴ See paragraphs 4.494 to 4.512.

applied. We address this issue by applying an adjustment to cost allowances using the same approach as that Ofwat used in its PR19 FD.¹⁸¹⁵

- 12.13 The overall effect of our modelling changes described above is to increase Anglian's base allowances by around £20 million compared to the allowances in Ofwat's FD.¹⁸¹⁶
- 12.14 Finally, we recognise that our approach is reliant on models which are based on a limited set of explanatory variables and, like any econometric model, are subject to some limitations and a degree of uncertainty in their final estimates. While we have reflected this already in earlier decisions (such as selection of the catchup benchmark), we have also reviewed a number of specific issues raised by Anglian as base cost adjustment claims in relation to capital maintenance, sludge transport, leakage, and smart metering. Of these, the only one for which we allow additional Totex is leakage (£25.7 million), for the reasons explained in paragraph 12.39.¹⁸¹⁷

Unmodelled base costs

- 12.15 In designing our base models discussed above, we exclude certain costs that are unsuitable for modelling where, for example, there is insufficient data for modelling or where exceptional circumstances apply to particular companies. We refer to these as unmodelled base costs. These include costs associated with abstraction, business rates, compliance with the Industrial Emissions Directive and Traffic Management Act, amongst others.¹⁸¹⁸
- 12.16 Ofwat made an allowance for Anglian's unmodelled base costs, and we provisionally decide that these are largely appropriate.¹⁸¹⁹
- 12.17 Consistent with our provisional decision on base costs above, we apply a frontier shift on these unmodelled base costs of 1% together with a labour RPE. We do not consider that our approach gives rise to any double counting necessitating an adjustment. Our frontier shift is slightly below the level which Ofwat set in its final determination, and so this results in an increase in Anglian's allowances of just over £1 million compared to Ofwat's FD.¹⁸²⁰
- 12.18 Due to the nature of certain drivers of unmodelled base costs (such as management having a more limited degree of control than over other costs),

¹⁸¹⁵ See paragraphs 4.533 to 4.559.

¹⁸¹⁶ See Table 6-4.

¹⁸¹⁷ See paragraphs 4.560 to 4.580, 8.38 to 8.50, and 5.402 to 5.407.

¹⁸¹⁸ See paragraphs 4.581 to 4.673.

¹⁸¹⁹ See paragraphs 4.670 to 4.673 and Table 6-6.

¹⁸²⁰ See paragraphs 4.393 and 4.585.

we apply a cost sharing rate of 75/25 (customer/company) for abstraction charges, and 90/10 (customer/company) for business rates, rather than using Anglian's Totex cost sharing rate.¹⁸²¹

Enhancement costs

- 12.19 We provide additional allowances to Anglian where we have been persuaded that it is undertaking necessary investment for the purpose of enhancing the capacity or quality of service beyond a base level.¹⁸²²
- 12.20 In our review of enhancement expenditure, we generally focus on areas where Ofwat and Anglian have provided conflicting views and where we need to resolve these in coming to our determination. To help us reach our own view, our assessment often involves considering additional evidence or arguments which were not available to Ofwat at the time that it made its FD. For other enhancement expenditure, including major schemes which met Ofwat's evidential threshold to receive additional enhancement funding, we provisionally adopt the same approach as Ofwat did in its final determination.¹⁸²³
- 12.21 We make use of comparative data (including econometric modelling, engineering comparisons and cost benchmarking comparisons) where available to develop our best estimate for efficient enhancement costs. In particular, for P-removal and WINEP allowances more generally, we have used benchmarking in our assessment to test the efficiency of companies' proposals for these large and broadly-comparable programmes of work. Our provisional decision is to make adjustments to Ofwat's P-removal allowances based on alternative model specifications but to adopt the same overall approach. This results in no change to Anglian's allowance compared to Ofwat's FD.¹⁸²⁴
- 12.22 We apply efficiency challenges and reduce allowances where we are concerned about the robustness of the evidence provided for enhancement schemes. In doing so we are seeking to ensure that customers do not overpay for inefficient service whilst also ensuring sufficient allowance is available to achieve the enhanced level of service/quality. This results in our provisional decision to apply a shallow-dive efficiency factor based on

¹⁸²¹ See paragraphs 4.670 to 4.673.

¹⁸²² See paragraphs 5.5 to 5.8 for a description of how enhancement allowances fit into the broader price review framework.

¹⁸²³ See paragraphs 5.4 and 5.16 to 5.17.

¹⁸²⁴ See paragraphs 5.123 to 5.133.

Anglian's estimated base costs efficiency, and a deep-dive efficiency factor of 10%.¹⁸²⁵

12.23 Anglian raised a number of specific projects which we have assessed in greater detail. We make the following provisional decisions:

- (a) **Strategic Interconnector Programme:** Anglian proposed to build a series of interconnectors to transport water around its region in order to provide for an improved supply demand balance and increased resilience. We are supportive of this aim and the benefits it will bring customers. After careful review, we consider that Anglian has demonstrated its plans are prudent and costs are efficient. We provisionally provide Anglian with its full requested additional allowance for this scheme.¹⁸²⁶
- (b) **Smart Metering Scheme:** Anglian proposed to install smart meters in nearly all properties in its region by the end of AMP8, which would particularly assist with reducing leakage and water consumption in an area of the country which has relatively little rainfall. We are supportive of Anglian's proposal but concerned that certain elements of its requested allowance would result in customers paying twice for the same activities as metering forms an element of base activities. We therefore provisionally allow Anglian with an additional enhancement allowance to reflect the cost of installing smart meters but reject its request for additional funding through a base cost adjustment.¹⁸²⁷
- (c) **Water Resilience Scheme:** Anglian included a request for additional funds for the replacement of certain assets within its water treatment works, and development of a new risk planning tool. Our provisional decision is that these activities represent incremental improvements which the sector has delivered, and continues to deliver, as part of its day-to-day operational functions, and so we provisionally reject Anglian's request for additional allowance for this scheme.¹⁸²⁸
- (d) **SEMD/Non-SEMD:** Anglian included a request for additional funds for the delivery of certain water security-related activities. We provisionally provide Anglian with its full requested allowance on SEMD activities particularly where these arise from new legal obligations, but we apply an

¹⁸²⁵ See paragraphs 5.134 to 5.168.

¹⁸²⁶ See paragraphs 5.296 to 5.366.

¹⁸²⁷ See paragraphs 5.367 to 5.424.

¹⁸²⁸ See paragraphs 5.425 to 5.440.

efficiency challenge on aspects of non-SEMD where the evidence provided on cost efficiency is insufficiently robust.¹⁸²⁹

- (e) **Bioresources Scheme:** Anglian proposed to expand one of its sludge treatment centres to accommodate expected increases in the level of sludge being produced in the future. We find that this proposal is reasonable given the limited availability of alternative capacity from other suppliers, and reflects an efficient whole-life approach to the issue identified. We provisionally provide Anglian with its full requested additional allowance for this scheme.¹⁸³⁰

12.24 Together, these provisional decisions result in an increase of around £54 million in Anglian's enhancement allowance compared with Ofwat's FD, before the application of frontier shift.¹⁸³¹

12.25 When providing companies with specific funding to undertake additional activities, there is a risk that the company does not subsequently choose to proceed with the scheme while customers nonetheless bear the cost. In order to ensure that the higher level of service being funded by these schemes is delivered, we have included a number of scheme-specific mechanisms to protect customers from non- or under-delivery of these schemes. For the Strategy Interconnector Programme, the Smart Metering Scheme and SEMD/non-SEMD, we include a proposed PC and ODI in order to protect customers from the risk of non-delivery on these schemes.¹⁸³²

12.26 In addition to the above schemes, we have assessed Anglian's concerns around its uncertainty of recovering its costs of treating metaldehyde following the overturning of a ban on the use of this pesticide. Our provisional decision is that the best approach to mitigate this risk is to allow Anglian its full requested allowance of £63 million, but to protect customers by including a claw-back mechanism to remove the funding for the remaining years if the ban is reintroduced during the AMP.¹⁸³³

12.27 As discussed in paragraph 12.39, we consider that Anglian may require an additional enhancement allowance (as well as a base cost adjustment) in order to meet its leakage PC. For the purposes of our provisional determination, we include an indicative enhancement allowance of £68 million, slightly less than Ofwat's FD figure of £71 million.¹⁸³⁴

¹⁸²⁹ See paragraphs 5.441 to 5.466.

¹⁸³⁰ See paragraphs 5.467 to 5.490.

¹⁸³¹ See Table 5-24.

¹⁸³² See paragraphs 5.361 to 5.365, 5.148 to 5.421, and 5.466.

¹⁸³³ See paragraphs 5.491 to 5.505.

¹⁸³⁴ See paragraphs 8.51 to 8.74.

12.28 Consistent with our provisional decision on base costs above, we apply a frontier shift of 1% together with a labour RPE on all enhancement costs (not just WINEP and metering as Ofwat did). We do not consider that our approach gives rise to any double counting necessitating an adjustment. This results in a decrease of around £16 million in Anglian's enhancement allowances.¹⁸³⁵

Other costs

12.29 As well as the three cost areas discussed above, there are a number of other cost categories which contribute to Anglian's Totex allowance.¹⁸³⁶

12.30 Anglian has not raised any concerns with any of these cost categories, and we have no evidence to support the use of alternative figures, and so we provisionally decide to use the figures in Ofwat's FD.¹⁸³⁷

Overall Totex

12.31 Our provisional determination of Anglian's wholesale total Totex allowance is shown in Table 12-1 below:

Table 12-1: Totex by wholesale price control and type of cost, 2020-25 (£ million, 2017-18 CPIH deflated prices)

	<i>Water resources</i>	<i>Water network plus</i>	<i>Wastewater network plus</i>	<i>Bioresources</i>	<i>Total</i>
Modelled base allowance (including CAC)	130	1,179	1,725	379	3,414
Unmodelled base allowance	61	182	101	14	359
Enhancement allowance	39	735	734	14	1,522
Other Totex allowances*	22	-11	-108	12	-85
Total Totex	253	2,084	2,453	420	5,209

* Other Totex allowances include: operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset); and pension deficit recovery costs; see Table 3.2 of [Anglian FD](#).
Source: CMA analysis

Note: The enhancement allowance includes an adjustment for leakage which is indicative and subject to review prior to the final determination.

¹⁸³⁵ See paragraphs 5.506 to 5.520.

¹⁸³⁶ Operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset); and pension deficit recovery costs; see Table 3.2 of [Anglian FD](#).

¹⁸³⁷ We note that we have not currently made any adjustments in these costs for frontier shift or RPEs.

12.32 As shown in Table 12-2 below, our total Totex allowance is around £144 million higher than Ofwat's FD, reflecting our view that additional funding is needed to deliver the higher quality, more resilient services for customers that we have set out in our provisional determination.

Table 12-2: Comparison between CMA provisional decision on Totex and Ofwat's FD (£ million, 2017-18 CPIH deflated prices)

			<i>£m</i>
	<i>Ofwat FD</i>	<i>CMA provisional decision</i>	<i>Delta</i>
Modelled base allowance (including CAC)	3,368	3,414	+46
Unmodelled base allowance	357	359	+1
Enhancement allowance	1,425	1,522	+97
Other Totex allowances	-85	-85	-
Total Totex	5,065	5,209	+144

Source: Table 3.2 of [Anglian FD](#), CMA analysis

12.33 Our provisional total Totex allowance remains around £600 million lower than Anglian's submissions proposed, with our allowance equivalent to closing around 20% of the difference.¹⁸³⁸

12.34 In order to mitigate the risk that we set a Totex allowance that turns out to be either too low or too high, we include an overall Totex cost sharing mechanism which applies to the majority of Totex. Under the cost sharing mechanism, if a company underspends its allowance, customers share in the saving made. Conversely, if the company needs to overspend to deliver the necessary services, it can recover part of the costs from customers. Cost sharing enables us to rely less on other mechanisms in the price control that provide some protection from uncertainty.¹⁸³⁹

12.35 The Totex cost sharing rates we set for Anglian are 45% outperformance and 55% underperformance for both water and for wastewater.¹⁸⁴⁰ These cost sharing rates will apply to the following Totex allowances:¹⁸⁴¹

¹⁸³⁸ Paragraph 19 of [Anglian's SoC](#) refers to Ofwat's FD underfunding its proposed plan by £744 million.

¹⁸³⁹ See paragraphs 6.90 to 6.118.

¹⁸⁴⁰ See paragraphs 6.90 to 6.118.

¹⁸⁴¹ These costs reflect the sum of base expenditure (including cost adjustments), unmodelled base costs, enhancement expenditure, and the adjustment to reflect operating leases; minus Grants and contributions before the deduction of income offset, abstraction charges, and business rates. The last two of these have bespoke cost sharing rates set out in paragraphs 4.670 to 4.671.

- (a) Water resources: £169 million.
- (b) Water network plus: £1,725 million.
- (c) Wastewater network plus: £2,269 million.

Outcomes

- 12.36 Overall, we provisionally decide that the package of performance commitments and delivery incentives imposed by Ofwat should largely remain in place, having found no evidence to suggest that those are inappropriate.¹⁸⁴²
- 12.37 We focus our assessment on the common PCs and the related ODIs and provisionally conclude that the PC levels for the three common performance measures set at the forecast upper quartile level are appropriate. We consider that it is normal regulatory practice to make assessments using comparative regulation, and that upper quartile is a common measure used when promoting improvements in efficiency.¹⁸⁴³
- 12.38 However, we have made the following provisional determinations based on our investigation of specific PCs and ODIs:
- (a) **Adjustments to common PCs and ODIs (other than leakage):** For a small number of Anglian's common PCs and ODIs we have altered the company's collars and deadbands in order to protect the company against small variations in performance beyond management's control, while maintaining strong incentives to invest.¹⁸⁴⁴ We also welcome the common PC linked to vulnerable customers that encourages companies to identify those customers most likely to need additional support. A thorough and up-to-date PSR may also prompt companies to identify further innovations that will allow the sector better to help vulnerable customers.¹⁸⁴⁵
 - (b) **Bespoke PCs and ODIs:** We have reviewed Anglian's water quality contacts PC, and its bathing water quality PC, and provisionally decide that customer views and comparative evidence support adopting the same approach that Ofwat's used in this area.¹⁸⁴⁶ Finally, we also

¹⁸⁴² See paragraphs 7.42 to 7.105 and 7.235 to 7.245.

¹⁸⁴³ See paragraphs 7.106 to 7.147.

¹⁸⁴⁴ See paragraphs 7.106 to 7.195.

¹⁸⁴⁵ See paragraphs 7.188 to 7.195.

¹⁸⁴⁶ See paragraphs 7.196 to 7.234.

welcome Anglian's bespoke PCs to support the delivery of appropriate services to vulnerable customers.¹⁸⁴⁷

12.39 In relation to leakage specifically, we provisionally decide to retain the leakage PC at the level set by Ofwat, but in doing so provisionally conclude that Anglian may require additional allowance to achieve the required level of performance.¹⁸⁴⁸ In particular:

- (a) We provisionally conclude that there is a link between maintaining higher performance on leakage and costs such that the base cost model we use will not adequately compensate companies that are maintaining performance above the upper quartile. Since Anglian meets this criterion, we increase its base cost allowance by £25.7 million.¹⁸⁴⁹
- (b) We provisionally conclude that Anglian may require enhancement cost funding for achieving the leakage reductions it committed to, and so should be allowed the efficient cost of doing so. We intend to do further work to establish the appropriate level of enhancement funding for Anglian for leakage between provisional and Final Determinations. As an indication of the effect of this approach, we calculate provisional allowances for it based on applying its company-specific efficiency factor, frontier shift and RPE adjustment to its requested allowance. This results in an indicative allowance for Anglian of £68.0 million of enhancement Totex.¹⁸⁵⁰
- (c) We also consider the ODI rates relating to the leakage PC and in particular reject the use of enhanced ODI rates to reward substantial outperformance in this area. As explained above, we conclude that leakage improvements will require additional funding and so will impose costs on customers. In the circumstances, and in the absence of evidence for the cost-benefit trade off of further leakage reductions, we do not consider it would be appropriate to use enhanced ODIs to shift the frontier in this area. We also make adjustments to increase Anglian's penalty rates for underperformance ODIs, as we have provisionally concluded that this would make the calibration of the ODIs more consistent with our determination on enhancement costs.¹⁸⁵¹

¹⁸⁴⁷ See paragraph 7.192.

¹⁸⁴⁸ See paragraphs 8.29 to 8.74 and 8.100.

¹⁸⁴⁹ These figures are included in the Totex allowances discussed earlier; see paragraphs 8.38 to 8.50.

¹⁸⁵⁰ These figures are included in the Totex allowances discussed earlier; see paragraphs 8.51 to 8.74.

¹⁸⁵¹ See paragraphs 8.75 to 8.99.

12.40 For the purposes of this provisional determination, we do not list every PC and/or ODI to which Anglian is subject. Instead, we provide a list of the changes we have made to Ofwat's FD.¹⁸⁵² If we do not reference a PC or ODI, our provisional determination is that we have seen no evidence to support adopting a different approach to that used by Ofwat, and so we apply the same requirement that Ofwat included in its FD.

12.41 The summary of changes we have made to PCs and ODIs in Ofwat's FD (excluding scheme-specific PCs) are set out in Table 12-3 below:¹⁸⁵³

Table 12-3: Summary changes on outcome requirements

<i>Unique reference</i>	<i>Description of commitment</i>	<i>Description of intervention</i>
PR19ANH_5	Leakage	Remove enhanced ODI; provide additional Totex; and amend Tier 1 penalties
PR19ANH_8	Pollution incidents	Raise underperformance collar to 41.6
PR19ANH_11	Mains repairs	Set an underperformance deadband of 10 repairs per 1,000km above the PCL (For each year of AMP7: 150.1, 148.1, 146.2, 144.2, 142.3)
PR19ANH_12	Unplanned outage	Set an underperformance deadband of 1.2x PCL (2.81)

Source: CMA

12.42 Our provisional conclusion is that the overall reward cap on ODIs should not change, although we are seeking further evidence on this.

WACC and financeability

WACC

12.43 We perform our own determination of the cost of capital using the CAPM. The CAPM is an established methodology with well-understood theoretical foundations and which is based on the use of observable market data, together with some judgment on how to balance different sources of data. The CAPM is used by all UK regulators when calculating the cost of capital, and was the framework used by Ofwat in its PR19 FD. We perform our own assessment of each of the parameters of this model, although our analysis is often built on our interpretation of the analysis and data provided by the Parties. We have included additional and more up-to-date market data in our assessment.¹⁸⁵⁴

¹⁸⁵² The list of PCs and ODIs which Ofwat included in its FD is available here: [Ofwat \(2019\), PR19 final determinations: Anglian Water outcomes performance commitment appendix](#)

¹⁸⁵³ See Table 7-17 and paragraph 8.100.

¹⁸⁵⁴ See paragraphs 9.5 to 9.14.

12.44 The main components of the CAPM which we provisionally decide on are (in inflation adjusted CPIH-real terms):

- (a) **The total market return (6.2% to 7.2%):** To calculate the total market return, we place the most weight on historical ex post returns (from 1900 to the present day), and place some weight on both historic ex ante approaches and forward-looking evidence as a cross-check when selecting our range;¹⁸⁵⁵
- (b) **The risk free rate (-1.4% to -0.8%):** We calculate a risk free rate by placing weight on both long-tenor index-linked gilts and AAA-rated non-government bonds (the highest quality commercial debt);¹⁸⁵⁶
- (c) **The equity beta (0.65 to 0.80):** We calculate an equity beta based on a range of approaches of analysing the observable market data of WASC comparators, including a potential debt beta;¹⁸⁵⁷ and
- (d) **The industry cost of debt (2.3% to 2.9%):** We calculate a weighted average of new and embedded debt, including issuance and liquidity costs. In doing so, we largely rely on a notional approach using external indices and we do not apply a so-called 'outperformance wedge' because we do not consider there is evidence that water companies could systematically outperform our chosen index once tenor and credit rating are adjusted for.¹⁸⁵⁸

12.45 As part of this assessment, we provisionally form views on related metrics, particularly inflation (CPIH of 2%, with a 0.9% RPI-CPI wedge)¹⁸⁵⁹ and notional gearing (60%).¹⁸⁶⁰

12.46 Having established a range for our appointee WACC of 2.82% to 3.99% using the parameters above, we then select a point estimate. The selection of this point estimate requires the application of judgement in weighing up various considerations. In particular, we need to take account of the potential for error in our estimates whilst also considering the need to adjust for any risks to customers from underinvestment without being unnecessarily generous to shareholders.¹⁸⁶¹

¹⁸⁵⁵ See paragraphs 9.142 to 9.222.

¹⁸⁵⁶ See paragraphs 9.38 to 9.141.

¹⁸⁵⁷ See paragraphs 9.223 to 9.319.

¹⁸⁵⁸ See paragraphs 9.320 to 9.411.

¹⁸⁵⁹ See paragraphs 9.15 to 9.28.

¹⁸⁶⁰ See paragraphs 9.29 to 9.37.

¹⁸⁶¹ See paragraphs 9.631 to 9.680.

12.47 We vary our approach to picking a point estimate based on the associated level of uncertainty involved in the calculation. As a result, for the costs of embedded (historical) debt allowance, we are picking a point estimate at the bottom of the range as we can observe that average historical benchmark costs of debt will fall over the period. For the cost of new debt allowance, we are estimating a current cost that will be subject to a true-up mechanism at PR24 and so consider the midpoint of our range to be the most appropriate estimate. For the cost of equity allowance, we are predicting a future cost with a number of uncertain component variables. Because there is a higher risk of error when estimating the cost of equity, we consider it prudent to pick an estimate between the midpoint and the top of our range. Taken together, these estimates lead us to provisionally estimate a cost of capital allowance that is marginally above the mid-point of the range, at 3.50%.¹⁸⁶²

12.48 The CMA range for its WACC parameters are therefore shown in Table 12-4 below, alongside Ofwat's FD figures:

Table 12-4: CMA point estimates of WACC components versus Ofwat PR19, CPIH-Real

	<i>Ofwat PR19</i>	<i>CMA Point Estimate</i>	<i>Delta</i>
TMR	6.50%	6.95%	+0.45%
RFR	-1.39%	-0.96%	+0.43%
Equity Risk Premium	7.89%	7.91%	+0.02%
Equity Beta	0.71	0.76	+0.05
Cost of New Debt	0.53%	0.37%	-0.16%
Cost of Embedded Debt	2.42%	2.76%	+0.34%
Proportion of New Debt	20%	17%	-3%
Issuance and Liquidity Costs	0.10%	0.10%	-
Pre-tax Cost of Debt	2.14%	2.45%	+0.31%
Post-tax Cost of Equity	4.19%	5.08%	+0.89%
Gearing	60%	60%	-
Appointee-level Vanilla WACC*	2.96%	3.50%	+0.54%

*'Vanilla' here refers to a WACC set using a pre-tax cost of debt and a post-tax cost of equity.
Source: CMA analysis and Ofwat PR19 FD

¹⁸⁶² See paragraphs 9.674 to 9.676.

12.49 We note that our WACC figure is around 12bps lower than Anglian proposed to us in its Statement of Case, equivalent to us closing around 80% of the difference between Ofwat and the company.¹⁸⁶³

Retail margin adjustment

12.50 Our view is that using the unadjusted Appointee WACC and a retail margin of 1% would result in water companies being overcompensated by receiving returns on their notional retail assets twice, as the retail margin includes compensation for risks which would be faced by an independent retail business but which are in practice mitigated for a vertically integrated appointee business.¹⁸⁶⁴

12.51 We calculate the extent of this overcompensation as being equivalent to 8bps of RCV, and accordingly our provisional decision is to reduce Anglian's allowed revenues by this amount as a retail margin adjustment.¹⁸⁶⁵

Gearing outperformance sharing mechanism

12.52 Ofwat introduced a GOSM for the first time in PR19. Ofwat stated that equity investors benefit from higher equity returns that are associated with their increased risk, but there is no substantive benefit passed to customers. In addition, Ofwat stated where companies adopt high levels of gearing, they may reduce financial resilience and transfer some risk to customers and / or potentially taxpayers in the event that a company fails. To address this, Ofwat introduced a mechanism that it said would share the benefits of higher gearing with customers.¹⁸⁶⁶

12.53 We consider that Ofwat has legitimate concerns that customers may face costs where the water companies have gearing well above notional levels, and this increase in gearing could have an adverse effect on financial resilience. However, we have concerns about the GOSM implemented to address these concerns by Ofwat at PR19. These concerns relate to the effectiveness of a GOSM in improving financial resilience and the specifics of its design and, more fundamentally, whether the financial benefits of higher gearing assumed by Ofwat in its design of the GOSM exist. As a result, we provisionally decide not to include a GOSM in our re-determined price controls.¹⁸⁶⁷

¹⁸⁶³ See Table 9-1.

¹⁸⁶⁴ See paragraphs 9.554 to 9.563.

¹⁸⁶⁵ See paragraphs 9.554 to 9.563.

¹⁸⁶⁶ See paragraphs 9.564 to 9.567.

¹⁸⁶⁷ See paragraphs 9.622 to 9.629.

Financeability

12.54 We are required to ensure that companies can continue to finance their functions. We have therefore completed a financial ratio analysis similar to that which would be undertaken by the credit rating agencies, in particular regarding the level of cash flow. The outputs of this ratio analysis for Anglian is shown in Table 12-5 below:¹⁸⁶⁸

Table 12-5: Credit ratio analysis for Anglian

Ref	Ratio	Gearing	Interest cover	AICR	FFO/Net debt	Dividend cover	RCF/Net debt
1	Ofwat	60.0%	4.0	1.5	9.5%	1.4	8.3%
2	CMA WACC (3.50%)	59.1%	3.8	1.5	9.9%	1.6	8.7%
3	CMA WACC inputs, but Totex increased by £144.3m	59.3%	3.9	1.5	9.8%	1.7	8.6%
4	CMA WACC, Totex £144.3 plus 1% penalty	60.5%	3.6	1.3	9.0%	1.1	7.7%

Source: CMA analysis

12.55 Our analysis of Anglian's ratios suggests that, based on our determination and the assumption of a notional capital structure, Anglian would achieve financial ratios which are consistent with an investment-grade credit rating. The base case ratios are consistent with rating agency statements about achieving BBB+/Baa1 levels, and the downside scenario still producing ratios consistent with an investment grade credit rating of BBB/Baa2.¹⁸⁶⁹

12.56 We have made an assessment of the WACC and wholesale Totex requirements, in each case providing an increased allowance compared to Ofwat's final determination. This represents a reasonable level of costs that each of the Disputing Companies could be expected to incur, and we have de-risked the determination, including moderating the cost sharing rates to rebalance risk between customers and investors. Each of these factors improves financeability.

12.57 We find that Anglian should be able to achieve strong investment-grade credit ratings based on the notional capital structure, and this is consistent with our assumptions in the WACC for the cost of debt. We also find that under a reasonable downside scenario, Anglian's ratios are worse than the baseline model but still investment-grade. We consider that companies facing a financeability constraint, such as to address a downside scenario, may consider a range of mitigating actions to address impact, such as absorbing headroom in credit ratios, the contribution of equity to forgo dividends or inject

¹⁸⁶⁸ See Table 10-3.

¹⁸⁶⁹ See paragraphs 10.76 to 10.78.

fresh capital. We conclude that this supports the view that our provisional determination for Anglian is financeable.¹⁸⁷⁰

Implied calculations of revenue and implication on bills

Revenue adjustments

12.58 The majority of a water company's wholesale revenue is derived from the Totex and WACC figures discussed above. However, there are certain additional elements which affect Anglian's revenue allowance in AMP7.¹⁸⁷¹

12.59 For the majority of these revenue categories, Anglian has not raised any concerns and we have no evidence to support the use of alternative figures, and so we provisionally decide to use the figures in Ofwat's FD.

12.60 However, we have received submissions in one area, which we consider support a different approach. Ofwat's FD used a corporation tax rate of 17% on the expectation that the rate was going to drop from the current figure of 19%. However, in the current circumstances and in the absence of strong government guidance that this is now likely, we consider it appropriate to use the prevailing rate. Accordingly, we provisionally decide to use a corporation tax of 19%. However, we note that this has no effect on Anglian, as its Totex allowance for tax is zero in AMP7. We also adopt the same approach as Ofwat of including a reconciliation mechanism which reflects subsequent changes in the corporation tax rate.¹⁸⁷²

Implied Anglian revenue in AMP7

12.61 As stated in paragraph 12.2 above, we have not yet sought to model all the consequential changes of our provisional decisions or areas where we have decided not to make changes in our provisional determination. We have therefore not yet produced a robust revenue figure (or value of 'K'). We intend to complete a full update of the calculation of K (and any necessary supporting figures) prior to completing our Final Determination. We will consult with the Main Parties in parallel to our consultation on this provisional determination on the technical steps required to convert our determination to changes to the price control licence conditions.

¹⁸⁷⁰ See paragraphs 10.76 to 10.78.

¹⁸⁷¹ Revenue adjustments for PR14 reconciliations; Tax; Grants & contributions after adjustment for income offset (price control); Non-price control income; Innovation competition; Revenue re-profiling; see Table 4.1 of [Anglian FD](#).

¹⁸⁷² See paragraphs 11.2 to 11.8.

12.62 However, we have produced an indicative estimate for Anglian's wholesale allowed revenue which should reflect the majority of changes which our provisional decisions would result in. This is shown in Table 7: Calculation of indicative wholesale allowed revenue for each water company (£m below:

Table 12-6: Calculation of wholesale allowed revenue (£m)

	<i>Water resources</i>	<i>Water network plus</i>	<i>Wastewater network plus</i>	<i>Bioresources</i>	<i>Total</i>
PAYG ¹	201	1,068	965	352	2,587
RCV Run-off ²	50	593	1,176	96	1,915
Return on Capital (Appointee) ³	30	462	702	48	1,242
Retail margin adjustment ⁴	-1	-12	-18	-1	-32
Other CMA adjustments ⁵	0	0	0	0	0
Reconciliation*	0	20	4	0	24
Tax ⁶	0	0	0	0	0
Grants and contributions*	0	104	132	0	236
Deduct non-Price control income*	-17	-39	-6	-2	-64
Innovation competition*	0	8	13	0	21
Revenue reprofiling*	0	0	0	0	0
Wholesale revenue	264	2,205	2,967	493	5,929

1. This figure is calculated by applying Anglian's PAYG rates (before Ofwat accelerated any revenue) of 79.4%, 50.7%, 38.6%, and 83.5% (for each respective control) to the figures in Table 12-1 above, with the exception of pension deficit allowances which are not subject to PAYG and are instead all included in this AMP. We have indicated that a further adjustment may be appropriate if Anglian provides further clarification in respect of its submissions on the misallocation between capex and opex.

2. This figure is calculated by taking the RCV run-off allowance in Ofwat's FD (see table 4.1), and then calculating the value of additional RCV contributions from non-PAYG Totex in the AMP (halved to represent the average over the period) and then applying Anglian's post-2020 RCV-runoff rates of 4.96%, 3.91%, 5.06%, and 6.00% for each respective control to these figures.

3. This figure is calculated by multiplying the Ofwat allowances for return on capital for wholesale (see table 4.8) by 1.01 for CPIH-linked returns and 1.02 for RPI-linked returns to convert to appointee level, and then by 18% and 31% to reflect the higher CMA WACC figures (3.50%/2.96% for CPIH = 1.18; 2.57%/1.96% for RPI = 1.31); the CMA post-2020 rate of 3.50% is then also applied to the new RCV addition calculated in note (2) above.

4. Calculated as being equivalent to a 0.08% adjustment to the WACC.

5. N/A

6. This figure is calculated by uplifting the Ofwat allowances for tax by 19/17.

* These revenue figures have not currently been changed from Ofwat's FD

Source: Ofwat FD (Table 3.2 of [Anglian FD](#)) and CMA analysis.

12.63 This indicative calculation results in Anglian's wholesale revenue over the AMP being around £221 million higher than Ofwat's FD.¹⁸⁷³

12.64 In relation to the retail price control, neither Anglian nor any of the other Disputing Companies have raised any concerns that Ofwat's approach should be re-considered. Our provisional decision is to align our approach with

¹⁸⁷³ Ofwat's FD included wholesale revenues for Anglian of £5,708 million; see Table 1.3 in [Anglian FD](#).

Ofwat's FD19. This includes the household retail expenditure allowance and the outcome measures relating to the customer experience and developer experience (C-MeX and D-MeX respectively).¹⁸⁷⁴ Therefore, for the purposes of this provisional determination, we include the residential retail revenue figure which Ofwat used in its final determination (ie £426 million).¹⁸⁷⁵ We note that changes to wholesale allowances may have consequential effects on the residential retail allowances, and this is one of the areas which we intend to reflect in our final determination.

12.65 The estimated effect of these changes on average annual customer bills is shown in Table 12-7 below, compared to Anglian's historical bills and Ofwat's FD.¹⁸⁷⁶

Table 12-7: CMA provisional decision indicative impact on Anglian's average annual bills in AMP7 (£, 2017-18 CPIH deflated)

	<i>Anglian historical bills (2019/20)</i>	<i>Anglian average bill in April business plan*</i>	<i>Anglian average bill under Ofwat FD</i>	<i>Anglian average bill under CMA provisional decision</i>
Average annual bill (water and sewerage)	£422	£418	£386	£400

*The April business plan figure here is taken from Ofwat's published documents, and may not align with all of the implications of the company's submissions in its SoC.

Source: CMA calculations; Based on a wholesale vs retail split of Anglian's average bills in Ofwat's FD of £354 wholesale and £32 retail (see [Anglian FD financial model](#)); and an uplift of 3.9% (£221 million increase on Ofwat's £5,708 million wholesale revenue allowance) on the wholesale element. Anglian business plan bills taken from [Anglian FD](#), Table 1.1.

12.66 The indicative bill in our provisional determination is higher than Ofwat's FD by around £14 per year. This reflects the judgements the CMA has made about financing investments that are needed in the sector both now and in the future.

12.67 We also note that, under our provisional determination, Anglian's indicative average bills are still £22 per year lower than they were in 2019/20 (and £18 per year lower than Anglian's April business plan), which should assist customers who were struggling with the affordability of this essential utility.

12.68 Finally, we emphasise that while we have looked at individual components in detail, and necessarily made decision on each of these, we have also considered any cross-cutting or interconnected issues when making such decisions. In particular, the relationship between cost and service, as well as risk and return have influenced our decisions in each of the major areas of the

¹⁸⁷⁴ See paragraphs 11.94 to 11.98.

¹⁸⁷⁵ Table 6.2 of [Anglian FD](#)

¹⁸⁷⁶ As discussed in paragraph 12.2, we have not yet implemented all the technical steps required to convert our determination to changes to the price control licence conditions. In addition, the price control sets revenue allowances for the individual companies. This determines the average bill that the company can charge its customers. Individual bills will vary depending on the charging scheme adopted by the company, see [information on charging schemes](#).

determination (outcomes, Totex and WACC). This is a determination of a whole package 'in the round', and our provisional decision is that this package secures compliance with all our duties.

13. The provisional determination for Bristol

- 13.1 This section provides a summary of our individual provisional determination for Bristol. In this, we set out our provisional determination, but we do not fully restate the explanation or rationale for our decisions; many methodologies will be common between the individual companies, and we will cross-reference to the relevant earlier sections of our report to identify where we have explained these rationales.
- 13.2 For the purposes of this provisional determination, all the figures we are including in this section are indicative. While we have updated the key figures referenced in this document, we have not necessarily reflected all consequential changes throughout other areas of the determination. Therefore, it is likely that there will be other consequential changes in our Final Determination (such as tax implications). We have tried to identify which figures we have not currently updated in the text below.
- 13.3 We will consult with the Main Parties in parallel to our consultation on this provisional determination on the technical steps required to convert our determination to changes to the price control licence conditions. This will include any modelling required to reflect the Final Determination.
- 13.4 As a result of the above, the average bill impacts which we show are only indicative, but we consider they are useful in assessing the implications for affordability at this stage.

Introduction

- 13.5 As originally proposed in our approach to the determinations document,¹⁸⁷⁷ we are using the same regulatory building blocks as Ofwat used in its determinations. In particular, we have maintained:¹⁸⁷⁸
- (a) Ofwat's approach of setting four wholesale price controls (water resources, water network plus, wastewater network plus, and bioresources);¹⁸⁷⁹
 - (b) Separating our assessment into its major component parts around costs, outcomes, and financial returns;¹⁸⁸⁰

¹⁸⁷⁷ [CMA approach to the redeterminations](#), paragraph 29; also see paragraphs 3.16 to 3.27 in this report.

¹⁸⁷⁸ See paragraph 3.5.

¹⁸⁷⁹ See paragraph 11.93. We note that these separate controls are specified in Bristol's licence conditions.

¹⁸⁸⁰ See paragraphs 2.85 and 3.2 to 3.15.

(c) Managing bioresources as an average revenue control;¹⁸⁸¹ and

(d) Setting a separate retail control.¹⁸⁸²

13.6 The rest of this section sets out the provisional decisions we have applied to Bristol, grouped into:

(a) Totex allowances;

(b) outcomes;

(c) WACC and financeability; and

(d) implied calculations of revenue, with implications on average bills in the period.

Totex allowances

13.7 In setting Bristol's Totex allowance in our provisional determination, we have considered four main cost areas:

(a) modelled base costs (including growth);

(b) unmodelled base costs;

(c) enhancement costs; and

(d) other costs.

Modelled base costs

13.8 Water companies conduct many routine activities in order to run their businesses and provide a base level of service to customers. We adopt an econometric modelling approach to assess most of the costs of Bristol's base level of service relying on data from across the sector. Comparative benchmarking of this nature allows us better to estimate the efficient costs for these day to day operations than simply relying on individual company data or forecasts. Our modelling approach is similar to Ofwat's, although we select a slightly different set of model specifications, as well as updating the forecast data for connected properties and population density.¹⁸⁸³

¹⁸⁸¹ See paragraphs 3.22 and 11.99 to 11.101.

¹⁸⁸² See paragraphs 3.20 and 11.94 to 11.98.

¹⁸⁸³ See paragraphs 4.2 to 4.252.

- 13.9 Our cost models estimate how much it would cost the average water company to cover base operations. However, we want to set cost allowances for an efficient water company, and so we apply a catchup efficiency challenge based on our assessment of the upper quartile performers. Our provisional conclusion is to apply an upper quartile benchmark which we consider sets a challenging benchmark whilst acknowledging the limitations of our econometric modelling (and the consequent risk that the company will have insufficient allowed revenue to ensure a base level of service).¹⁸⁸⁴
- 13.10 Future costs are likely to differ from the historical benchmarks because of changes to productivity levels and costs. We therefore:
- (a) Apply a 'frontier shift' which reduces the modelled allowance by 1% per year to reflect expected productivity gains from improvements in technology and new ways of working;¹⁸⁸⁵ and
 - (b) Provide an RPE adjustment for labour costs, which are a material cost item. We also include a reconciliation mechanism for these labour costs to protect both customers and the company against forecasting error.¹⁸⁸⁶
- 13.11 Serving new properties involves additional costs for water companies, both from the cost of installing a new connection, and more broadly from an overall increase in demand in an area necessitating reinforced or additional infrastructure (like the cost of an additional treatment works). We therefore:
- (a) allow for differences in forecast growth for the number of properties served by Bristol, by increasing its allowance due to forecast growth being above industry average (using updated ONS forecast figures);¹⁸⁸⁷ and
 - (b) include a reconciliation mechanism to protect against inaccuracy in these forecasts, which is calibrated using total growth costs.¹⁸⁸⁸
- 13.12 Ofwat's historical data collection approach contained no distinction between base opex and enhancement opex. Therefore, Ofwat's modelled base costs could double count Bristol's enhancement opex if an adjustment was not applied. We address this issue by applying an adjustment to cost allowances using the same approach as that Ofwat used in its PR19 FD.¹⁸⁸⁹

¹⁸⁸⁴ See paragraphs 4.253 to 4.297.

¹⁸⁸⁵ We have applied this adjustment to all of Totex, not just base costs; See paragraphs 4.298 to 4.393.

¹⁸⁸⁶ We have applied this adjustment to all of Totex, not just base costs; See paragraphs 4.394 to 4.453.

¹⁸⁸⁷ See paragraphs 4.454 to 4.532.

¹⁸⁸⁸ See paragraphs 4.494 to 4.512.

¹⁸⁸⁹ See paragraphs 4.533 to 4.559.

13.13 The overall effect of our modelling changes described above is to increase Bristol's base allowances by around £3 million compared to the allowances in Ofwat's FD.¹⁸⁹⁰

13.14 Finally, we recognise that our approach is reliant on models which are based on a limited set of explanatory variables and, like any econometric model, are subject to some limitations and a degree of uncertainty in their final estimates. While we have reflected this already in earlier decisions (such as selection of the catchup benchmark), we have also considered a cost adjustment claim for Bristol in relation to leakage. This has resulted in an increased allowance for Bristol of around £0.5 million, for the reasons explained in paragraph 13.38.

Unmodelled base costs

13.15 In designing our base models discussed above, we exclude certain costs that are unsuitable for modelling where, for example, there is insufficient data for modelling or where exceptional circumstances apply to particular companies. We refer to these as unmodelled base costs. These include costs associated with abstraction, business rates, compliance with the Industrial Emissions Directive and Traffic Management Act, amongst others.¹⁸⁹¹

13.16 Ofwat made an allowance for Bristol's unmodelled base costs, and we provisionally decide that these are largely appropriate.¹⁸⁹²

13.17 We have also considered Bristol's costs for obtaining raw water supplies for its network. Bristol is heavily reliant on abstraction from the G&S canal and the nature of these costs makes them higher relative to most water companies. We found insufficient evidence of offsetting lower costs in other parts of their operations, and Bristol's management has limited control over these costs. Our provisional decision is therefore to allow Bristol a cost adjustment claim of £8.6 million to reflect its higher abstraction charges (around £2.7 million higher than Ofwat's FD before the application of frontier shift).¹⁸⁹³

13.18 Consistent with our provisional decision on base costs above, we apply a frontier shift on these unmodelled base costs of 1% together with a labour RPE. We do not consider that our approach gives rise to any double counting necessitating an adjustment. Our frontier shift is slightly below the level which

¹⁸⁹⁰ See Table 6-4.

¹⁸⁹¹ See paragraphs 4.581 to 4.673.

¹⁸⁹² See paragraphs 4.670 to 4.673 and Table 6-6.

¹⁸⁹³ See paragraphs 4.594 to 4.601.

Ofwat set in its FD, and so this results in a small increase in Bristol's allowances compared to Ofwat's FD.¹⁸⁹⁴

13.19 The combined effect of the above changes is to increase Bristol's base allowances by just under £3 million compared to Ofwat's FD.¹⁸⁹⁵

13.20 Due to the nature of certain drivers of unmodelled base costs (such as management having a more limited degree of control than over other costs), we apply a cost sharing rate of 75/25 (customer/company) for abstraction charges, and 90/10 (customer/company) for business rates, rather than using Bristol's Totex cost sharing rate.¹⁸⁹⁶

Enhancement costs

13.21 We provide additional allowances to Bristol where we have been persuaded that it is undertaking necessary investment for the purpose of enhancing the capacity or quality of service beyond a base level.¹⁸⁹⁷

13.22 In our review of enhancement expenditure, we generally focus on areas where Ofwat and Bristol have provided conflicting views and where we need to resolve these in coming to our determination. To help us reach our own view, our assessment often involves considering additional evidence or arguments which were not available to Ofwat at the time that it made its final determination. For other enhancement expenditure, including major schemes which met Ofwat's evidential threshold to receive additional enhancement funding, we provisionally adopt the same approach as Ofwat did in its final determination.¹⁸⁹⁸

13.23 We make use of comparative data (including econometric modelling, engineering comparisons and cost benchmarking comparisons) where available to develop our best estimate for efficient enhancement costs.¹⁸⁹⁹

13.24 We apply efficiency challenges and reduce allowances where we are concerned about the robustness of the evidence provided for enhancement schemes. In doing so we are seeking to ensure that customers do not overpay for inefficient service whilst also ensuring sufficient allowance is available to achieve the enhanced level of service/quality. This results in our

¹⁸⁹⁴ See paragraphs 4.393 and 4.585.

¹⁸⁹⁵ See Table 6-6.

¹⁸⁹⁶ See paragraphs 4.670 to 4.673.

¹⁸⁹⁷ See paragraphs 5.5 to 5.8 for a description of how enhancement allowances fit into the broader price review framework.

¹⁸⁹⁸ See paragraphs 5.4 and 5.16 to 5.17.

¹⁸⁹⁹ See paragraphs 5.123 to 5.133.

provisional decision to apply a shallow-dive efficiency factor based on Bristol's estimated base costs efficiency, and a deep-dive efficiency factor of 10%.¹⁹⁰⁰

13.25 Together, these provisional decisions result in no change in Bristol's enhancement allowance compared with Ofwat's FD, before the application of frontier shift.¹⁹⁰¹

13.26 As discussed in paragraph 13.38, we consider that Bristol may require an additional enhancement allowance (as well as a base cost adjustment) in order to meet its leakage PC. For the purposes of our provisional determination, we include an indicative enhancement allowance £4.3 million, slightly less than Ofwat's FD figure of £4.8 million.¹⁹⁰²

13.27 Consistent with our provisional decision on base costs above, we apply a frontier shift of 1% together with a labour RPE on all enhancement costs (not just WINEP and metering as Ofwat did). We do not consider that our approach gives rise to any double counting necessitating an adjustment. This results in a decrease of around £1 million in Bristol's enhancement allowances.¹⁹⁰³

Other costs

13.28 As well as the three cost areas discussed above, there are a number of other cost categories which contribute to Bristol's Totex allowance.¹⁹⁰⁴

13.29 Bristol has not raised any concerns with any of these cost categories, and we have no evidence to support the use of alternative figures, and so we provisionally decide to use the figures in Ofwat's FD.¹⁹⁰⁵

Overall Totex

13.30 Our provisional determination of Bristol's wholesale total Totex allowance is shown in Table 13-1 below:

¹⁹⁰⁰ See paragraphs 5.134 to 5.168.

¹⁹⁰¹ See Table 5-24.

¹⁹⁰² See paragraphs 8.51 to 8.74.

¹⁹⁰³ See paragraphs 5.506 to 5.520.

¹⁹⁰⁴ Operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset); and pension deficit recovery costs; see Table 3.2 of [Bristol FD](#).

¹⁹⁰⁵ We note that we have not currently made any adjustments in these costs for frontier shift or RPEs.

Table 13-1: Totex by wholesale price control and type of cost, 2020-25 (£ million, 2017-18 CPIH deflated prices)

	<i>Water resources</i>	<i>Water network plus</i>	<i>Total</i>
Modelled base allowance (including CAC)	49	294	343
Unmodelled base allowance	23	21	44
Enhancement allowance	6	23	29
Other Totex allowances*	2	-8	-6
Total Totex	80	330	410

* Other Totex allowances include: Operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset); and pension deficit recovery costs; see Table 3.2 of [Bristol FD](#).

Source: CMA analysis

Note: The enhancement allowance includes an adjustment for leakage which is indicative and subject to review prior to the final determination.

13.31 As shown in Table 13-2 below, our total Totex allowance is around £5 million higher than Ofwat's FD, reflecting our view that additional funding is needed to deliver the higher quality, more resilient services for customers that we have set out in our provisional determination:

Table 13-2: Comparison between CMA provisional decision on Totex and Ofwat's FD (£ million, 2017-18 CPIH deflated prices)

	<i>Ofwat FD</i>	<i>CMA provisional decision</i>	<i>Delta</i>
Modelled base allowance (including CAC)	340	343	+4
Unmodelled base allowance	42	44	+3
Enhancement allowance	30	29	-1
Other Totex allowances	-6	-6	-
Total Totex	405	410	+5

Source: Table 3.2 of [Bristol FD](#), CMA analysis

13.32 Our provisional total Totex allowance remains around £25 million lower than Bristol's submissions proposed, with our allowance equivalent to closing around 15% of the difference.¹⁹⁰⁶

¹⁹⁰⁶ Paragraph 25 of [Bristol's SoC](#) refers to errors in Ofwat's FD giving rise to a funding gap of £30 million.

13.33 In order to mitigate the risk that we set a Totex allowance that turns out to be either too low or too high, we include an overall Totex cost sharing mechanism which applies to the majority of Totex. Under the cost sharing mechanism, if a company underspends its allowance, customers share in the saving made. Conversely, if the company needs to overspend to deliver the necessary services, it can recover part of the costs from customers. Cost sharing enables us to rely less on other mechanisms in the price control that provide some protection from uncertainty.¹⁹⁰⁷

13.34 The Totex cost sharing rate we set for Bristol is 45% outperformance and 55% underperformance.¹⁹⁰⁸ This cost sharing rate will apply to the following Totex allowances:¹⁹⁰⁹

(a) Water resources: £55 million.

(b) Water network plus: £287 million.

Outcomes

13.35 Overall, we provisionally decide that the package of performance commitments and delivery incentives imposed by Ofwat should largely remain in place, having found no evidence to suggest that those are inappropriate.¹⁹¹⁰

13.36 We focus our assessment on the common PCs and the related ODIs and provisionally conclude that the PC levels for the three common performance measures set at the forecast upper quartile level are appropriate. We consider that it is normal regulatory practice to make assessments using comparative regulation, and that upper quartile is a common measure used when promoting improvements in efficiency.¹⁹¹¹

13.37 However, we have made the following provisional determinations based on our investigation of specific PCs and ODIs:

(a) **Adjustments to PCs and ODIs (other than leakage):** For a small number of Bristol's common PCs and ODIs we have made different provisional decisions: (i) altered the company's deadbands in order to protect the company against small variations in performance beyond

¹⁹⁰⁷ See paragraphs 6.90 to 6.118.

¹⁹⁰⁸ See paragraphs 6.90 to 6.118.

¹⁹⁰⁹ These costs reflect the sum of base expenditure (including cost adjustments), unmodelled base costs, enhancement expenditure, and the adjustment to reflect operating leases; minus Grants and contributions before the deduction of income offset, abstraction charges, and business rates. The last two of these have bespoke cost sharing rates set out in paragraphs 4.670 to 4.671.

¹⁹¹⁰ See paragraphs 7.42 to 7.105 and 7.235 to 7.245.

¹⁹¹¹ See paragraphs 7.106 to 7.147.

management's control, while maintaining strong incentives to invest, and (ii) adjusted the calibration of Bristol's per capita consumption ODI to reflect the overlap between this PC and meter penetration.¹⁹¹² We also welcome the common PC linked to vulnerable customers that encourages companies to identify those customers most likely to need additional support. A thorough and up-to-date PSR may also prompt companies to identify further innovations that will allow the sector better to help vulnerable customers.¹⁹¹³ Finally, we also welcome Bristol's bespoke PCs to support the delivery of appropriate services to vulnerable customers.¹⁹¹⁴

13.38 In relation to leakage specifically, we provisionally decide to retain the leakage PC at the level set by Ofwat, but in doing so provisionally conclude that Bristol may require additional allowance to achieve the required level of performance.¹⁹¹⁵ In particular:

- (a) We provisionally conclude that there is a link between maintaining higher performance on leakage and costs such that the base cost model we use will not adequately compensate companies that are maintaining performance above the upper quartile. Since Bristol meets this criterion, we increase its base cost allowance by £0.5 million.¹⁹¹⁶
- (b) We provisionally conclude that Bristol may require enhancement cost funding for achieving the leakage reductions it committed to, and so should be allowed the efficient cost of doing so. We intend to do further work to establish the appropriate level of enhancement funding for Bristol for leakage between provisional and Final Determinations. As an indication of the effect of this approach, we calculate provisional allowances for it based on applying its company-specific efficiency factor, frontier shift and RPE adjustment to its requested allowance. This results in an indicative allowance for Bristol of £4.3 million of enhancement Totex.¹⁹¹⁷
- (c) We also make adjustments to increase Bristol's penalty rates for underperformance ODIs, as we have provisionally concluded that this

¹⁹¹² See paragraphs 7.154 to 7.163.

¹⁹¹³ See paragraphs 7.188 to 7.195.

¹⁹¹⁴ See paragraph 7.192.

¹⁹¹⁵ See paragraphs 8.29 to 8.74 and 8.100.

¹⁹¹⁶ These figures are included in the Totex allowances discussed earlier; see paragraphs 8.38 to 8.50.

¹⁹¹⁷ These figures are included in the Totex allowances discussed earlier; see paragraphs 8.51 to 8.74.

would make the calibration of the ODIs more consistent with our determination on enhancement costs.¹⁹¹⁸

13.39 For the purposes of this provisional determination, we do not list every PC and/or ODI to which Bristol is subject. Instead, we provide a list of the changes we have made to Ofwat's FD.¹⁹¹⁹ If we do not reference a PC or ODI, our provisional determination is that we have seen no evidence to support adopting a different approach to that used by Ofwat, and so we apply the same requirement that Ofwat included in its FD.

13.40 The summary of changes we have made to PCs and ODIs in Ofwat's FD (excluding scheme-specific PCs) are set out in Table 13-3 below:¹⁹²⁰

Table 13-3: Summary changes on outcome requirements

<i>Unique reference</i>	<i>Description of commitment</i>	<i>Description of intervention</i>
PR19BRL_PC18	Leakage	Provide additional Totex; and amend Tier 1 penalties
PR19BRL_PC19	PCC	Reduce ODI rates to £-0.03m and £0.025m
PR19BRL_PC03	Mains repairs	Set an underperformance deadband of 10 repairs per 1,000km above the PCL (For each year of AMP7: 148.4, 146.5, 144.6, 142.7, 140.7)
PR19BRL_PC04	Unplanned outage	Set an underperformance deadband of 1.2x PCL (2.81)

Source: CMA

13.41 Our provisional conclusion is that the overall reward cap on ODIs should not change, although we are seeking further evidence on this.

WACC and financeability

WACC

13.42 We perform our own determination of the cost of capital using the CAPM). The CAPM is an established methodology with well-understood theoretical foundations and which is based on the use of observable market data, together with some judgment on how to balance different sources of data. The CAPM is used by all UK regulators when calculating the cost of capital, and was the framework used by Ofwat in its PR19 FD. We perform our own assessment of each of the parameters of this model, although our analysis is often built on our interpretation of the analysis and data provided by the

¹⁹¹⁸ See paragraphs 8.75 to 8.99.

¹⁹¹⁹ The list of PCs and ODIs which Ofwat included in its FD is available here: Ofwat (2019), [PR19 final determinations: Bristol Water outcomes performance commitment appendix](#)

¹⁹²⁰ See Table 7-17 and paragraph 8.100.

Parties. We have included additional and more up-to-date market data in our assessment.¹⁹²¹

13.43 The main components of the CAPM which we provisionally decide on are (in inflation adjusted CPIH-real terms):

- (a) **The total market return (6.2% to 7.2%):** To calculate the total market return, we place the most weight on historical ex post returns (from 1900 to the present day), and place some weight on both historic ex ante approaches and forward-looking evidence as a cross-check when selecting our range;¹⁹²²
- (b) **The risk free rate (-1.4% to -0.8%):** We calculate a risk free rate by placing weight on both long-tenor index-linked gilts and AAA-rated non-government bonds (the highest quality commercial debt);¹⁹²³
- (c) **The equity beta (0.65 to 0.80):** We calculate an equity beta based on a range of approaches of analysing the observable market data of WASC comparators, including a potential debt beta;¹⁹²⁴
- (d) **The industry cost of debt (2.3% to 2.9%):** We calculate a weighted average of new and embedded debt, including issuance and liquidity costs. In doing so, we largely rely on a notional approach using external indices and we do not apply a so-called 'outperformance wedge' because we do not consider there is evidence that water companies could systematically outperform our chosen index once tenor and credit rating are adjusted for; and¹⁹²⁵
- (e) **Company-specific adjustment (CSA, uplift of 10bps on embedded debt costs):** For Bristol, we have evidence of higher historical debt costs due to its small size. In doing so, we have not applied a customer-benefits test of the type used by Ofwat. We make no adjustment to Bristol's cost of equity.¹⁹²⁶

¹⁹²¹ See paragraphs 9.5 to 9.14.

¹⁹²² See paragraphs 9.142 to 9.222.

¹⁹²³ See paragraphs 9.38 to 9.141.

¹⁹²⁴ See paragraphs 9.223 to 9.319.

¹⁹²⁵ See paragraphs 9.320 to 9.411.

¹⁹²⁶ See paragraphs 9.412 to 9.533.

- 13.44 As part of this assessment, we provisionally form views on related metrics, particularly inflation (CPIH of 2%, with a 0.9% RPI-CPI wedge)¹⁹²⁷ and notional gearing (60%).¹⁹²⁸
- 13.45 Having established a range for our industry-average appointee WACC of 2.82% to 3.99% using the parameters above, we then select a point estimate. The selection of this point estimate requires the application of judgement in weighing up various considerations. In particular, we need to take account of the potential for error in our estimates whilst also considering the need to adjust for any risks to customers from underinvestment without being unnecessarily generous to shareholders.¹⁹²⁹
- 13.46 We vary our approach to picking a point estimate based on the associated level of uncertainty involved in the calculation. As a result, for the costs of embedded (historical) debt allowance, we are picking a point estimate at the bottom of the range as we can observe that average historical benchmark costs of debt will fall over the period. For the cost of new debt allowance, we are estimating a current cost that will be subject to a true-up mechanism at PR24 and so consider the midpoint of our range to be the most appropriate estimate. For the cost of equity allowance, we are predicting a future cost with a number of uncertain component variables. Because there is a higher risk of error when estimating the cost of equity, we consider it prudent to pick an estimate between the midpoint and the top of our range. Taken together, these estimates lead us to provisionally estimate a cost of capital allowance that is marginally above the mid-point of the range, at 3.50%.¹⁹³⁰ Applying Bristol's small company adjustment on the cost of embedded debt increases this to 3.55%.
- 13.47 The CMA range for its WACC parameters are therefore shown in Table 13-4 below, alongside Ofwat's FD figures:

¹⁹²⁷ See paragraphs 9.15 to 9.28.

¹⁹²⁸ See paragraphs 9.29 to 9.37.

¹⁹²⁹ See paragraphs 9.631 to 9.680.

¹⁹³⁰ See paragraphs 9.674 to 9.676.

Table 13-4: CMA point estimates of WACC components versus Ofwat PR19, Bristol-specific cost of embedded debt, CPIH-Real

	<i>Ofwat PR19</i>	<i>CMA Point Estimate</i>	<i>Delta</i>
TMR	6.50%	6.95%	+0.45%
RFR	-1.39%	-0.96%	+0.43%
Equity Risk Premium	7.89%	7.91%	+0.02%
Equity Beta	0.71	0.76	+0.05
Cost of New Debt	0.53%	0.37%	-0.16%
Cost of Embedded Debt (incl CSA)	2.42%	2.86%	+0.44%
Proportion of New Debt	20%	17%	-3%
Issuance and Liquidity Costs	0.10%	0.10%	-
Pre-tax Cost of Debt	2.14%	2.53%	+0.40%
Post-tax Cost of Equity	4.19%	5.08%	+0.89%
Gearing	60%	60%	-
Appointee-level Vanilla WACC*	2.96%	3.55%	+0.59%

*'Vanilla' here refers to a WACC set using a pre-tax cost of debt and a post-tax cost of equity.
Source: CMA analysis and Ofwat PR19 FD

13.48 We note that our WACC figure is around 49bps lower than Bristol proposed to us in its Statement of Case, equivalent to us closing around 55% of the difference between Ofwat and the company.¹⁹³¹

Retail margin adjustment

13.49 Our view is that using the unadjusted Appointee WACC and a retail margin of 1% would result in water companies being overcompensated by receiving returns on their notional retail assets twice, as the retail margin includes compensation for risks which would be faced by an independent retail business but which are in practice mitigated for a vertically integrated appointee business.¹⁹³²

13.50 We calculate the extent of this overcompensation as being equivalent to 8bps of RCV, and accordingly our provisional decision is to reduce Bristol's allowed revenues by this amount as a retail margin adjustment.¹⁹³³

¹⁹³¹ See Table 9-1.

¹⁹³² See paragraphs 9.554 to 9.563.

¹⁹³³ See paragraphs 9.554 to 9.563.

Gearing outperformance sharing mechanism

13.51 Ofwat introduced a GOSM for the first time in PR19. Ofwat stated that equity investors benefit from higher equity returns that are associated with their increased risk, but there is no substantive benefit passed to customers. In addition, Ofwat stated where companies adopt high levels of gearing, they may reduce financial resilience and transfer some risk to customers and / or potentially taxpayers in the event that a company fails. To address this, Ofwat introduced a mechanism that it said would share the benefits of higher gearing with customers.¹⁹³⁴

13.52 We consider that Ofwat has legitimate concerns that customers may face costs where the water companies have gearing well above notional levels, and this increase in gearing could have an adverse effect on financial resilience. However, we have concerns about the GOSM implemented to address these concerns by Ofwat at PR19. These concerns relate to the effectiveness of a GOSM in improving financial resilience and the specifics of its design and, more fundamentally, whether the financial benefits of higher gearing assumed by Ofwat in its design of the GOSM exist. As a result, we provisionally decide not to include a GOSM in our re-determined price controls.¹⁹³⁵

Financeability

13.53 We are required to ensure that companies can continue to finance their functions. We have therefore completed a financial ratio analysis similar to that which would be undertaken by the credit rating agencies, in particular regarding the level of cash flow. The outputs of this ratio analysis for Bristol is shown in Table 13-5 below:¹⁹³⁶

Table 13-5: Credit ratio analysis for Bristol

Ref	Ratio	Gearing	Interest cover	AICR	FFO/Net debt	Dividend cover	RCF/Net debt
1	Ofwat	58.8%	5.4	1.5	13.5%	2.8	11.4%
2	CMA WACC (3.55%)	57.8%	3.9	1.6	10.5%	1.4	8.3%
3	CMA WACC and increase in Totex by £5.2m	57.9%	3.9	1.6	10.5%	1.4	8.3%
4	CMA WACC and Totex £5.2 plus 1% penalty	59.1%	3.6	1.3	9.5%	1.0	7.4%
5	CMA WACC and increase in Totex by £5.2m and IRE	57.9%	4.9	1.6	13.2%	3.1	12.1%

Source: CMA analysis

¹⁹³⁴ See paragraphs 9.564 to 9.567

¹⁹³⁵ See paragraphs 9.622 to 9.629

¹⁹³⁶ See Table 10-4

- 13.54 Our analysis of Bristol's ratios suggests that, based on our determination and the assumption of a notional capital structure, Bristol would achieve financial ratios which are consistent with an investment-grade credit rating. The base case ratios are consistent with rating agency statements about achieving BBB+/Baa1 levels, and the downside scenario still producing ratios consistent with an investment grade credit rating of BBB/Baa2. Ratios presented in the last scenario (scenario 5 in the table above) are consistent with Ofwat's approach to IRE and Standard and Poor's definition of the FFO/Net Debt. Under this treatment, the FFO/Net Debt is 14.3%.¹⁹³⁷
- 13.55 We have made an assessment of the WACC and wholesale Totex requirements, in each case providing an increased allowance compared to Ofwat's final determination. This represents a reasonable level of costs that each of the Disputing Companies could be expected to incur, and we have de-risked the determination, including moderating the cost sharing rates to rebalance risk between customers and investors. Each of these factors improves financeability.
- 13.56 We find that Bristol should be able to achieve strong investment-grade credit ratings based on the notional capital structure, and this is consistent with our assumptions in the WACC for the cost of debt. We also find that under a reasonable downside scenario, Bristol's ratios are worse than the baseline model but still investment-grade. We consider that companies facing a financeability constraint, such as to address a downside scenario, may consider a range of mitigating actions to address impact, such as absorbing headroom in credit ratios, the contribution of equity to forgo dividends or inject fresh capital. We conclude that this supports the view that our provisional determination for Bristol is financeable.¹⁹³⁸

Implied calculations of revenue and implication on bills

Revenue adjustments

- 13.57 The majority of a water company's wholesale revenue is derived from the Totex and WACC figures discussed above. However, there are certain additional elements which affect Bristol's revenue allowance in AMP7.¹⁹³⁹

¹⁹³⁷ See paragraphs 10.79 to 10.80.

¹⁹³⁸ See paragraphs 10.79 to 10.80.

¹⁹³⁹ Revenue adjustments for PR14 reconciliations; Tax; Grants & contributions after adjustment for income offset (price control); Non-price control income; Innovation competition; Revenue re-profiling; see Table 4.1 of [Bristol FD](#).

- 13.58 For the majority of these revenue categories, Bristol has not raised any concerns and we have no evidence to support the use of alternative figures, and so we provisionally decide to use the figures in Ofwat's FD.
- 13.59 However, we have received submissions in one area, which we consider support a different approach. Ofwat's FD used a corporation tax rate of 17% on the expectation that the rate was going to drop from the current figure of 19%. However, in the current circumstances and in the absence of strong government guidance that this is now likely, we consider it appropriate to use the prevailing rate. Accordingly, we provisionally decide to use a corporation tax of 19%. This results in an increase in Bristol's allowed revenue compared to Ofwat's FD of around £1 million. We also adopt the same approach as Ofwat of including a reconciliation mechanism which reflects subsequent changes in the corporation tax rate.¹⁹⁴⁰

Implied Bristol revenue in AMP7

- 13.60 As stated in paragraph 13.2 above, we have not yet sought to model all the consequential changes of our provisional decisions or areas where we have decided not to make changes in our provisional determination. We have therefore not yet produced a robust revenue figure (or value of 'K'). We intend to complete a full update of the calculation of K (and any necessary supporting figures) prior to completing our Final Determination. We will consult with the Main Parties in parallel to our consultation on this provisional determination on the technical steps required to convert our determination to changes to the price control licence conditions.
- 13.61 However, we have produced an indicative estimate for Bristol's wholesale allowed revenue which should reflect the majority of changes which our provisional decisions would result in. This is shown in Table 13-6 below:

¹⁹⁴⁰ See paragraphs 11.2 to 11.8.

Table 13-6: Calculation of wholesale allowed revenue (£m)

	<i>Water resources</i>	<i>Water network plus</i>	<i>Total</i>
PAYG ¹	63	242	305
RCV Run-off ²	14	113	127
Return on Capital (Appointee) ³	18	63	81
Retail margin adjustment ⁴	0	-2	-2
Other CMA adjustments ⁵	0	0	0
Reconciliation*	0	-7	-7
Tax ⁶	0	12	12
Grants and contributions*	0	15	15
Deduct non-Price control income*	0	-10	-10
Innovation competition*	0	2	2
Revenue reprofiling*	0	0	0
Wholesale revenue	95	427	523

1. This figure is calculated by applying Bristol's PAYG rates of 78.4% and 73.3% (for each respective control) to the figures in Table 13-1 above, with the exception of pension deficit allowances which are not subject to PAYG and are instead all included in this AMP.

2. This figure is calculated by taking the RCV run-off allowance in Ofwat's FD (see table 4.1), and then calculating the value of additional RCV contributions from non-PAYG Totex in the AMP (halved to represent the average over the period) and then applying Bristol's RCV-runoff rates of 6.04% and 5.32% for each respective control to these figures.

3. This figure is calculated by multiplying the Ofwat allowances for return on capital for wholesale (see table 4.8) by 1.01 for CPIH-linked returns and 1.02 for RPI-linked returns to convert to appointee level, and then by 20% and 34% to reflect the higher CMA WACC figures (3.55%/2.96% for CPIH = 1.20; 2.62%/1.96% for RPI = 1.34); the CMA post-2020 rate of 3.55% is then also applied to the new RCV addition calculated in note (2) above.

4. Calculated as being equivalent to a 0.08% adjustment to the WACC.

5. N/A

6. This figure is calculated by uplifting the Ofwat allowances for tax by 19/17.

* These revenue figures have not currently been changed from Ofwat's FD

Source: Ofwat FD (Table 3.2 of [Bristol FD](#)) and CMA analysis.

13.62 This indicative calculation results in Bristol's wholesale revenue over the AMP being around £21 million higher than Ofwat's FD.¹⁹⁴¹

13.63 In relation to the retail price control, neither Bristol nor any of the other Disputing Companies have raised any concerns that Ofwat's approach should be re-considered. Our provisional decision is to align our approach with Ofwat's FD19. This includes the household retail expenditure allowance and the outcome measures relating to the customer experience and developer experience (C-MeX and D-MeX respectively).¹⁹⁴² Therefore, for the purposes of this provisional determination, we include the residential retail revenue figure which Ofwat used in its FD (ie £51 million).¹⁹⁴³ We note that changes to

¹⁹⁴¹ Ofwat's FD included wholesale revenues for Bristol of £502 million; see Table 1.3 in [Bristol FD](#).

¹⁹⁴² See paragraphs 11.94 to 11.98.

¹⁹⁴³ Table 6.2 of [Bristol FD](#).

wholesale allowances may have consequential effects on the residential retail allowances, and this is one of the areas which we intend to reflect in our Final Determination.

13.64 The estimated effect of these changes on average annual customer bills is shown in Table 13-7 below, compared to Bristol's historical bills and Ofwat's FD.¹⁹⁴⁴

Table 13-7: CMA provisional decision indicative impact on Bristol's average annual bills in AMP7 (£, 2017-18 CPIH deflated)

	<i>Bristol historical bills (2019/20)</i>	<i>Bristol average bill in April business plan*</i>	<i>Bristol average bill under Ofwat FD</i>	<i>Bristol average bill under CMA provisional decision</i>
Average annual bill (water only)	£182	£174	£160	£166

*The April business plan figure here is taken from Ofwat's published documents, and may not align with all of the implications of the company's submissions in its SoC.

Source: CMA calculations; Based on a wholesale vs retail split of Bristol's average bills in Ofwat's FD of £140 wholesale and £20 retail (see [Bristol FD financial model](#)); and an uplift of 4.1% (£21 million increase on Ofwat's £502 million wholesale revenue allowance) on the wholesale element. Bristol business plan bills taken from [Bristol FD](#), Table 1.1.

13.65 The indicative bill in our provisional determination is higher than Ofwat's FD by around £6 per year. This reflects the judgements the CMA has made about financing investments that are needed in the sector both now and in the future.

13.66 We also note that, under our provisional determination, Bristol's indicative average bills are still £16 per year lower than they were in 2019/20 (and £8 per year lower than Bristol's April business plan), which should assist customers who were struggling with the affordability of this essential utility.

13.67 Finally, we emphasise that while we have looked at individual components in detail, and necessarily made decision on each of these, we have also considered any cross-cutting or interconnected issues when making such decisions. In particular, the relationship between cost and service, as well as risk and return have influenced our decisions in each of the major areas of the determination (outcomes, Totex and WACC). This is a determination of a whole package 'in the round', and our provisional decision is that this package secures compliance with all our duties.

¹⁹⁴⁴ As discussed in paragraph 13.2, we have not yet implemented all the technical steps required to convert our determination to changes to the price control licence conditions. In addition, the price control sets revenue allowances for the individual companies. This determines the average bill that the company can charge its customers. Individual bills will vary depending on the charging scheme adopted by the company, see [information on charging schemes](#).

14. The provisional determination for Northumbrian

- 14.1 This section provides a summary of our individual provisional determination for Northumbrian. In this, we set out our provisional determination, but we do not fully restate the explanation or rationale for our decisions; many methodologies will be common between the individual companies, and we will cross-reference to the relevant earlier sections of our report to identify where we have explained these rationales.
- 14.2 For the purposes of this provisional determination, all the figures we are including in this section are indicative. While we have updated the key figures referenced in this document, we have not necessarily reflected all consequential changes throughout other areas of the determination. Therefore, it is likely that there will be other consequential changes in our Final Determination (such as tax implications). We have tried to identify which figures we have not currently updated in the text below.
- 14.3 We will consult with the Main Parties in parallel to our consultation on this provisional determination on the technical steps required to convert our determination to changes to the price control licence conditions. This will include any modelling required to reflect the Final Determination.
- 14.4 As a result of the above, the average bill impacts which we show are only indicative, but we consider they are useful in assessing the implications for affordability at this stage.

Introduction

- 14.5 As originally proposed in our approach to the determinations document,¹⁹⁴⁵ we are using the same regulatory building blocks as Ofwat used in its determinations. In particular, we have maintained:¹⁹⁴⁶

- (a) Ofwat's approach of setting four wholesale price controls (water resources, water network plus, wastewater network plus, and bioresources);¹⁹⁴⁷

¹⁹⁴⁵ [CMA approach to the redeterminations](#), paragraph 29; also see paragraphs 3.16 to 3.27 in this report.

¹⁹⁴⁶ See paragraph 3.5.

¹⁹⁴⁷ See paragraph 11.93. We note that these separate controls are specified in Northumbrian's licence conditions.

- (b) Separating our assessment into its major component parts around costs, outcomes, and financial returns;¹⁹⁴⁸
- (c) Managing bioresources as an average revenue control;¹⁹⁴⁹ and
- (d) Setting a separate retail control.¹⁹⁵⁰

14.6 The rest of this section sets out the provisional decisions we have applied to Northumbrian, grouped into:

- (a) Totex allowances;
- (b) outcomes;
- (c) WACC and financeability; and
- (d) implied calculations of revenue, with implications on average bills in the period.

Totex allowances

14.7 In setting Northumbrian's Totex allowance in our provisional determination, we have considered four main cost areas:

- (a) modelled base costs (including growth);
- (b) unmodelled base costs;
- (c) enhancement costs; and
- (d) other costs.

Modelled base costs

14.8 Water companies conduct many routine activities in order to run their businesses and provide a base level of service to customers. We adopt an econometric modelling approach to assess most of the costs of Northumbrian's base level of service relying on data from across the sector. Comparative benchmarking of this nature allows us better to estimate the efficient costs for these day to day operations than simply relying on individual company data or forecasts. Our modelling approach is similar to Ofwat's,

¹⁹⁴⁸ See paragraphs 2.85 and 3.2 to 3.15

¹⁹⁴⁹ See paragraphs 3.22 and 11.99 to 11.101

¹⁹⁵⁰ See paragraphs 3.20 and 11.94 to 11.98

although we select a slightly different set of model specifications, as well as updating the forecast data for connected properties and population density.¹⁹⁵¹

- 14.9 Our cost models estimate how much it would cost the average water company to cover base operations. However, we want to set cost allowances for an efficient water company, and so we apply a catchup efficiency challenge based on our assessment of the upper quartile performers. Our provisional conclusion is to apply an upper quartile benchmark which we consider sets a challenging benchmark whilst acknowledging the limitations of our econometric modelling (and the consequent risk that the company will have insufficient allowed revenue to ensure a base level of service).¹⁹⁵²
- 14.10 Future costs are likely to differ from the historical benchmarks because of changes to productivity levels and costs. We therefore:
- (a) Apply a 'frontier shift' which reduces the modelled allowance by 1% per year to reflect expected productivity gains from improvements in technology and new ways of working;¹⁹⁵³ and
 - (b) Provide an RPE adjustment for labour costs, which are a material cost item. We also include a reconciliation mechanism for these labour costs to protect both customers and the company against forecasting error.¹⁹⁵⁴
- 14.11 Serving new properties involves additional costs for water companies, both from the cost of installing a new connection, and more broadly from an overall increase in demand in an area necessitating reinforced or additional infrastructure (like the cost of an additional treatment works). We therefore:
- (a) allow for differences in forecast growth for the number of properties served by Northumbrian, by decreasing its allowance due to forecast growth being below industry average (using updated ONS forecast figures). Unlike Ofwat, we have not halved this adjustment;¹⁹⁵⁵ and
 - (b) include a reconciliation mechanism to protect against inaccuracy in these forecasts, which is calibrated using total growth costs.¹⁹⁵⁶

¹⁹⁵¹ See paragraphs 4.2 to 4.252

¹⁹⁵² See paragraphs 4.253 to 4.297

¹⁹⁵³ We have applied this adjustment to all of Totex, not just base costs; See paragraphs 4.298 to 4.393.

¹⁹⁵⁴ We have applied this adjustment to all of Totex, not just base costs; See paragraphs 4.394 to 4.453.

¹⁹⁵⁵ See paragraphs 4.454 to 4.532

¹⁹⁵⁶ See paragraphs 4.494 to 4.512

14.12 Ofwat's historical data collection approach contained no distinction between base opex and enhancement opex. Therefore, Ofwat's modelled base costs could double count Northumbrian's enhancement opex if an adjustment was not applied. We address this issue by applying an adjustment to cost allowances using the same approach as that Ofwat used in its PR19 FD.¹⁹⁵⁷

14.13 The overall effect of our modelling changes described above is to reduce Northumbrian's base allowances by around £7 million compared to the allowances in Ofwat's FD.¹⁹⁵⁸

Unmodelled base costs

14.14 In designing our base models discussed above, we exclude certain costs that are unsuitable for modelling where, for example, there is insufficient data for modelling or where exceptional circumstances apply to particular companies. We refer to these as unmodelled base costs. These include costs associated with abstraction, business rates, compliance with the Industrial Emissions Directive and Traffic Management Act, amongst others.¹⁹⁵⁹

14.15 Ofwat made an allowance for Northumbrian's unmodelled base costs, and we provisionally decide that some of these are appropriate, but have intervened in the following areas:¹⁹⁶⁰

(a) **Abstraction charges:** Northumbrian has atypical abstraction costs associated with the Kielder Transfer Scheme (which reflect the cost of building, maintaining, and operating the reservoir), that have increased following an Environment Agency consultation which finished after the Ofwat FD was published. We reflect this latest information by provisionally allowing Northumbrian an additional £61 million to cover these costs. This allowance is subject to a 100% pass-through rate, such that any difference to actual spend will be borne / passed back to customers.¹⁹⁶¹

(b) **Business rates:** Ofwat was not aware of, and did not reflect in its FD, a revision of Northumbrian's rateable values which took place in 2018. This resulted in an over allowance of around £59 million of Totex for

¹⁹⁵⁷ See paragraphs 4.533 to 4.559

¹⁹⁵⁸ See Table 6-4

¹⁹⁵⁹ See paragraphs 4.581 to 4.673

¹⁹⁶⁰ See paragraphs 4.670 to 4.673 and Table 6-6

¹⁹⁶¹ See paragraphs 4.602 to 4.614

Northumbrian's business rates, which we remove in our provisional determination.¹⁹⁶²

- (c) **IED compliance costs:** Northumbrian has provided evidence and explanation (supported by views from the Environment Agency) that it is likely to incur some costs during AMP7 to ensure compliance with the IED due to changing interpretation of this legislation. We provisionally decide to allow £12 million of Totex to address this.¹⁹⁶³

14.16 Consistent with our provisional decision on base costs above, we apply a frontier shift on these unmodelled base costs of 1% together with a labour RPE. We do not consider that our approach gives rise to any double counting necessitating an adjustment. Our frontier shift is slightly below the level which Ofwat set in its FD, and so this results in a small increase in Northumbrian's allowances compared to Ofwat's FD.¹⁹⁶⁴

14.17 The combined effect of the above changes is to increase Northumbrian's base allowances by around £15 million compared to Ofwat's FD.¹⁹⁶⁵

14.18 Due to the nature of certain drivers of unmodelled base costs (such as management having a more limited degree of control than over other costs), we apply a cost sharing rate of 75/25 (customer/company) for abstraction charges and IED compliance costs and 90/10 (customer/company) for business rates, rather than using Northumbrian's Totex cost sharing rate.¹⁹⁶⁶

Enhancement costs

14.19 We provide additional allowances to Northumbrian where we have been persuaded that it is undertaking necessary investment for the purpose of enhancing the capacity or quality of service beyond a base level.¹⁹⁶⁷

14.20 In our review of enhancement expenditure, we generally focus on areas where Ofwat and Northumbrian have provided conflicting views and where we need to resolve these in coming to our determination. To help us reach our own view, our assessment often involves considering additional evidence or arguments which were not available to Ofwat at the time that it made its FD.

¹⁹⁶² See paragraphs 4.641 to 4.642. For the purposes of this provisional determination, we have allocated this figure between Northumbrian's four controls based on its year 1 opening RCV figures.

¹⁹⁶³ See paragraphs 4.643 to 4.664

¹⁹⁶⁴ See paragraphs 4.393 and 4.585

¹⁹⁶⁵ See Table 6-6

¹⁹⁶⁶ See paragraphs 4.670 to 4.673

¹⁹⁶⁷ See paragraphs 5.5 to 5.8 for a description of how enhancement allowances fit into the broader price review framework.

For other enhancement expenditure, including major schemes which met Ofwat's evidential threshold to receive additional enhancement funding, we provisionally adopt the same approach as Ofwat did in its Final Determination.¹⁹⁶⁸

- 14.21 We make use of comparative data (including econometric modelling, engineering comparisons and cost benchmarking comparisons) where available to develop our best estimate for efficient enhancement costs. In particular, for P-removal and WINEP allowances more generally, we have used benchmarking in our assessment to test the efficiency of companies' proposals for these large and broadly-comparable programmes of work. Our provisional decision is to make adjustments to Ofwat's P-removal allowances based on alternative model specifications but to adopt the same overall approach. This results in an increase in Northumbrian's allowances of around £4 million compared to Ofwat's FD.¹⁹⁶⁹
- 14.22 We apply efficiency challenges and reduce allowances where we are concerned about the robustness of the evidence provided for enhancement schemes. In doing so we are seeking to ensure that customers do not overpay for inefficient service whilst also ensuring sufficient allowance is available to achieve the enhanced level of service/quality. While Northumbrian's shallow-dive efficiency challenge figures change very slightly, this makes very little difference compared to Ofwat's FD. Applying a 10% cost efficient challenge to deep dives results in a reduction in Northumbrian's enhancement allowances of around £6.5 million.¹⁹⁷⁰
- 14.23 Northumbrian raised two specific projects which we have assessed in greater detail. We make the following provisional decisions:
- (a) **Essex Resilience Scheme:** Northumbrian proposed to build a new interconnector to allow the transfer of raw water between its reservoir in Abberton to its reservoir in Hanningfield, to mitigate the risk of substantial supply loss to the local area (in the context of ongoing climate change, population growth, and other risk factors). We consider that, in light of the nature of the risk, the cost of addressing the issue is relatively modest particularly given the number of households affected and the long-life nature of the solution which would provide ongoing benefits for many years to come. We provisionally allow Northumbrian its full requested additional allowance for this scheme;¹⁹⁷¹ and

¹⁹⁶⁸ See paragraphs 5.4 and 5.16 to 5.17

¹⁹⁶⁹ See paragraphs 5.123 to 5.133

¹⁹⁷⁰ See paragraphs 5.134 to 5.168

¹⁹⁷¹ See paragraphs 5.214 to 5.255

(b) **Sewer Flooding Resilience Scheme:** Northumbrian proposed to undertake a 'proactive' scheme to reduce the risk of internal sewer flooding in properties which have not previously been flooded. We do not include any increased allowance for this scheme as we have not seen robust evidence that the scheme proposed by Northumbrian represents incremental benefits for customers which should attract additional enhancement funding, rather than simply reflecting an alternative approach to carrying out its base activities (which are already funded).¹⁹⁷²

14.24 This scheme allowance results in an increase of £20 million in Northumbrian's Totex allowance compared with Ofwat's FD, before the application of frontier shift.¹⁹⁷³

14.25 When providing companies with specific funding to undertake additional activities, there is a risk that the company does not subsequently choose to proceed with the scheme while customers nonetheless bear the cost. In order to ensure that the higher level of service being funded through the Essex Resilience Scheme is delivered, we also include a proposed PC and ODI in order to protect customers from the risk of non-delivery on this scheme.¹⁹⁷⁴

14.26 Consistent with our provisional decision on base costs above, we apply a frontier shift of 1% together with a labour RPE on all enhancement costs (not just WINEP and metering as Ofwat did). We do not consider that our approach gives rise to any double counting necessitating an adjustment. This results in a decrease of around £5 million in Northumbrian's enhancement allowances.¹⁹⁷⁵

Other costs

14.27 As well as the three cost areas discussed above, there are a number of other cost categories which contribute to Northumbrian's Totex allowance.¹⁹⁷⁶

14.28 Northumbrian has not raised any concerns with any of these cost categories, and we have no evidence to support the use of alternative figures, and so we provisionally decide to use the figures in Ofwat's FD.¹⁹⁷⁷

¹⁹⁷² See paragraphs 5.256 to 5.295

¹⁹⁷³ See Table 5-24

¹⁹⁷⁴ See paragraphs 5.253 to 5.255

¹⁹⁷⁵ See paragraphs 5.506 to 5.520

¹⁹⁷⁶ Operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset); and pension deficit recovery costs; see Table 3.2 of [Northumbrian FD](#).

¹⁹⁷⁷ We note that we have not currently made any adjustments in these costs for frontier shift or RPEs.

Overall Totex

14.29 Our provisional determination of Northumbrian's wholesale total Totex allowance is shown in Table 14-1 below:

Table 14-1: Totex by wholesale price control and type of cost, 2020-25 (£ million, 2017-18 CPIH deflated prices)

	<i>Water resources</i>	<i>Water network plus</i>	<i>Wastewater network plus</i>	<i>Bioresources</i>	<i>Total</i>
Modelled base allowance (including CAC)	88	1,036	759	65	1,949
Unmodelled base allowance	214	154	6	16	391
Enhancement allowance	14	167	184	0	365
Other Totex allowances*	26	-70	-10	1	-54
Total Totex	342	1,287	939	83	2,651

* Other Totex allowances include: Operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset); and pension deficit recovery costs; see Table 3.2 of [Northumbrian FD](#).
Source: CMA analysis

14.30 As shown in Table 14-2 below, our total Totex allowance is around £22 million higher than Ofwat's FD, reflecting our view that additional funding is needed to deliver the higher quality, more resilient services for customers that we have set out in our provisional determination:

Table 14-2: Comparison between CMA provisional decision on Totex and Ofwat's FD (£ million, 2017-18 CPIH deflated prices)

	<i>Ofwat FD</i>	<i>CMA provisional decision</i>	<i>Delta</i>
Modelled base allowance (including CAC)	1,955	1,949	-7
Unmodelled base allowance	376	391	+15
Enhancement allowance	352	365	+13
Other Totex allowances	-54	-54	-
Total Totex	2,630	2,651	+22

Source: Table 3.2 of [Northumbrian FD](#), CMA analysis

- 14.31 Our provisional total Totex allowance remains around £157 million lower than Northumbrian's submissions proposed, with our allowance equivalent to closing around 10% of the difference.¹⁹⁷⁸
- 14.32 In order to mitigate the risk that we set a Totex allowance that turns out to be either too low or too high, we include an overall Totex cost sharing mechanism which applies to the majority of Totex. Under the cost sharing mechanism, if a company underspends its allowance, customers share in the saving made. Conversely, if the company needs to overspend to deliver the necessary services, it can recover part of the costs from customers. Cost sharing enables us to rely less on other mechanisms in the price control that provide some protection from uncertainty.¹⁹⁷⁹
- 14.33 The Totex cost sharing rates we set for Northumbrian are 45% outperformance and 55% underperformance for both water and for wastewater.¹⁹⁸⁰ These cost sharing rates will apply to the following Totex allowances:¹⁹⁸¹
- (a) Water resources: £101 million.
 - (b) Water network plus: £1,098 million.
 - (c) Wastewater network plus: £924 million.

Outcomes

- 14.34 Overall, we provisionally decide that the package of performance commitments and delivery incentives imposed by Ofwat should largely remain in place, having found no evidence to suggest that those are inappropriate.¹⁹⁸²
- 14.35 We focus our assessment on the common PCs and the related ODIs and provisionally conclude that the PC levels for the three common performance measures set at the forecast upper quartile level are appropriate. We consider that it is normal regulatory practice to make assessments using comparative

¹⁹⁷⁸ Paragraph 492 of [Northumbrian's SoC](#) refers to an overall Totex level in Ofwat's FD which was £179 million lower than its own business plan.

¹⁹⁷⁹ See paragraphs 6.90 to 6.118

¹⁹⁸⁰ See paragraphs 6.90 to 6.118

¹⁹⁸¹ These costs reflect the sum of base expenditure (including cost adjustments), unmodelled base costs, enhancement expenditure, and the adjustment to reflect operating leases; minus Grants and contributions before the deduction of income offset, abstraction charges, and business rates. The last two of these have bespoke cost sharing rates set out in paragraphs 4.670 to 4.671

¹⁹⁸² See paragraphs 7.42 to 7.105 and 7.235 to 7.245

regulation, and that upper quartile is a common measure used when promoting improvements in efficiency.¹⁹⁸³

14.36 However, we have made the following provisional determinations based on our investigation of specific PCs and ODIs:

(a) **Adjustments to PCs and ODIs (other than leakage):** For a small number of Northumbrian's common PCs and ODIs we have altered the company's collars and deadbands in order to protect the company against small variations in performance beyond management's control, while maintaining strong incentives to invest.¹⁹⁸⁴ We also welcome the common PC linked to vulnerable customers that encourages companies to identify those customers most likely to need additional support. A thorough and up-to-date PSR may also prompt companies to identify further innovations that will allow the sector better to help vulnerable customers.¹⁹⁸⁵ Finally, we also welcome Northumbrian's bespoke PCs to support the delivery of appropriate services to vulnerable customers.¹⁹⁸⁶

14.37 In relation to leakage specifically, we provisionally decide to retain the leakage PC at the level set by Ofwat while removing the enhanced ODI. We have not made any adjustments for Northumbrian's leakage Totex, as it is not a high performer on leakage in AMP6 and has not identified a need for enhancement Totex to achieve leakage reductions in AMP7.¹⁹⁸⁷

14.38 For the purposes of this provisional determination, we do not list every PC and/or ODI to which Northumbrian is subject. Instead, we provide a list of the changes we have made to Ofwat's FD.¹⁹⁸⁸ If we do not reference a PC or ODI, our provisional determination is that we have seen no evidence to support adopting a different approach to that used by Ofwat, and so we apply the same requirement that Ofwat included in its FD.

14.39 The summary of changes we have made to PCs and ODIs in Ofwat's FD (excluding scheme-specific PCs) are set out in Table 14-3 below:¹⁹⁸⁹

¹⁹⁸³ See paragraphs 7.106 to 7.147

¹⁹⁸⁴ See paragraphs 7.106 to 7.195

¹⁹⁸⁵ See paragraphs 7.188 to 7.195

¹⁹⁸⁶ See paragraph 7.192

¹⁹⁸⁷ See paragraphs 8.29 to 8.74 and 8.100

¹⁹⁸⁸ The list of PCs and ODIs which Ofwat included in its FD is available here: Ofwat (2019), [PR129 final determinations: Northumbrian Water outcomes performance appendix](#)

¹⁹⁸⁹ See Table 7-17 and paragraph 8.100

Table 14-3: Summary changes on outcome requirements

<i>Unique reference</i>	<i>Description of commitment</i>	<i>Description of intervention</i>
PR19NES_COM05	Leakage (NW)	Remove enhanced ODI
PR19NES_COM06	Leakage (ESW)	Remove enhanced ODI
PR19NES_COM12	Mains repairs	Set an underperformance deadband of 10 repairs per 1,000km above the PC (For each year of AMP7: 151.9, 147.1, 142.4, 137.9, 133.4)
PR19NES_COM13	Unplanned outage	Set an underperformance deadband of 1.2x PCL (For each year of AMP7: 7.64, 6.43, 5.23, 4.02, 2.81)

Source: CMA

14.40 Our provisional conclusion is that the overall reward cap on ODIs should not change, although we are seeking further evidence on this.

WACC and financeability

WACC

14.41 We perform our own determination of the cost of capital using the Capital Asset Pricing Model (CAPM). The CAPM is an established methodology with well-understood theoretical foundations and which is based on the use of observable market data, together with some judgment on how to balance different sources of data. The CAPM is used by all UK regulators when calculating the cost of capital, and was the framework used by Ofwat in its PR19 FD. We perform our own assessment of each of the parameters of this model, although our analysis is often built on our interpretation of the analysis and data provided by the Parties. We have included additional and more up-to-date market data in our assessment.¹⁹⁹⁰

14.42 The main components of the CAPM which we provisionally decide on are (in inflation adjusted CPIH-real terms):

- (a) **The total market return (6.2% to 7.2%):** To calculate the total market return, we place the most weight on historical ex post returns (from 1900 to the present day), and place some weight on both historic ex ante approaches and forward-looking evidence as a cross-check when selecting our range;¹⁹⁹¹

¹⁹⁹⁰ See paragraphs 9.5 to 9.14

¹⁹⁹¹ See paragraphs 9.142 to 9.222

- (b) **The risk free rate (-1.4% to -0.8%):** We calculate a risk free rate by placing weight on both long-tenor index-linked gilts and AAA-rated non-government bonds (the highest quality commercial debt);¹⁹⁹²
- (c) **The equity beta (0.65 to 0.80):** We calculate an equity beta based on a range of approaches of analysing the observable market data of WASC comparators, including a potential debt beta;¹⁹⁹³ and
- (d) **The industry cost of debt (2.3% to 2.9%):** We calculate a weighted average of new and embedded debt, including issuance and liquidity costs. In doing so, we largely rely on a notional approach using external indices and we do not apply a so-called 'outperformance wedge' because we do not consider there is evidence that water companies could systematically outperform our chosen index once tenor and credit rating are adjusted for.¹⁹⁹⁴

14.43 As part of this assessment, we provisionally form views on related metrics, particularly inflation (CPIH of 2%, with a 0.9% RPI-CPI wedge)¹⁹⁹⁵ and notional gearing (60%).¹⁹⁹⁶

14.44 Having established a range for our Appointee WACC of 2.82% to 3.99% using the parameters above, we then select a point estimate. The selection of this point estimate requires the application of judgement in weighing up various considerations. In particular, we need to take account of the potential for error in our estimates whilst also considering the need to adjust for any risks to customers from underinvestment without being unnecessarily generous to shareholders.¹⁹⁹⁷

14.45 We vary our approach to picking a point estimate based on the associated level of uncertainty involved in the calculation. As a result, for the costs of embedded (historical) debt allowance, we are picking a point estimate at the bottom of the range as we can observe that average historical benchmark costs of debt will fall over the period. For the cost of new debt allowance, we are estimating a current cost that will be subject to a true-up mechanism at PR24 and so consider the midpoint of our range to be the most appropriate estimate. For the cost of equity allowance, we are predicting a future cost with a number of uncertain component variables. Because there is a higher risk of error when estimating the cost of equity, we consider it prudent to pick an

¹⁹⁹² See paragraphs 9.38 to 9.141

¹⁹⁹³ See paragraphs 9.223 to 9.319

¹⁹⁹⁴ See paragraphs 9.320 to 9.411

¹⁹⁹⁵ See paragraphs 9.15 to 9.28

¹⁹⁹⁶ See paragraphs 9.29 to 9.37

¹⁹⁹⁷ See paragraphs 9.631 to 9.680

estimate between the midpoint and the top of our range. Taken together, these estimates lead us to provisionally estimate a cost of capital allowance that is marginally above the mid-point of the range, at 3.50%.¹⁹⁹⁸

14.46 The CMA range for its WACC parameters are therefore shown in Table 14-4 below, alongside Ofwat's FD figures:

Table 14-4: CMA point estimates of WACC components versus Ofwat PR19, CPIH-Real

	<i>Ofwat PR19</i>	<i>CMA Point Estimate</i>	<i>Delta</i>
TMR	6.50%	6.95%	+0.45%
RFR	-1.39%	-0.96%	+0.43%
Equity Risk Premium	7.89%	7.91%	+0.02%
Equity Beta	0.71	0.76	+0.05
Cost of New Debt	0.53%	0.37%	-0.16%
Cost of Embedded Debt	2.42%	2.76%	+0.34%
Proportion of New Debt	20%	17%	-3%
Issuance and Liquidity Costs	0.10%	0.10%	-
Pre-tax Cost of Debt	2.14%	2.45%	+0.31%
Post-tax Cost of Equity	4.19%	5.08%	+0.89%
Gearing	60%	60%	-
Appointee-level Vanilla WACC*	2.96%	3.50%	+0.54%

*'Vanilla' here refers to a WACC set using a pre-tax cost of debt and a post-tax cost of equity.
Source: CMA analysis and Ofwat PR19 FD

14.47 We note that our WACC figure is around 4bps lower than Northumbrian proposed to us in its Statement of Case, equivalent to us closing around 95% of the difference between Ofwat and the company.¹⁹⁹⁹

Retail margin adjustment

14.48 Our view is that using the unadjusted Appointee WACC and a retail margin of 1% would result in water companies being overcompensated by receiving returns on their notional retail assets twice, as the retail margin includes compensation for risks which would be faced by an independent retail

¹⁹⁹⁸ See paragraphs 9.674 to 9.676

¹⁹⁹⁹ See Table 9-1

business but which are in practice mitigated for a vertically integrated appointee business.²⁰⁰⁰

- 14.49 We calculate the extent of this overcompensation as being equivalent to 8bps of RCV, and accordingly our provisional decision is to reduce Northumbrian's allowed revenues by this amount as a retail margin adjustment.²⁰⁰¹

Gearing outperformance sharing mechanism

- 14.50 Ofwat introduced a GOSM for the first time in PR19. Ofwat stated that equity investors benefit from higher equity returns that are associated with their increased risk, but there is no substantive benefit passed to customers. In addition, Ofwat stated where companies adopt high levels of gearing, they may reduce financial resilience and transfer some risk to customers and / or potentially taxpayers in the event that a company fails. To address this, Ofwat introduced a mechanism that it said would share the benefits of higher gearing with customers.²⁰⁰²

- 14.51 We consider that Ofwat has legitimate concerns that customers may face costs where the water companies have gearing well above notional levels, and this increase in gearing could have an adverse effect on financial resilience. However, we have concerns about the GOSM implemented to address these concerns by Ofwat at PR19. These concerns relate to the effectiveness of a GOSM in improving financial resilience and the specifics of its design and, more fundamentally, whether the financial benefits of higher gearing assumed by Ofwat in its design of the GOSM exist. As a result, we provisionally decide not to include a GOSM in our re-determined price controls.²⁰⁰³

Financeability

- 14.52 We are required to ensure that companies can continue to finance their functions. We have therefore completed a financial ratio analysis similar to that which would be undertaken by the credit rating agencies, in particular regarding the level of cash flow. The outputs of this ratio analysis for Northumbrian is shown in Table 14-5 below.²⁰⁰⁴

²⁰⁰⁰ See paragraphs 9.554 to 9.563

²⁰⁰¹ See paragraphs 9.554 to 9.563

²⁰⁰² See paragraphs 9.564 to 9.567

²⁰⁰³ See paragraphs 9.622 to 9.629

²⁰⁰⁴ See Table 10-5

Table 14-5: Credit ratio analysis for Northumbrian

<i>Ref</i>	<i>Ratio</i>	<i>Gearing</i>	<i>Interest cover</i>	<i>AICR</i>	<i>FFO/Net debt</i>	<i>Dividend cover</i>	<i>RCF/Net debt</i>
1	Ofwat	59.5%	4.2	1.5	10.0%	1.8	6.9%
2	CMA WACC (3.50%)	58.7%	4.0	1.6	10.3%	2.5	8.3%
3	CMA WACC and increase in Totex by £21.6m	58.8%	4.0	1.5	10.3%	2.5	8.3%
4	CMA WACC, Totex & penalty	60.0%	3.7	1.3	9.4%	2.2	7.4%

Source: CMA analysis

- 14.53 Our analysis of Northumbrian's ratios suggests that, based on our determination and the assumption of a notional capital structure, Northumbrian would achieve financial ratios which are consistent with an investment-grade credit rating. The base case ratios are consistent with rating agency statements about achieving BBB+/Baa1 levels, and the downside scenario still producing ratios consistent with an investment grade credit rating of BBB/Baa2.²⁰⁰⁵
- 14.54 We have made an assessment of the WACC and wholesale Totex requirements, in each case providing an increased allowance compared to Ofwat's final determination. This represents a reasonable level of costs that each of the Disputing Companies could be expected to incur, and we have de-risked the determination, including moderating the cost sharing rates to rebalance risk between customers and investors. Each of these factors improves financeability.
- 14.55 We find that Northumbrian should be able to achieve strong investment-grade credit ratings based on the notional capital structure, and this is consistent with our assumptions in the WACC for the cost of debt. We also find that under a reasonable downside scenario, Northumbrian's ratios are worse than the baseline model but still investment-grade. We consider that companies facing a financeability constraint, such as to address a downside scenario, may consider a range of mitigating actions to address impact, such as absorbing headroom in credit ratios, the contribution of equity to forgo dividends or inject fresh capital. We conclude that this supports the view that our provisional determination for Northumbrian is financeable.²⁰⁰⁶

²⁰⁰⁵ See paragraphs 10.81 to 10.82

²⁰⁰⁶ See paragraphs 10.81 to 10.82

Implied calculations of revenue and implication on bills

Revenue adjustments

- 14.56 The majority of a water company's wholesale revenue is derived from the Totex and WACC figures discussed above. However, there are certain additional elements which affect Northumbrian's revenue allowance in AMP7.²⁰⁰⁷
- 14.57 For the majority of these revenue categories, Northumbrian has not raised any concerns and we have no evidence to support the use of alternative figures, and so we provisionally decide to use the figures in Ofwat's FD.
- 14.58 However, we have received submissions in two areas, which we consider support a different approach:
- (a) Northumbrian raised concerns about an error in relation to Ofwat's treatment of its grants and contributions costs, arising from changes that Northumbrian made to the structure of its submitted business planning tables. We provisionally decide that this adjustment is an error which results in a double-count of revenues and should be remedied by decreasing Northumbrian's Water Network Plus Grants and Contributions revenue allowance by £11 million. We note that this provisional decision also increases Northumbrian's Water Network Plus RCV by £12 million, which has an effect on AMP7 revenue through a slightly increased RCV run-off and return on capital.²⁰⁰⁸
 - (b) Ofwat's FD used a corporation tax rate of 17% on the expectation that the rate was going to drop from the current figure of 19%. However, in the current circumstances and in the absence of strong government guidance that this is now likely, we consider it appropriate to use the prevailing rate. Accordingly, we provisionally decide to use a corporation tax of 19%. This results in an increase in Northumbrian's allowed revenue compared to Ofwat's FD of around £8 million. We also adopt the same approach as Ofwat of including a reconciliation mechanism which reflects subsequent changes in the corporation tax rate.²⁰⁰⁹

²⁰⁰⁷ Revenue adjustments for PR14 reconciliations; Tax; Grants & contributions after adjustment for income offset (price control); Non-price control income; Innovation competition; Revenue re-profiling; see Table 4.1 of [Northumbrian FD](#).

²⁰⁰⁸ See paragraphs 11.60 to 11.92

²⁰⁰⁹ See paragraphs 11.2 to 11.8

Implied Northumbrian revenue in AMP7

14.59 As stated in paragraph 14.2 above, we have not yet sought to model all the consequential changes of our provisional decisions or areas where we have decided not to make changes in our provisional determination. We have therefore not yet produced a robust revenue figure (or value of 'K'). We intend to complete a full update of the calculation of K (and any necessary supporting figures) prior to completing our Final Determination. We will consult with the Main Parties in parallel to our consultation on this provisional determination on the technical steps required to convert our determination to changes to the price control licence conditions.

14.60 However, we have produced an indicative estimate for Northumbrian's wholesale allowed revenue which should reflect the majority of changes which our provisional decisions would result in. This is shown in Table 14-6 below:

Table 14-6: Calculation of wholesale allowed revenue (£ million)

	<i>Water resources</i>	<i>Water network plus</i>	<i>Wastewater network plus</i>	<i>Bioresources</i>	<i>Total</i>
PAYG ¹	310	749	360	34	1,453
RCV Run-off ²	79	441	447	51	1,019
Return on Capital (Appointee) ³	43	279	291	21	634
Retail margin adjustment ⁴	-1	-7	-8	-1	-16
Other CMA adjustments ⁵	0	0	0	0	0
Reconciliation*	0	0	-1	0	-1
Tax ⁶	10	29	29	7	74
Grants and contributions ⁷	0	97	18	0	115
Deduct non-Price control income*	-7	-35	-9	0	-50
Innovation competition*	0	7	5	0	12
Revenue reprofiling*	0	0	0	0	-1
Wholesale revenue	434	1,560	1,132	113	3,239

1. This figure is calculated by applying Northumbrian's PAYG rates (before Ofwat accelerated any revenue) of 90.5%, 57.4%, 37.7%, and 40.7% (for each respective control) to the figures in Table 14-1 above, with the exception of pension deficit allowances which are not subject to PAYG and are instead all included in this AMP.

2. This figure is calculated by taking the RCV run-off allowance in Ofwat's FD (see table 4.1), and then calculating the value of additional RCV contributions from non-PAYG Totex in the AMP (halved to represent the average over the period) and then applying Northumbrian's RCV-runoff rates of 4.25%, 4.79%, 4.63%, and 3.19% for each respective control to these figures.

3. This figure is calculated by multiplying the Ofwat allowances for return on capital for wholesale (see table 4.8) by 1.01 for CPIH-linked returns and 1.02 for RPI-linked returns to convert to appointee level, and then by 18% and 31% to reflect the higher CMA WACC figures (3.50%/2.96% for CPIH = 1.18; 2.57%/1.96% for RPI = 1.31); the CMA post-2020 rate of 3.50% is then also applied to the new RCV addition calculated in note (2) above.

4. Calculated as being equivalent to a 0.08% adjustment to the WACC.

5. N/A

6. This figure is calculated by uplifting the Ofwat allowances for tax by 19/17.

7. Changes from Ofwat's figures represent remedies to the G&C error

* These revenue figures have not currently been changed from Ofwat's FD
Source: Ofwat FD (Table 3.2 of [Northumbrian FD](#)) and CMA analysis.

14.61 This indicative calculation results in Northumbrian's wholesale revenue over the AMP being around £124 million higher than Ofwat's FD.²⁰¹⁰

14.62 In relation to the retail price control, neither Northumbrian nor any of the other Disputing Companies have raised any concerns that Ofwat's approach should be re-considered. Our provisional decision is to align our approach with Ofwat's FD19. This includes the household retail expenditure allowance and the outcome measures relating to the customer experience and developer experience (C-MeX and D-MeX respectively).²⁰¹¹ Therefore, for the purposes of this provisional determination, we include the residential retail revenue figure which Ofwat used in its FD (ie £256 million).²⁰¹² We note that changes to wholesale allowances may have consequential effects on the residential retail allowances, and this is one of the areas which we intend to reflect in our Final Determination.

14.63 The estimated effect of these changes on average annual customer bills is shown in Table 14-7 below, compared to Northumbrian's historical bills and Ofwat's FD.²⁰¹³

Table 14-7: CMA provisional decision indicative impact on Northumbrian's average annual bills in AMP7 (£, 2017-18 CPIH deflated)

	<i>Northumbrian historical bills (2019/20)</i>	<i>Northumbrian average bill in April business plan*</i>	<i>Northumbrian average bill under Ofwat FD</i>	<i>Northumbrian average bill under CMA provisional decision</i>
Average annual bill (water and sewerage)	£429	£343	£323	£335

*The April business plan figure here is taken from Ofwat's published documents, and may not align with all of the implications of the company's submissions in its SoC.

Source: CMA calculations; Based on a wholesale vs retail split of Northumbrian's average bills in Ofwat's FD of £295 wholesale and £28 retail (see [Northumbrian FD financial model](#)); and an uplift of 4.0% (£124 million increase on Ofwat's £3,115 million wholesale revenue allowance) on the wholesale element. Northumbrian business plan bills taken from [Northumbrian FD](#), Table 1.1.

14.64 The indicative bill in our provisional determination is higher than Ofwat's FD by around £12 per year. This reflects the judgements the CMA has made about financing investments that are needed in the sector both now and in the future.

²⁰¹⁰ Ofwat's FD included wholesale revenues for Northumbrian of £3,115 million; see Table 1.3 in [Northumbrian FD](#).

²⁰¹¹ See paragraphs 11.94 to 11.98

²⁰¹² Table 6.2 of [Northumbrian FD](#)

²⁰¹³ As discussed in paragraph 14.2, we have not yet implemented all the technical steps required to convert our determination to changes to the price control licence conditions. In addition, the price control sets revenue allowances for the individual companies. This determines the average bill that the company can charge its customers. Individual bills will vary depending on the charging scheme adopted by the company, see [information on charging schemes](#).

- 14.65 We also note that, under our provisional determination, Northumbrian's indicative average bills are still £94 per year lower than they were in 2019/20 (and £8 per year lower than Northumbrian's April business plan), which should assist customers who were struggling with the affordability of this essential utility.
- 14.66 Finally, we emphasise that while we have looked at individual components in detail, and necessarily made decision on each of these, we have also considered any cross-cutting or interconnected issues when making such decisions. In particular, the relationship between cost and service, as well as risk and return have influenced our decisions in each of the major areas of the determination (outcomes, Totex and WACC). This is a determination of a whole package 'in the round', and our provisional decision is that this package secures compliance with all our duties.

15. The provisional determination for Yorkshire

- 15.1 This section provides a summary of our individual provisional determination for Yorkshire. In this, we set out our provisional determination, but we do not fully restate the explanation or rationale for our decisions; many methodologies will be common between the individual companies, and we will cross-reference to the relevant earlier sections of our report to identify where we have explained these rationales.
- 15.2 For the purposes of this provisional determination, all the figures we are including in this section are indicative. While we have updated the key figures referenced in this document, we have not necessarily reflected all consequential changes throughout other areas of the determination. Therefore, it is likely that there will be other consequential changes in our Final Determination (such as tax implications). We have tried to identify which figures we have not currently updated in the text below.
- 15.3 We will consult with the Main Parties in parallel to our consultation on this provisional determination on the technical steps required to convert our determination to changes to the price control licence conditions. This will include any modelling required to reflect the Final Determination.
- 15.4 As a result of the above, the average bill impacts which we show are only indicative, but we consider they are useful in assessing the implications for affordability at this stage.

Introduction

- 15.5 As originally proposed in our approach to the determinations document,²⁰¹⁴ we are using the same regulatory building blocks as Ofwat used in its determinations. In particular, we have maintained:²⁰¹⁵
- (a) Ofwat's approach of setting four wholesale price controls (water resources, water network plus, wastewater network plus, and bioresources);²⁰¹⁶
 - (b) Separating our assessment into its major component parts around costs, outcomes, and financial returns;²⁰¹⁷

²⁰¹⁴ [CMA approach to the redeterminations](#), paragraph 29; also see paragraphs 3.16 to 3.27 in this report.

²⁰¹⁵ See paragraph 3.5

²⁰¹⁶ See paragraph 11.93. We note that these separate controls are specified in Yorkshire's licence conditions.

²⁰¹⁷ See paragraphs 2.85 and 3.2 to 3.15

(c) Managing bioresources as an average revenue control;²⁰¹⁸ and

(d) Setting a separate retail control.²⁰¹⁹

15.6 The rest of this section sets out the provisional decisions we have applied to Yorkshire, grouped into:

(a) Totex allowances;

(b) outcomes;

(c) WACC and financeability; and

(d) implied calculations of revenue, with implications on average bills in the period.

Totex allowances

15.7 In setting Yorkshire's Totex allowance in our provisional determination, we have considered four main cost areas:

(a) modelled base costs (including growth);

(b) unmodelled base costs;

(c) enhancement costs; and

(d) other costs.

Modelled base costs

15.8 Water companies conduct many routine activities in order to run their businesses and provide a base level of service to customers. We adopt an econometric modelling approach to assess most of the costs of Yorkshire's base level of service relying on data from across the sector. Comparative benchmarking of this nature allows us better to estimate the efficient costs for these day to day operations than simply relying on individual company data or forecasts. Our modelling approach is similar to Ofwat's, although we select a slightly different set of model specifications, as well as updating the forecast data for connected properties and population density.²⁰²⁰

²⁰¹⁸ See paragraphs 3.22 and 11.99 to 11.101

²⁰¹⁹ See paragraphs 3.20 and 11.94 to 11.98

²⁰²⁰ See paragraphs 4.2 to 4.252

- 15.9 Our cost models estimate how much it would cost the average water company to cover base operations. However, we want to set cost allowances for an efficient water company, and so we apply a catchup efficiency challenge based on our assessment of the upper quartile performers. Our provisional conclusion is to apply an upper quartile benchmark which we consider sets a challenging benchmark whilst acknowledging the limitations of our econometric modelling (and the consequent risk that the company will have insufficient allowed revenue to ensure a base level of service).²⁰²¹
- 15.10 Future costs are likely to differ from the historical benchmarks because of changes to productivity levels and costs. We therefore:
- (a) Apply a 'frontier shift' which reduces the modelled allowance by 1% per year to reflect expected productivity gains from improvements in technology and new ways of working;²⁰²² and
 - (b) Provide an RPE adjustment for labour costs, which are a material cost item. We also include a reconciliation mechanism for these labour costs to protect both customers and the company against forecasting error.²⁰²³
- 15.11 Serving new properties involves additional costs for water companies, both from the cost of installing a new connection, and more broadly from an overall increase in demand in an area necessitating reinforced or additional infrastructure (like the cost of an additional treatment works). We therefore:
- (a) allow for differences in forecast growth for the number of properties served by Yorkshire, by decreasing its allowance due to forecast growth being below industry average (using updated ONS forecast figures). Unlike Ofwat, we have not halved this adjustment;²⁰²⁴ and
 - (b) include a reconciliation mechanism to protect against inaccuracy in these forecasts, which is calibrated using total growth costs.²⁰²⁵
- 15.12 Ofwat's historical data collection approach contained no distinction between base Opex and enhancement Opex. Therefore, Ofwat's modelled base costs could double count Yorkshire's enhancement Opex if an adjustment was not

²⁰²¹ See paragraphs 4.253 to 4.297

²⁰²² We have applied this adjustment to all of Totex, not just base costs; See paragraphs 4.298 to 4.393

²⁰²³ We have applied this adjustment to all of Totex, not just base costs; See paragraphs 4.394 to 4.453

²⁰²⁴ See paragraphs 4.454 to 4.532

²⁰²⁵ See paragraphs 4.494 to 4.512

applied. We address this issue by applying an adjustment to cost allowances using the same approach as that Ofwat used in its PR19 FD.²⁰²⁶

- 15.13 The overall effect of our modelling changes described above is to reduce Yorkshire's base allowances by around £12 million compared to the allowances in Ofwat's FD.²⁰²⁷

Unmodelled base costs

- 15.14 In designing our base models discussed above, we exclude certain costs that are unsuitable for modelling where, for example, there is insufficient data for modelling or where exceptional circumstances apply to particular companies. We refer to these as unmodelled base costs. These include costs associated with abstraction, business rates, compliance with the Industrial Emissions Directive and Traffic Management Act, amongst others.²⁰²⁸
- 15.15 Ofwat made an allowance for Yorkshire's unmodelled base costs, and we provisionally decide that these are largely appropriate. In particular, we have applied the same cost challenge that Ofwat did to Yorkshire's proposed TMA costs (50%).²⁰²⁹
- 15.16 Although we have not provided any allowance for Yorkshire's IED compliance costs, we have included a bespoke cost sharing rate of 75/25 (customer/company).²⁰³⁰
- 15.17 Consistent with our provisional decision on base costs above, we apply a frontier shift on these unmodelled base costs of 1% together with a labour RPE. We do not consider that our approach gives rise to any double counting necessitating an adjustment. Our frontier shift is slightly below the level which Ofwat set in its FD, and so this results in a small increase in Yorkshire's allowances compared to Ofwat's FD.²⁰³¹
- 15.18 The combined effect of the above changes is to increase Yorkshire's base allowances by around £1 million compared to Ofwat's FD.²⁰³²
- 15.19 Due to the nature of certain drivers of unmodelled base costs (such as management having a more limited degree of control than over other costs),

²⁰²⁶ See paragraphs 4.533 to 4.559

²⁰²⁷ See Table 6-4

²⁰²⁸ See paragraphs 4.581 to 4.673

²⁰²⁹ See paragraphs 4.615 to 4.621, 4.670 to 4.673, and Table 6-6.

²⁰³⁰ See paragraphs 4.643 to 4.664

²⁰³¹ See paragraphs 4.393 and 4.585

²⁰³² See Table 6-6

we apply a cost sharing rate of 75/25 (customer/company) for abstraction charges and IED compliance costs, and 90/10 (customer/company) for business rates, rather than using Yorkshire's Totex cost sharing rate.²⁰³³

Enhancement costs

- 15.20 We provide additional allowances to Yorkshire where we have been persuaded that it is undertaking necessary investment for the purpose of enhancing the capacity or quality of service beyond a base level.²⁰³⁴
- 15.21 In our review of enhancement expenditure, we generally focus on areas where Ofwat and Yorkshire have provided conflicting views and where we need to resolve these in coming to our determination. To help us reach our own view, our assessment often involves considering additional evidence or arguments which were not available to Ofwat at the time that it made its final determination. For other enhancement expenditure, including major schemes which met Ofwat's evidential threshold to receive additional enhancement funding, we provisionally adopt the same approach as Ofwat did in its final determination.²⁰³⁵
- 15.22 We make use of comparative data (including econometric modelling, engineering comparisons and cost benchmarking comparisons) where available to develop our best estimate for efficient enhancement costs. In particular, for P-removal and WINEP allowances more generally, we have used benchmarking in our assessment to test the efficiency of companies' proposals for these large and broadly-comparable programmes of work. Our provisional decision is to make adjustments to Ofwat's P-removal allowances based on alternative model specifications but to adopt the same overall approach. This results in an increase in Yorkshire's allowances of around £9 million compared to Ofwat's FD.²⁰³⁶
- 15.23 We apply efficiency challenges and reduce allowances where we are concerned about the robustness of the evidence provided for enhancement schemes. In doing so we are seeking to ensure that customers do not overpay for inefficient service whilst also ensuring sufficient allowance is available to achieve the enhanced level of service/quality. Reflecting our shallow dive efficiency factors results in no change to Yorkshire's allowance compared to Ofwat's FD. However, applying a 10% cost efficient challenge to

²⁰³³ See paragraphs 4.670 to 4.673

²⁰³⁴ See paragraphs 5.5 to 5.8 for a description of how enhancement allowances fit into the broader price review framework.

²⁰³⁵ See paragraphs 5.4 and 5.16 to 5.17

²⁰³⁶ See paragraphs 5.123 to 5.133

deep dives results in a reduction in Yorkshire's enhancement allowances of around £5 million.²⁰³⁷

15.24 Yorkshire raised one specific project, which we have assessed in greater detail, and on which we make decisions, specifically its Living with Water Partnership in Hull and Haltemprice. We provide additional enhancement funding to help address the unique circumstances in this area which result in an increased risk of flooding. However, due to residual concerns on the specifics of the approach, we apply an efficiency challenge to the estimate included in Yorkshire's business plan. We also include a proposed PC and ODI in order to protect customers from the risk of non-delivery on this scheme.²⁰³⁸

15.25 This scheme allowance results in an increase of £7 million in Yorkshire's Totex allowance compared to Ofwat's FD, before the application of frontier shift.²⁰³⁹

15.26 As discussed in paragraph 15.38, we consider that Yorkshire may require an additional enhancement allowance in order to meet its leakage PC. For the purposes of our provisional determination, we include an indicative enhancement allowance of £93 million.²⁰⁴⁰

15.27 Consistent with our provisional decision on base costs above, we apply a frontier shift of 1% together with a labour RPE on all enhancement costs (not just WINEP and metering as Ofwat did). We do not consider that our approach gives rise to any double counting necessitating an adjustment. This results in a decrease of around £1.4 million in Yorkshire's enhancement allowances.²⁰⁴¹

Other costs

15.28 As well as the three cost areas discussed above, there are a number of other cost categories which contribute to Yorkshire's Totex allowance.²⁰⁴²

²⁰³⁷ See paragraphs 5.134 to 5.168

²⁰³⁸ See paragraphs 5.177 to 5.213

²⁰³⁹ See Table 5-24

²⁰⁴⁰ See paragraphs 8.51 to 8.74

²⁰⁴¹ See paragraphs 5.506 to 5.520

²⁰⁴² Operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset); and pension deficit recovery costs; see Table 3.2 of [Yorkshire FD](#).

15.29 Yorkshire has not raised any concerns with any of these cost categories, and we have no evidence to support the use of alternative figures, and so we provisionally decide to use the figures in Ofwat's FD.²⁰⁴³

Overall Totex

15.30 Our provisional determination of Yorkshire's wholesale total Totex allowance is shown in Table 15-1 below:

Table 15-1: Totex by wholesale price control and type of cost, 2020-25 (£ million, 2017-18 CPIH deflated prices)

	<i>Water resources</i>	<i>Water network plus</i>	<i>Wastewater network plus</i>	<i>Bioresources</i>	<i>Total</i>
Modelled base allowance (including CAC)	117	1,221	1,285	260	2,883
Unmodelled base allowance	63	167	84	6	320
Enhancement allowance	33	195	745	35	1,008
Other Totex allowances*	0	-36	-33	1	-67
Total Totex	214	1,547	2,082	302	4,145

* Other Totex allowances include: Operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset); and pension deficit recovery costs; see Table 3.2 of [Yorkshire FD](#).

Source: CMA analysis

Note: The enhancement allowance includes an adjustment for leakage which is indicative and subject to review prior to the final determination.

15.31 As shown in Table 15-2 below, our total Totex allowance is around £92 million higher than Ofwat's FD reflecting our view that additional funding is needed to deliver the higher quality, more resilient services for customers that we have set out in our provisional determination:

²⁰⁴³ We note that we have not currently made any adjustments in these costs for frontier shift or RPEs.

Table 15-2: Comparison between CMA provisional decision on Totex and Ofwat's FD (£ million, 2017-18 CPIH deflated prices)

	<i>Ofwat FD</i>	<i>CMA provisional decision</i>	<i>Delta</i>
Modelled base allowance (including CAC)	2,896	2,883	-12
Unmodelled base allowance	319	320	+1
Enhancement allowance	906	1,008	+103
Other Totex allowances	-67	-67	-
Total Totex	4,053	4,145	+92

Source: Table 3.2 of [Yorkshire FD](#), CMA analysis

15.32 Our provisional total Totex allowance remains around £773 million lower than Yorkshire's submissions proposed, with our allowance equivalent to closing around 10% of the difference.²⁰⁴⁴

15.33 In order to mitigate the risk that we set a Totex allowance that turns out to be either too low or too high, we include an overall Totex cost sharing mechanism which applies to the majority of Totex. Under the cost sharing mechanism, if a company underspends its allowance, customers share in the saving made. Conversely, if the company needs to overspend to deliver the necessary services, it can recover part of the costs from customers. Cost sharing enables us to rely less on other mechanisms in the price control that provide some protection from uncertainty.²⁰⁴⁵

15.34 The Totex cost sharing rates we set for Yorkshire are 45% outperformance and 55% underperformance for both water and for wastewater.²⁰⁴⁶ These cost sharing rates will apply to the following Totex allowances:²⁰⁴⁷

(a) Water resources: £150 million.

(b) Water network plus: £1,373 million.

²⁰⁴⁴ Paragraph 116 of [Yorkshire's SoC](#) refers to Ofwat's interventions giving a reduced allowance of £865 million compared to its plan.

²⁰⁴⁵ See paragraphs 6.90 to 6.118

²⁰⁴⁶ See paragraphs 6.90 to 6.118

²⁰⁴⁷ These costs reflect the sum of base expenditure (including cost adjustments), unmodelled base costs, enhancement expenditure, and the adjustment to reflect operating leases; minus Grants and contributions before the deduction of income offset, abstraction charges, and business rates. The last two of these have bespoke cost sharing rates set out in paragraphs 4.670 to 4.671.

(c) Wastewater network plus: £1,990 million.

Outcomes

15.35 Overall, we provisionally decide that the package of performance commitments and delivery incentives imposed by Ofwat should largely remain in place, having found no evidence to suggest that those are inappropriate.²⁰⁴⁸

15.36 We focus our assessment on the common PCs and the related ODIs and provisionally conclude that the PC levels for the three common performance measures set at the forecast upper quartile level are appropriate. We consider that it is normal regulatory practice to make assessments using comparative regulation, and that upper quartile is a common measure used when promoting improvements in efficiency.²⁰⁴⁹

15.37 However, we have made the following provisional determinations based on our investigation of specific PCs and ODIs:

(a) **Adjustments to common PCs and ODIs (other than leakage):** For a small number of Yorkshire's common PCs and ODIs we have altered the company's collars and deadbands in order to protect the company against small variations in performance beyond management's control, while maintaining strong incentives to invest.²⁰⁵⁰ We also welcome the common PC linked to vulnerable customers that encourages companies to identify those customers most likely to need additional support. A thorough and up-to-date PSR may also prompt companies to identify further innovations that will allow the sector better to help vulnerable customers.²⁰⁵¹

(b) **Bespoke PCs and ODIs:** We have reviewed Yorkshire's low pressure PC and provisionally decide that, under full consideration, the methodology and customer evidence used to support the rewards ODI was not robust, and so we have removed the reward element.²⁰⁵² Finally, we also welcome Yorkshire's bespoke PCs to support the delivery of appropriate services to vulnerable customers.²⁰⁵³

15.38 In relation to leakage specifically, we provisionally decide to retain the leakage PC at the level set by Ofwat, but in doing so provisionally conclude that

²⁰⁴⁸ See paragraphs 7.42 to 7.105 and 7.235 to 7.245

²⁰⁴⁹ See paragraphs 7.106 to 7.147

²⁰⁵⁰ See paragraphs 7.106 to 7.195

²⁰⁵¹ See paragraphs 7.188 to 7.195

²⁰⁵² See paragraphs 7.221-229

²⁰⁵³ See paragraph 7.192

Yorkshire may require additional allowance to achieve the required level of performance.²⁰⁵⁴ In particular:

- (a) We provisionally conclude that there is a link between maintaining higher performance on leakage and costs such that the base cost model we use will not adequately compensate companies that are maintaining performance above the upper quartile. However, Yorkshire does not meet this criterion so does not receive any additional base allowance.²⁰⁵⁵
- (b) We provisionally conclude that Yorkshire may require enhancement cost funding for achieving the leakage reductions it committed to, and so should be allowed the efficient cost of doing so. We intend to do further work to establish the appropriate level of enhancement funding for Yorkshire for leakage between provisional and final determinations. As an indication of the effect of this approach, we calculate provisional allowances for it based on applying its company-specific efficiency factor, frontier shift and RPE adjustment to its requested allowance. This results in an indicative allowance for Yorkshire of £93 million of enhancement Totex.²⁰⁵⁶
- (c) We also consider the ODI rates relating to the leakage PC and in particular reject the use of enhanced ODI rates to reward substantial outperformance in this area. As explained above, we conclude that leakage improvements will require additional funding and so will impose costs on customers. In the circumstances, and in the absence of evidence for the cost-benefit trade off of further leakage reductions, we do not consider it would be appropriate to use enhanced ODIs to shift the frontier in this area. We also make adjustments to increase Yorkshire's penalty rates for underperformance ODIs, as we have provisionally concluded that this would make the calibration of the ODIs more consistent with our determination on enhancement costs.²⁰⁵⁷

15.39 For the purposes of this provisional determination, we do not list every PC and/or ODI to which Yorkshire is subject. Instead, we provide a list of the changes we have made to Ofwat's FD.²⁰⁵⁸ If we do not reference a PC or ODI, our provisional determination is that we have seen no evidence to

²⁰⁵⁴ See paragraphs 8.29 to 8.74 and 8.100.

²⁰⁵⁵ These figures are included in the Totex allowances discussed earlier; see paragraphs 8.38 to 8.50.

²⁰⁵⁶ These figures are included in the Totex allowances discussed earlier; see paragraphs 8.51 to 8.74.

²⁰⁵⁷ See paragraphs 8.75 to 8.99.

²⁰⁵⁸ The list of PCs and ODIs which Ofwat included in its FD is available here: Ofwat (2019), [PR19 final determinations: Yorkshire Water outcomes performance appendix](#)

support adopting a different approach to that used by Ofwat, and so we apply the same requirement that Ofwat included in its final determination.

15.40 The summary of changes we have made to PCs and ODIs in Ofwat's FD (excluding scheme-specific PCs) are set out in Table 15-3 below:²⁰⁵⁹

Table 15-3: Summary changes on outcome requirements

<i>Unique reference</i>	<i>Description of commitment</i>	<i>Description of intervention</i>
PR19YKY_22	Leakage	Remove enhanced ODI; provide additional Totex; and amend Tier 1 penalties
PR19YKY_31	Internal sewer flooding	Increase collar to: For each year of AMP7: 2.7, 3.2, 3.8, 4.3, 4.9
PR19YKY_24	Mains repairs	Set an underperformance deadband of 10 repairs per 1,000km above the PC (For each year of AMP7: 196.1, 193.6, 191.0, 188.4, 185.8)
PR19YKY_23	Unplanned outage	Set an underperformance deadband of 1.2x PCL (For each year of AMP7: 6.14, 5.30, 4.48, 3.64, 2.81)
PR19YKY_28	Low pressure	Remove outperformance incentive

Source: CMA

15.41 Our provisional conclusion is that the overall reward cap on ODIs should not change, although we are seeking further evidence on this.

WACC and financeability

WACC

15.42 We perform our own determination of the cost of capital using the Capital Asset Pricing Model (CAPM). The CAPM is an established methodology with well-understood theoretical foundations and which is based on the use of observable market data, together with some judgment on how to balance different sources of data. The CAPM is used by all UK regulators when calculating the cost of capital, and was the framework used by Ofwat in its PR19 FD. We perform our own assessment of each of the parameters of this model, although our analysis is often built on our interpretation of the analysis and data provided by the Parties. We have included additional and more up-to-date market data in our assessment.²⁰⁶⁰

15.43 The main components of the CAPM which we provisionally decide on are (in inflation adjusted CPIH-real terms):

²⁰⁵⁹ See Table 7-17 and paragraph 8.100

²⁰⁶⁰ See paragraphs 9.5 to 9.14

- (a) **The total market return (6.2% to 7.2%):** To calculate the total market return, we place the most weight on historical ex post returns (from 1900 to the present day), and place some weight on both historic ex ante approaches and forward-looking evidence as a cross-check when selecting our range;²⁰⁶¹
- (b) **The risk free rate (-1.4% to -0.8%):** We calculate a risk free rate by placing weight on both long-tenor index-linked gilts and AAA-rated non-government bonds (the highest quality commercial debt);²⁰⁶²
- (c) **The equity beta (0.65 to 0.80):** We calculate an equity beta based on a range of approaches of analysing the observable market data of WASC comparators, including a potential debt beta;²⁰⁶³ and
- (d) **The industry cost of debt (2.3% to 2.9%):** We calculate a weighted average of new and embedded debt, including issuance and liquidity costs. In doing so, we largely rely on a notional approach using external indices and we do not apply a so-called 'outperformance wedge' because we do not consider there is evidence that water companies could systematically outperform our chosen index once tenor and credit rating are adjusted for.²⁰⁶⁴

15.44 As part of this assessment, we provisionally form views on related metrics, particularly inflation (CPIH of 2%, with a 0.9% RPI-CPI wedge)²⁰⁶⁵ and notional gearing (60%).²⁰⁶⁶

15.45 Having established a range for our appointee WACC of 2.82% to 3.99% using the parameters above, we then select a point estimate. The selection of this point estimate requires the application of judgement in weighing up various considerations. In particular, we need to take account of the potential for error in our estimates whilst also considering the need to adjust for any risks to customers from underinvestment without being unnecessarily generous to shareholders.²⁰⁶⁷

15.46 We vary our approach to picking a point estimate based on the associated level of uncertainty involved in the calculation. As a result, for the costs of embedded (historical) debt allowance, we are picking a point estimate at the bottom of the range as we can observe that average historical benchmark

²⁰⁶¹ See paragraphs 9.142 to 9.222

²⁰⁶² See paragraphs 9.38 to 9.141

²⁰⁶³ See paragraphs 9.223 to 9.319

²⁰⁶⁴ See paragraphs 9.320 to 9.411

²⁰⁶⁵ See paragraphs 9.15 to 9.28

²⁰⁶⁶ See paragraphs 9.29 to 9.37

²⁰⁶⁷ See paragraphs 9.631 to 9.680

costs of debt will fall over the period. For the cost of new debt allowance, we are estimating a current cost that will be subject to a true-up mechanism at PR24 and so consider the midpoint of our range to be the most appropriate estimate. For the cost of equity allowance, we are predicting a future cost with a number of uncertain component variables. Because there is a higher risk of error when estimating the cost of equity, we consider it prudent to pick an estimate between the midpoint and the top of our range. Taken together, these estimates lead us to provisionally estimate a cost of capital allowance that is marginally above the mid-point of the range, at 3.50%.²⁰⁶⁸

15.47 The CMA range for its WACC parameters are therefore shown in Table 15-4 below, alongside Ofwat's FD figures:

Table 15-4: CMA point estimates of WACC components versus Ofwat PR19, CPIH-Real

	<i>Ofwat PR19</i>	<i>CMA Point Estimate</i>	<i>Delta</i>
TMR	6.50%	6.95%	+0.45%
RFR	-1.39%	-0.96%	+0.43%
Equity Risk Premium	7.89%	7.91%	+0.02%
Equity Beta	0.71	0.76	+0.05
Cost of New Debt	0.53%	0.37%	-0.16%
Cost of Embedded Debt	2.42%	2.76%	+0.34%
Proportion of New Debt	20%	17%	-3%
Issuance and Liquidity Costs	0.10%	0.10%	-
Pre-tax Cost of Debt	2.14%	2.45%	+0.31%
Post-tax Cost of Equity	4.19%	5.08%	+0.89%
Gearing	60%	60%	-
Appointee-level Vanilla WACC*	2.96%	3.50%	+0.54%

*'Vanilla' here refers to a WACC set using a pre-tax cost of debt and a post-tax cost of equity.
Source: CMA analysis and Ofwat PR19 FD

15.48 We note that our WACC figure is around 28bps lower than Yorkshire proposed to us in its Statement of Case, equivalent to us closing around 65% of the difference between Ofwat and the company.²⁰⁶⁹

²⁰⁶⁸ See paragraphs 9.674 to 9.676

²⁰⁶⁹ See Table 9-1

Retail margin adjustment

15.49 Our view is that using the unadjusted appointee WACC and a retail margin of 1% would result in water companies being overcompensated by receiving returns on their notional retail assets twice, as the retail margin includes compensation for risks which would be faced by an independent retail business but which are in practice mitigated for a vertically integrated appointee business.²⁰⁷⁰

15.50 We calculate the extent of this overcompensation as being equivalent to 8bps of RCV, and accordingly our provisional decision is to reduce Yorkshire's allowed revenues by this amount as a retail margin adjustment.²⁰⁷¹

Gearing outperformance sharing mechanism

15.51 Ofwat introduced a GOSM for the first time in PR19. Ofwat stated that equity investors benefit from higher equity returns that are associated with their increased risk, but there is no substantive benefit passed to customers. In addition, Ofwat stated where companies adopt high levels of gearing, they may reduce financial resilience and transfer some risk to customers and / or potentially taxpayers in the event that a company fails. To address this, Ofwat introduced a mechanism that it said would share the benefits of higher gearing with customers.²⁰⁷²

15.52 We consider that Ofwat has legitimate concerns that customers may face costs where the water companies have gearing well above notional levels, and this increase in gearing could have an adverse effect on financial resilience. However, we have concerns about the GOSM implemented to address these concerns by Ofwat at PR19. These concerns relate to the effectiveness of a GOSM in improving financial resilience and the specifics of its design and, more fundamentally, whether the financial benefits of higher gearing assumed by Ofwat in its design of the GOSM exist. As a result, we provisionally decide not to include a GOSM in our re-determined price controls.²⁰⁷³

Financeability

15.53 We are required to ensure that companies can continue to finance their functions. We have therefore completed a financial ratio analysis similar to

²⁰⁷⁰ See paragraphs 9.554 to 9.563

²⁰⁷¹ See paragraphs 9.554 to 9.563

²⁰⁷² See paragraphs 9.564 to 9.567

²⁰⁷³ See paragraphs 9.622 to 9.629

that which would be undertaken by the credit rating agencies, in particular regarding the level of cash flow. The outputs of this ratio analysis for Yorkshire is shown in Table 15-5 below:²⁰⁷⁴

Table 15-5: Credit ratio analysis for Yorkshire

Ref	Ratio	Gearing	Interest cover	AICR	FFO/Net debt	Dividend cover	RCF/Net debt
1	Ofwat	60.5%	4.2	1.5	10.1%	2.0	8.1%
2	CMA WACC (3.50%)	59.9%	3.3	1.5	8.2%	1.1	6.2%
3	CMA WACC and increase in Totex by £91.9m	60%	3.3	1.5	8.1%	1.1	6.1%
4	CMA WACC, Totex & penalty	61.2%	3.1	1.3	7.3%	0.7	5.3%
5	CMA WACC and increase in Totex by £91.9m and IRE	60.0%	4.0	1.5	10.3%	2.2	8.3%

Source: CMA analysis

15.54 Our analysis of Yorkshire's ratios suggests that, based on our determination and the assumption of a notional capital structure, Yorkshire would achieve financial ratios which are consistent with an investment-grade credit rating. The base case ratios are consistent with rating agency statements about achieving BBB+/Baa1 levels, and the downside scenario still producing ratios consistent with an investment grade credit rating of BBB/Baa2. Ratios presented in the last scenario (scenario 5 in the table above) are consistent with Ofwat's approach to IRE and Standard and Poor's definition of the FFO/Net Debt. Under this treatment, the FFO/Net Debt is 10.3%.²⁰⁷⁵

15.55 We have made an assessment of the WACC and wholesale Totex requirements, in each case providing an increased allowance compared to Ofwat's final determination. This represents a reasonable level of costs that each of the Disputing Companies could be expected to incur, and we have de-risked the determination, including moderating the cost sharing rates to rebalance risk between customers and investors. Each of these factors improves financeability.

15.56 We find that Yorkshire should be able to achieve strong investment-grade credit ratings based on the notional capital structure, and this is consistent with our assumptions in the WACC for the cost of debt. We also find that under a reasonable downside scenario, Yorkshire's ratios are worse than the baseline model but still investment-grade. We consider that companies facing a financeability constraint, such as to address a downside scenario, may consider a range of mitigating actions to address impact, such as absorbing headroom in credit ratios, the contribution of equity to forgo dividends or inject

²⁰⁷⁴ See Table 10-6

²⁰⁷⁵ See paragraphs 10.83 to 10.87

fresh capital. We conclude that this supports the view that our provisional determination for Yorkshire is financeable.²⁰⁷⁶

Implied calculations of revenue and implication on bills

Revenue adjustments

15.57 The majority of a water company's wholesale revenue is derived from the Totex and WACC figures discussed above. However, there are certain additional elements which affect Yorkshire's revenue allowance in AMP7.²⁰⁷⁷

15.58 For the majority of these revenue categories, Yorkshire has not raised any concerns and we have no evidence to support the use of alternative figures, and so we provisionally decide to use the figures in Ofwat's FD.

15.59 However, we have received submissions in two areas, which we consider support a different approach:

- (a) Yorkshire raised concerns about the effects of an accidental data input error it made in PR14, and which it raised with Ofwat as soon as this error was identified in 2015-16. We provisionally decide that this is a clear and unambiguous error which should be remedied by increasing Yorkshire's Water Network Plus revenue allowance by £35 million. We have reflected this in a separate line in the revenue table below. We note that this provisional decision also decreases Yorkshire's Water Network Plus RCV by £9 million, which has an effect on AMP7 revenue through a slightly lower RCV run-off and return on capital.²⁰⁷⁸
- (b) Ofwat's FD used a corporation tax rate of 17% on the expectation that the rate was going to drop from the current figure of 19%. However, in the current circumstances and in the absence of strong government guidance that this is now likely, we consider it appropriate to use the prevailing rate. Accordingly, we provisionally decide to use a corporation tax of 19%. This results in a small increase in Yorkshire's allowed revenue compared to Ofwat's FD of around £1 million. We also adopt the same approach as Ofwat of including a reconciliation mechanism which reflects subsequent changes in the corporation tax rate.²⁰⁷⁹

²⁰⁷⁶ See paragraphs 10.83 to 10.87

²⁰⁷⁷ Revenue adjustments for PR14 reconciliations; Tax; Grants & contributions after adjustment for income offset (price control); Non-price control income; Innovation competition; Revenue re-profiling; see Table 4.1 of [Yorkshire FD](#).

²⁰⁷⁸ See paragraphs 11.9 to 11.59

²⁰⁷⁹ See paragraphs 11.2 to 11.8

Implied Yorkshire revenue in AMP7

15.60 As stated in paragraph 15.2 above, we have not yet sought to model all the consequential changes of our provisional decisions or areas where we have decided not to make changes in our provisional determination. We have therefore not yet produced a robust revenue figure (or value of 'K'). We intend to complete a full update of the calculation of K (and any necessary supporting figures) prior to completing our Final Determination. We will consult with the Main Parties in parallel to our consultation on this provisional determination on the technical steps required to convert our determination to changes to the price control licence conditions.

15.61 However, we have produced an indicative estimate for Yorkshire's wholesale allowed revenue which should reflect the majority of changes which our provisional decisions would result in. This is shown in Table 15-6 below:

Table 15-6: Calculation of wholesale allowed revenue (£ million)

	<i>Water resources</i>	<i>Water network plus</i>	<i>Wastewater network plus</i>	<i>Bioresources</i>	<i>Total</i>
PAYG ¹	173	1,185	950	176	2,484
RCV Run-off ²	69	392	717	143	1,322
Return on Capital (Appointee) ³	84	342	595	45	1,066
Retail margin adjustment ⁴	-2	-9	-15	-1	-27
Other CMA adjustments ⁵	0	35	0	0	35
Reconciliation*	1	10	40	0	51
Tax ⁶	0	2	6	5	13
Grants and contributions*	0	53	38	0	92
Deduct non-Price control income*	0	-13	-5	0	-18
Innovation competition*	0	8	10	0	18
Revenue reprofiling*	0	0	0	0	0
Wholesale revenue	325	2,005	2,337	368	5,035

1. This figure is calculated by applying Yorkshire's PAYG rates (before Ofwat accelerated any revenue) of 80.9%, 76.4%, 45.4%, and 57.9% (for each respective control) to the figures in Table 15-1 above, with the exception of pension deficit allowances which are not subject to PAYG and are instead all included in this AMP.

2. This figure is calculated by taking the RCV run-off allowance in Ofwat's FD (see table 4.1), and then calculating the value of additional RCV contributions from non-PAYG Totex in the AMP (halved to represent the average over the period) and then applying Yorkshire's RCV-runoff rates of 2.48%, 3.46%, 3.68%, and 9.39% for each respective control to these figures.

3. This figure is calculated by multiplying the Ofwat allowances for return on capital for wholesale (see table 4.8) by 1.01 for CPIH-linked returns and 1.02 for RPI-linked returns to convert to appointee level, and then by 18% and 31% to reflect the higher CMA WACC figures (3.50%/2.96% for CPIH = 1.18; 2.57%/1.96% for RPI = 1.31); the CMA post-2020 rate of 3.50% is then also applied to the new RCV addition calculated in note (2) above.

4. Calculated as being equivalent to a 0.08% adjustment to the WACC.

5. These adjustments reflect remedies to the WRFIM error identified.

6. This figure is calculated by uplifting the Ofwat allowances for tax by 19/17.

* These revenue figures have not currently been changed from Ofwat's FD

Source: Ofwat FD (Table 3.2 of [Yorkshire FD](#)) and CMA analysis.

- 15.62 This indicative calculation results in Yorkshire's wholesale revenue over the AMP being around £212 million higher than Ofwat's FD.²⁰⁸⁰
- 15.63 In relation to the retail price control, neither Yorkshire nor any of the other Disputing Companies have raised any concerns that Ofwat's approach should be re-considered. Our provisional decision is to align our approach with Ofwat's FD19. This includes the household retail expenditure allowance and the outcome measures relating to the customer experience and developer experience (C-MeX and D-MeX respectively).²⁰⁸¹ Therefore, for the purposes of this provisional determination, we include the residential retail revenue figure which Ofwat used in its FD (ie £320 million).²⁰⁸² We note that changes to wholesale allowances may have consequential effects on the residential retail allowances, and this is one of the areas which we intend to reflect in our final determination.
- 15.64 The estimated effect of these changes on average annual customer bills is shown in Table 15-7 below, compared to Yorkshire's historical bills and Ofwat's FD.²⁰⁸³

Table 15-7: CMA provisional decision indicative impact on Yorkshire's average annual bills in AMP7 (£, 2017-18 CPIH deflated)

	<i>Yorkshire historical bills (2019/20)</i>	<i>Yorkshire average bill in April business plan*</i>	<i>Yorkshire average bill under Ofwat FD</i>	<i>Yorkshire average bill under CMA provisional decision</i>
Average annual bill (water and sewerage)	£383	£379	£364	£379

*The April business plan figure here is taken from Ofwat's published documents, and may not align with all of the implications of the company's submissions in its SoC.

Source: CMA calculations; Based on a wholesale vs retail split of Yorkshire's average bills in Ofwat's FD of £335 wholesale and £30 retail (see [Yorkshire FD financial model](#)); and an uplift of 4.4% (£212 million increase on Ofwat's £4,823 million wholesale revenue allowance) on the wholesale element. Yorkshire business plan bills taken from [Yorkshire FD](#), Table 1.1.

- 15.65 The indicative bill in our provisional determination is higher than Ofwat's FD by around £15 per year. This reflects the judgements the CMA has made about financing investments that are needed in the sector both now and in the future.
- 15.66 We also note that, under our provisional determination, Yorkshire's indicative average bills are still £4 per year lower than they were in 2019/20 (and around

²⁰⁸⁰ Ofwat's FD included wholesale revenues for Yorkshire of £4,823 million; see Table 1.3 in [Yorkshire FD](#).

²⁰⁸¹ See paragraphs 11.94 to 11.98

²⁰⁸² Table 6.2 of [Yorkshire FD](#)

²⁰⁸³ As discussed in paragraph 15.2, we have not yet implemented all the technical steps required to convert our determination to changes to the price control licence conditions. In addition, the price control sets revenue allowances for the individual companies. This determines the average bill that the company can charge its customers. Individual bills will vary depending on the charging scheme adopted by the company, see [information on charging schemes](#).

the same level as Yorkshire's April business plan), which should assist customers who were struggling with the affordability of this essential utility.

- 15.67 Finally, we emphasise that while we have looked at individual components in detail, and necessarily made decision on each of these, we have also considered any cross-cutting or interconnected issues when making such decisions. In particular, the relationship between cost and service, as well as risk and return have influenced our decisions in each of the major areas of the determination (outcomes, Totex and WACC). This is a determination of a whole package 'in the round', and our provisional decision is that this package secures compliance with all our duties.

16. Next steps

- 16.1 Having reached our provisional view on each of the individual elements of the price controls and considered the price control 'in the round' for each of the four redeterminations, we are inviting comments on these provisional findings.
- 16.2 As set out at paragraphs 3.62 to 3.65, in order to finally determine the price controls for each company for each activity, we will need to translate our decisions on each of the building blocks into a calculation on the effect on the licence. We will consult with the Main Parties in parallel to our consultation on this Provisional Determination on the technical steps required to convert our determination to changes to the price control licence conditions. This will include any modelling required to reflect the Final Determination.
- 16.3 To submit views on the provisional redeterminations, please email waterdetermination2020@cma.gov.uk
- 16.4 Please note that, due to the ongoing COVID-19 outbreak, we are not able to accept delivery of any documents or correspondence by post or courier to any of our offices.
- 16.5 All Parties are requested to make any submissions in response to this document by 9am on Tuesday 27 October 2020.