

**Ofwat's response to Bristol Water's
Price Determination Statement of
Case dated
11 March 2015**



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About this document

1. We provide a summary of our key responses to Bristol Water Plc's (Bristol Water's) Statement of Case in section 2 of this document. We provide full details of our responses in the accompanying appendices. In the table below we list the policy areas, summarise the key issues raised by Bristol Water and set out where to find more information in this document.

Policy Area	Key issues raised	More information
Wholesale totex	Base costs Enhancement costs Modelling	Section 2.1, Appendix 1
Risk and reward	Retail margin Uncertainty mechanism for non-household retail (NHHR)	Section 2.2, Appendix 2
Financeability and affordability	Notional and actual financeability Financial ratios Pay As You Go (PAYG)	Section 2.3, Appendix 3
Outcomes	Comparative assessment Supply interruptions Mean Zonal Compliance Water quality contacts	Section 2.4, Appendix 4
Reconciling 2010-15 performance	Serviceability	Section 2.5, Appendix 5
Retail price control	Household retail costs NHHR costs	Section 2.6 and 2.7

2. Most of the evidence we will refer to in this document is publicly available. This reflects the transparency we demonstrated throughout the price review process. Where we refer to information that is not publicly available, we have provided these as part of this response.
3. Unless otherwise stated all costs that are quoted are in 2012-13 prices. References to 'we' and 'us' are to the Water Services Regulation Authority.

1. Introduction

4. The 2014 price review (PR14) sought to deliver the best possible outcome for customers across England and Wales (both domestic and non-domestic), the environment and society, now and in the future, ensuring a financially sustainable and resilient sector in the long term.
5. Elements of PR14 were substantially different from the previous price review, PR09. For the first time we set separate binding controls. The use of totex, already used within other regulated sectors, was a key measure introduced to help redress the balance of operating and capital expenditure incentives and support the delivery of the right outcome for customers. We incentivised companies to go beyond average performance and move towards frontier efficiency and service performance. And we encouraged companies to seek outperformance against measures across the whole of the business, not just through the outperformance of the cost of finance. This in turn was aligned to a more balanced assessment of the risk and reward that companies faced.
6. We wanted companies to take more responsibility for understanding what their customers' priorities were, acting upon them and delivering against expectations in an efficient and sustainable way over the long term. We wanted companies to also take ownership for managing risk and to be more dynamic and ensure a better allocation of risk and reward (so as to better align the interests of capital investors and company management with the interests of customers). All of this was to deliver the best possible outcome for customers across England and Wales (both domestic and non-domestic), the environment and society, now and in the future, ensuring a financially sustainable and resilient sector in the long term.
7. Overall, the companies responded positively to the change in approach and to the greater ownership and flexibility they had over their business plans. We note that Bristol Water also took steps to engage customers in advance of submitting its original plan in December and in our risk based review judged this engagement to be generally acceptable. While customer acceptability was an important part of our risk based review test, particularly for the areas of outcomes and affordability, it was only one of a range of tests when assessing the quality of the business plans. We note that customers did not, and to some extent could not, have access to comparative information on areas such as costs when expressing their views. Customer engagement is the starting point when developing a plan, but we expect companies to challenge themselves to ensure that the resulting plan is efficient. In making the determinations we

intervened where we held this comparative information and where we felt it was in the best interest for customers.

8. A small number of companies still required substantial intervention in some areas in their draft determinations. But once we had reviewed and assessed responses to the draft determinations, only Bristol Water continued to require very substantial intervention in its final determination. We continued to engage and work with companies to resolve issues throughout the process. All of these companies, with the exception of Bristol Water, managed to close the gap in totex.
9. Throughout PR14 we sought to make decisions that were based on robust evidence. Consistent with our methodology, the onus was on companies to provide compelling evidence in support of their business plans. Bristol Water's evidence was not sufficient to persuade us that the higher bills the company proposed were justified. Early on in the process we intervened in the business plans where we had not been satisfied by the evidence provided by the company. We hoped this would encourage the company to make sure its supporting evidence was robust. However, even in the later stages of the price review Bristol Water had still not provided persuasive evidence. We therefore had to take a view on what expenditure would be in customers' interests. In doing this we substantially increased the level of allowed totex compared to the draft determination, but we were not able to close the full gap and accept Bristol Water's totex figure.
10. The most material interventions in Bristol Water's business plan at the final determination stage related to:
 - the cost of capital;
 - financeability;
 - outcomes; and
 - reconciling 2010-15 performance.
11. In the final determination we also made some interventions to the retail price controls. In its letter¹ requesting a reference, Bristol Water indicated that it is content with the retail price controls in the final determination. However, the entire disputed determination (including the wholesale water, household retail and non-household retail price controls and the designation of retail activities) has been referred to the Competition and Markets Authority (CMA).

¹ Letter from Luis Garcia (Chief Executive, Bristol Water) to Cathryn Ross (Chief Executive, Ofwat) dated 12 February 2015.

12. On 11 March Bristol Water provided us with a copy of its Statement of Case in respect of its rejection of the price limits set by Ofwat for the 2015-2020 period. The CMA formally asked² us to respond to the Bristol Water submission by 25 March 2015.
13. We have reviewed Bristol Water's Statement of Case, including the new information presented. We maintain our view that the final determination we set on 12 December 2014 fully satisfies our duties in respect of all stakeholders. In particular, the final determinations furthered the consumer objective and will enable an efficient company to finance its functions and earn a reasonable return. These also allow for Bristol Water, operating efficiently, to deliver efficient investment in line with appropriate long-term plans in order to provide long-term resilience of its water supply system. We remain of the view that the price limits deliver a balanced outcome which fully satisfies our duties in this respect. We used a consistent approach to set price limits for all 18 companies³ and only one, Bristol Water, rejected them. We looked at all of the issues in the round and with the advantage of seeing information across the whole industry.
14. We informed Bristol Water of its price limits in our formal letter⁴. We also provided it with the policy chapters referred to in this document and the company specific appendix. This set out in detail the outcomes which Bristol Water must deliver, the efficient cost levels for wholesale and retail that we had made allowance for and our reasons for making these allowances. Our approach to setting price limits is set out in our methodology⁵ and is supported by the policy chapters. Bristol Water has used this material to produce its submission.
15. We stand by our determination. We have identified the key issues arising from Bristol Water's submission and explained our position on these, but unless we specifically say so, this amplifies or explains our determination and associated documents.

² CMA Draft administrative timetable (provided by email 18 March 2015).

³ As well as setting full price controls for 18 water companies, we also set a simplified price control for Cholderton and District Water Company Limited, which reflected the exceptionally small size of that company.

⁴ [Letter from Cathryn Ross to Luis Garcia, dated 12 December 2014](#)

⁵ We consulted on our approach to PR14 in 2013, setting out our final methodology statement in July 2013 in '[Setting price controls for 2015-20 – final methodology and expectations for companies' business plans](#)'.

2. Our key responses

2.1 Wholesale totex

2.1.1 Background

16. We set out the background to our approach to wholesale cost assessment in section A1.2.1 of our opening statement. Further details on our approach are set out in the final determination '[policy chapter A3 – wholesale water and wastewater costs and revenues](#)' and a specific commentary in relation to Bristol Water in section A2 of the [company specific appendix for Bristol Water](#).

2.1.2 Our approach

17. In its Statement of Case, Bristol Water notes that the 'most significant reason for seeking a redetermination from the CMA is the difference between our Business Plan and FD14 regarding the assessment of the appropriate level of costs'⁶. It goes on to suggest that its approach to developing its business plan was consistent with good industry practice and that Ofwat's approach to cost assessment was not sufficiently robust.
18. Clearly the assessment of wholesale costs is a particularly important area to Bristol Water and its customers – and more widely to all the companies and their customers across both the water and wastewater sectors. We expect that across the industry companies will spend around £40 billion of wholesale totex over the period of the new price controls.
19. Bearing in mind the importance of these matters we have taken care to develop an approach to cost assessment reflecting:
- that at present wholesale activities are exposed to very limited amounts of competition and so to help ensure that the projections of costs that are used in the price controls are efficient (and to incentivise efficiency in the longer-term) we have used comparative benchmarking;
 - the benchmarking models we adopted have been subject to an extensive testing and selection process, and have been verified by our expert consultants and advisors as robust. Further, we have not relied

⁶ Bristol Water Statement of Case, Executive summary, paragraph 12

on individual models, but used three separate modelling streams to make projections of wholesale water costs;

- that however carefully we have specified and estimated benchmarking models we fully accept that they cannot capture all the factors driving costs, and, so we have considered company representations on any special cost factors not captured by our modelling – which allows us to consider in a focused and targeted way detailed evidence and information relating to the individual circumstances and plans of each water company;
- the concerns expressed by the Cave review⁷ and the Gray review⁸ on Ofwat's previous approaches to cost assessment, and, the recommendations that we should consider a totex approach to wholesale cost assessment;
- the wisdom and expertise of Jacobs, PwC, CEPA and our academic adviser (Dr Andrew Smith of the University of Leeds), which we have drawn on extensively in both developing and implementing our approach to wholesale cost assessment; and
- full transparency and careful consideration of representations arising from the extensive consultations with companies and other stakeholders.

20. The result of this process has been an approach to cost assessment that has made a significant contribution to the setting of 28 separate wholesale price controls as part of the PR14 process. This approach is not only based on benchmarking models, but on the consideration of special cost factor claims and modelling adjustments. We have already made very significant adjustments to the results of our modelling for Bristol Water – and the changes between the Risk Based Review (RBR) and final determination for Bristol Water were the biggest for any water company. Further, the approach we adopted to cost modelling and special cost factor claims was same for wholesale activities across the sector, and 27 out of the 28 wholesale price controls have been accepted by companies. Only Bristol Water decided to refer these matters to the CMA for determination.

2.1.3 Points raised by Bristol Water

21. In addition to highlighting the substantial difference between its forecasts of wholesale totex and our projections in its executive summary, Bristol Water:

⁷ Independent Review of Competition and Innovation in Water Markets: Final report Professor Martin Cave April 2009.

⁸ The Review of Ofwat and consumer representation in the water sector, David Gray, 2011.

- characterises the cost projections in the final determination as unsustainable;
- claims that its approach to developing its business plan and totex projections was consistent with good practice; and
- suggests that Ofwat's approach to cost assessment was insufficiently robust.

2.1.4 Our response to points raised by Bristol Water

2.1.4.1 Cost projections

22. In relation to the sustainability of our cost projections there is strong evidence that our allowances for costs are consistent with longer-term efficient levels:
23. In modelling costs we have adopted a consistent approach across all 18 wholesale water businesses. Where special cost factor claims and modelling adjustments are concerned we have given Bristol Water the benefit of the doubt in a number of areas (for instance in relation to the Cheddar water treatment works and traffic congestion costs). We have also made significant adjustments to our modelled allowances for both base (in relation to water treatment costs) and enhancement expenditure (by increasing the allowance in the refined totex modelling stream). Between the RBR and final determination we adjusted our cost threshold more for Bristol Water (with a 31 percentage point reduction in the difference between Bristol's business plan forecasts and our cost projections) than for any other water company (the next biggest reduction was for Dee Valley with 10 percentage point reduction.)
24. Examining the trends in Bristol Water's business plan forecasts of base totex suggests that its base expenditure is trending sharply downwards. Comparing its base costs in 2013-14 (when its costs were expected to be £91 million) and 2017-18 (when it is forecasting to spend £66 million) gives compound annual reduction of 7.7% per year. Projecting this rate of reduction forward a further two years until 2019-20 (the last year of the new price control) gives £56 million in 2019-20 – compared to our base cost allowance of £58 million in 2019-20.
25. Approximately two thirds of the difference between our projections of enhancement totex and the forecasts made by Bristol Water relates to the Cheddar 2 reservoir, and the evidence suggests that Bristol can proceed on a sustainable basis without constructing this reservoir during the period 2015 to 2020. This is discussed further in section A1.2.3 of this document. Our

conclusions on Cheddar 2 were supported by an independent report by Jacobs engineering consultants, which is provided alongside this response.

2.1.4.2 Business plan approach

26. As we have explained in section 2.1.2 above the focus of our approach to cost assessment was on benchmarking and the consideration of modelling adjustments and special cost factor claims. This is different to the approach that Bristol Water has adopted to making its business plan forecasts of costs. Nonetheless, in the course of our investigations into the robustness of our models and Bristol Water's special cost factor claims we reviewed evidence that casts substantial doubt on the claims made by Bristol Water about the strength of both its business planning processes and benchmarking analysis. In particular:
27. An assessment of both its third party assurance reports (described in more detail in sections A1.1 and A1.2 of appendix 1) and our assessment of its business case for the Cheddar 2 reservoir (which is its biggest investment project) raise significant questions as to whether Bristol Water's business plan has been prepared in a way consistent with good practice;
28. Bristol Water's customer testing of business plan scenarios is not a sufficient condition for a business plan to be considered robust, particularly as customers do not appear to have been provided with good information on relative efficiency and quality of service;
29. Although Bristol Water had its plan reviewed by various independent experts this does not in itself create efficiency;
30. Bristol Water's detailed benchmarking and suggestions that mains asset age, proportion of upstream assets and Modern Equivalent Asset Values (MEAVs) are robust cost drivers in the water sector appear flawed; and,
31. Bristol Water notes in its executive summary that its business plan is supported 'by Oxera through the use of disaggregated econometric models during the latter part of the PR14 process'⁹. We received no such modelling during the PR14 process and the final Oxera report which was submitted to us as late as November 2014 merely noted this was work in progress – despite a price review process spanning approximately 18 months. It is difficult to

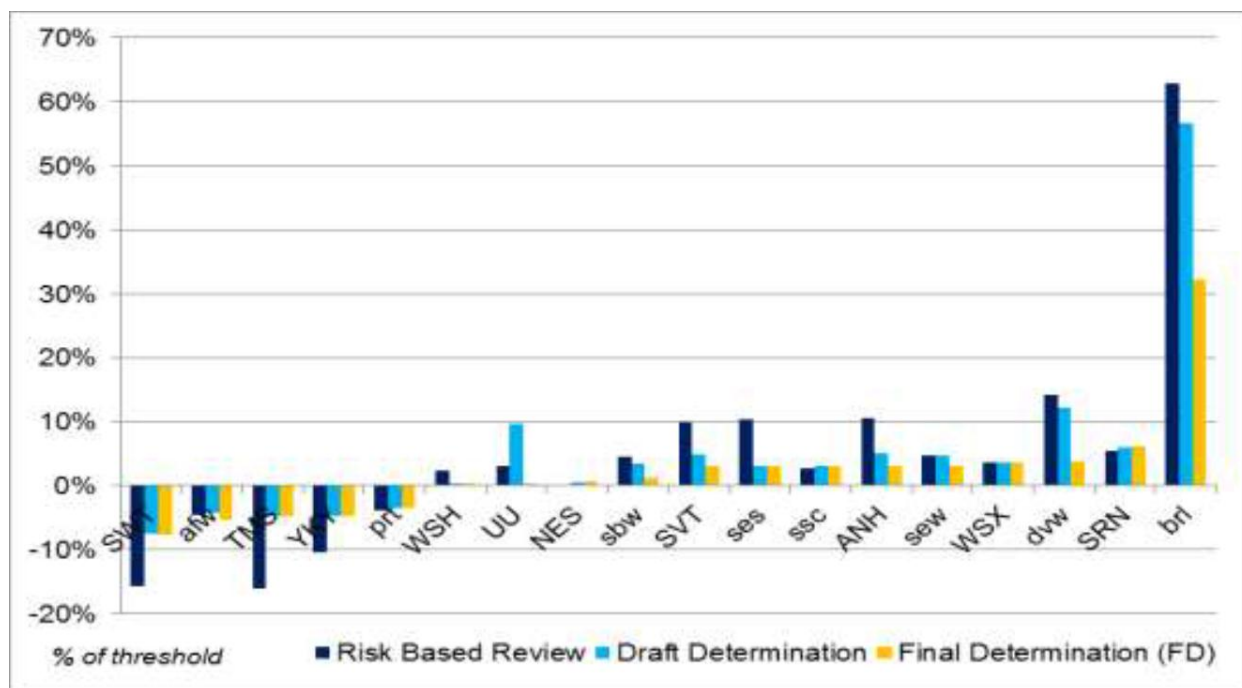
⁹ Bristol Water Statement of Case, Executive Summary, paragraph 18

reconcile this modelling progression with Bristol Water's suggestions of good practice.

2.1.4.3 Ofwat's approach to cost assessment

32. With respect to the robustness of our approach to cost assessment:
33. The combination of 3 separate modelling streams (including totex, base and enhancement models, models using both full and refined sets of cost drivers, models estimated using different techniques – both Ordinary Least Squares (OLS) and Generalised Least Squares (GLS) means that we have an appropriately balanced approach to cost modelling;
34. We have adopted a rigorous and transparent approach to model selection and testing, which has involved validation by CEPA, PwC and our academic advisor (Dr Andrew Smith);
35. The models are only part of the process – we have also considered modelling adjustments and special cost factor claims, which taken together means that our approach is both reasonably broad and robust. As noted in paragraph 20 above, the modelling adjustments we made in favour of Bristol were larger than for any other water company;
36. We have developed cost thresholds and projections using this process that reasonably accurately reflect the revised business plans of 17 out of the 18 water companies – and as illustrated in the chart below Bristol Water is the only exception to this pattern;

Figure 1 Differences between Ofwat cost projections/thresholds and company forecasts of totex



37. Bearing in mind the overall success of our approach to cost assessment, our use of both base plus enhancement models and are consideration of both modelling adjustments and special cost factor claims, it is difficult to understand the suggestions made by Bristol Water that the use of modelling for assessing enhancement expenditure is inappropriate;

38. As we explained and demonstrated in the final determinations our cost models are relatively stable – for instance, producing broadly consistent results when adding an additional year 2013-14 to the data sets;

39. Bristol Water has also suggested that excluding certain companies from the dataset and re-estimating models reveals that the model coefficients are not stable. We question the validity of this test (in particular given the small dataset) but in any case it is more important to evaluate the stability of the models' predictions rather than individual coefficients. Tests show that across the industry our forecasts were stable when compared to the average forecasts obtained through the exclusion of single companies from the sample (an average absolute difference of 0.6% from current predictions, with a standard deviation of 0.5%). For Bristol Water the average prediction was only 1.4% higher than its forecast derived from the model estimated on the basis of the full set of companies;

40. Bristol Water has highlighted issues with the sign and magnitude of certain coefficients in our full totex model. We accept that a fully specified cost model may not always have well determined coefficients because of issues such as multi-collinearity, but nonetheless the overall model predictions remain statistically unbiased. It is the overall functioning of the model that we have focused on and it is this which is important. As a part of the PR14 process we have also cross checked the results of all three modelling streams against each other and made adjustments where appropriate;
41. Where Bristol Water has suggested alternative explanatory variables for use in benchmarking models we have tested these variables and made modelling adjustments where either the variables are statistically significant or there is other persuasive evidence that suggests the models materially underestimate the efficient level of costs for Bristol Water; and
42. The alternative functional forms for models suggested by Oxera seem to have significantly more disadvantages than advantages. A Cobb Douglas approach appears to put undue restrictions on scale effects, ignores statistically significant translog terms and so is prone to omitted variables bias. A four component stochastic frontier model is based on strong distributional assumptions regarding the components of the composite error term. It is also a relatively new approach to modelling so has not been subject to full review and assessment in applications. Oxera's own academic advisor, Professor Kumbhakar, has said in the context of stochastic frontier modelling 'we found that efficiency results are quite sensitive to how inefficiency is modelled and interpreted'. Finally, decomposing the model error term between unobserved heterogeneity, permanent efficiency, transient efficiency and noise may double count the special cost factor claim process – which was designed to target factors that could not be reasonably explained by the cost modelling.

2.1.5 Summary

43. In summary:
44. We developed an approach to cost assessment that both properly protects the interests of customers and provides allowances for efficient levels of costs;
45. Given that at present there is very limited scope for competition in wholesale activities it is appropriate to consider the advantages (both in the short and longer term) of making benchmark comparisons of costs;

46. Where there is clear evidence that such comparisons do not adequately reflect the circumstances of individual companies, then it is appropriate to consider, as we did for all companies, modelling and special cost factor adjustments;
47. Using this approach we have developed cost thresholds and projections that reasonably accurately reflect the revised business plans of 17 out of the 18 water companies – with Bristol Water being the only exception to this pattern;
48. As noted above, we have made significant modelling adjustments for Bristol Water (and more than for any other water company) and given it the benefit of the doubt in relation to a number of special cost factor claims to ensure that our allowances for totex are consistent with longer-term efficient levels;
49. Although the remaining gap between our cost projections and its business plan forecasts of costs are large this is understandable given the greater than 50% increase in Bristol Water's base costs that occurred between 2010-11 and 2012-13;
50. Significant issues we have identified with Bristol Water's business planning processes and in particular its failure to be able to provide a convincing justification for the Cheddar 2 reservoir, its biggest investment project; and conspicuous contrast between the behaviour of Bristol Water and other companies exposed as relatively high cost by our wholesale cost assessment processes, where both United Utilities Water and Thames Water (in relation to its separate Tideway activities) revisited business plans and brought forward significant efficiency savings. In contrast Bristol Water appeared to concentrate on bringing forward 15 special cost factor claims.
51. Bearing in mind the above and the significant adjustments we have already made to our modelling results suggests that the remaining differences indicate Bristol Water has a relatively high cost plan and the scope to make very significant efficiency savings; and
52. We note Bristol Water's representations that it would 'like the CMA to consider whether Bristol Water's plan in relation to base totex is justified by making use of an engineering assessment of the needs, solutions and costs'¹⁰. We note that such assessments are inherently difficult to undertake given the very detailed information that is involved and the limitations that are associated

¹⁰ Ibid, paragraph 1127

with this sort of analysis. In particular it does not draw on comparative efficiency assessments to help protect the interests of customers.

53. We are confident that our projections of costs provide a reasonable estimate of the efficient level of costs. Bristol Water's present level of base costs are significantly above these levels and so we also consider whether a glide path should be allowed such that Bristol water would face an easier transition to these efficient levels. Having considered these matters carefully we decided that any additional costs in the earlier years of the new price control were something for shareholders rather than customers to fund. In respect of enhancement expenditure two thirds of difference between our projections and Bristol Water's business plan forecasts relates to the Cheddar 2 reservoir – and we have found no compelling case that this spending is necessary within the price control period. The remaining difference on enhancement spending relates to the extensive scope and cost of Bristol Water's remaining enhancement schemes, which Bristol Water would need to revisit to meet our projections of costs.

2.2 Risk and reward

2.2.1 Background

54. We set out the background on this area in A2.7 of our opening statement on pages 61-63. Further details on our general approach on risk and reward are provided in '[Policy chapter A7 – Risk and Reward](#)' and specific comment on Bristol Water in the relevant sections of the [company specific appendix for Bristol Water](#).

2.2.2 Our approach

55. We have been transparent, setting out detailed expectations in our risk and reward guidance in January 2014, which is well in advance of when such clarity was historically provided in a price review process. We updated it only in response to evidence, such as market evidence, on a fall in the cost of debt.
56. Our focus in setting a cost of capital was on a company with a notional capital structure as this ensures that risks around financing decisions, such as the level of gearing and structure of debt, remain with shareholders and the company rather than being passed on to customers. This is in line with well-established regulatory practice that it is up to companies to determine their actual financing structure and the fundamental principle that risk should be

allocated to whoever is best placed to manage it. Equity holders should bear the consequences of their financing decisions, while customers should only pay for efficient financing costs. The use of notional financing structure means that customers will bear costs associated with notional structure and companies gain benefit from outperformance and underperformance against notional structure. The use of notional structure also facilitates comparison across companies.

2.2.3 Points raised by Bristol Water

57. Bristol largely agreed with the notional cost of capital for the industry included in the final determinations, although it accepted that total market returns should be lower.
58. It said that the adjustment for the retail margin calculated on company specific factors is small, rounding to zero, and therefore the cost of capital at the appointee level and wholesale level should be the same.
59. Bristol Water considers that its cost of equity is higher than it is for the larger water and sewerage companies and that we should also use its actual cost of embedded debt.
60. Bristol Water has calculated inflation for the purpose of calculating the real cost of capital based on forecasts over the next five years. These forecasts are lower than the long term forecast of RPI in the final determination used to align expected inflation and corporate debt structure. Bristol Water's approach would lead, all other things being equal, to a higher cost of capital.
61. Bristol Water thinks that it was inappropriate for us to apply a customer benefits test before allowing any higher costs of debt.
62. A comparison of the components of the weighted average cost of capital (WACC) that Bristol sets out in its Statement of Case is provided in table 1.

Table 1 Comparison of final determination WACC with Bristol Water's proposals

WACC components	Ofwat final determinations (notional company)	Bristol Water (Specific to Bristol Water)
Gearing	62.5%	62.5%
Total Market Returns	6.75%	6.5%

WACC components	Ofwat final determinations (notional company)	Bristol Water (Specific to Bristol Water)
Risk-free Rate	1.25%	1.25%
Asset Beta	0.30	0.3675
Cost of equity (post-tax)	5.65%	6.4%
Cost of New Debt	2.00%	2.30%
Cost of Embedded Debt	2.65%	3.15%
Embedded debt ratio	75:25	
Allowance for debt fees	0.10%	
Overall cost of debt	2.59%	3.15%
Appointee WACC (vanilla)	3.74%	4.37%
Retail margin allowance	0.14%	0.0%
Wholesale WACC (vanilla)	3.6%	4.37%

2.2.4 Our response to points raised by Bristol Water

63. We note that Bristol Water has used the lower value for total market returns selected by the CMA in its final determination for Northern Ireland Electricity in 2014. We agree that this is within the range the evidence suggested, although we have selected an estimate at the upper end of our range of 6.75%.
64. We consider that the financing risks are a matter for the company and shareholder not customers. This reflects our combined duties. We remain strongly of the view that it is necessary to give all companies, large and small, a strong incentive to seek and maintain financing at the best possible terms.¹¹ Therefore, we continue to consider that it is inappropriate, in principle, to use a company's actual cost of debt financing as a starting point for estimating its efficient cost of financing.
65. We consider that there is evidence that the smaller water only companies have a cost of debt that is 0.25% higher than the efficient cost for the sector. The additional costs relates to the smaller size on the cost of raising bond financing. Consistent with our wider approach to costs, we consider that it is

¹¹ See also our secondary efficiency duty, s. 2(3)(a) WIA91.

important that customers are only obliged to pay higher costs to support a small company when there is clear benefit to customers for doing so. We explain in section A2.7 of this document how the benefits test is appropriate in order to ensure that we fulfil all our duties.

66. Bristol Water's own assessment of actual embedded debt costs of 3.15% is overstated. We show in section A2.5 of this document that a figure of no more than 2.7% would be more appropriate. This is without taking account of £4m of interest received from loans to the holding company, as these loans relate to higher cost debt, this would further reduce average cost of embedded debt to level below that of our notional company. Therefore, we consider that Bristol Water has not demonstrated that its embedded cost of debt is higher than our notional cost of embedded debt allowed in the final determination.
67. Regarding the cost of equity, we disagree that there is evidence to support the use of a higher asset beta for small companies to account for the effect of operational gearing, as the Competition Commission (CC) had done for PR09.¹² After carefully reviewing the Competition Commission's analysis¹³ and market data, we concluded that Bristol Water's proposed approach lacks conceptual validity, and that there is no evidence of a difference in systematic risk between Water and Sewerage companies (WaSCs) and Water Only companies (WOCs). We discuss this evidence in section A2.6.
68. It would be inappropriate to set the wholesale Weighted Average Cost of Capital (WACC) equal to the WACC for the appointed company, as proposed by Bristol Water. Not only would this mean that our change in the price control methodology would increase the company's allowed returns without any evidence of a change in its risk profile, from activities which are not exposed to significant competition, it would also be inconsistent with the fact that the risk profile of the wholesale price control has changed relative to the PR09 price control, with the transfer of bad debt risk to the retailer. Moreover we do not agree that the approach suggested by Bristol Water is robust. We discuss this further in section A2.4 of Annex 2.

¹² Bristol Water made this argument in Bristol Water (October 2014), 'Bristol Water Representation on the PR14 Draft Determination – Appendices', p. 200 and 202-204 and our analysis of this issue is in PwC (August 2014), '[Company specific adjustments to the WACC - A report prepared for Ofwat](#)', p. 29-37 and PwC (December 2014), '[Company specific adjustments to the WACC - A review of company representations](#)', p. 9-10.

¹³ We respectfully disagree with the suggestion made by Bristol Water that we did not take account of the Competition Commission's findings. We did so, for example, in PwC (August 2014), '[Company specific adjustments to the WACC - A report prepared for Ofwat](#)', 29-32 and PwC (December 2014), '[Company specific adjustments to the WACC - A review of company representations](#)', p. 9-10.

69. Bristol Water has revised its estimate of RPI for the purpose of calculating the real cost of capital. It now proposes to use forecasts over the next five years. These forecasts are lower than the long term forecast of RPI in the final determination used to align expected inflation and term structure of corporate. Bristol Water's approach would lead, all other things equal, to a higher cost of capital.
70. We note that long term corporate debt benchmark rates used for estimating the cost of new debt have fallen since the calculation of our final determination

2.2.5 Summary

71. Our final determination allowed Bristol Water an efficient allowed return based on industry benchmark data for cost of debt and evidence on cost of equity. Bristol Water has contended that it faces a higher actual cost of debt and for an adjustment to the cost of equity to allow for impact of operational leverage. It also argues that it is inappropriate to require it to demonstrate the benefits to customers from allowing a higher cost of capital.
72. Bristol Water has not provided sufficient evidence for a higher allowed return because:
- careful consideration of the actual cost of debt shows that it is below Ofwat's allowed cost of debt for the sector;
 - there is not a sound conceptual basis for an adjustment to the cost of equity based on operational gearing, moreover, the methodology proposed by Bristol Water does not provide a reliable basis for making such an adjustment; and
 - the benefits test requires sufficient evidence that there are benefits to customers from allowing Bristol Water to recover costs of financing above efficient industry level.

2.3 Financeability

2.3.1 Background

73. We set out the background on this area in A2.7 of our opening statement on pages 61 to 63. Further details on our general approach on financeability is provided in ['policy chapter A8 – financeability and affordability'](#) of the final determination, and specific comment for Bristol Water on pages 49 to 65 of the [company specific appendix for Bristol Water](#).

2.3.2 Our approach

74. Our final determination was made in accordance with our statutory duties. These include (among other things) a duty to secure that a company is able to finance the proper carrying out of its functions. We interpret this financing duty as requiring that we ensure that an efficient company with a notional capital structure is able to finance its functions. As discussed above, a company's actual capital structure is a choice for the company and it bears the risk associated with its choices.
75. As part of preparing business plans, Ofwat required that all companies demonstrate the financeability of their plan and provide evidence based on financial ratios as set out in the methodology statement.
76. Consistent with our final methodology statement and the approach that we (and the Competition Commission) have used previously, we considered financeability before adjustments to revenues that reflect performance over 2010-15, to ensure that our focus is on financeability for the 2015-20 period and that companies take responsibility for performance in previous periods. It is based on an efficient company, which assumes that companies are able to deliver their plans based on the expenditure allowance in our final determination.
77. Our focus was on the financeability of the company with a notional capital structure as this ensures that risks around financing decisions, such as the level of gearing and structure of debt, remain with shareholders and the company rather than being passed on to customers. This is in line with our principle that risk should be allocated to whoever is best placed to manage it. In principle, if efficient companies can earn 'reasonable' returns over a price control period on the component parts of the appointed business, their overall financeability should be secure. In practice, financeability challenges can still arise from timing mismatches between required and actual cashflows within individual years.
78. It may be appropriate for a company to consider the use of PAYG and Regulatory Capital Value (RCV) run-off rates to address financial constraints that would affect the notional company, if they exist, but we would expect the company to demonstrate benefits to customers and have customer support for their use. It would not be appropriate to use PAYG to support target ratios for the actual capital structure, as this would mean that customers bear the risk from companies' financing decisions.

2.3.3 Points raised by Bristol Water

79. Bristol Water considers that financeability should be tested using its actual company structure including re-calculated penalties and recognising the potential impact of downside shocks. It argues that the final determination is not financeable, once the menu penalties have been considered.
80. It does not consider we have used appropriate definitions of credit ratios and proposes to use those used by Moody's [CONFIDENTIAL]. to assess financeability. It also considers that Ofwat should perform its financeability analysis based on Bristol Water's target credit ratios to maintain its current credit rating.
81. It considers that the PAYG ratio set in the final determination did not take account of the split of totex into operating and capital costs for the purpose of assessing financeability. Furthermore Bristol Water suggests that the PAYG ratio could be adjusted further to allow revenue to be profiled to meet customers' bill preferences and address any financeability concerns that arise.

2.3.4 Our response to points raised by Bristol Water

82. In line with our principle that risk should be allocated to whoever is best placed to manage it, a company's actual capital structure is a choice for the company and it bears the risk and reward associated with its choices. Equally we consider placing responsibility for cost out and underperformance with equity holders is in the best interests of customers.
83. The Board of Bristol Water provided assurance to us that Bristol Water was financeable on a notional basis in its June business plan. And as can be seen in Table A5.7 of our Final Determination document and in Section A1.5 of our Referral of Bristol Water's determination to the CMA, the financial ratios we calculated were broadly comparable to notional financeability ratios submitted by Bristol Water in its June business plan.
84. We show in appendix 3 that Bristol Water's credit ratios in the final determination are above or similar to other companies. Therefore, we reject Bristol Water's arguments that the final determination is not financeable or fails to provide sufficient headroom for financeability. Bristol Water's concerns appear to be due to its costs being in excess of efficient levels and the consequences for its menu incentives. We do not accept that customers should pay higher charges due to inefficiency of service delivery.

85. We do not accept that our financeability duty requires Ofwat to target a particular level of credit rating by Bristol Water and note that companies in the sector target a variety of ratings and credit ratios. These are likely to reflect the particular circumstances and approach to financing of each company.
86. We accept there are some technical differences between our calculations and those used by credit agencies as well as some more fundamental differences relating to agencies' focus on the actual rather than notional company. We note there are technical differences between the agencies themselves in defining ratios and the importance attached to particular ratios. We consulted on our proposed ratios in our methodology statement and remain convinced that they provide an appropriate basis for assessment of financeability consistent with our duties. For convenience, we have also calculated ratios for the notional company on the basis we understand that would be used by rating agencies and find that they do not make a material difference to our assessment of financeability.
87. Since we issued our final determinations for all companies there has been no concern raised by Moody's [CONFIDENTIAL] about our approach to assessing financeability. Bristol Water's credit rating is unchanged and the move to negative outlook appears to reflect the difference between its business plan and Ofwat determination of efficient cost allowances.
88. In assessing financeability, it is necessary to consider the proportion of revenue allowed in period (which in turn is determined by the level of PAYG and RCV run off rate, the allowed return and tax allowance) against the costs incurred in the period, as assessed in the Ofwat financial model. The PAYG level we set at final determinations is higher than proposed by Bristol Water in its business plan and higher than the level of operating costs and expensed level of Infrastructure Renewal Expense (IRE), as we explain in appendix 3. The RCV run off rate is as proposed by Bristol Water and is higher than most other companies. Therefore, the final determination provides sufficient funding in the 2015-20 period to meet financeability requirements.
89. In our final determination, we made an adjustment to PAYG rates in 2015/16 to reflect the challenges Bristol Water faced in adjusting to allowed revenue in the final determination compared to the final year of the current control period, 2014-15. This adjustment takes account of the significant cost challenges facing Bristol Water and was not made for any other company.
90. We note that PAYG adjustments to these rates can help companies manage both financeability for the notional structure and affordability but as they alter

the profile of revenue recovered over time i.e. between current and future customers, it is important to consider whether any adjustment is in customers' interest.

2.3.5 Summary

91. Bristol Water has argued that the final determination is not financeable and considers the assessment of financeability should be based on its target Moody's [CONFIDENTIAL] credit ratios and take account of menu penalties.
92. Bristol Water is financeable at final determination. The financing duty requires us to ensure that final determination allows Bristol Water to access finance and does not require Ofwat to target a specific credit rating or ratio. As set out in Appendix 3, Bristol Water ratios compare favourably to other companies. Bristol Water proposed approach of taking account of menu penalties in the financeability assessment would mean that customers would bear the costs associated with Bristol Water's inefficiency. We do not consider this is consistent with our statutory duties or established practice.

2.4 Outcomes

2.4.1 Background

93. We set out the background on this area in A1.2.3, page 28, of our opening statement. Further details on our general approach to outcomes in our final determination is provided in ['policy chapter A2 - outcomes'](#) and specific comment for Bristol Water in section A2.2, page 15, of the ['company specific appendix for Bristol Water'](#).

2.4.2 Our approach

94. The levels of performance that companies achieve are of fundamental importance. Customers are paying for the upper quartile performance targets that have been derived from our comparative assessment of outcomes and should receive it as soon as practicable. Our estimates of totex are based on estimates of historical efficiency, with the best companies delivering both cost efficiency and relatively high levels of service. Both cost and service efficiency should evolve over time and we hope that average companies will attain both our cost and service targets over the period of the new price controls. Our comparator checks and resulting interventions act as an important safeguard of customers' interests and help us to maximise the value of comparative regulation by benchmarking service levels and performance commitments.

2.4.3 Points raised by Bristol Water

95. In its Statement of Case to the CMA, Bristol Water states that there is little dispute between itself and Ofwat on outcomes (paragraph 2051, page 509) except for the performance targets for Unplanned customer minutes lost, Negative water quality contacts and Mean zonal compliance. These were the three Bristol Water performance commitments covered by our comparative assessments. Our position in relation to these matters is summarised below and dealt with in more detail in Appendix 4. Bristol Water also sets out some objections to the general approach we took to comparative assessments. These matters are dealt with in appendix 4.

2.4.4 Our response to points raised by Bristol Water

96. We do not consider Bristol Water has provided adequate evidence or put forward convincing arguments to change our approach to comparative assessments. We consider that comparative assessments are an appropriate way of ensuring customers receive the level of service they have paid for. In Appendix 4 we provide more detail in support of our methodology and, in addition, note that 15 of the 16 non-enhanced companies accepted the upper quartile challenge made in our comparative assessments (they were either already proposing upper quartile performance commitments or they accepted our interventions). Bristol Water is the only company that has not accepted our interventions following our comparative assessments.
97. With regards to supply interruptions, there is no persuasive evidence in Bristol Water's Statement of Case that indicates we have made an error or treated Bristol Water in an unfair way compared with other companies. We made the same adjustment to Bristol Water's measure for upper quartile performance as we did for Thames Water, which also had a performance commitment that was different to the Ofwat key performance indicator on supply interruptions. In addition, all the other 15 non-enhanced companies accepted or proposed upper quartile performance commitments for supply interruptions from 2017-18 to 2019-20, either through our interventions or through their own business plan targets.
98. Similarly, in relation to negative water quality contacts and mean zonal compliance, there is no persuasive evidence in Bristol Water's Statement of Case that suggests we have made an error or treated it in an unfair way compared with other companies. All customers have paid to receive upper quartile performance and that is what we expect from Bristol Water by 2017-18. All the other 15 non-enhanced companies accepted or proposed upper

quartile performance commitments for negative water quality contacts and mean zonal compliance from 2017-18 to 2019-20, either through our interventions or through their own business plan targets.

2.5 Reconciling 2010-15 performance

2.5.1 Background

99. We set out the background on this area in A1.2.4 of our opening statement on page 31. Further details on our general approach on serviceability was provided on pages 53 to 68 '[Policy chapter A4 – reconciling performance for 2010-15](#)' and specific comment for Bristol Water on page 94 and pages 102 to 105 of the '[company specific appendix for Bristol Water](#)'.

2.5.2 Points raised by Bristol Water

100. Bristol Water disagrees that action should be taken over its performance in 2010-2015 on interruptions to customers' water supply that last longer than twelve hours. It believes that the overall guidance suggests its performance on this indicator can only be judged as seriously as 'deteriorating' if it has breached the upper control limit for three consecutive years in the five year period. In the absence of this, it believes its overall performance relating to water infrastructure assets (assets that are focused on distributing water to customers) should be considered stable as all other indicators within the specified basket were stable. It considers that this means no shortfalling action should be taken to reduce the RCV.

101. Furthermore, Bristol Water considers:

- that the failures were outside management control;
- the indicator is volatile and is not a useful 'measure of performance or customer service' (paragraph 1836);
- the service standard levels expected at PR09 for interruptions greater than twelve hours were inappropriate; and
- the failures were not pertinent to the aim of serviceability and so regulatory action is inappropriate.

2.5.3 Our response to points raised by Bristol Water

102. We do not agree with Bristol Water's position and consider that the shortfall we applied at our final determination is appropriate and proportionate to the service failures that have impacted on customers. We consider that;

- on a correct application of our PR09 methodology (applying a shortfall where individual indicators are less than stable), we were right to shortfall for performance on supply interruptions greater than 12 hours at our final determination. Bristol Water itself says, on the evidence available at our final determination, that its performance on the interruptions greater than 12 hours indicator was marginal. We therefore consider that even a marginal performance is sufficient to justify the £4.1m shortfall applied; and
- new evidence that was not available to us at FD has now been presented with Bristol Water's statement of case to support an argument that the performance on supply interruptions greater than 12 hours was beyond management control. We do not consider this to be convincing evidence, as it is based on a concept of management control that is too narrow.

2.5.3.1 PR09 methodology

103. We agree that it is important that the company is assessed in line with the framework set out at PR09. Bristol Water refer to [RD15/06](#) which was published in 2006, but this was superseded by our final determinations at PR09, where we set out our methodology both in the confidential supplementary reports that we sent to companies alongside our 2009 final determination and the public letter PR09/38. We provide more detail in appendix 5 of this document.
104. PR09/38 stated: "Stable serviceability required for **all indicators** from 2012, if less than stable company should assume it is at risk of shortfall. Shortfall will be applied at the next periodic review if marginal or deteriorating in 2014." (emphasis added)
105. Bristol Water has stated that its service for the water supply interruptions over 12 hours indicator was marginal (i.e. less than stable) for all four years from 2012 (paragraph 1814). While we consider its performance against the indicator actually became deteriorating, in either case PR09/38 set out that we would apply a shortfall (i.e. recover expenditure allowed at FD09 for customers). The serviceability shortfall is a claw back of monies that had been allowed to companies at PR09, but which were either not spent or were spent but had not achieved the specific objectives desired. To provide appropriate incentives and protect customers it is important to recover the expenditure that was assumed would be required at PR09 to deliver the service standards that were set.

2.5.3.2 Management Control

106. Bristol Water provided very little evidence in advance of our final determination to support its arguments that events were outside management control. The company has now introduced new evidence with an additional engineering report from CH2M Hill (SOC334) and from McCallum Layton undertaking customer survey information (two reports on Kingswood and Burnham on Sea incidents SOC272 and SOC273).
107. We do not agree that this further evidence shows that the incidents were outside of Bristol Water's overall management control. Bristol Water has focused on the difficulties involved in repairing mains rather than on restoring supplies to customers and states that the management of these issues is outside of the management control of the operational manager for each event, we consider this is a very narrow interpretation of management control. We consider management control to include prudent preparation that management can take in advance to 'maintain the flow of service to consumers', which includes mitigating the risk of failures occurring, real time monitoring and control, increasing the speed and effectiveness of any operational response and putting in place other measures to maintain supplies despite asset failures occurring. We provide further detail of this in appendix 5.

2.5.3.3 Appropriateness of serviceability shortfall

108. Customers not receiving a supply of water for more than twelve hours should cause significant concern to the management of Bristol Water and is a clear sign of service failure. It is untimely for Bristol Water to suggest that the levels set at 2009 are inappropriate, especially when all companies had a specific opportunity to raise issues during a review of serviceability indicators in 2012 and Bristol Water, in particular, had the opportunity to raise such concerns when the CC carried out its redetermination in 2010.
109. A number of companies for which we had imposed serviceability shortfalls in our draft determinations raised concerns in their representations around the proportionality of serviceability shortfalls, including that some indicators were more volatile than others. Between draft and final determinations we implemented further work to consider this area as we explained in pages 55 to 66 '[Policy chapter A4 – reconciling performance for 2010-15](#)'.
110. We collected further information from all companies on actual expenditure split between each serviceability indicator in a query we issued on 31 October 2014. This broadly supported our approach, but we noted that in some cases

our draft determination methodology might result in disproportionately large values. We altered our calculation to address this issue.

111. We also investigated whether there were alternative approaches to determine a further adjustment for proportionality. We issued a follow-up query on 14 November inviting all companies and key stakeholders to provide views. From this we agreed that the underlying volatility of an indicator could be used as a mitigating or attenuating factor in the calculation of serviceability shortfalls, but only if there was strong evidence of a heightened level of volatility for relevant indicators. As a result, we applied a volatility factor for three indicators including water interruptions greater than 12 hours. Our approach within the final determination has therefore taken account of the volatility of the interruption greater than 12 hours indicator and has reduced the scale of any shortfall applied.
112. Up to PR04 we did not give guidance as to how to judge that an indicator was not stable and we did not have precise upper control limits. While this may have helped to focus management on the aim to keep service to customers rather than focus on the regulatory system, it was not transparent. In 2006, we started to provide further information. We subsequently revised our methodology at PR09.
113. We note that Bristol Water's Statement of Case focuses on the details of Ofwat's methodology, with the aim of seeking to avoid regulatory action, as opposed to showing how it has delivered the appropriate service to customers (or where it has not setting out how it will return funding to customers). We do not consider that the position sought by the company is aligned with our primary statutory objectives both to further the consumer objective and to secure that the companies properly carry out their functions i.e. to 'maintain the flow of services to customers and the environment'.
114. We would like to highlight the parallel between this and our decision at PR14 not to publish totex models before companies provided business plans. Our decision was in order that companies would focus on delivering appropriately scoped and efficient business plans, as opposed to focusing on the regulatory system. We note that since publishing the models Bristol Water has foremost attempted to show why the models are incorrect, rather than provide clear evidence that its business plan is in line with upper quartile efficiency.
115. Bristol's argument is that the shortfall adjustment should not have been applied and therefore the RCV should be £4.1m higher. We would like to highlight that we made our final determination in the round, and we could have

reached a different decision in relation to the particular method we used to reconcile the capital incentive scheme (CIS), which would have resulted in a lower RCV.

116. The particular method we used to make the CIS RCV adjustment used a different RPI indexation approach (based on outturn rather than forecast RPI) from that used in the CIS financing cost adjustment. We considered this inconsistency late on in the process, but decided not to make an adjustment at the time as it was important for regulatory certainty to avoid last minute changes in approach. Instead we highlighted this issue at final determinations and committed to looking at how to address this issue in the long term interests of customers on a future looking basis, that is, from 2020. As we explain further in section A5.2 of appendix 5 we intend to publish a consultation document in late March on our proposals in this area.
117. We consider that the most appropriate approach would be to use forecast RPI for both measures. This would mean that the RCV has been artificially inflated due to this issue. This issue affects all companies and is in proportion to each company's capex allowance in PR09. For Bristol, its RCV is around £9.3m higher than it would otherwise be if we had used forecast RPI in a consistent way.

2.6 Household retail

2.6.1 Background

118. We set out the background on this area in section A1.3 of our opening statement. Further details on our general approach to household retail in our final determination is provided in ['policy chapter A5 – household retail costs and revenues'](#) and specific comment for Bristol Water in section A3, page 36, of the ['company specific appendix for Bristol Water'](#).
119. Bristol Water's Board has accepted the household retail final determination (Bristol Water's Statement of Case, paragraph 2147).

2.6.2 Points raised by Bristol Water

120. The company argues in its Statement of Case, section 15.3.1.9, that our metering adjustment penalises them unfairly because:
- there are issues with the quality of the data on metering costs; and

- the company disagrees with our methodology as it results in the company receiving an efficiency challenge on the additional cost to serve metered customers when their total cost to serve metered customers is below the industry average.

121. Bristol Water states that the value of the efficiency challenge for the additional cost to serve metered customers is £1.8 million.
122. The company states in its Statement of Case, paragraph 2107, that the value of its adjustment for input price pressure included in its final determination was incorrectly rebased from 2012-13 prices to 2013-14 prices. It presents the corrected values for the input price pressure adjustment in table 147. The corrected value would result in £1.3 million lower allowed revenues for Bristol Water.

2.6.3 Our response to points raised by Bristol Water

123. We disagree with Bristol Water's position on the metering adjustment. All comparative assessments rely on data from across a range of companies. We have been through an iterative process of improving the allocation of costs between wholesale and retail, household and non-household retail and between metered and unmetered customers. Several companies proposed reallocations of metering costs between draft and final determination and Bristol Water had the opportunity to do this if it deemed it to be appropriate. We consider that the data used was sufficiently robust to allow us to set an efficiency challenge on this area of costs.
124. We also disagree with the company's methodological point. It is appropriate to apply efficiency challenges to individual cost areas to effectively target efficiency incentives on inefficient activities. This approach is consistent with alternative comparative efficiency assessment techniques, for example data envelope analysis. Bristol Water's additional cost to serve metered customers is above the industry average, and we therefore consider that the £1.8 million efficiency challenge is appropriate.
125. We agree with Bristol Water that we have incorrectly rebased the value of the adjustment for input price pressure between 2012-13 and 2013-14 price bases. Adjusting for this error would reduce Bristol Water's allowed retail revenues by £1.3 million.
126. We consider that, as Bristol Water's Board has accepted the final determination for household retail, and we have not identified any further

material issues, it would be appropriate not to make further interventions in the household retail control.

2.7 Non-household retail

2.7.1 Background

127. We set out the background on this area in section A1.4 of our opening statement. Further details on our general approach to non-household retail in our final determination is provided in '[policy chapter A6 – non-household retail costs and revenues](#)' and specific comment for Bristol Water in section A4, page 44, of the '[company specific appendix for Bristol Water](#)'.

2.7.2 Points raised by Bristol Water

128. While Bristol Water considers it to be non-material (Bristol Water's Statement of Case, paragraph 2153), the company has requested that an allowance (equivalent to the household retail control) is made for input price pressures.
129. The company states that Ofwat erroneously deducted £0.756 million from the company's plan, when the figure should have been £0.726 million (Bristol Water's Statement of Case, paragraph 2178).
130. The company considers that the costs of market set-up should be included in the revenue allowance, or in Ofwat's 2016 redetermination of the non-household control.

2.7.3 Our response to points raised by Bristol Water

131. Bristol Water's board have accepted the non-household retail final determination (Bristol Water's Statement of Case, paragraph 2151). Therefore, any request from Bristol to increase the allowed revenue in this area should be seen as unnecessary, as the company's Board clearly does not consider it to be required in order for them to meet their legal duties and sufficiently serve their customers/other stakeholders.
132. The company provided a report by Economic Insight (SOC016) which assessed the impact of input price pressure on household retail. In the report's executive summary, it explicitly states that 'This report sets out detailed evidence to quantify the appropriate net input price pressure adjustment that should be made to Bristol Water's allowed cost to serve within the retail HH

control.' Therefore, it is questionable whether the evidence provided is indeed appropriate for the non-household control; no evidence was provided for this being the case.

133. The company states that the issues covered by the Economic Insight report remain true for non-household (para 2181). However, as well as not providing any evidence to support this claim, the company neglects to address the fact that as per our final methodology (section 7.3.1) we stated that input price pressures would be remunerated through the net margin. We did not impose a net margin figure; we accepted the company's revised business plan proposal of 2.5%. In developing its proposal, the company was aware that we considered the role of the net margin to include the remuneration of input price pressures (as we had stated so in our final methodology).
134. However, if we had applied exactly the same approach, we would need to have undertaken an efficiency assessment as we only allowed household input price pressure adjustments for companies' that were in the upper quartile of efficiency. While the company was upper quartile for unmeasured non-household retail, there are relatively few non-households without a meter. The vast majority of their non-household customers (88%) are metered. The company is not upper quartile for metered customers; it is approximately average, therefore it would not have passed an equivalent assessment for non-household.
135. The figure of £0.756 million comes from the company's business plan 'Retail Non-Household Plan - June Submission.pdf' table 6.
136. The company assumed a level of expenditure in order to ensure market readiness. These costs were not supported by evidence to justify the need, costs and benefits. We therefore did not make an additional allowance in the final determinations (we allowed up to the 5.3% materiality threshold, that is, a 5.3% increase in costs from 2014-15 levels, but no greater). We note that no further evidence has been provided to justify these costs beyond an assertion that they will be required, and a reference to a discussion paper produced over two years ago by Anglian Water (SOC111). It should be noted that an explicit allowance was made through the wholesale controls for market set up costs (table AA1.6 of the company-specific appendix of our final determinations).

Appendix 1: Wholesale totex

137. Section 6 of our opening statement provided an overview of our approach to wholesale costs. We included a list of all the documents relevant to wholesale costs in Table A3.1 of [Final price control determination notice: policy chapter A3 – wholesale water and wastewater costs and revenues](#).
138. This appendix deals with issues relating to base totex (in section A1.1), enhancement totex (in section A1.2) and cost modelling (in section A1.3) as raised by Bristol Water in chapters 9 to 11 of its Statement of Case to the Competition Market Authority.

A1.1 Base totex

A1.1.1 Background

139. In chapter 9 of its Statement of Case to the Competition Market Authority the main arguments made by Bristol Water in relation to base totex include:
- its approach to developing its business plan is consistent with good practice;
 - the cost assumptions in its plan are challenging and are supported by a variety of benchmarking (including modelling produced by Oxera) and 3rd party assurance;
 - Ofwat's totex assessment is insufficient to deliver the outcomes customers want and is over reliant on models that are not safe to use for this purpose; and
 - Bristol would like the CMA to consider whether its plan in relation to base totex is justified by making use of an engineering assessment of the needs, solutions and costs.
140. We adopted different approaches to making projections of totex and base costs than those used by Bristol in making its business plan forecasts. The key features of our approach included.
- Using a total expenditure (totex) approach to assess allowed costs in order to:
 - incentivise efficiency and encourage companies to develop innovative and low-cost solutions to meeting the needs of their customers;
 - take account of the synergies between different types of expenditure by internalising opex and capex trade-offs, and to

- address concerns about a bias towards capital over operational solutions and expenditures.
 - Deriving cost allowances on the basis of comparative efficiency, using benchmarking models where practicable. The intention was to both incentivise efficiency and share the benefits of these efficiencies with customers over the short and longer term.
141. In general we did not use bottom-up approaches to assess costs, or consider operating and base capital costs separately as we had at previous price reviews. Nonetheless, we fully recognised that benchmarking models cannot capture all the factors driving cost and so we assessed special cost factor claims in detail, including where appropriate bottom-up information on costs (for example traffic congestion and Canal and Rivers Trust payments (both specific to Bristol Water), and policy items such as business rates, open water costs and pension costs). This meant that we considered some material elements of opex separately, and similarly in our consideration of special cost factor claims we also considered some claims for base capital costs such as Bristol's asset reliability (unplanned customer minutes lost) investment and its Bedminster service reservoir.
142. We also carried out a wider assessment of whether our modelling provided an appropriate cost threshold for Bristol Water and so provided appropriate protection for customers. As part of this we reviewed our base cost modelling and made a further base cost allowance for Bristol Water (to better reflect the costs associated with water treatment complexity).
143. Bearing in mind the above we also strongly reject the suggestions that Bristol Water has made about the robustness of our cost assessment process.
144. We adopted a different approach to cost assessment to that used by Bristol Water, which stressed the importance of its own business planning and benchmarking analysis. As part of our investigations into the robustness of our cost models and special cost factor claims we nonetheless reviewed evidence that casts substantial doubt on the robustness of Bristol Water's business planning processes and its benchmarking analysis.
145. Section A.1.1.2 below discusses evidence relating to Bristol's benchmarking of costs and section A.1.1.3 discusses the reports and the evidence from its third party assurance. The overall robustness of our modelling approach is discussed in section A1.3. The disaggregated modelling that Oxera appear to

have undertaken was not made available to us during the PR14 process, but their use of Cobb Douglas and Stochastic Frontier analysis in totex and base models is discussed section A1.3. The conclusions to this section (A1.1.4) reinforce the robustness of projections of base spending and highlight the evidence suggesting that Bristol Water has relatively high base costs.

A1.1.2 Benchmarking

146. We found some important weaknesses in Bristol's approach to benchmarking, in particular in its use of a number of specific drivers to explain costs.

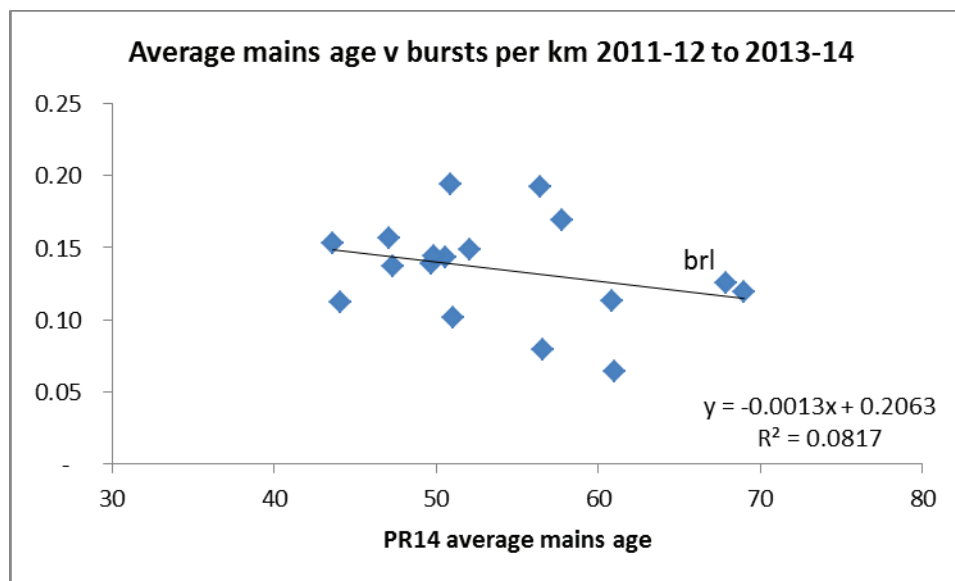
A1.1.2.1 Asset Age

147. Bristol Water suggests that mains age should be used as an explanatory variable to explain base totex. It uses asset age – including mains age – as a driver in capital maintenance workload forecasting, so it is not surprising that using it as a driver better explains Bristol's forecasts of costs. However, it is important to note:

- 25 years after privatisation asset age has been significantly influenced by the management policies and practices in those years;
- mains age may not be representative of the age of other assets, and the industry spends more on capital maintenance for other assets than for mains;
- service to customers should drive asset replacement, not age per se;
- there is no meaningful relationship between mains condition (proxied by bursts per km) and mains age – and so it is not clear that mains age is an appropriate cost driver. This is illustrated in the figure¹⁴ below;

¹⁴ Data from Table W21: water service serviceability of the June business plan for number of burst mains for 2011-12 to 2013-14. We excluded the Thames Water data point from the regression because there appeared to be errors in the reported mains length which gave the fifth lowest total in the industry (behind Dee Valley Water, Sembcorp Bournemouth Water, Portsmouth Water, and Sutton and East Surrey Water) which does not seem an accurate reflection of the size of Thames Water's area served.

Figure A1.1 Average mains age v bursts per km by company for 2011-12 to 2013-14



- mains age data does not appear robust, judging from some of the movements in average age between PR09 and PR14 data across companies;
- mains age is not typically a statistically significant driver of costs if added to our cost models; and
- other companies with relatively high average mains age perform very well in terms of our benchmarking models.

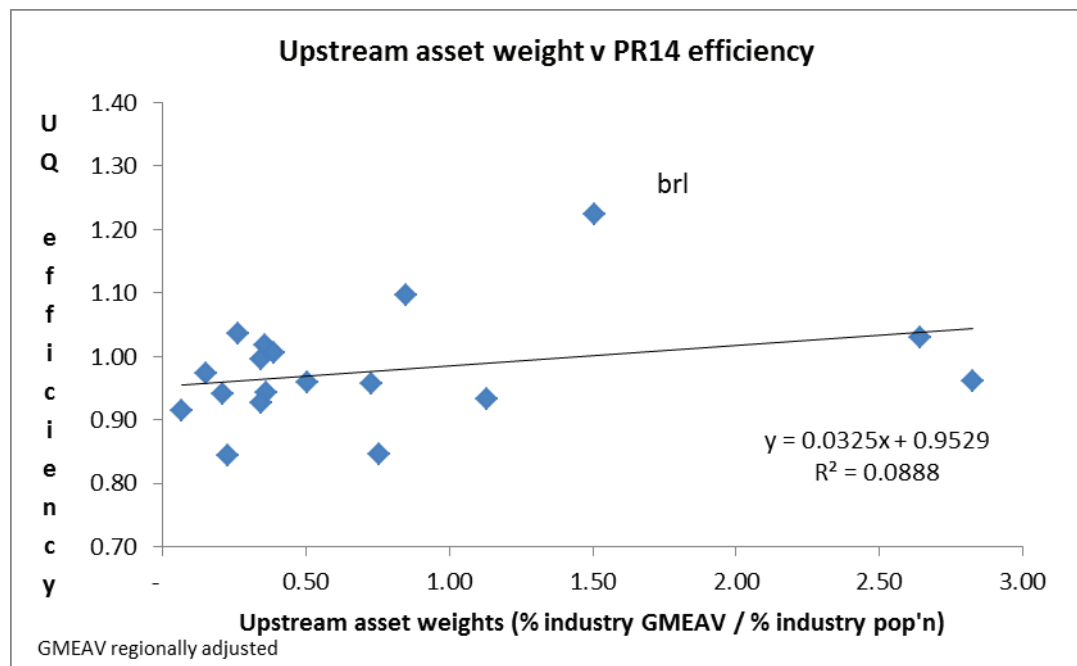
A1.1.2.2 Upstream assets

148. Our analysis using industry data from PR09 Business Plans shows that Bristol has a broadly average number and size of upstream assets, however its gross replacement cost per asset is very high compared to the industry average - and Gross modern equivalent asset value (GMEAV) is the driver the company has used.
149. At the draft determination we tested whether the proportion of upstream assets drives differing levels of spend across companies (as this is not explicitly taken into account in our modelling). We used regression analysis to examine the extent that the efficiency scores from our historical modelling of costs could be explained by the proportion of upstream assets (it was not practicable to test this variable directly in our modelling as we did not have a sufficient data to match our existing panel datasets).
150. For each company the proportion of industry upstream assets will be related to company size, so we used a variable in this analysis which took account of

both company size and the proportion of upstream assets. We therefore calculated an adjusted proportion of upstream assets by dividing each company's proportion of the GMEAV of the industry's upstream assets by that company's proportion of the industry population. This normalised proportion measured whether the company's share of upstream assets was higher or lower than might be expected relative to their share of industry population.

151. The figure below shows no substantial relationship between the extent of companies' upstream assets and the PR14 efficiency assessment – suggesting that upstream assets are not an important variable in explaining differences in costs between companies and are not an important factor to take into account in benchmarking costs.

Figure A1.2 Upstream asset weight v PR14 efficiency by company



A1.1.2.3 GMEAV

152. The replacement cost analysis in sections 9.4.4.2.4.1 and 9.4.4.2.4.2 of Bristol's Statement of Case uses a combination of GMEAV and assumed asset lives to drive a theoretical level of efficient spend. As noted above we have concerns about the use of both asset age and GMEAVs as robust cost drivers.
153. It is also instructive to consider some of the detail of the analysis put forward by Bristol. It calculates the implied spend by dividing its GMEAV in each asset

class by its estimated asset life to calculate an implied annual spend and then multiplying this by 5 to get the spend per AMP. We cross checked this analysis using industry data from PR09 business plans on GMEAV and maintenance spend, which was the last time we collected detailed GMEAV information. Our analysis shows that GMEAV is not necessarily an accurate guide to asset replacement needs or costs. For example the planned level of mains related spend at PR09 implies an asset life of more than 200 years, rather than the 100 -125 year period assumed in Bristol's analysis. Therefore we do not consider that this approach to estimating maintenance expenditure is robust.

A1.1.2.4 Separate benchmarking of costs

154. Separate benchmarking of opex and capital maintenance misses important cost drivers and the interaction between cost drivers. For example when a company spends money on maintaining pumps we would expect the refurbished pumps to use energy more efficiently and therefore energy costs should be lower. We do not see these types of interaction in Bristol's plans, which we would expect given the size of their proposed maintenance programme, other than to increase costs when they take account of the additional opex arising from new enhancements.
155. Bristol Water notes in its executive summary that its business plan is supported 'by Oxera through the use of disaggregated econometric models during the latter part of the PR14 process'. We received no such modelling during the PR14 process and the final Oxera report submitted as late as November 2014 merely noted this was work in progress – despite a price review process spanning approximately 18 months. It is difficult to reconcile this with Bristol's suggestions of good business planning practices.
156. Oxera's use of Cobb Douglas and Stochastic Frontier analysis in totex and base models is discussed section A1.3.

A1.1.3 Reviews and reports by Bristol's consultants and its 3rd party assurance

157. We consider that scrutiny by various independent experts and the associated reports does not in itself create or guarantee efficiency. Moreover our reviews of these reports (to the extent we considered them as part of our assessment of special cost factor claims relating to base costs) indicated significant questions about the efficiency of Bristol Water's business plan forecasts.

158. For example as part of our analysis for the final determination we reviewed the Mott MacDonald report 'PR14 Technical Assurance' which Bristol provided as part of their representations on the draft determination. We concentrated on Mott MacDonald's review of the capital investment programme of c£342 million in the December 2013 business plan¹⁵.
159. Mott MacDonald said that 'on the whole the investment plan is based on robust models and non-modelled process which compares reasonably with that of other water companies (though not yet best practice).' (Appendix B pB29). We note that a comment of 'compares reasonably with' is not itself evidence of efficiency.
160. Further consideration of the detail raises a number of more significant concerns. The particular findings that caused us concern were:-
- **Maintenance** – 'the process has developed significantly since PR09 but future improvements should focus on modelling service rather than end of asset life and improving the forward look element of risk analysis of named schemes, to extend beyond addressing current or near-term risks (section 3.3.8 p18).'
 - **Asset level models**¹⁶ – 'Most models are driven by either asset failure, performance or predicted end of life assets not service. Investment is mainly not risk-driven as cost and service are not targeted which means that there is an inherent assumption that all assets are required and need to be maintained.' Appendix B p B94-B102.)
 - **Uncertainty** – 'it is being included in the asset models and named schemes¹⁶ and can influence the outcomes of the optimiser but at the time of the review little information was available on the robustness of the whole process'. (ref Appendix B, pB38)
 - **Cross asset optimiser** – 'The approach is reasonable but depends on the options presented to it. A significant proportion of the investment (£144m or 41% in total, 21% is quality and growth) is not challenged by the optimiser, being passed through as 'must invest'. We reviewed a sample of five 'must invest' schemes and considered

¹⁵ The Mott Macdonald review of the June 2014 revised business plan was limited to checking that tables were appropriately compiled and tracing a sample back to source data, together with the commentaries that were available for review. They did not review the revised business plan document.

¹⁶ Asset level models are used to optimise the programme of work in each area for modelled investment. Named schemes are outside the scope of the automated modelling system. The investment programme for the modelled investment and the named schemes is then optimised using the cross asset optimiser. Must invest schemes are not optimised in the cross asset optimiser and can be either modelled or named schemes.

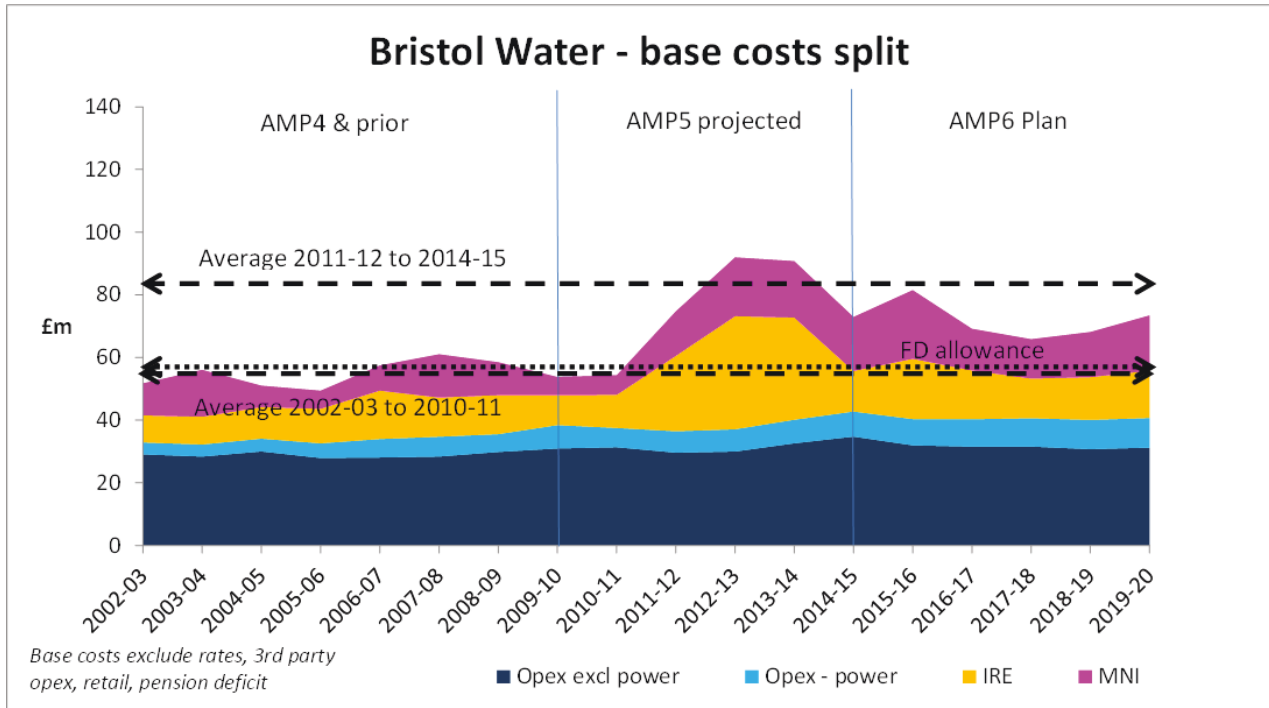
that more could have been left open to the optimiser.' (Overview of findings p17)

A1.1.4 Conclusion on base costs

161. As we have explained above the evidence that we have reviewed as part of the PR14 process raises serious questions about Bristol Water's benchmarking of base costs and the processes underlying its business plan forecasts.
162. Section 1.3 below deals with the criticisms that Bristol Water has made of our approach to cost modelling. We have also stressed repeatedly that the cost modelling was only the start of our process – we considered modelling adjustments and special cost factor claims in order to deal with issues not properly taken into account by our modelling. As we have explained in the key responses section to this document the combination of these approaches has allowed us to successfully establish cost thresholds and make projections for 17 out of 18 water companies.
163. Our approach has worked for other companies with similar challenges to Bristol; for example Thames Water, which shares similar characteristics of mains age and congestion in part of its area of operation, and Sutton and East Surrey, which has a statutory obligation to carry out very complex water treatment. In these cases our cost models together with the special cost factor process allowed us to take account of those challenges.
164. We made significant adjustments to Bristol Water's modelled allowances to take account of water treatment complexity, canal payment and traffic costs. These factors meant that Bristol Water's cost threshold increased by 14% from draft determination to final determination, the biggest percentage increase of any company.
165. Although the remaining difference of approximately £70 million between our projection of base costs of £288 million and Bristol Water's forecasts of £359 million over the five years is significant, there are a number of factors that suggest this difference is indicative of Bristol water's relatively high costs:
- the greater than 50% increase in Bristol's base costs that occurred between 2010-11 and 2012-13 (see chart below)
 - weaknesses in Bristol Water's benchmarking of costs set out in section A.1.1.2
 - the significant issues we have identified with Bristol Water's business planning processes described in section A.1.1.3 above

- the size of the adjustments we have made to Bristol Water's modelling results for water treatment complexity and special cost factor claims relating to base spending.

Figure A1.3 Analysis of the actual and forecast Bristol Water base costs



166. As well as showing the very sharp increase in historical costs the above chart also shows a downward trend in Bristol's base cost forecasts – providing further evidence that it should be able to achieve a lower and more efficient level of base costs over the period of the new price controls. Comparing its base costs in 2013-14 (when its base costs were expected to be £91 million) and 2017-18 (when it is forecasting to spend £66 million) gives a compound annual reduction of 7.7% per year. Projecting this rate of reduction forward a further two years until 2019-20 (the last year of the new price control) gives £56 million in 2019-20 – compared to our base cost allowance of £58 million in 2019-20.

167. We also note the Bristol Water expresses concern that the allowance for base costs is significantly lower than that allowed by the Competition Commission for Bristol Water in 2010. We do not accept the view that efficiency or spending levels should necessarily be static over time and we are of the view that customers' interests are only properly protected when companies continue to seek out opportunities for efficiency. We also note that in 2010 the

Competition Commission came to the following conclusions (pages 26 to 27 of its full report).

'...there may be legitimate and efficient reasons why companies' maintenance expenditure might vary between periods, and ... smaller companies ... may naturally have more lumpy investment profiles

Accordingly, we funded £158 million of capital maintenance for this review period, which is 76 per cent more than Bristol Water spent on capital maintenance during the last review period and is sufficient, in our view, for Bristol Water to deliver its programme.

We were satisfied that our adjustments reduced the effect of the Asset management Assessment (AMA) on Bristol Water sufficiently to address our concerns. However, we stress that we do not intend our treatment of the AMA in Bristol Water's case to set a precedent that might unduly influence future Ofwat determinations.'

168. The £158 million in the CC conclusions above is before CIS adjustments (as a result of which our projections included an additional capex equal to 25 per cent of the difference between Bristol Water's FBP capex and our funded capex. The source for Bristol Water's AMP4 expenditure is its June 2010 return adjusted to 2007-08 prices for comparability purposes.

A1.2 Enhancement totex

A1.2.1 Background

169. In chapter 10 of its Statement of Case to the Competition Market Authority the main points raised by Bristol Water in relation to enhancement totex include:
- Bristol Water has adopted a detailed and thorough approach to developing its plans for enhancement spending, consistent with good practice, reflecting customer driven outcomes and the circumstances in which it operates;
 - its assumptions on costs are supported by benchmarking and independent assessment;
 - the Cheddar 2 reservoir is a key component of its enhancement plans;
 - Ofwat has not made a sufficient allowance for enhancement spending;
 - Bristol Water also sets out a more detailed critique of Ofwat's approach in section 10.4 and suggests that it was not transparent, involved ad-hoc adjustments and was relatively complicated, and, that

Ofwat has not appropriately considered expenditure requirements for growth and lead communication pipe replacement.

170. We present below in section A1.2.2 a summary of the approach we followed when assessing wholesale enhancement expenditure requirements. We are confident that our approach is reasonable, takes full advantage of benchmark comparisons across the water sector, is transparent and has been consistently applied across all 18 companies. On this basis we reject the suggestions made by Bristol about the transparency, consistency and appropriateness of our approach.
171. The main difference between Ofwat's projections and Bristol's forecasts of enhancement spending relates to the Cheddar 2 reservoir, which accounts for £43 million of the £61 million gap. We address these issues in section A1.2.3.
172. We then go on in section A1.2.4 to discuss our other assumptions on efficiency and scope of the plan (that account for the remaining differences).

A1.2.2 Treatment of enhancement expenditure

173. Our approach to cost assessment has involved an unprecedented degree of transparency. All the underlying data, models and considerations behind the approach to special cost factor claims were published at the RBR and subsequently updated for the draft and final determinations. Bristol received special treatment ahead of its draft determination and was given early warning of the large gap between its forecasts of costs and our projections. Companies and wider stakeholders had the opportunity to understand how the models worked and the criteria being used to derive implicit allowances, as well as the assessment of special cost factor claims and un-modelled allowance adjustments.
174. We used three modelling streams to derive our water cost thresholds. Two of the modelling streams (the full modelling stream and the refined modelling stream) consider all expenditure - base and enhancement expenditure. The third modelling stream (the bottom up modelling stream), considers base and enhancement costs separately. Enhancement costs were derived from enhancement unit cost models and an un-modelled allowance where no unit cost model was available¹⁷. The results from the three modelling streams are

¹⁷ Water service enhancement cost drivers where we have no unit cost model are: ecological improvements; low pressure; improving taste, odour and colour; raw water deterioration; resilience;

triangulated (averaged) to derive an initial estimate of efficient costs, the basic cost threshold (BCT). This provides an estimate of the base and enhancement expenditure required by each company.

175. Companies had the opportunity to present special cost factor claims where they considered that their circumstances were such that the BCT did not properly allow for the costs necessary to efficiently provide water services. Such claims needed to clearly demonstrate why the BCT did not allow for their forecast expenditure, why the spending was needed, that it was optimal, that it reflected upper quartile efficiency and that the interests of customers would be protected. Where companies satisfied these conditions we made adjustments to the cost thresholds to take account of the additional funding necessary to allow for efficient costs of the special cost factor.
176. In relation to Bristol Water where the gap between the BCT and its business plan was particularly large we considered 3 factors :
- whether the RBR modelling provided an adequate allowance for Bristol Water's enhancement costs
 - whether we had provided adequate funding for Bristol's particularly large programme of investment related to our un-modelled category
 - other special cost factor claims relating to enhancement spending made by Bristol.
177. Nonetheless, at final determination stage our allowance for Bristol's enhancement totex was £91m, compared to a revised business plan total of £152m. Of this £61 million difference some £43 million was accounted for by the exclusion of spending on the Cheddar 2 reservoir from our projections. We also made the assumptions that a number of Bristol's remaining enhancement projects totalling circa £70 million (Southern Resilience, Cheddar Raw Water Deterioration, NEP and Discoloured Water Contacts) which were all considered as unmodelled allowance adjustments), could be delivered with up to 20% greater efficiency, and, that our modelling of enhancement costs would cover the remaining elements of enhancement spending. Taken together these assumptions explain the remaining £18 million of difference between the Ofwat cost threshold and Bristol's revised business plan forecasts.

SEMD; NEP – flow monitoring; NEP- protected areas and any other cost drivers not covered by the unit cost models

A1.2.2.1 Enhancement modelling adjustments

178. We were concerned that the allowance in the refined modelling stream might not be sufficient to deliver an appropriate enhancement programme for Bristol Water – as the refined model appeared to produce a relatively low implicit allowance for enhancement spending. Consequently we made an additional allowance in the refined modelling stream for enhancement expenditure so that it matched the allowance assumed in the bottom up modelling stream. These adjustments are described in the final determination company specific appendix¹⁸ and made in the 'DD18' tab of the feeder model W011.

A1.2.2.2 Adjustments to the un-modelled allowance

179. For the bottom up modelling stream we calculated an un-modelled allowance for the enhancement expenditure to reflect the cost drivers where modelling had not been practicable. In cases where the company projected materially more than the un-modelled allowance, we scrutinised the bottom up costs using the four assessment gates described in section A1.2.2.3 below.

180. If these four assessment gates were satisfied, we made an adjustment to the bottom up modelling stream to increase the un-modelled allowance. However, since the three modelling streams were triangulated to form the cost threshold, this meant that the adjustment to the cost threshold was only one third of the un-modelled adjustment.

181. It is notable that as with other areas of its plan, Bristol Water proposed a very large programme of work in relation to un-modelled spending. Nonetheless, we made three adjustments to the un-modelled allowance for Bristol Water on the basis that the evidence was consistent with our assessment gates¹⁹.

These were:

- Discoloured Water Contacts claim
- National Environment Programme claim, and
- Southern Resilience claim

182. A fourth claim for Raw Water Deterioration was initially rejected; however in the final determination we gave Bristol the benefit of the doubt and also made an adjustment to the un-modelled allowances to reflect our view of the efficient costs of this scheme.

¹⁸ [Final price determination notice: company-specific appendix – Bristol Water, section AA1.1.2.2, page 71](#)

¹⁹ Resilience in 'UC2-new' tab of the W011 feeder model, Drinking Water Protected Areas in 'UC3-new' and Discoloured water contacts in 'UC4-new'

183. Despite us previously requesting the full report, Bristol had previously released only the executive summary of a Mott MacDonald Assurance Report written in 2013²⁰. On reviewing the full report²¹ during draft determination representations we became concerned that it might be more appropriate to address the algal issues at Cheddar treatment works through monitoring in AMP6, with a view to adopting a capital solution in AMP7.
184. We asked Bristol Water how it had responded to Mott MacDonald's challenges (query 172). Bristol responded to us with additional information and set out optioneering to justify why it has chosen the preferred capital intervention. However, we did not consider that the information provided clear empirical evidence to address the key points originally raised by Mott MacDonald.
185. Nonetheless, we decided at final determination to give Bristol Water the benefit of the doubt in respect of these matters and make an adjustment to our un-modelled allowance for this scheme.

A1.2.2.3 Special cost factor claims

186. As well as considering adjustments for un-modelled costs we also consider wider claims for special cost factors relating to base or enhancement spending. Consistent with our approach to un-modelled allowances our 4 assessment gates were:
- evidence of need to adjust the cost threshold for the project/programme of work in question
 - support from optioneering and cost benefit assessments
 - evidence of upper quartile efficiency, and
 - that any adjustment would be consistent with the interests of customers, including that there were appropriate links with the outcomes framework.
187. A successful special cost factor claim would have the potential to lead to an adjustment to all 3 modelling streams, depending on whether analytical assessment suggested there was any implicit allowance in the high level modelling for the special cost factor claim in question.

²⁰ Mott MacDonald Report Executive Summary.pdf supplied to Ofwat as Level3 document in December business plan

²¹ SOC136 ESD 9 – MM Assurance Report 20141002

188. So in addition to the un-modelled adjustments we considered Bristol's other special cost factor claims relating to enhancement expenditure.
189. Cheddar 2 is considered in the following section. Bristol Water's 3 other three enhancement claims were treated as follows:
- Growth claim (DD06 in the published wholesale cost template) failed the need assessment gate as it was substantially covered by the enhancement unit cost models in the bottom up stream. Bristol provided no evidence to suggest that it was atypical relative the rest of the industry and therefore not covered by the full and refined modelling streams.
 - Discoloured Water Enhancement claim (DD10) was considered to relate to base expenditure and subsequently failed the need assessment gate.
 - Southern Resilience claim (DD04) has resilience and growth components. The resilience component was considered as an un-modelled allowance adjustment as discussed above. The growth component was shown to be fully accounted for in the bottom up modelling stream. No compelling information was provided to suggest that it was atypical relative the rest of the industry and therefore not covered by the full and refined modelling streams.
190. We did not make any adjustment for lead communications pipe expenditure because there is a modelled allowance for such activity and Bristol Water did not make a claim for additional expenditure above our modelled allowance.

A1.2.3 Cheddar 2 Reservoir special cost factor claim

191. Bristol Water states that proceeding with the reservoir is in the best interests of customers and has the support of customers, the LEF, the EA and Defra²². Bristol Water also notes that, alongside playing a key part of its Water Resource Management Plan (WRMP), it also considerably improves local drought resilience and delivers improvements in resilience that its customers preferred²³.
192. Water companies have statutory obligations to produce WRMPs. The long term (25 year) planning horizon associated with these plans requires for the management of uncertainty. The incremental nature of the WRMP process means that company plans can evolve over time. This suggests that lower

²² Bristol Statement of Case paragraph 1289

²³ Bristol Statement of Case paragraph 1375

benefit and higher risk options (for example where interventions are based on highly uncertain future input assumptions as appear to be the case for the Cheddar 2 reservoir) can be considered later in the planning period. This allows the most time for the solution type or the size to be refined as projections solidify. Companies need to develop and sequence their plans in a proportionate way considering the robustness of the solutions. This should help promote efficient investment.

193. The Water Resources Management Plan (WRMP) should inform the investment choices that are presented in business plans, for delivery in AMP6, but inclusion in the Final WRMP does not replace the need to successfully demonstrate the need and efficiency in line with the price review process.
194. Our concerns around including the Cheddar 2 reservoir in price control cost baseline centre on the following key observations.
- There is significant uncertainty surrounding the demand for non-potable water that would come from the development of the Seabank 3 power station, which is the primary justification for the Cheddar 2 reservoir. The power station does not have planning permission, the owners have not committed to the site and Bristol Water has not secured an agreement to supply the site. An existing power station on the site is currently supplied with non-potable water via treated sewage effluent from Wessex Water. The inclusion of Cheddar 2 in the optimal basket of supply demand interventions appears to depend on the assumptions made around the requirement by Bristol Water to supply the power station site.
 - Bristol Water states that additional resilience benefits over and above those provided for by the WRMP process further justify the inclusion of Cheddar 2. The evidence presented on customer engagement relating to levels of service does not appear to consistently support this view. Further, resilience benefits inherent in other WRMP scenarios and wider schemes do not appear to have been properly taken into account when comparing the scenarios. Customer preferences are for bills not to increase rather than service levels and bills to go up.
195. These issues are explained further below.

A1.2.3.1 Uncertainty associated with proposed non potable demand

196. There appears to be significant uncertainty associated with non-potable demand assumptions placed in the WRMP process. This relates to when and

if the Seabank 3 power station will be developed and whether or not Bristol Water will enter into a contract for its non-potable water supply.

197. Bristol Water's WRMP assumes that the non-potable supply will commence in 2018-19. However, to our knowledge, the Seabank 3 project does not have planning consent suggesting that the project is at an early stage of development. This is supported by that fact that no application for capacity market permits relating to 2018-19 generation capacity was made for Seabank 3 as part of the December 2014 capacity auction. We are also aware that the Seabank site is currently supplied with treated sewage effluent from Wessex Water²⁴. An environmental assessment report provided in May 2014 by the power station developers suggests that Seabank 3 would also be supplied from this source.
198. Consequently we cannot support Bristol's comment that "given the advanced stage of planning attributable to the potential power plant demand it is inevitable that it would have to form a component of our long term supply demand strategy".²⁵
199. Bristol provided a copy of a letter dated 13 June 2014 from SSE (the owners of the Seabank site) which describes on-going negotiations with the company. It states that SSE is still assessing in detail its future water requirements both for the existing site and future developments and that it has not made a final decision on the most appropriate future source or sources of water for the current operation.
200. We consider that the above uncertainties mean that the constraints placed by Bristol Water on its Water Resources Management Plan optimisation process may not be appropriate. The optimised basket of water resources interventions is sensitive to the inclusion or not of the non-potable demand requirement. This can be seen in the results of Bristol Water's optimisation scenario testing presented in section 11 of its final WRMP²⁶.
201. Scenario 4a optimises the interventions if the non-potable supply is removed as a constraint. It shows that Cheddar 2 is not required and:

²⁴ Seabank 3 Preliminary Environmental Information Report- Non-Technical Summary, URS, May 2014

²⁵ Bristol Statement of Case: paragraph 1340.

²⁶ Bristol's FWRMP <http://www.bristolwater.co.uk/wp/wp-content/uploads/2013/05/WRMP-final-V1-1406121.pdf>, Section 11, page 173

- the whole life objective function of the re-optimised interventions improves if the non-potable supply constraint is removed (i.e. the solution is preferable to Bristol's preferred interventions)
- short term (AMP6/7) and Long term (25 year) NPV totex and notional bill impacts reduce relative to Bristol Water's preferred plan
- 'water available for use' can be maintained above projected Distribution Input + Headroom delivering Bristol's defined level of service commitments across the planning period and
- up until the 2030's Water available for use is significantly higher than 'DI+Headroom'. This means that customers are likely to receive an improved level of service relative to the planning assumptions set out in the WRMP.

202. There is significant uncertainty around if and when any demand for non-potable water from Seabank 3 power station may materialise. Given the uncertainty we consider that the interests of customers are better served if the non-potable demand is not included and construction of Cheddar 2 is not started in AMP 6. This is because service can be maintained at expected levels for a lower cost and bill impact over both the short and longer term.

A1.2.3.2 Requirement to service non-potable demand

203. The Water Industry Act (WIA91 s55) states that water undertakers have a duty to make a connection and provide a supply of water for non-domestic purposes only at the point that an owner/occupier has made a request for a supply.

204. From our understanding of the negotiations between SSE and Bristol Water from the 13 June 2014 letter, we do not consider that a formal request for a supply has been made. The letter states that SSE has not made a final decision on the most appropriate future source or sources of water.

205. The WIA91 also states (s55(3)) that the duty on the undertaker to supply water for non-domestic purposes does not apply if it would cause it to incur unreasonable expenditure in order to meet its obligations to provide domestic supplies, or would put at risk its ability to meet its current and probable future obligations to provide domestic supplies.

206. As stated above, we note the short and long term totex and bill impacts of scenario 4a are lower than Bristol's preferred scenario that includes the Cheddar 2 reservoir. While there remains significant uncertainty about the power station it would not seem consistent with customers' interests or

Bristol's statutory obligations to proceed with the reservoir development. If the non-potable demand were to become certain it would be appropriate for Bristol water to seek to fund any enhancement expenditure in such a way as to protect the interests of its domestic customers.

207. Bearing the above in mind, we conclude that Bristol Water does not have a statutory obligation to plan for this non-potable supply, and, that there is insufficient evidence that the Cheddar 2 scheme would be an efficient use of resources.

A1.2.3.3 Customer acceptability of current service levels

208. Bristol Water has stated that it is in customers' interests to proceed with the Cheddar 2 reservoir irrespective of whether or not the Seabank 3 demand materialises. This is because the re-optimised interventions (scenario 4b - including Cheddar 2 but without Seabank 3 supply) provide enhanced levels of service to customers as well resilience improvements for a bill impact of about £9²⁷ per customer for AMP6/7.
209. We understand that an increased supply demand surplus (over and above planned head room) will increase levels of service and resilience. Nonetheless, it appears that Bristol's customers currently receive a higher level of service and resilience than the planning assumptions suggest are necessary. It is not clear if comparative information presented in section 10.6 of Bristol Water's Statement of Case or its engagement with customers takes proper account of this.
210. Intervening to deliver a significant supply demand surplus over and above normal requirements appears to be contrary to the engagement on levels of service as part of the WRMP process. Bristol Water set out in its business plan²⁸ that its chosen headroom relates to 90% confidence of maintaining the current level of service. The WRMP was consulted on and agreed on this basis. Therefore, we would expect that any desired improvements in the levels of service should have been considered and agreed as part of the headroom calculations rather than through choosing a solution that delivers a large supply demand surplus throughout the planning period.

²⁷ In Chapter 11 of its WRMP, Bristol shows that the bill impact of scenario 4b has an AMP6/7 bill impact of £17 relative to £8 for scenario 4a.

²⁸ 'SDB approach and methodology' document, SOC215

211. Additionally, delivering enhanced levels of service alongside bill increases does not appear to reconcile with customer engagement on proposed water bill and service levels. When presented with notional service packages, acceptability testing showed that a package that maintained service and had no bill impact was the most acceptable (and more consistently acceptable to all groups of household customers including those who currently cannot afford their bill).²⁹

A1.2.4 Other enhancement issues

212. Bristol contends that Ofwat has applied an unsupported 19% efficiency assumption to its enhancement costs and that this adjustment is on top of Bristol's own 12.5% efficiency assumption.

213. Our efficiency challenge was designed to ensure that allowed costs represented industry upper quartile efficiency. We applied an efficiency adjustment where we used company bottom up costs but we could find insufficient evidence that the costs represented upper quartile efficiency.

214. As noted above we considered company bottom up costs in two specific circumstances (when making an un-modelled allowances, and, in relation to wider special cost factor claims). In respect of Bristol Water no enhancement special cost factor claims passed our assessment gates. Therefore, we applied an efficiency challenge only to the un-modelled adjustments.

215. Bristol provided a report prepared by Chandler KBS in June 2014 which suggested its costs were up to 19% higher than industry average³⁰. However Bristol applied only a 5% efficiency catch-up to its costs. Our upper quartile efficiency calculation suggested efficient costs were 6.5% lower than industry average. We therefore applied a 19.6% to Bristol's June plan for un-modelled costs that were over and above the implicit allowance³¹.

216. During the draft determination representations, Bristol increased its efficiency challenge to 12.5% to partially address some of the concerns raised by its own assurance processes.

217. On reviewing further information provided in the draft determination representations, we remained unconvinced that Bristol's efficiency was large

²⁹ SOC002 Wholesale Plan – June Submission. Outcome – sufficient supply, Figure 58, page 240

³⁰ SOC203 ESD1 – CKBS Benchmark Report 20141002

³¹ $0.86 * 0.9347 = 0.804 = 19.6\%$ challenge

enough to arrive at industry upper quartile costs. Mott MacDonald concluded that direct costs were now close to those of other water companies (this would suggest below average rather than upper quartile costs). Chandler KBS found that, of the company's explanation for 14% of its original 19% gap, the maximum that could be justified was 5.6% "assuming that Bristol Water can substantiate the level of risk historically through its management process."³²

218. As a result of this information, we retained our draft determination view of efficient costs. But it is important to be clear that our efficiency challenge has been applied in a way that replaces rather than adds to Bristol's own efficiency challenge. It leads to a relatively modest reduction in the allowance for un-modelled claims of £3.4 million relative to Bristol Water's revised business plan.

³² SOC203 ESD1 – CKBS Benchmark Report 20141002 page 3

Table A1.1 Pre-triangulation summary of unmodelled cost claims and allowances

Unmodelled cost claim	Bristol's June Business plan, £m (net of Implicit Allowance)	Ofwat view in Draft Determination (net of IA)	Bristol's Representation to draft determination (net of IA)	Ofwat view in Final Determination (net of IA)
Raw Water Deterioration	21.1	16.9	18.7	16.9
Southern Resilience	13.1	9.5	11.4	10.5
NEP- Drinking water protected areas	11.9	9.6	11.0	9.6
Asset reliability – discoloured water contacts	7.5	6.0	5.3	5.9
TOTAL un-modelled claims	53.5	42.0	46.4	42.9

219. Of the £61 million gap between our projections of enhancement totex and Bristol Water's forecasts £43 million is accounted for by the Cheddar 2 reservoir. Of the remaining £18 million around £3 million is accounted for by its higher unmodelled costs. The remaining differences relate to the wide ranging scope of its enhancement plans and the relatively weak evidence it provided in relation to its special cost factor claims and un-modelled claims where its representations did not adequately address the treatment of these claims in the totex modelling streams.
220. In particular in our April 2014 Policy and Information update³³ we set out what companies should provide if they made any changes to their special cost factor claims when they submitted their June plans. We asked companies to explain why the claim was not included or highlighted in the December 2013 business plan; explain and demonstrate why costs are not allowed for in the models that support the initial cost thresholds, and, include a quantified estimate of any partial allowances. Bristol Water included in its June plan new

³³ http://www.ofwat.gov.uk/pricereview/pr14/pap_pos140404pr14policy.pdf
Pages 21-22

special cost factor claims for the areas we had assessed as additions to the un-modelled allowance, but failed to adequately explain why the costs were not allowed for in our totex modelling.

A1.2.5 Conclusions on enhancement totex

221. The treatment of the Cheddar 2 reservoir represents the main difference between Ofwat's projections of enhancement totex and Bristol Water's forecasts of enhancement spending, with Cheddar 2 accounting for £43 million of the £61 million gap.
222. The Cheddar 2 reservoir is Bristol Water's biggest enhancement project. Nonetheless, there was insufficient evidence of non-potable demand and insufficient evidence of customer preference for service improvements. These conclusions were supported by an independent report by Jacobs engineering consultants, which is provided alongside this response.
223. The failure of Bristol Water to be able to clearly articulate a persuasive case for its biggest enhancement project suggests weaknesses in its business planning processes. This is in addition to the factors identified in the discussion of base costs in section A2.1 and the discussion of the Motts and Chandler KBS assurance reports in A.1.2.2 and A1.2.4 above.
224. Consistent with our approach to base expenditure and totex we used a mixture of modelling and consideration of special cost factor claims to assess enhancement expenditure. We adopted a fully transparent approach and made available to Bristol Water and other stakeholders an unprecedented amount of detail that fully explained the basis for our calculations and adjustments.
225. We made an adjustment to our modelled allowances to take account of the results of one modelling stream that appeared to produce a relatively low estimate of enhancement expenditure for Bristol Water. We also allowed for the costs of 4 additional schemes in finalising our un-modelled allowance.
226. Bearing in mind the concerns noted above about Bristol Water's business planning information we suggest an approach based on benchmarking and the consideration of special cost factor claims produces more robust estimates of enhancement costs

A1.3 Wholesale cost modelling

A1.3.1 Background

227. In chapter 11 of its Statement of Case to the Competition Market Authority, Bristol Water raises a number of issues in relation to our cost modelling, in particular:

- Ofwat's cost assessment process resulted in a substantial shortfall, of about 17% compared to its business plan
- the approach to cost assessment is focused on top down econometric models without due consideration to a more disaggregated benchmarking and individual assessment of cost components.
- the modelling approach used by Ofwat is not robust and does not form a safe basis for assessing the cost requirements of companies. The estimated coefficients are unstable and not consistent with expectations; it is particularly difficult to model enhancement expenditure and the alternative and equally credible modelling developed by Oxera (e.g. Cobb-Douglas, stochastic frontier) provides a more favourable output for Bristol Water.
- the process for assessing special cost factors has not been sufficiently transparent or robust and overlooked evidence on the need for additional maintenance (which was a key element of the 2010 redetermination by the CC) spend and the fact that key enhancement projects and other aspects of the plan have been subject to independent assurance.
- The financeability of the Bristol Water is impaired by the large revenue penalty arising from the totex menu adjustment (these issues are addressed in appendix 3 to this response).

228. Below we address each of the main arguments made by Bristol Water.

A1.3.2 The remaining gap between our forecast and Bristol Water's forecast

229. In section A1.1 we show that there is strong evidence that suggests our allowances for base costs are consistent with longer term efficient levels. Bristol's present costs are significantly above these levels, but we have concluded it should be for shareholders and not customers to fund any transition to efficient levels. In section A1.2 we show that, on enhancement, the biggest difference between our projections and forecasts made by Bristol Water relates to the Cheddar 2 reservoir. The evidence suggests that Bristol Water can proceed on a sustainable basis without constructing this reservoir during the period 2015 to 2020.

A1.3.3 Total expenditure benchmarking

230. Bristol Water states that our approach is focused on total cost benchmarking without due consideration to a more disaggregated benchmarking and individual assessment of cost components.
231. We do not accept this characterisation of our approach to wholesale cost assessment. First, our wholesale cost modelling involved three separate modelling streams and so was relatively broad. Second, we have always accepted that cost modelling would only be a starting point for our analysis, and, that we would consider special cost factors and modelling adjustments in order to come up with a robust view of the efficient level of costs.
232. The modelling streams included five different econometric benchmarking models as well as three “unit cost” models for a more bespoke assessment of some of the enhancement activities. Despite our focus on top down benchmarking, we consider that our approach gave due consideration for enhancement activities and special cost factors, such to make our projections reasonably robust.
233. Further our focus on totex was consistent with the recommendations of the Cave³⁴ and Gray³⁵ reviews. These reviews noted that a disaggregated approach to cost assessment could introduce a bias to companies' expenditure decisions. For example, assessing and treating operating and capital expenditure separately can lead to different incentives for companies to undertake operating or capital solutions, and typically resulted in a bias towards capex over opex solutions. A total cost approach ensures that companies are focused on minimising the total cost, encourages innovation and should provide the best value for customers.
234. Disaggregated approaches have disadvantages, as they may fail to take account of opex and capex trade-offs and the results may also be distorted by the way companies categorise costs.
235. We undertook a thorough and open process when developing our approach to wholesale cost assessment. We engaged CEPA to support us in the development process and in 2013 we published CEPA's Cost Assessment

³⁴ Cave, M., [Independent Review of Competition and Innovation in Water Markets: Final Report](#), April 2009

³⁵ Defra, [Review of Ofwat and consumer representations in the water sector](#), 2011

Report for consultation³⁶, before publishing our final models in April 2014.³⁷ In choosing our final models we carefully considered advantages and disadvantages of many different models in terms of cost drivers, aggregation of cost for the dependent variable and estimation techniques. Bristol Water had the opportunity to raise its arguments on the need for a disaggregated approach along this process.

236. In its Statement of Case Bristol Water presented evidence based on disaggregated modelling prepared by Oxera (this was presented to us here for the first time, despite having about 18 months to submit evidence and challenge our approach). Notwithstanding our reservations with disaggregated modelling stated above, we note that the data used by Oxera (which was not provided) required a significant number of assumptions to construct,³⁸ and there is no evidence to indicate how these models perform across the wider industry.

A1.3.3.1 Including enhancement expenditure in totex benchmarking

237. Bristol Water suggests that enhancement expenditure is company specific, reflecting the different water quality, growth and resilience risk they face. As such it is more suitable for bottom up assessment.
238. We recognise that enhancement expenditure is lumpy in nature and more affected by company specific circumstances than base costs. To address this inherent difficulty in modelling, we:
- used a smoothed value of enhancement spend, by averaging it over a 5-year period. This is consistent with the approach Ofgem used in its price controls;
 - developed a more disaggregated modelling stream, where different categories of enhancement expenditure is modelled separately with bespoke cost drivers³⁹, and
 - established a process for assessing special cost factor claims for costs that are likely not to be captured in our models. In this process a

³⁶ CEPA, Ofwat: Cost Assessment, January 2013.

³⁷ CEPA, Ofwat: Cost assessment advanced econometric models, March 2014

³⁸ For example capital maintenance econometric returns (CMER) data from 1997-98 was used to impute some of the missing historical data with the assumption that the data remains unchanged. The exact data imputed is not identified which means it is difficult to comment on whether it is appropriate – though as a general point it is highly likely that the data will have changed, potentially significantly, since 1997-98.

³⁹ We used econometric models to calculate base expenditure (WM9 and WM10 in the CEPA 2014 report). Enhancement expenditure was estimated by the use of 3 unit cost models plus uplift for unmodelled enhancement costs – see Ofwat, Basic cost threshold model - Appendix C Enhancement modelling, April 2014.

company's unique circumstance is assessed, and where appropriate, the associated cost is allowed. We set out the process for companies to make special cost factor claims in our final methodology statement, and we included a specific table in the business plan reporting requirements which allowed companies to make these claims and set out the relevant evidence in their business plans.

239. As indicated in the CEPA report, in wholesale water we considered that we managed to obtain robust totex models that would be a useful addition to our suite of models.⁴⁰

A.1.3.4 Counter-intuitive coefficient estimates

240. Bristol Water suggests that some of the estimated coefficients are not consistent with prior expectations based on economic or engineering knowledge. It gives three specific examples where it suggest that contrary to expectations an increase in a variable would lead to a reduction in the modelled cost allowance. The variables in question are:
- number of properties served
 - water supplied to customers, and
 - proportion of metered customers.
241. It also suggests that the density elasticity, which is negative for Bristol Water (as well as for a number of other companies), is counter-intuitive and contributes to their costs being underestimated.
242. In contrast, we think it is important to focus on overall model performance and robustness.
- Our coefficient estimates are based on the OLS and random effects estimators, both of which are unbiased and consistent under certain conditions (notably, that the errors are uncorrelated with the explanatory variables). Likewise the model predictions are unbiased. We recognise, however, that individual estimates may be imprecise. Nonetheless, the non-bias of the prediction does not hinge on the individual coefficient estimates being precise but on the collective effect of all the coefficient estimates. A good example is the case of multi-collinearity where, individually, highly correlated explanatory variables may not be estimated accurately, but jointly their prediction would remain unbiased. Indeed, the density variable in our models is

⁴⁰ The totex models used are the full totex model OLS (WM3 in the CEPA 2014 report) and the refined totex models OLS and RE (WM6 and WM5 in the CEPA 2014 report respectively).

relatively highly correlated with two other variables: population density ($r=0.73$) and regional wage ($r=0.6$). We therefore consider that an “un-intuitive” sign of a single coefficient estimate need not undermine the credibility of our model's predictions.

- Consistent with the above, when we use our modelling results to establish forecast expenditure we do it consistent with the fact that the accuracy of the model depends on the collective set of estimated coefficients: we do not extrapolate only a single variable (e.g. density), but rather the full set of explanatory variables. So, in our view, it is not particularly insightful to argue that an increase in a single variable is forecasted to reduce costs because this is not how we use these models in forecasting—we move all the variables together.
- Bristol suggests that it is counter-intuitive that each additional property that it serves leads to a lower cost prediction by the model. We note, however, that **the number of properties is not a variable in our models**. The number of properties plays a part only through its effect on another variable - ‘property density’. Further:
 - the effect of property density on costs is not clear cut and it is not necessarily counter-intuitive that the effect is negative in certain circumstances. Density can impact cost in different and offsetting ways (we would expect it to reduce treatment costs for example, due to the ability to have larger, more efficient treatment plants serving densely populated areas);
 - companies have a similar negative relationship between property density and cost and perform relatively well in our cost benchmarking
- In respect of the proportion of metered customers, we indicated that “We would expect a relatively small negative coefficient, between -0.1 and 0.0, as metered properties are expected to have lower water consumption than non-metered and hence lower costs. If usage is included in the model it is not clear what the effect will be as the cost difference effect could be picked up in either or both variables.” (CEPA report, page 20). This suggests that it is not contrary to prior expectations that an additional metered customer results in a reduction of costs. It also demonstrates the interaction between variables in a model and the difficulty in assessing the coefficient of a single variable in isolation.

A1.3.5 Unstable coefficient estimates

243. Bristol Water argues that the estimated coefficients are unstable with respect to the omission of individual companies. It presents its evidence in Table 104,

comparing the estimated coefficients with the full set of companies to the values obtained with the omission of Thames Water, Dee Valley Water and Wessex Water.

244. We recognise that the omission of some companies has a large impact on the models' estimated coefficients. This is not unexpected with a relatively small cross section of heterogeneous companies. For this reason we complemented our modelling results with an assessment of special cost factors and an overall assessment—and, where needed, an adjustment—of our modelling results.
245. However, what is more important is to evaluate the stability of the models' predictions rather than its estimated coefficients. To assess that, we excluded one company at a time and derived the new predictions. We then average all these predictions and compared it to our current predictions, i.e. predictions based on the full set of 18 companies. The results showed that across the industry forecasts were stable in respect to the exclusion of single companies from the sample (an average absolute deviation of 0.6% from current predictions across the industry, with a standard deviation of 0.5%). For Bristol Water the average forecast was 1.4% higher than its forecast under the full set of companies. We consider that this result substantiates the credibility of our models. Moreover, we think that it is important that our models be based on the full set of companies, incorporating all the possible information on the relationship between explanatory variables and costs across the industry.
246. We have also re-estimated our models using an additional year of data which became available late last year (2013-14 outturn data). We have found that with the inclusion of the additional data the models remained relatively stable and performed well, in particular in the water service. We found that large movements in coefficient estimates were confined to variables that are highly correlated. This is not unexpected, given that the coefficients of correlated variables are sensitive to model specification. Incidentally, Bristol Water fared worse under both alternatives that we considered to the inclusion of the new year of data in our econometric models. We note, contrary to Bristol Water's argument in footnote 969 that we have not published our analysis on the re-estimation of our wholesale cost model, our analysis and results are reported in "Final price control determination notice: policy chapter A3 – wholesale water and wastewater costs and revenues", Annex 1.

A1.3.6 “Missing” explanatory variables – mains age, GMEAV, the proportion of upstream assets and water treatment complexity

247. See section A1.1.2 for an explanation of how we investigated a range of additional explanatory variables suggested by Bristol and as noted in section A1.1.1 we allowed for a water treatment complexity variable.

A1.3.7 Evidence based on the Cobb-Douglas functional form

248. Bristol Water claims (with reference to Oxera modelling) that changing the functional form of the econometric models from translog to Cobb-Douglas, as well as using asset age and treatment complexity as additional explanatory variables, results in a more robust and a substantially more favourable outcome for Bristol Water.⁴¹

249. We discussed our reservations with regards to the additional explanatory variables in sections A1.1.1 and A1.1.2. Below we set out our rationale for using the translog function followed by further modelling evidence that casts doubt on the results from the Cobb-Douglas estimation.

250. As part of our model selection process we have considered both the Cobb-Douglas and translog functional forms. The main advantage of the translog functional form is that it allows cost elasticities and returns to scale to vary across companies whereas the Cobb-Douglas imposes constant elasticities and the same returns to scale across all companies.

251. We have decided not to use the Cobb-Douglas in our final set of models for a number of reasons:

- Statistical tests for model specification favoured the translog over the Cobb-Douglas. The Cobb-Douglas is nested within the translog so it is possible to use an F-test to test the Cobb-Douglas restriction on the parameters. The F-test rejected the constant elasticity form of the Cobb-Douglas at a 99% level of confidence in all our models.
- Subjective/regulatory judgement over the plausibility of the models' predictions and efficiency estimates. We examined cost predictions of the translog and Cobb-Douglas models relative to actual outturns as well as the resultant relative efficiency scores. Across the industry, cost predictions of the Cobb-Douglas model were less accurate and at

⁴¹ We could not find evidence of the numbers used by Bristol Water in SoC paragraph 1525.

times exhibited substantial deviations from actual performance. Likewise, the resultant inefficiency scores of the Cobb-Douglas model were consistently higher than those of the translog models with a large gap between frontier companies and the rest. Efficiency scores from the translog model were more credible overall. On this basis we had more confidence in the results of the translog model.

- Evidence from studies of the sector of varying economies of scale in water companies (Stone and Webster⁴²; Saal et al⁴³) – consistent with this evidence, the translog allows for varying economies of scale across companies while the Cobb-Douglas does not.
- In the academic literature, the Cobb-Douglas functional form is regarded as an inflexible function and the translog is typically the preferred form.

252. Despite our arguments above, we have re-examined the results of our modelling across the industry using a Cobb-Douglas function. We found that for the majority of companies this will result in a substantially different outcome and that for half of the companies (9 of 18) the outcome is over 5% higher than the outcomes obtained with the translog function. Our conclusion is that it is not unique to Bristol Water that the Cobb-Douglas results in a more favourable outcome and, more importantly, given that all companies except Bristol Water accepted our final determinations we consider that the forecasts of the Cobb-Douglas model are not appropriate across the industry and do not protect customers.

253. To further examine if our translog model unduly disadvantaged Bristol Water, we re-estimated its expenditure forecast while removing all statistically insignificant translog terms from the model. As Table A1.2 shows, the impact on Bristol Water's expenditure allowance is minimal (and negative overall). To obtain the results that Bristol Water is presenting in its Statement of Case one would have to exclude the significant terms as well. However, we think there is no case to remove the statistically significant translog terms and removing them can result in a serious 'omitted variable bias' in our models.

⁴² Stone & Webster, Investigation into evidence for economies of scale in the water and sewerage industry in England and Wales: Final Report, prepared for and published by Ofwat, 2004.

⁴³ Saal, David; Arocena, Pablo; Maziotis, Alexandros and Triebs, Thomas (2013). Scale and scope economies and the efficient vertical and horizontal configuration of the water industry: a survey of the literature. *Review of network economics*, 12 (1), 93–129.

Table A1.2 Refined modelling forecast for Bristol Water – current forecast versus forecasts obtained when excluding statistically insignificant translog terms

	WM6	WM5	WM10	WM9
All explanatory Variables	294.2	291.9	277.6	281.3
Excluding non-significant translog terms	294.6	289.4	277.0	283.3
Difference	0.4	-2.5	-0.6	2.0

* the insignificant translog terms are length² in all models and density² in the base models (WM9 and WM10)

A1.3.8 Evidence based on stochastic frontier (SF) model

254. Bristol Water presents evidence from SF modelling produced by Oxera, which results in a more favourable outcome for Bristol. The evidence provided by Oxera is based on a particular SF model – “the four component model”. The model decomposes the error term into four components which are taken to represent unobserved heterogeneity, persistent inefficiency, transient inefficiency and statistical noise.
255. We do not have much confidence in the results of the SF models. SF models require a lot of data and are based on strong distributional assumptions regarding the components of the composite error term. The specific model used by Oxera—the “four-component” model—is relatively recent and untested.
256. As Professor Kumbhakar emphasised in his an article where he compared the four-components model to other models with different assumptions and specifications:⁴⁴

“We found that efficiency results are quite sensitive to how inefficiency is modelled and interpreted.”

⁴⁴ Technical efficiency in competing panel data models: a study of Norwegian grain farming. Subal C. Kumbhakar • Gudbrand Lien, J. Brian Hardaker; Journal of Productivity Analysis , April 2014, Volume 41, Issue 2, pp 321-337

“The variability of the results from the different models clearly demonstrates the difficulty in ‘correctly’ measuring efficiencies. No model can be held to be ‘correct’ [...]. For the future, model choice in empirical research should not be based on ‘standard practice’, but on a reasoned choice. A good understanding of the institutional and production environments of the industry under study, and of the data applied, are crucial in deciding which estimator should be utilized.”

257. Notwithstanding the limitation of SF models noted above, we have examined Oxera's evidence (including the Stata code) on the four component SF model. We were not convinced that the model application was robust. We note:
- Oxera uses historical plus forecast data to estimate the model (with a gap of two years 2013-14 and 2014-15). This is in contrast to our approach of using historical data only. Oxera does not present results based on historical data only.
 - Oxera adds £44 million and £27 million to the totex and base totex modelling results respectively, presumably representing unobserved company effects. These values are hardcoded into the Stata code and the method of their derivation is not provided.
 - To obtain Bristol Water's expenditure forecast, Oxera multiplied its efficiency score by its own forecast of totex (again, we do not know whether the totex forecast is net of policy items). We are not convinced that this is the best approach to forecast companies' expenditure with this model. Moreover, this approach would not be a reasonable one for a regulator to adopt as it clearly provides an undesirable incentive for companies to overstate their forecast when they submit their business plans to us.
258. We have considered using SF model early in our price review but have ruled it out on the basis that these models are not transparent, complicated to implement and their result is strongly affected by their distributional assumptions (particularly in small samples). We consider that our approach which uses more robust econometric models complemented by the assessment of special cost factors which can capture “unobserved heterogeneity” (e.g. canal water, congestion) can accomplish the same result in principle in a more robust way.

A1.3.9 Wholesale cost modelling conclusions

259. We have summarised in section A1.3.2.1 the evidence on the sustainability of our cost projections.

260. We consider that our modelling suite is broad and robust. The development of our modelling suite drew on the expertise of CEPA, our academic advisor Dr. Andrew Smith and our own internal staff. Our models have been tested extensively by CEPA and PwC and have been separately assured by PwC. We have been transparent throughout the development of our cost assessment approach and consulted on our approach in different stages of the periodic review. Our modelling assessment is complemented by a well-defined and transparent process for the consideration of special costs that may have not been captured in our models. We are confident that our models' forecast is appropriate as is evidenced by the fact that all companies except Bristol accepted their result by accepting our final determinations.
261. In section A1.3.3 we explain the rationale for our top down approach to cost assessment, the serious disadvantages of disaggregated approaches and the mechanisms we implemented to complement our top down approach to ensure its robustness (e.g. the process for assessing special cost factors).
262. In section 1.3.4 we also respond to and rebut Bristol Water's substantive modelling challenges. For example the claim that our models are unstable; that the parameter estimates are counter-intuitive as well as its evidence, as provided by Oxera modelling, based on different modelling approaches such as the Cobb-Douglas or stochastic frontier models. We consider that these modelling challenges to be weak and anecdotal.
263. Finally the points made by Bristol in relation to the allowances made by the Competition Commission in 2010 were addressed in section A1.1.4 on base costs.

Appendix 2: Risk and reward

A2.1 Background

264. Throughout our PR14 price control process, we sought to achieve an appropriate balance of risk and rewards. This meant requiring companies to carry out a detailed analysis of business risks – published in the form of RORE ranges⁴⁵ – and setting a package of uncertainty mechanisms and allowed returns that compensated investors for the unavoidable risks they were running.
265. As set out in our methodology statement in July 2013, we set the wholesale cost of capital on the following basis:
- We calculated an industry appointee weighted average cost of capital across the industry using the CAPM model with a notional capital structure taking into account a range of market evidence;
 - To calculate the industry weighted average cost of capital for the wholesale business we deducted an allowance for the retail margin from the appointee cost of capital;
 - For companies that requested a company-specific uplift to the cost of capital, we only allowed this where it was in customers' interest, namely when there was robust evidence of incremental financing costs and customer benefits from providing the uplift that more than offset these costs.
266. In most areas of the WACC calculation, there is no material dispute between Bristol Water and Ofwat. The remaining areas of disagreement are set out in the table below.

Table A2.1 Overview of key areas of disagreement

Area	Ofwat view	Bristol Water view	Chapter in this appendix
Inflation	2.8% Based on long-term inflation expectations	2.46% Revised since draft determination	A2.2

⁴⁵ See Ofwat (December 2014), 'Final price control determination notice: policy chapter A7 – risk and reward', section A7.2.

Area	Ofwat view	Bristol Water view	Chapter in this appendix
		submission, based on inflation expectations for AMP6	
Retail Margin allowance	0.14%	0% Rounded down from 0.02%	A2.3
Cost of new debt	2.00% Not including a company-specific uplift	2.30% Including a company-specific uplift	A2.4
Cost of embedded debt	2.75% Based on past Iboxx yields of investment grade bonds, including the company-specific uplift	3.15% Based on Bristol Water's actual debt costs	A2.5
Cost of equity	5.65% Without a company-specific uplift	6.4% Based on an uplift for operational gearing	A2.6
Validity of the benefits test	Consistent with our customer and financing duties	In conflict with our financeability duty	A2.7
Quantum of benefits	–£29m to –£21m Based on considering a wide range of potential benefits.	At least £25-£33 per customer per annum.	A2.8

A2.2 Inflation

267. In PR14, consistent with licence conditions and previous price controls, Ofwat applies a real cost of capital to the RCV to calculate allowed returns and the value of the RCV is indexed to the Retail Price Index (RPI). The inflation forecast used in setting the cost of capital matters because it affects the real returns and real yields that are calculated from market data that is usually in nominal terms. Ordinarily, a lower inflation assumption will result in a higher real WACC. Throughout the PR14 price control process, we used a long-term RPI inflation forecast of 2.8% in order to set the WACC. This estimate was an increase on the 2.5% long assumption used in PR09, allowing for an increase

in the formula effect of 0.3%⁴⁶. The use of a long term view of RPI also avoid sharp swings in the WACC due to short term movements in RPI during the pricing setting process.

268. Bristol Water used a 2.95% RPI inflation rate in its December 2013 business plan and reduced this to 2.8%, consistent with our assumptions, in its revised business plan. In its Statement of Case, Bristol Water argued that the expected inflation over the regulatory period should be used to adjust returns – from nominal to real.⁴⁷ Referring to UK Treasury data on the 5-year inflation forecast implied in gilt yield curves, Bristol Water suggested an inflation rate of 2.46%.
269. As our cost of debt is based on long term corporate debt (10 plus years) we consider that the appropriate typical inflation forecast is a long-term RPI inflation forecast. We also used implied inflation rates from differences between real and nominal gilt yields as a cross-check, over 10 and 20 year periods suggested RPI of between 2.6% to 3.1%.⁴⁸

A2.3 Retail Margin Allowance

270. The cost of equity and debt are calculated using appointee-level inputs and result in an appointee-level WACC. The separation of retail price controls mean that retail controls are now remunerated by retail margins and so without deduction from the appointee control, we would be rewarding water company retail businesses twice (once in the retail margin and once in the WACC at the appointee level).
271. In separating the retail and wholesale controls, Ofwat allocated all of the RCV to the wholesale controls, included retail assets. This means that existing retail assets receive their return via wholesale controls. We have not adjusted retail margins to reflect this allocation, as it important for the non household control to provide level playing field for competition.
272. We deducted the household retail margin, calculated as a return on RCV, from the appointee WACC to estimate the wholesale WACC. In our risk and reward guidance, this amounted to 0.15% (after rounding).⁴⁹ All companies except

⁴⁶ Ofwat, [Risk and reward guidance](#), p. 12.

⁴⁷ Bristol Water Statement of Case, p. 435.

⁴⁸ See PwC (December 2014), '[Updated evidence on the WACC for PR14](#)', p. 18-20.

⁴⁹ See '[Setting price controls for 2015-20 – risk and reward guidance](#)', p. 36.

Bristol Water accepted this guidance, although Northumbrian Water raised similar concerns following issue of Risk and Reward guidance: The enhanced companies accepted in April 2014, and the other companies (including Northumbrian Water) accepted it in their business plan resubmissions. Bristol Water made various conceptual objections⁵⁰, which it repeated in its Statement of Case.

273. For our final determinations, we updated our calculation using updated inputs for wholesale allowed revenues and RCV. We also adjusted our calculation to take into account that the retail margin needed to be expressed in post tax terms to be consistent with WACC. We concluded that the retail margin allowance should be set at 0.14%.⁵¹

274. In its revised Business Plan, Bristol Water set out an alternative calculation of the retail margin allowance.⁵² This calculation deviated in a number of important respects from our risk and reward guidance:

- It was specific to Bristol Water, relying on inputs that were specific to Bristol Water;
- It deducted a significant amount to represent the taxes paid by the retail business, shown in row E in the table below;
- It deducted an amount to represent the return required on retail assets and new working capital, shown in row F in the table below; and
- It deducted an amount to compensate the retail business for inflation risk, which is shown in row H in the table below.

275. In its Statement of Case, each of these items appears in table 119⁵³, which we repeat here for convenience:

Table A2.3 Bristol Water Statement of Case table 119 and comparison with Ofwat final determination calculation

Item	Calculation proposed by Bristol Water	Bristol SOC representation of Ofwat Final Determination	Bristol Water Statement of Case	Ofwat's final determination
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⁵⁰ See, Bristol Water (June 2014), 'PR14 Business Plan – Wholesale Plan – June Submission', p. 111-112.

⁵¹ See Ofwat (December 2014), '[Final price control determination notice: policy chapter A7 – risk and reward](#)', p. 40-41.

⁵² Bristol Water (June 2014), 'PR14 Business Plan – Wholesale Plan – June Submission', p. 112.

⁵³ Bristol Water Statement of Case, p. 442.

Item	Calculation proposed by Bristol Water	Bristol SOC representation of Ofwat Final Determination	Bristol Water Statement of Case	Ofwat's final determination
Retail net margin	A	0.9%	1.0%	0.9%
Revenue Requirement	B	10,812m	109.8m	10,812m
RCV	C	63,072m	491m	63,072m
Return on Wholesale RCV	$D = A*B/C$	0.1%	0.22%	0.15%
Convert to post-tax nominal return	$E = D*4.4/7.81$		0.12%	
Post-tax real return required on new Retail Assets	F	[0.15%]	0.03%	0.01%
Residual real post-tax return	$G = F - E$	Implied 0.15%	0.09%	0.14%
Additional risk arising from loss of indexation of retail costs	H	Not assessed	0.07%	Not quantified
Final Required Adjustment to Wholesale WACC	$I = H - G$	-0.14%	-0.02%	-0.14%

Source: Bristol Statement of Case and Ofwat final determination, policy chapter A7, page 40-41.

276. **Sector v company specific values:** In line with our overall policy on the cost of capital, we consider that it is inappropriate to use company-specific inputs to calculate the retail margin adjustment. Using company-specific inputs would result in a company-specific wholesale WACC, which is inconsistent with our view that the notional wholesale cost of capital is the same for all companies. Instead, it would give different companies a different wholesale WACC

depending on the size of their retail business, i.e. depending on a factor unrelated to the characteristics of the wholesale business.

277. It should be noted that using company-specific inputs would result in a larger retail margin allowance for Bristol Water, and therefore a lower wholesale WACC. This is because Bristol Water's retail business makes up a larger proportion of the company than it does for most water companies and the water business is less capital intensive than the wastewater business. As a general rule, this is true for all WOCs, which is why our forecast return on regulated equity is somewhat higher for WOCs than it is for WaSCs.⁵⁴
278. **Tax:** Bristol Water has overstated tax adjustment by using ratio of pre-tax wholesale nominal rate of return with post real cost of capital, rather than calculating tax on retail margins.
279. Bristol Water suggested that our conversion to a post-tax margin should be based on wholesale cost of capital to estimate tax wedge for retail and is based on a 20% tax rate.⁵⁵ We consider that this is inappropriate because it is inconsistent with the average rate for the appointed business for the sector and have used a tax rate of 10% (and in line A of the table, this results in a post tax margin of 0.9% rather than 1.0%). We also note that even if a 20% tax rate is used on the retail margin, the adjustment would amount to 0.2% and not the 0.10% calculated by Bristol Water. Finally, we note that use of 20% marginal tax rate would imply zero financing costs for the retail business, while such a business is likely to have low or zero gearing, it would face costs relating to raising working capital.
280. **Retail assets:** All of the retail assets at 1 April 2015 have allocated to wholesale RCV, and therefore remunerated through the wholesale control. Bristol Water has misrepresented Ofwat's calculation, which is set out in final determination. Ofwat estimated the return required on new assets in the retail price control and deducted this from the retail margin allowance. Bristol Water's estimate values the new assets deployed in the retail business at the net present value of all retail profits for the next 30 years, and then proposes that the CMA should allow a return on that value and so overstates deduction required for new retail assets in 2015-20 and so overstates deduction required for new retail assets in 2015-20.⁵⁶

⁵⁴ See Ofwat (December 2014), 'Final price control determination notice: policy chapter A7 – Risk and Reward, figure A7.1, p. 13.

⁵⁵ Bristol Water Statement of Case, footnote 1132.

⁵⁶ Bristol Water Statement of Case Table 118 on p. 440, and associated footnotes.

281. **Inflation risk:** Finally, we consider that it is inappropriate to assume that there is inflation risk in the retail price control which requires reflecting in the adjustment. In carrying out its retail activities, Bristol Water is not exposed to the risk that RPI inflation might be higher or lower than expected, it is exposed to the possibility that its costs might turn out to be higher. But this is a risk that is more within its control, it can be managed and mitigated, and there is no reason to remunerate it through a specific allowance in the WACC or the retail margin. Furthermore, even if it were assumed that a specific risk premium should be allowed for inflation risk, the inflation risk premium implied in calculation of implied inflation in long term gilt yields suggests around 10% of cost of debt⁵⁷, which if applied to the full retail margin would suggest a deduction of 0.01% from the adjustment to wholesale WACC rather than the 0.07% proposed by Bristol Water.
282. We remain of the view, that it would be inappropriate to set the wholesale WACC equal to the WACC for the appointed company. Not only would this mean that our change in the price control methodology would increase the company's returns without any change in its risk profile, it would also be inconsistent with the change in the risk profile of the wholesale price control relative to the PR09 price control. Certain sources of risk, most importantly the risk of non-payment by customers, no longer have to be borne by the wholesale business which instead now has a more flexible form of control available to manage some remaining demand risks. As the risk of the appointed company is now divided between wholesale and retail, so too should the returns.

A2.4 Cost of new debt

283. Consistent with our approach to estimating the notional cost of debt, we have derived the cost of debt from yield curves for A and BBB rated corporate debt.⁵⁸ When we initially carried out this analysis in our Risk and Reward guidance, we calculated a current real cost of new debt of 1.8% to 2.2%. We applied a 60 basis point uplift to this range based on interest rate expectations, to obtain a range cost of new debt of 2.6% to 2.8%, reflecting a greater weighting towards the upper end of the range. We used a point estimate of 2.65% (excluding issuance costs of 0.10%), reflecting evidence of water company outperformance against benchmark cost of debt . All

⁵⁷ PwC, [Updated evidence on the WACC for PR14](#), p. 19.

⁵⁸ See [Risk and Reward guidance](#), p. 21.

companies accepted that guidance: The enhanced companies did in April 2014, and the other companies accepted it in their business plan resubmissions. Some companies did, however, argue for a company-specific cost of new debt higher than 2.65%.⁵⁹

284. In the final determinations we updated this analysis with nominal corporate bond yields falling 47 and 67 points for A and BBB ratings respectively to 4.17% and 4.37% (or around 1.35% and 1.55% in real terms). We noted that while market interest rate expectations had fallen since January 2014 we did not consider that there is sufficient evidence to change the 60 basis point uplift for future increases from the lower starting point. Applying this gave an updated range of 1.95% to 2.15%. Consistent with the risk and reward guidance we deducted 15 basis points from the upper end of range to reflect a degree of expected outperformance, to give a cost of new debt of 2.0% (excluding issuance costs of 0.10%).

Table A2.4 Summary of Ofwat estimate⁶⁰

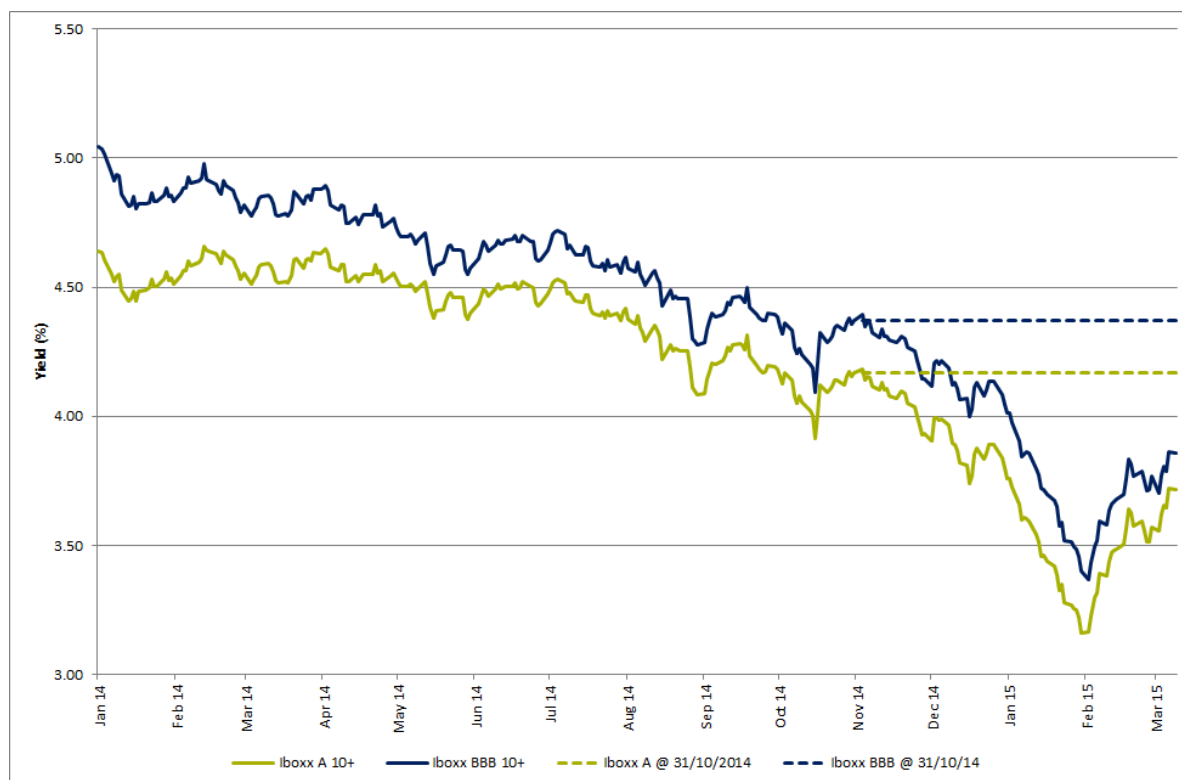
Item	Estimate
Nominal spot yield on investment grade corporate debt	4.17% - 4.37%
Inflation assumption	2.80%
Real spot yield	1.35% - 1.55%
Expected average increase over the period	0.60%
Cost of new debt with forward looking uplift	1.95% - 2.15%
Point estimate	2.0%

285. Since the calculation of the cost of capital, using data to 31 October 2014, corporate debt yields have fallen further.

⁵⁹ See, for example, Bristol Water (June 2014), 'PR14 Business Plan – Wholesale Plan – June Submission', p. 102.

⁶⁰ PwC (December 2014), '[Updated evidence on the WACC for PR14](#)', p. 23.

Figure A2.1 Nominal Iboxx yields since the start of 2014



286. In its Statement of Case, Bristol Water made its own estimate of the cost of new debt. While its analysis was different from ours, Bristol Water concluded that our 2.0% estimate is appropriate for Bristol Water, prior to considering issue and holding costs..⁶¹

287. It stated that a new loan taken out in November 2014, which is not included in our PR14 analysis, for which it is paying a 2.4% nominal rate – or -0.4% real – rate of interest.⁶² This suggests that there is considerable scope for outperformance against cost of debt raised early in the 2015-20 period..

Table A2.5 Summary of Bristol Water estimate

Item	Estimate
Average expected long-term nominal gilt yield	2.7%
Inflation assumption	2.46%

⁶¹ Bristol Water Statement of Case, p. 424-427.

⁶² Bristol Water Statement of Case, p. 429. Using Bristol Water's inflation forecast, the real rate would be -0.06%.

Item	Estimate
Real average expected gilt yield	0.25%
Spread between Bristol Water interest rates and gilt yields	1.75%
Cost of new debt	2.0%
Cash holding and Issuance Costs ⁶³	0.30%
Overall cost of new debt	2.3%

288. This table shows that the only material difference of opinion between Bristol Water and Ofwat is regarding the assumption about inflation, which is discussed in appendix 4.2, above, and regarding Bristol Water's proposed cash holding and issuance costs, which are discussed in appendix 4.5.3, below.

A2.5 Cost of embedded debt

289. In line with our policy to set a single notional cost of debt for all companies, we have also set a single cost of embedded debt. We consider that taking into account companies' actual embedded debt costs would weaken their incentive to secure financing at the lowest cost.

290. As with the cost of new debt, we based our January guidance primarily on yields for A and BBB rated corporate debt.⁶⁴ Looking at historic yields, we calculated a range for the real cost of embedded debt of 2.6% to 2.8%, with a point estimate of 2.65% (excluding issuance costs of 0.10%). We noted, this is higher than the actual cost of water companies bond issuances in the 2000 to 2014 period, which suggested a real rate of 2.2%, but accepted that not all companies were able to outperform benchmark rates to the same extent, so a higher range was appropriate. All companies accepted that guidance: The enhanced companies did in April 2014, and the other companies accepted it in their business plan resubmissions. Some companies did, however, argue for a company-specific cost of embedded debt higher than 2.65%.⁶⁵

⁶³ See Bristol Water Statement of Case, Table 116, p. 437.

⁶⁴ See [Risk and Reward guidance](#), p. 21.

⁶⁵ See, for example, Bristol Water (June 2014), 'PR14 Business Plan – Wholesale Plan – June Submission', p. 102 and 107-109, where Bristol Water proposed a company-specific cost of embedded debt of 3.4%.

291. In our draft and final determinations, we continued to use cost of embedded debt of 2.65%. For our final determinations, we updated our evidence on the historic yields of corporate bonds. We noted that the 10 year average of A and BBB rated bonds had fallen by 10 basis points, but considered that this was not sufficient basis to lower the embedded cost of debt and we concluded that 2.65% (excluding 0.10% issuance costs) was still the correct figure.⁶⁶
292. When considering applications for a company-specific uplift, we used the same methodology, but we considered whether there were reasons why WoCs might have higher costs when accessing debt finance. In our draft determinations, we concluded that small WoCs had debt costs that were 0.25% higher than those of a WaSC. We confirmed this conclusion in our final determinations.
293. Bristol Water suggested that we should use company-specific cost embedded debt costs rather than a single notional allowance, referring to the Competition Commission's final report in the 2010 Bristol Water reference. In this report, the Competition Commission⁶⁷ acknowledged that setting an industry standard rate has the advantage of incentivising companies to reduce their costs of debt but wished to avoid penalising companies that needed to borrow at times of high interest rates. We remain strongly of the view that it is necessary to give all companies, large and small, a strong incentive to seek financing at the best possible terms.⁶⁸ Therefore, we continue to consider that it is inappropriate to use a company's actual cost of debt financing as a starting point for estimating its efficient cost of financing.
294. While we continue to consider that the notional cost of debt is the appropriate basis for setting the cost of debt allowance, we have considered the evidence submitted by Bristol Water of its own cost of debt. We analysed Bristol Water's own assessment of actual embedded debt costs of 3.15% in its Statement of Case. We consider this is overstated and that a maximum figure of 2.7% - which is not materially different from the 2.75% (including issue costs) that we allowed in the final determination for embedded debt. The 2.7% estimate is before making any adjustment for interest received by Bristol Water on loans to its holding company. There are a number of aspects of the Bristol Water claim for higher embedded cost of debt that require careful examination:

⁶⁶ This is consistent with the range of 100bp-200bp over gilt yields used in the CMA's Energy market investigation, see CMA (February 2015), 'Energy market investigation: Analysis of cost of capital of energy firms', p. 24.

⁶⁷ Competition Commission (August 2010), 'Bristol Water plc – A reference under section 12(3)(a) of the Water Industry Act 1991, Appendix N, paragraph 47

⁶⁸ See also our secondary efficiency duty, s. 2(3)(a) WIA91.

- Bristol Water has included irredeemable preference shares, attracting dividends of 8.75%, within their assessment of actual embedded debt costs. These were reclassified from equity to debt⁶⁹ in 2006, in order to comply with the accounting standard FRS25 (Financial Instruments: Presentation), with the associated dividends being reclassified as interest expense. We note that the Competition Commission⁷⁰ excluded preference shares from their analysis of embedded debt costs in 2010.
- Bristol Water achieved premiums of £9.1m on the issuance of Artesian finance. This effectively reduces the true cost of these tranches of debt as acknowledged by KPMG⁷¹. The impact of these premiums has been omitted from Bristol's assessment.
- A significant proportion of Bristol Water's most expensive debt, raised through Artesian finance, at times of high interest rates was not required to support the needs of the business and was used to make a cash return to shareholders. This was achieved through the provision of loans from the regulated business to the holding company which attract a fixed interest receivable of £4 million per annum within the regulated business. This interest income has not been reflected in Bristol Water's calculation of its cost of embedded debt and, in the event that the CMA adopts an actual cost of debt approach, must be taken into account. The interest received from loans to the holding company is not relevant to our calculation of notional cost of embedded debt, as we assume that companies do not make loans to holding company. However, the interest received is clearly relevant to an assessment of Bristol Water's actual cost of embedded debt.

295. Further detail and evidence on these observations is provided below.

A2.5.1 Bristol Water's Estimated Embedded Debt Costs

296. Table A2.5 is an extract from Bristol Water's Statement of Case.⁷² It summarises its assessment of embedded debt costs at 31 December 2014.

⁶⁹ Bristol Water plc (2006), 'Regulatory Accounting Statements – Year ended 31 March 2006, p.5

⁷⁰ Competition Commission (August 2010), 'Bristol Water plc – A reference under section 12(3)(a) of the Water Industry Act 1991, Appendix N, Annex 3, Tables 1 and 2

⁷¹ KPMG (March 2015), 'Benchmarking Bristol Water's embedded debt', p.6

⁷² Bristol Water Statement of Case, section 12.3.3.2, Table 114

Table A2.5 Summary of Bristol Water debt costs at 31 December 2014

Cost of Existing Debt	Amount	Interest Rate	Real rate
Index Linked Debt	170,495	3.39%	3.39%
Fixed	81,570	6.36%	3.90%
New Fixed Loan Nov 14	50,000	2.40%	-0.06%
Variable	12,529	1.22%	0.12%
Blended Cost of debt			2.84%
Cash holding and issuance costs			0.30%
Total cost of debt			3.14%

297. Bristol Water has reduced its estimated opening position for the real cost of embedded debt from 3.4%, as submitted in its wholesale business plan in June 2014, to 3.14% reflecting changes to its capital structure made in November 2014 and a reduced inflation assumption of 2.46%, based on treasury implied 5-year inflation in the first two weeks of January 2015, compared to its assumption of 2.8% in June 2014.
298. It has also estimated the cost of debt in the residual embedded debt structure at March 2020 taking account of the retirement of specific tranches existing short term debt, indexation of index linked debt, projected forward interest rates for floating rate debt, and issuance of new debt. Their estimate for 2020 is 3.16%. This has been averaged with the opening position of 3.14% to arrive at their adopted position of 3.15%.
299. In paragraph 1733 of its Statement of Case, Bristol says that it considers the averaging of the cost of debt at the start and end of the period to be more robust than the approach normally taken by regulators.⁷³ In this particular case the average is unduly impacted by end of period position, where the cost of debt is increased by the retirement of the new fixed loan in December 2019.⁷⁴ This particular loan carries a real interest rate of -0.06% or – -0.40% if Ofwat's inflation assumption is used – throughout the period, apart from the last three months. We do not consider the approach proposed by Bristol Water to be robust and estimate that it is likely to overstate Bristol's average cost of debt over the period by about 0.10%.

⁷³ Bristol Water Statement of Case, p. 437.

⁷⁴ KPMG (March 2015), 'Benchmarking Bristol Water's embedded debt', p.8

A2.5.2 Irredeemable Preference Shares

300. Bristol Water changed its accounting treatment of preference shares in 2006 in order to comply with the accounting standard FRS25 and now treats them as debt rather than equity with the associated dividends being reclassified as interest expense.
301. They attract a dividend rate of 8.75% and their inclusion increases the weighted average cost of embedded debt.
302. While we do not dispute the accounting classification as debt the preference shares do have some equity like attributes:
- The dividends, which are normally payable on annual basis, would not be payable if there were insufficient distributable reserves; and
 - The preference shares are subordinated to the Artesian debt which includes a dividend lock up clause in the event of failure to comply with debt covenants
303. Bristol Water is the only water only company where preference shares impact on the cost of its actual debt. We do not consider that it is appropriate to include preference shares in the cost of debt for an efficiently-financed notional company, given their equity-like characteristics and, which is consistent with approach by the Competition Commission when it excluded preference shares from the Bristol Water cost of debt in 2010.
304. In our indicative estimate of opening embedded debt costs in section A4.4.4.5 we have adjusted Bristol Water's assessment of fixed debt costs by excluding £12.5 million of preference shares which reduces the amount of fixed debt from £81.570 million to £69.070 million and reduces the nominal interest rate from 6.36% to 5.93%.

A2.5.3 Cash Holding and Issuance Costs

305. Bristol Water has included issuance costs of 0.10% together with an allowance of 0.20% to reflect the cost of holding cash balances in its assessment of the total cost of debt.
306. While the allowance of 0.10% for issuance costs is in line with the Ofwat industry standard allowance we consider that if a company specific cost of debt is adopted then for consistency issuance costs should also be specific to Bristol Water.

307. Bristol Water's actual cost of issuance is more than offset by significant lease premiums, particularly related to the issuance of Artesian debt. The premium received on the Artesian I loans amounted to £8.6m. Costs incurred in the issue of the Artesian I loans amounted to £2.6m. As a consequence the net proceeds from the loan were £6.0m higher than the face value of the loan.
308. The net premium received on the Artesian II loans amounted to £0.5m. Costs incurred in the issue of the Artesian II loans were £1.5m. In this case therefore, the net proceeds from the loan were £1.0m lower than the face value of the loan.
309. Bristol Water amortise net costs and premiums associated with loan issuance to their profit and loss account on a straight line basis over the term of the loans. Table A2.6 shows that the net position for issuance costs and premiums for its existing debt portfolio was £2.7 million on 31 March 2014 i.e. premiums have exceeded costs. It also shows the amortisation credits that are due in future years, with £0.4 million due between 1 April 2017 and 31 March 2019. We estimate the credit to be £0.5 million over the period, 2015-20 which equates to 0.03% of the value of existing debt.

Table A2.6 Net Premiums and Issuance Costs

The movements in net unamortised premiums were as follows:

	2014	2013
	£m	£m
Net unamortised premiums at 1 April	3.3	3.4
Amortised during the year	(0.4)	(0.1)
Loan issue costs on loans drawn during the year	(0.2)	-
Net unamortised premiums at 31 March	2.7	3.3

The premiums net of expense on issue of new loans are amortised over the terms of the respective loans. Amortisation credits due in future years are as follows:

	2014	2013
	£m	£m
Within one year	-	0.2
Between one and two years	-	0.2
Between two and five years	0.4	0.5
After five years	2.3	2.4
	2.7	3.3

Source: Bristol Water plc Annual Report 2014

310. For simplicity in our indicative assessment of the actual embedded cost of debt in section A4.5.1 we have assumed a credit of +0.03% to reflect actual issuance costs and premiums across the current debt portfolio, including Artesian finance. We have made an allowance for the cost of holding cash

0.20% within our assessment of the actual cost of debt, consistent with Bristol Water's submission and the assessment of the Competition Commission in 2010. We do not include these holding costs in our notional cost of debt as they are offset by the lower cost of short term floating debt, which is not factored into our notional cost of debt.⁷⁵

A2.5.4 Indicative Ofwat assessment of embedded debt costs

311. Table A2.7 illustrates our indicative assessment of opening embedded debt costs utilising the assumptions discussed in sections A4.5.1 to A4.5.3 together with our long term inflation assumption of 2.8% adopted in our final determination. We consider that 2.71% is a more reasonable estimate of the actual cost of debt than the Bristol Water submission of 3.14%. It is slightly below our industry standard allowance of 2.75%.

Table A2.7 Summary of Ofwat our long term inflation assumption of 2.8% adopted

Cost of Existing Debt	Amount	Nominal Interest Rate %	Real Interest Rate %
Index Linked Debt	170,495		3.39%
Fixed	69,070	5.93%	3.04%
New Fixed Loan Nov 14	50,000	2.40%	-0.39%
Variable	12,529	2.58%	-0.21%
Blended Cost of debt			2.54%
Cash Holding and Issuance costs			0.17%
Total cost of debt			2.71%

A2.5.5 Treatment of loan to holding company

312. A significant proportion of Bristol Water's most expensive debt, raised through Artesian finance at times of high interest rates, was not required to support the needs of the business. It was used to make immediate cash returns to holding company shareholders.

⁷⁵ Ofwat, [Risk and Reward guidance](#), p.21, footnote 23.

313. This was facilitated by raising Artesian debt in February 2004 and June 2005 within the regulated business Bristol Water plc. The regulated business then made two unsecured loans to the holding company Bristol Water Holdings UK, the first for £47.0 million in February 2004 and the second for £21.5 million in June 2005. The unsecured loans were not made on "back to back" terms, the first has a fixed interest coupon of 6.042% and the second a fixed rate of 5.550% whereas the debt raised in the regulated business was on a mixture of index linked and fixed rate terms.
314. These loans create an interest receivable of £4.0 million per annum within the regulated business as shown in Table A2.8. This is not recognised in Bristol Water's assessment of the cost of embedded debt.

Table A2.8 Net Interest Payable

	2014		2013	
	£m	£m	£m	£m
Interest payable and similar charges relate to:				
Bank borrowings		1.5		1.0
Term loans and debentures		9.2		9.0
- interest charges				
- indexation and amortisation of fees and premium on loans		4.8		4.8
Finance leases*		0.1		(0.1)
		15.6		14.7
Dividends on 8.75% irredeemable cumulative preference shares		1.1		1.1
Net Interest charge in respect of retirement benefit scheme		0.2		-
Interest payable and similar charges		16.9		15.8
Less interest receivable and similar income				
Loan to Bristol Water Holdings UK Limited - interest receivable	(4.0)		(4.0)	
Other external investments and deposits	(0.1)		(0.3)	
Interest receivable and similar income		(4.1)		(4.3)
Net interest payable and similar charges		12.8		11.5

Dividends on the 8.75% irredeemable cumulative preference shares are payable at a fixed rate of 4.375% on 1 April and 1 October each year. Payment by the Company to the share registrars is made two business days earlier. The payments are classified as interest in accordance with FRS 25.

* The amount for the prior year was a net gain due to a rebate per the lease agreement received last year.

Source: Bristol Water plc Annual Report 2014

315. Our notional cost of debt assumes that debt is raised for use in the business and is not loaned to the holding company. However, if the cost of debt is calculated on the actual cost of debt faced by Bristol Water, then any such calculation should net off the interest received from the interest paid by Bristol

Water. Otherwise customers will be paying for financing costs which are not incurred by the regulated company.

A2.6 Cost of Equity

316. The asset beta is the only variable in the cost of equity that is specific to the water sector. It captures the systematic risk that water company shareholders are exposed to, shareholders do not receive compensation for the non-systematic risk they run, as this risk can be removed by holding a well-diversified portfolio of securities.
317. We have based our estimate on the empirical beta evidence of the three listed WaSCs, including Pennon Group which is the parent company of South West Water.⁷⁶ There is one listed WoC, Dee Valley Water, but its shares are illiquid, meaning that there are particular difficulties in estimating a beta on the same basis as for the other companies.
318. For our Risk and Reward guidance in January 2014, we took into account observed betas for daily and monthly returns up to that point for Pennon, Severn Trent and United Utilities⁷⁷, which were as follows:

Table A2.9 Asset betas

	Daily betas over the last 2 years	Monthly betas over the last 5 years
Pennon	0.368	0.322
Severn Trent	0.323	0.231
United Utilities	0.302	0.276
Average	0.331	0.277

319. We sense-checked these results against the observed asset betas for National Grid and the energy company SSE, which were 0.27 and 0.46.⁷⁸ Based on this evidence, we concluded that the asset beta should be set at 0.3. All companies accepted that guidance: The enhanced companies

⁷⁶ South West Water makes up about 40% of the Pennon Group, on a revenue basis.

⁷⁷ Risk and Reward guidance, p. 17.

⁷⁸ Risk and Reward guidance, p. 18.

accepted this in April 2014, and the other companies accepted it in their business plan resubmissions. Some companies, however, argued for a company-specific asset beta higher than 0.3.⁷⁹

320. In our draft and final determinations, we continued to use an asset beta of 0.3. For our final determinations, we updated our evidence on the observed betas for listed water companies, and took into account the Competition Commission's decision in Northern Ireland Electricity.⁸⁰ However, this did not lead us to change our view on the asset beta.
321. It should be noted that, contrary to the CC in the 2010 Bristol Water appeal⁸¹, we have applied a Blume adjustment to all of these estimates, in order to avoid statistical biases that can affect the estimate of beta.⁸² The adjustment estimates the equity beta by taking a weighted average of the observed (raw) equity beta and the beta of the market, which is by definition equal to unity.⁸³ Since observed equity betas for water companies tend to be lower than one, the Blume adjustment results in a higher beta – and therefore a higher WACC. If we remove the adjustment, the asset betas are as follows:

Table A2.10 Asset betas

	Daily betas over the last 2 years	Monthly betas over the last 5 years
Pennon	0.286	0.231
Severn Trent	0.246	0.123

⁷⁹ See, for example, Bristol Water (June 2014), 'PR14 Business Plan – Wholesale Plan – June Submission', p. 102 and 105-106, where Bristol Water proposed an asset beta of 0.3675. Our policy on the company-specific uplift is discussed below.

⁸⁰ PwC (December 2014), 'Updated evidence on the WACC for PR14', p. 33.

We note that the CMA has recently commented – in its analysis of the cost of capital of energy firms for the Energy market investigation – that “monthly and quarterly betas are generally more reliable than those estimated on the basis of high frequency data, i.e. daily or weekly betas”. See CMA (February 2015), 'Energy market investigation - Analysis of cost of capital of energy firms', p. 15. This suggests that, if anything, more weight should be placed on the monthly betas, which would have led us to a lower beta estimate still.

⁸¹ See Competition Commission (August 2010), 'Bristol Water plc: A reference under section 12(3)(a) of the Water Industry Act 1991', final report, par. 118.

⁸² The use of a Blume adjustment is discussed in more detail in Competition Commission (August 2010), 'Bristol Water plc: A reference under section 12(3)(a) of the Water Industry Act 1991', final report, Appendix N, Annex 5 and Competition Commission (March 2014), 'Northern Ireland Electricity Limited price determination: A reference under Article 15 of the Electricity (Northern Ireland) Order 1992', final determination, appendix 13.2.

⁸³ In Bayesian terms, this means that our a priori estimate of beta is that it should be the same as the beta of the market.

United Utilities	0.221	0.176
Average	0.251	0.177

322. This would reduce our asset beta estimate by almost 30%. We note that removing the Blume adjustment would result in a cost of equity of 4.4%, which, we consider too close to the cost of debt, we remain of the view that it is appropriate to apply the adjustment, and to use an asset beta of 0.3
323. On this basis, we calculated an equity market risk premium of 5.5%⁸⁴ and a cost of equity of 5.65%.
324. Bristol Water accepts that the Ofwat estimate of asset beta of 0.3 is not unreasonable for industry level cost of capital, but argues for a company specific uplift on the basis of higher operational gearing as determined by the CC in 2010 and propose an asset beta of 0.3675. Bristol Water noted the higher historic cost variance of WoCs, compared to WaSCs, as set out by Ofwat in its risk and reward guidance. They also noted Moody's credit opinion which suggest provides for higher adjusted interest cover rating (1.4x), which reflects Bristol's size and relatively high operational gearing. Bristol also argued for illiquidity cost premium of 0.3% to 0.4% for unlisted WoCs, although it noted that the CC rejected this argument in its 2010 decision. Bristol noted that the case for an equity premium based on size alone was not strong.
325. We have carefully considered the approach of the CC in its 2010 decision and its potential relevance for setting price controls for WoCs in the 2015-20 period.
326. PwC⁸⁵ considered a range of arguments for an adjustment based on operational gearing in its report for Ofwat at the final determination. PwC found:
- a) No evidence that WoCs were inherently more risky than WaSCs on the basis of revenue, operating and capital cost risks.
 - b) Unlikely to be any operating leverage relating to revenue and volume (demand) risks due to the revenue cap approach to setting wholesale price controls adopted by Ofwat in PR14.

⁸⁴ Note that this is higher than the equity risk premium range of 4%-5% used in the CMA's Energy market investigation, see CMA (February 2015), 'Energy market investigation: Analysis of cost of capital of energy firms', p. 9-14.

⁸⁵ PwC, Company specific adjustments to the WACC, p.25-39.

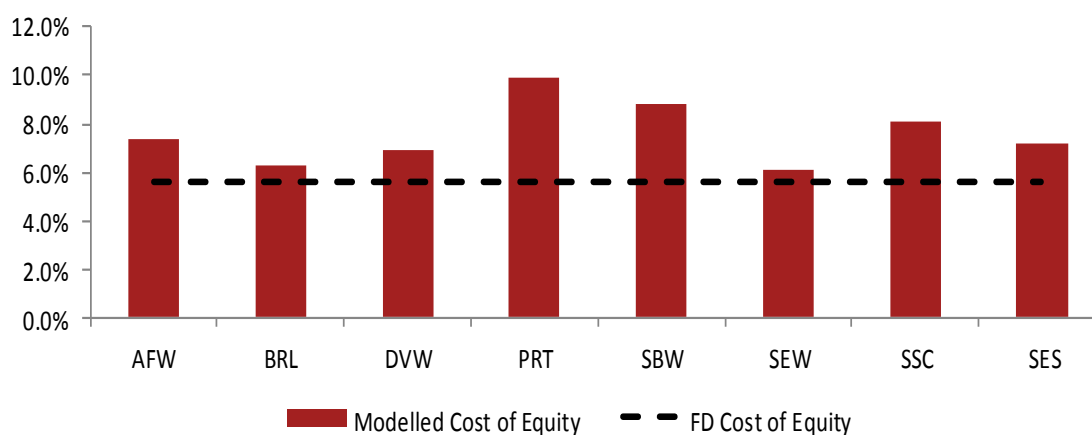
- c) If WoCs faced higher operational costs risks that when combined with revenue cap, this would not result in higher operational gearing or higher cost of equity, but on the contrary would imply case for a negative equity beta. This is because the performance of such a business would be negatively correlated with a more normally structured business.
- d) Capital costs are unlikely to result in operational leverage or cost of equity impact on WoCs.
- e) A fundamental problem with the assumption that the cash flows as a proportion of total revenue is a good measure of operational leverage. The CC itself in 2010 urged caution with this measure. PwC outline issues including; the assumption that operating costs are fixed over a 5 year period, that depreciation is variable and that financing costs reduce operational leverage.

327. PwC concluded that they could not establish a conceptual basis for greater exposure to systematic risk as a result of a higher ratio of operational cash flows to revenue.

328. PwC also found that if the approach used by the Competition Commission in the 2010 Bristol Water case is applied to WoCs in 2015-20, it does not result in stable basis for estimating the cost of equity of WoCs. Based on an adjustment of asset betas for operational gearing, the cost of equity for WoCs would range from 6.1% to 9.9%. For Portsmouth Water, for example, the formula used by the CC would result in a cost of equity of 9.90%, 4.25%-points higher than our single notional cost of equity. This suggests that operational gearing is not a good measure of difference in systematic risk between water companies.

Figure A2.2 Company uplift using the Bristol Water 2010 CC methodology⁸⁶

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329. Against this, Bristol Water offered a number of arguments.

- i. For instance, it relied on analysis we had carried out for our Risk and Reward guidance⁸⁸ to conclude that historical variation in RoRE had been higher for WOCs than for WaSCs. It suggested that this difference did not appear in the forecast RoRE ranges for 2015-20 because the “scenarios [used by different companies] were not consistent”, because “it [was] unlikely that companies [had] assessed probability levels in the same manner” and because we had published guidance on the likely RoRE ranges, which would “naturally lead companies to submitting scenarios that are close to that range.”⁸⁹
- ii. In regard to evidence on historic cost variation as set out in Ofwat’s risk and reward guidance, PwC noted that while the data suggests that WoCs historically were more sensitive to cost risks that this is likely to reflect specific rather than systematic risk relevant to allowed returns. We note that there are a number of limitations with the use of historic cost variation data to measure risk:
 - a) The data measures return relative to the average return on equity, rather than to the returns – and spending levels – we allowed in our previous price reviews.

⁸⁶ Graph adapted from PwC (August 2014), ‘Company specific adjustments to the WACC - A report prepared for Ofwat’, figure 11 on p. 35.

⁸⁷ Graph adapted from PwC (August 2014), ‘Company specific adjustments to the WACC - A report prepared for Ofwat’, figure 11 on p. 35.

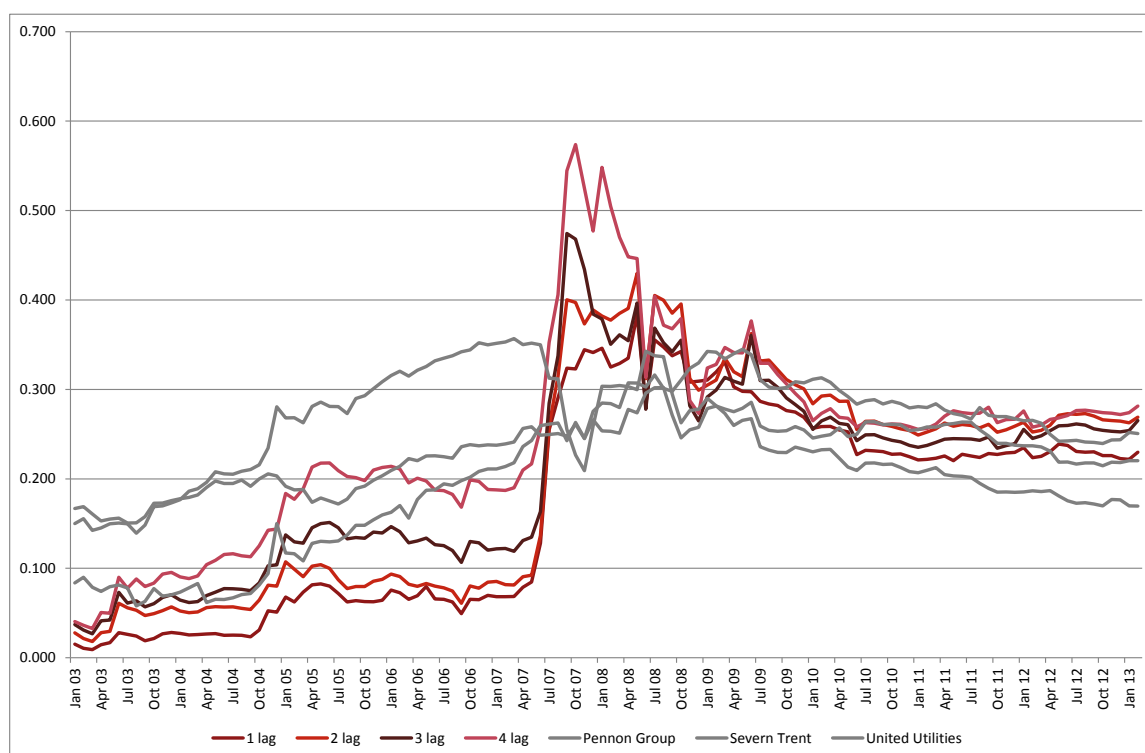
⁸⁸ Risk and Reward guidance p. 43, figure 11 and 12.

⁸⁹ Bristol Water (October 2014), ‘Bristol Water Representation on the PR14 Draft Determination’, p. 35.

- b) The ranges do not take account of returns to end 2009-14 period and so exclude end of period reconciliation, which may have significant impact on returns and need to be taken into account;
 - c) These ranges, which were based on accounting data rather than a measure of economic returns based on regulatory building blocks, and
 - d) The ranges showed a simple summation of the highest and lowest values observed for each category of costs and were intended to and act as a cross-check for our guidance on RoRE ranges, rather than measure systematic risk.
- iii. The forward-looking RoRE ranges, on the other hand, is based on a consistent analysis of business risks viewed from a regulatory building blocks perspective. We consider that the results we have obtained in the PR14 risk assessment process are sufficiently robust to allow us to reach conclusions about the relative risk exposure of different companies, albeit including both specific and systematic risk. As our analysis shows no material differences between companies, we consider that this supports our view that there is no difference in level of systematic risk and noncase for a company-specific uplift on the cost of equity. The RoRE includes a full range of risk and returns for 2015-20 including ODIs, which are not included in the historic data.
330. In addition to above evidence, we considered the following empirical evidence on relative risk between WoCs and WaSCs.
331. We observed **the beta of Dee Valley Water**, the only listed WOC. While we recognised the difficulties associated with estimating a beta for a share that is traded as infrequently as Dee Valley Water, we concluded that it does not have an asset beta that is demonstrably higher than the asset betas of Pennon, Severn Trent and United Utilities, contrary to what Bristol Water suggested should be the case.⁹⁰ This results are robust to changes in the lag used for the Dimson beta analysis.

⁹⁰ See PwC (August 2014), '[Company specific adjustments to the WACC - A report prepared for Ofwat](#)', p. 36-37 and PwC (December 2014), '[Company specific adjustments to the WACC - A review of company representations](#)', figure 4 on p. 12.

Figure A2.3 Betas for listed water companies, including the Dee Valley Water beta estimated using different Dimson lags



332. WaSCs and WOCs tend to have **similar valuation ratios**.⁹¹ That is to say, for both WaSCs and WOCs the price paid in a merger or acquisition in recent years tends to be about £1.20 for every pound of RCV, ranging from £0.93 in the acquisition of Wessex Water in 2002 by YTL Power International Bhd to £1.53 in the acquisition of South Staffordshire Water in 2004 by the First Islamic Investment Bank. The current shareholders of Bristol Water bought their shares for £1.51 per pound of RCV (Agbar, 2006), £1.22 (Capstone, 2011) and £1.25 (Itochu, 2012). This suggests that shareholders do not require a higher return to hold shares in Bristol Water or in small WOCs generally.
333. We noted that WaSCs and WOCs tend to have similar levels of **gearing**.⁹² As high-risk companies tend to maintain more equity, in order to absorb variation

⁹¹ See PwC (August 2014), 'Company specific adjustments to the WACC - A report prepared for Ofwat', figure 13 on p. 38.

⁹² See PwC (August 2014), 'Company specific adjustments to the WACC - A report prepared for Ofwat', table 19 on p. 47. Note that in the past, WOCs tended to have lower gearing than WaSCs, but in recent years that is no longer the case.

in returns and meet debt obligations, this suggests that the boards of these companies consider them as having similar risk.

334. In regard to higher requirements of credit rating agencies on Bristol Water, as we noted at draft determination, another WoC, Portsmouth Water was forecast to experience FFO/debt ratios below 6.0% on the basis of its actual company, while continuing to target its BAA1/BBB credit ratings⁹³. This is well below the 10% FFO/debt target for Bristol Water and suggests that company specific factors rather than differences in inherent risk between WoCs and WaSCs may explain Bristol Water's higher target ratio.
335. Finally, we observed that among listed WaSCs, there is no significant **relationship between the level of operational gearing and the observed asset beta**.⁹⁴ This suggests that, there is no empirical relationship between the measure of operational gearing proposed by Bristol Water and beta estimates..
336. The historic and forecast ratios of totex to RCV for each company are as follows:

Table A2.11 Ratio of totex to RCV during the PR09 and PR14 price control periods

Company	PR09	PR14
Anglian Water	12.9%	14.1%
Dŵr Cymru (Welsh Water)	13.4%	12.1%
Northumbrian Water	14.0%	14.7%
Severn Trent Water	15.1%	16.6%
South West Water	11.0%	12.6%
Southern Water	15.2%	14.2%
Thames Water	16.0%	14.3%
United Utilities	14.4%	12.7%
Wessex Water	12.3%	14.7%
Yorkshire Water	12.8%	13.7%

⁹³ Ofwat, [Draft price control determination notice: company specific appendix –Portsmouth Water](#).

⁹⁴ See appendix D.

Company	PR09	PR14
Affinity Water	24.2%	23.8%
Bristol Water	29.8%	22.8%
Dee Valley Water	28.1%	28.7%
Portsmouth Water	25.2%	26.5%
Sembcorp Bournemouth Water	20.2%	22.1%
South East Water	17.0%	16.0%
South Staffordshire Water	28.2%	30.7%
Sutton & East Surrey Water	24.0%	24.1%
Average of all companies	18.5%	18.6%
Average of WaSCs	13.7%	14.0%
Average of WOCs	24.6%	24.4%

Note:

PR09 data based on outturn totex at the appointee level.

PR14 data based on the sum of allowed totex at the wholesale level, retail household allowed cost to serve and indicative non-household cost to serve.

337. While this table shows that the average WaSC has a lower ratio of totex to RCV than the average WOC, there are significant differences between companies in each group. Severn Trent will have a higher ratio in the PR14 period than South East Water, even though the former is a WaSC and the latter is a WOC.
338. We do not observe any relationship between operational gearing and asset beta for listed companies. The table above shows that South West Water, which had the lowest ratio of totex to RCV of any company during the PR09 price control period, also had the highest asset beta.⁹⁵ This is not consistent with a direct link between higher operational gearing and a higher asset beta as proposed by Bristol Water.
339. Finally, we note that in response to our draft determination that did not allow an uplift to the cost of equity to any WoC, that five out of seven WoCs do not

⁹⁵ Note that South West Water makes up about 40% of its parent company, the Pennon Group, on a revenue basis.

make representations seeking an adjustment on the cost of equity at final determination. We remain of the view that there is not a sound conceptual basis for making an adjustment to the cost of equity based on difference in operational gearing. This is supported by a range of empirical evidence on systematic risk in the sector.

A2.7 Legal validity of the benefits test

340. Bristol Water⁹⁶, argued that the benefits test was inconsistent with our statutory duties.⁹⁷ The main focus of these representations was the interpretation of our financeability duty and the manner in which the different statutory duties should be balanced.
341. Simply put, Bristol Water effectively submits that our financeability duty under s.2(2A)(c) of the Water Industry Act 1991 includes a separate duty to secure reasonable returns⁹⁸, which it defined in its price control submissions as:
- A return which covers debt costs, “except to the extent that those costs are demonstrably due to inappropriate management decisions”; and
 - A “fair return on equity”⁹⁹, i.e. “fair return specifically to Bristol Water’s shareholders”.¹⁰⁰
342. Bristol Water submitted that this duty was owed with respect to the company as it is, rather than with respect to a notionally structured, efficiently operated company.¹⁰¹
343. Bristol Water’s case is contrary to longstanding and best regulatory practice. Companies are expected to operate efficiently and Ofwat, and other regulators, have never endorsed inefficiency in the sense of passing on costs, leading to higher charges to consumers, which could have been avoided through management action. The cost of capital is not conceptually different

⁹⁶ See Bristol Water Statement of Case, p. 444-446 and Bristol Water (October 2014), ‘Bristol Water Representation on the PR14 Draft Determination – Appendices’, p. 204-205.

⁹⁷ A full review of companies’ representations on this point is available in Ofwat (December 2014), ‘Final price control determination notice: policy chapter A7 – Annex 3: benefits assessment of an uplift on the cost of capital’, p. 13-14.

⁹⁸ See Bristol Water Statement of Case, p. 47, p. 410, p. 412, and p. 444-446.

⁹⁹ Bristol Water (October 2014), ‘Bristol Water Representation on the PR14 Draft Determination – Appendices’, p. 198.

¹⁰⁰ Bristol Water (October 2014), ‘Bristol Water Representation on the PR14 Draft Determination – Appendices’, p. 201.

¹⁰¹ Bristol Water Statement of Case, p. 412.

from any other cost. If a company raised capital at an unexplained premium it is hard to see why consumers should pay for this decision, in much the same way as an unjustified over-payment for an item of investment or labour costs would never be sanctioned. This mechanism provides incentives to reduce costs. It is the strength of comparative regulation that this enables comparative efficiencies to be identified and applied across the industry. Capital is no exception to this.

344. In this case, Bristol Water argues that its financing costs are higher due to its smaller scale of operation. Ofwat's answer is as follows.
345. First, as set out above, we are not convinced there is sufficient evidence that Bristol Water does in fact actually face higher financing costs.
346. Secondly, even if they are higher, we are not persuaded that any higher financing costs, possibly as a result of its smaller scale of operations are unavoidable. Companies have a number of options for addressing diseconomies of scale with regard to financing costs such as pooling debt with other companies as happened in relation to Artesian finance; and, with the imminent relaxation of the merger control regime, sub-optimal operations might be remedied by acquiring scale. The coming changes to the special water merger regime are set out in the Water Act 2014.
347. Lastly, Ofwat took the view, however, that where there is some benefit in maintaining sub-optimal scale and relative inefficiency then higher costs could be borne by customers and not shareholders. Ofwat engaged in a form of cost-benefit analysis, familiar in merger analysis, and assessed the worth of each WoC to the regulator for the information that each generated about comparative performance. For example, if the company added value to the regulator in identifying superior efficiency, there was merit in its continuation as an independent comparator if the benefits outweighed the detriment to consumers through higher charges.
348. Ofwat applied this approach to Bristol Water and was not convinced that the benefits outweighed the consumer detriment.
349. In our final determinations, we pursued well-established practice and considered that there was a single financeability duty, and that we had satisfied it by allowing sufficient revenue to make sure that Bristol Water was

able to finance its functions¹⁰², which includes a return sufficient for an efficient, notionally financed company to finance its functions.¹⁰³

350. Bristol Water's case is effectively that if its costs are higher, they must be taken into account in a more generous cost of capital or its ability to finance itself could be jeopardised. Ofwat's case is that the costs may not be higher, a factual matter; that even if they were higher, costs could be lowered by management action, possibly involving structural change; lastly, if, exceptionally, there was some merit in Bristol Water's current scale being maintained, only then should such higher costs be borne by customers.
351. As should be clear from the above, Ofwat has not elevated or prioritised the duty to protect the interests of consumers (the consumer objective in section 2(2A)(a) of the Water Industry Act 1991) over meeting the financing duty.¹⁰⁴ Bristol Water is seeking to elevate the financing duty over the interests of consumers in expecting customers to pay for what may be avoidable higher financing costs. Ofwat's position is that this is a false dichotomy: our aim is to create a framework and incentive regime that aligns the interests of investors and companies with the interests of customers. And specifically in relation to the consumer and financing duties – we think of it as trying to maximise the interests of existing and future consumers, maximising the delivery of what customers want, subject to ensuring that efficient companies can access capital markets.
352. We consider that the benefits test is appropriate in order to ensure that we fulfil all our duties so far as is practicable. We consider that the test is consistent with our consumer duty as it only allows incremental financing costs above efficient levels to be passed on to customers where it furthers consumers' interests to do so. We also consider that the test is consistent with our financing duty as our determinations are sufficient to make sure that all companies are financeable on the basis of an efficient, uniformly notionally structured company.

¹⁰² See Ofwat (December 2014), '[Final price control determination notice: policy chapter A8 – financeability and affordability](#)', section A8.2 p. 10 and Ofwat (December 2014), '[Final price control determination notice: company-specific appendix – Bristol Water](#)', section A5.5, p.55.

¹⁰³ See Ofwat (December 2014), '[Final price control determination notice: policy chapter A7 – Annex 3: benefits assessment of an uplift on the cost of capital](#)', p. 16.

¹⁰⁴ Bristol Water essentially made this argument in its Statement of Case, p. 444-445 and in Bristol Water (October 2014), 'Bristol Water Representation on the PR14 Draft Determination – Appendices', p. 204.

353. We also note that following our final determination, the rating agencies have not set out any concerns relating to the assessment of financing of WoCs, in relation, to the disallowance of any WACC premium.
354. A full review of companies' representations on this point, as well as our responses, is available in our final determination documents.¹⁰⁵

A2.8 Benefits

355. Our analysis, which resulted in a separate benefits estimate for each small WOC, started from the proposition that not allowing an uplift would increase the probability of the company merging with another water company. We then considered a number of impacts a merger might have in areas such as:
- Our wholesale cost assessment in future price controls, specifically
 - the amount of expenditure allowed;
 - the precision of the econometric models.
 - Our retail cost assessment in future price controls;
 - The rewards and penalties under the Service Incentive Mechanism in future price controls;
 - The rewards and penalties under outcome delivery incentives in future price controls;
 - Service quality; and
 - Innovation.
356. In its Statement of Case, Bristol Water referred to the same March 2014 Oxera report that it already submitted in June 2014 and in October 2014, without adding any new analysis.

A2.8.1 Benefits – Wholesale Cost Assessment

357. In its response to our draft determinations, Bristol Water made detailed submissions about our wholesale cost modelling. It suggested that, if the modelling were done as it proposed, Bristol would rank among the most efficient companies in the sector¹⁰⁶, meaning that under the benefits test it would show a net benefit related to wholesale cost assessment. However,

¹⁰⁵ See Ofwat (December 2014), 'Final price control determination notice: policy chapter A7 – Annex 3: benefits assessment of an uplift on the cost of capital', p. 13-14 and p. 16-17.

¹⁰⁶ See Bristol Water (October 2014), 'Bristol Water Representation on the PR14 Draft Determination – Appendices', par. 3.2 and p. 203, 205.

since we did not accept Bristol’s representations on this point¹⁰⁷, we did not reflect this in our final conclusions. In fact, when we updated our analysis to take into account the final determinations version of the wholesale cost modelling, Bristol Water showed an even larger net detriment than it did in our draft determinations.

A2.8.2 Benefits – Other

358. Bristol Water also said that the benefits analysis we carried out in our draft determinations was too narrow, as it provided a range of other benefits to its customers as well.¹⁰⁸ In its response to our draft determination, it gave a number of examples of customer engagement.¹⁰⁹ However, it did not provide evidence showing how these benefits depended on the company-specific uplift. In our final determination, we rejected the suggestion that the scope of the test was too narrow, because there was insufficient evidence that larger companies engage with the community less than smaller companies.¹¹⁰ In its Statement of Case, Bristol Water claimed that “this local engagement is (...) not delivered by other larger organisations”¹¹¹, but did not elaborate or provide evidence. It also claims that Ofwat “...has tested the presence of customer benefits by reference to one measure only, namely, which WoCs constitute efficient wholesale comparators.”¹¹² We reject this claim and as set out below have considered quantified benefits for the customer service incentive mechanism (SIM), the impact on comparative outcomes and a range of other potential benefits on a qualitative basis.

Table A2.12 Evidence provided Bristol Water

Revised BP (June)	DD Response (October)
<ul style="list-style-type: none"> Difference in the level of bills between WOCs and WaSCs; 	<ul style="list-style-type: none"> Bristol Water engagement with customers¹¹³;

¹⁰⁷ See Ofwat (December 2014), ‘Final price control determination notice: policy chapter A3 – wholesale water and wastewater costs and revenues’, p. 24-25 and Ofwat (December 2014), ‘Final price control determination notice: company-specific appendix – Bristol Water’, section A2.3, p.21.

¹⁰⁸ Bristol Water Statement of Case, p. 445, which incorrectly claims that we accepted only one type of customer benefit.

¹⁰⁹ Bristol Water (October 2014), ‘Bristol Water Representation on the PR14 Draft Determination – Appendices’, p. 205-207.

¹¹⁰ See Ofwat (December 2014), ‘Final price control determination notice: policy chapter A7 – Annex 3: benefits assessment of an uplift on the cost of capital’, p. 20-21.

¹¹¹ Bristol Water Statement of Case, p. 446.

¹¹² Bristol Water, Statement of Case, p445, para 1773.

¹¹³ Bristol Water provided similar evidence in its Statement of Case, p. 76-79. Neither submission sets out why Bristol Water considers that it is unique in this regard.

- Difference in ratio of revenue to RCV between WOCs and WaSCs; and
- Difference in efficiency between WOCs and WaSCs.

A2.8.3 Benefits – Conclusion

359. At -£29 million to -£21 million, the net benefit to customers of allowing a company-specific adjustment for Bristol Water is significantly more negative than that of any other water company. This is not caused by a single factor. While our estimate of the benefit under the SIM is positive for Bristol Water, we estimated a disbenefit in every other area we looked at. Simply put, our analysis shows that Bristol consistently performs poorly in most areas, meaning that it has no value as a comparator. Therefore we concluded that customers would not benefit from any uplift that we might allow for Bristol Water.

Table A2.13 Our draft and final determinations for Bristol Water¹¹⁴

Impact (£m, 30-yr NPV)		Draft Determination	Final Determination
Wholesale Costs Benchmark		-£6m to -£3m	-£19m to -£10m
Wholesale Loss of Precision		-	-
Retail Average Cost to Serve		-	-
SIM		-	£1m to £3m
ODIs	Negative Water Quality Contacts		x
	Mean Zonal Compliance		✓
	Water Supply Interruptions		x
Service Quality		-	-
Innovation		-	-

¹¹⁴ Adapted from Ofwat (December 2014), 'Final price control determination notice: policy chapter A7 – Annex 3: benefits assessment of an uplift on the cost of capital', p. 48-50.

Gross benefits	-£6m to -£3m	-£18m to -£7m
Increased financing cost	-£12m	-£13m
Net benefits of allowing a 0.15% uplift	-£18m to -£15m	-£29m to -£21m

360. The main cause of this shift was the method we used to combine historic and future rankings. For our draft determinations, we used historic and future data to create a single ranking of efficiency scores, which we then used to forecast future rankings and the impact of a loss of comparator. In response to our draft determinations, companies pointed out that this approach could lead to counterintuitive results, and proposed that we carry out our analysis using historic and future ranking separately, and then take a weighted average of the results. For our final determinations, we adopted this suggestion, which for many companies had the effect of significantly increasing the impact.

Appendix 3: Financeability and affordability

A3.1 Background

361. On page 38 of our opening statement we provided an explanation of our price control framework as it relates to financeability and affordability. For the sake of completeness, we also include a list of all the documents relevant to our assessment of financeability and affordability in the table below:

Table A3.1

Document name	Document date	Document purpose
Setting price controls for 2015-20 – final methodology and expectations for companies' business plans	July 2013	Outlines the methodology we planned to use in assessing financeability
Setting price controls for 2015-20 Draft price control determination notice: technical appendix A7 – financeability and affordability	August 2014	Sets out our approach to assessing financeability and affordability in setting draft determinations for the five years from 1 April 2015
Setting price controls for 2015-20 Draft price control determination notice: company-specific appendix – Bristol Water	August 2014	Sets out our assessment of financeability and affordability for Bristol Water at draft determination
Setting price controls for 2015-20 Final price control determination notice: policy chapter A8 – financeability and affordability	December 2014	Sets out our approach to assessing financeability and affordability in setting final determinations for the five years from 1 April 2015 and summarises the results of our review of representations received following publication of the draft determinations
Setting price controls for 2015-20 Final price control determination notice: company-specific appendix – Bristol Water	December 2014	Sets out our assessment of financeability and affordability for Bristol Water at final determination including our interventions in

Document name	Document date	Document purpose
		relation to their PAYG rates

A3.2 Points raised by Bristol Water

362. In their Statement of Case to the Competition Market Authority, Bristol Water disputed a number of issues relevant to the assessment of financeability and affordability. The argument that Bristol Water presented is set out in section 17 of the statement their case to the CMA and they have also provided a report that they have commissioned from KPMG which is titled “Financeability of Bristol Water’s PR14 Business Plan”. In paragraph 2245 Bristol Water states that its business plan “...would not be financeable under FD14”. The main points of its arguments are summarised as follows:
363. Bristol Water challenged the basis on which we had carried out our financeability assessment. It questioned the use of the notional capital structure and the inclusion of only the costs which Ofwat view to be efficient when we carried out the financeability assessment. It stated that any assessment of financeability should reflect their actual capital structure and actual costs. Bristol Water also challenged the Ofwat treatment of the menu penalty which they receive as a result of selecting a menu position greater than 100 as a post financeability adjustment, which as result we exclude from the financeability assessment.
364. Bristol Water questioned Ofwat’s approach to calculating the financial indicators which have been used to assess whether the plan is financeable. Specifically it has highlighted the differences between the calculations used by Ofwat in our assessment of financeability and the calculations used by the various rating agencies. It has also questioned the levels of particular financial ratios that we have used and the appropriate level of headroom that should be allowed.
365. Finally, Bristol Water has requested an increase in the level of revenue that it should be allowed through PAYG, to improve its financeability.

A3.3 Our response to Bristol Water's points

366. We do not accept some of the key assertions and claims made in the Bristol Water's submission.

A3.3.1 Basis of assessing financeability

367. One of our main statutory duties is to secure that relevant undertakers are able to finance the proper carrying out of their functions.

368. As set out in section 10.2 of our methodology document (Setting price controls for 2015-20 – final methodology and expectations for companies' business plans), and consistent with our long held policies in respect of setting price limits, we interpret this duty to require that we ensure that an efficient company can:

- earn a return at least equal to our allowed cost of capital; and
- raise finance on reasonable terms.

369. We assess financeability and financial ratios at a whole company level – using aggregated revenues, costs and cash flows associated with the regulated activities across the price controls that we have set. We have applied this approach consistently when considering the financeability of our determinations for each of the companies which we regulate and all companies other than Bristol Water have accepted our approach.

370. The key difference between our approach and the approach that Bristol Water has taken in the submission of its case is that in making an assessment of whether our determinations are financeable we consider an efficient notionally structured company and an efficient level of costs (including efficient levels of totex and financing costs which are consistent with our WACC).

371. We consider that this approach is appropriate as it means that the actual financial structure, including the timing of distributions of capital to shareholders is a matter for a company and its management to decide. Such decisions are made at its own and its investors' risk and not passed onto customers. In the same way if companies choose to spend totex which is in excess of the efficient level of costs which we have funded then they do so at its own risk. This approach also enables us to assess all companies on a consistent basis, ensuring that companies are treated in comparable manner.

372. In its own assessment of financeability, Bristol Water has included costs in line with its business plan which in many cases are in excess of the costs that we have determined to be efficient.
373. In 2010, in its determination in respect of Bristol Water, the Competition Commission agreed with the approach that we were taking in respect to the use of a notional capital structure when assessing financeability.
374. In paragraph 10.24 of its determination the Competition Commission stated that:
- “We therefore did not find it consistent with the consumer objective to determine that customers should pay higher prices either to rectify a possible financeability problem resulting from Bristol Water’s own earlier decisions about financial structure, or to fund future expansion that would confer a significant financial benefit on Bristol Water’s shareholders.”
375. We consider that the basis on which we have carried out our assessment of financeability remains appropriate and therefore we continue to take the approach of using a notionally efficient capital structure and notionally efficient costs.
376. Our financeability assessment is carried out before any adjustments to revenue in connection with legacy items, as these do not relate directly to the 2015-2020 price control period, and before the impact of any adjustments arising as a result of the company’s choice of menu position.
377. In paragraph 2254 of its submission to the CMA, Bristol Water challenged our treatment of the revenue penalty arising as a result of its menu choice as a post financeability adjustment, arguing that it should be taken into consideration when assessing financeability.
378. Adjustments relating to the company’s choice of menu position reflect the fact that the company has chosen a level of costs which differs from our view of efficient costs. In the case of Bristol Water at final determination, its costs reflected position 130 on the menu, however following final determination it has chosen to take position 125 on the menu and its revenues would be adjusted to take of this menu choice in our PR19 reconciliation.
379. The company’s allowed revenue at the point we undertake our assessment of financeability is consistent with its choice of costs. It is therefore appropriate to undertake a financeability assessment on this basis. The revenue penalty

relating to choosing a position on the menu which is above 100 reflects the fact that the company's costs are above the efficient level and it is not appropriate for customers to be paying for an inefficient level of costs.

380. This approach is also consistent with that adopted by the Competition Commission in 2010, paragraph 10.11 of the Competition Commission's determination on Bristol Water in 2010 stated:

"Further, since we were concerned with the financeability of an efficient company, we examined financial ratios before applying performance and incentive adjustments (such as adjustments for opex and capex outperformance, CIS and the overall performance adjustment)."

381. Sub-paragraph 6A.6 of Condition F of Bristol Water's licence includes a requirement for the company to use all reasonable endeavours to maintain an investment grade credit rating, however we do not specify where within investment grade companies should target.

382. We asked companies to set out in their business plans what level of investment grade credit rating they were targeting and why they considered it to be appropriate. Bristol Water has set out that it is targeting a credit rating consistent with Moody's Baa1 [CONFIDENTIAL]. We note that this is above the minimum required to meet investment grade credit rating and we do not consider our financing duty requires us to target a particular level of credit rating.

383. The Board of Bristol Water also provided assurance to us that Bristol Water was financeable on a notional basis in its June business plan. And as can be seen in Table A5.7 of our Final Determination document and in Section A1.5 of our Referral of Bristol Water's determination to the CMA, the financial ratios we calculated were broadly comparable to the notional financeability ratios submitted by Bristol Water in its June business plan.

384. We note that Bristol Water's regulatory accounts at 31 March 2014 show that the company was 68% geared with net debt of £292.3 million. The total index linked debt at that date was £167.7 million comprising 57% of the total net debt. In paragraph 2267 of its Statement of Case to the CMA, Bristol Water indicated that it expects gearing at the start of AMP 6 to be c.68% and therefore close to the notional position. We understand that recent changes in debt relate to fixed and floating rate debt but not to index linked debt, as a result the proportion of its debt that is index linked is expected to be higher than the 33% assumed in the notional structure, which is an advantage when

assessing financeability based on its actual structure as higher levels of index linked debt result in lower cash outflows compared to similar levels of non-index linked debt.

A3.3.2 Calculation of financial ratios

385. As set out in our methodology (Table 13 and Table 14 on pages 144 and 145), we use a number of financial indicators in assessing whether a company is financeable.
386. In its Statement of Case to the CMA, Bristol Water identifies two of these financial ratios as being of particular importance, FFO/Debt and ACICR.
387. Bristol Water states (Paragraph 2301) that it is seeking a Moody's ACICR of at least 1.4 [CONFIDENTIAL] to enable it to retain its current credit ratings. The level of these indicators is consistent with the credit ratings that Bristol Water has stated that it is targeting. However, as noted above, we did not consider that our financing duty requires us to allow Bristol Water to meet these levels, even on the basis of notional efficient company. The target rating reflects management preferences and the trade-off between cost of debt and balance of risk and return. We accept there may be benefits to customers in targeting a particular credit rating and we have allowed companies to use PAYG and RCV run off rates in such circumstances¹¹⁵.
388. Figure A2.9 in our Referral of Bristol's determination to the CMA shows the average of these [CONFIDENTIAL] financial indicators over AMP6 based on our final determinations and shows that on a notional basis the financial indicators for Bristol Water are relatively high compared to the other water companies.
389. The figures Bristol Water has submitted in Tables 163, 164 and 165 of its Statement of Case to the CMA are based on the company's actual capital structure and actual costs. Therefore the basis on which this information has been prepared is inconsistent with the approach that the CC previously agreed was appropriate when assessing financeability for a regulated company. We are therefore focusing our response on the financial ratios calculated on a notional basis, including an efficient assessment of costs as discussed above.

¹¹⁵ For example, see final determinations for Severn Trent Water and United Utilities.

390. In sections 17.2.4.1, 17.2.4.2 and 17.2.4.3 of its Statement of Case to the CMA, Bristol Water identifies that there are certain differences between the calculations of financial ratios used by Ofwat and by the ratings agencies. We acknowledged these differences in table A5.6 of Bristol Water's company specific appendix to the financial determination and noted that each of the rating agencies use its own methodology for calculating financial indicators and that we are not seeking to replicate any one agency's specific methodology.
391. The key differences in the basis of calculations that have been highlighted by Bristol Water are set out below:

Table A3.2

Rating Agency	Difference in Approach	Ofwat Response
Moody's	<ul style="list-style-type: none"> When calculating FFO to net debt we use average net debt whereas both Moody's use year-end net debt 	<ul style="list-style-type: none"> We use average net debt as it is more mathematically consistent with the calculation of FFO used in the numerator of this ratio. We note however that the rating agencies have a different approach and so we have recalculated the ratios using year end net debt below for reference
Moody's	<ul style="list-style-type: none"> Ofwat exclude preference dividends/preference shares from their calculations of interest and net debt whereas Moody's includes preference shares and the associated dividends in its calculations 	<ul style="list-style-type: none"> Under International Financial Reporting Standards, preference shares should be treated as debt. Within the Ofwat notional structure all debt is remunerated at the same rate in line with the cost of debt that is consistent with the WACC. As a result, the impact of the two approaches is the same and no adjustment needs to be made

392. The table below shows the FFO/net debt and ACICR ratios calculated by Ofwat and the impact of using the alternative calculations as discussed above:

Table A3.3

Ratio	2015-16	2016-17	2017-18	2018-19	2019-20	Average	Bristol's stated target
FFO/ Average Net Debt (Ofwat calculation)	15.5%	11.8%	11.9%	11.2%	9.9%	12.1%	10% (but Bristol Water is willing to accept 9% in 2019-20)
FFO/Year End Net Debt	15.2%	11.3%	11.4%	10.7%	9.5%	11.6%	10% (also see above)

Ratio	2015-16	2016-17	2017-18	2018-19	2019-20	Average	Bristol's stated target
[CONFIDENTIAL] ¹¹⁶	[]	[]	[]	[]	[]	[]	[]
[CONFIDENTIAL]	[]	[]	[]	[]	[]	[]	[]
ACICR (Ofwat calculation)	2.24	1.53	1.66	1.60	1.40	1.69	1.4x
Interest Cover (Ofwat calculation)	4.43	3.60	3.60	3.41	3.12	3.63	2.5-4.5
[CONFIDENTIAL]	[]	[]	[]	[]	[]	[]	[]

393. The figures set out above which refer to the Ofwat calculations are consistent with Phase 7 of the Ofwat financial model, which is the phase at which we carry out our financeability tests, before the introduction of revenue adjustments relating to legacy items or menu incentives.
394. The FFO/Debt figures fall over time due to the challenging capital expenditure programme which Bristol Water has put in place and this pattern of falling ratios is consistent with the company's own plan on an actual and a notional basis. (See table A8 of the June 2014 business plan submission).
395. The average ratios are well above the company's own targets, demonstrating that an efficient company will be able to manage its business to ensure that it is able to meet the level of financial ratios which are consistent with its targeted financial ratios. The company has a number of tools available to it to enable it to manage these over the AMP by re-profiling expenditure, reducing dividends or raising additional equity.
396. It is also worth noting that the Ofwat model assumes that on the opening balance sheet at 1 April 2015 33% of the debt is index linked. The model then assumes that all new debt raised is fixed rate debt which is non index linked. Therefore for Bristol Water, as a result of its large capital programme, by 31 March 2020 the proportion of debt which is index linked has fallen to 25%. This gives the company an additional lever to manage financeability by raising new debt in the form of index linked debt.

¹¹⁶ [CONFIDENTIAL]

397. [CONFIDENTIAL]
398. In its Statement of Case (paragraph 2352) Bristol Water has also highlighted that Moody's has stated that it would reverse the excessive use of PAYG rates to resolve financeability issues where it believed such use was not sustainable.
399. In their "Sector In-Depth" report dated 17 December 2014, Moody's stated that "We believe that changes in the speed of money will not in and of itself change a company's credit quality. On a net present value basis, the movements will be neutral. For Moody's Adjusted Interest Cover Ratio calculation, we reverse out speed of money adjustments by increasing regulatory capital charges by a corresponding amount. We believe this provides a more accurate picture of an entity's credit quality, as the immediate cash flow is a temporary rather than a permanent benefit, and revenues received now will reduce revenues receivable in the future. However, excess fast money can have positive implications for a company's liquidity position and offset immediate funding pressures (e.g., in the case of Bristol Water)."
400. The appropriate level of PAYG rates is discussed in more detail below, but given that Bristol Water has an RCV which is growing in real terms over the AMP, it does not appear that the rate of PAYG would lead to Moody's considering it to be excessive. Further, Bristol Water is asking for a potential increase in its PAYG rates to improve financeability which leads us to believe that it does not see a significant risk that Moody's would make an adjustment to the calculation of its financial ratios to reflect the fact that it considers the current rate of PAYG excessive.
401. Since we issued our final determinations for all companies there has been a measured response from the rating agencies.
402. Moody's has reaffirmed the credit ratings of a number of companies since final determination. Yorkshire Water has been put on notice that it is being reviewed for a potential down grade, however Moody's has made it clear in their publication dated 26 February 2015 (Rating Action: Moody's places Yorkshire Water's ratings under review for downgrade) that the reason it is considering downgrading Yorkshire Water is due to its actual debt structure and the risks within its substantial derivatives portfolio and not due to the outcome of the final determination in respect of AMP 6.

403. In the case of Bristol Water, Moody's has changed its outlook from stable to negative. It has not indicated that it is looking to downgrade Bristol Water's rating but identifies that the final determination is challenging for Bristol Water compared to where they were in the previous AMP and that there is ongoing uncertainty in respect of the outcome of the CMA's review. However, Moody's concerns appear to primarily relate to the totex gap and as such represent the difference between the efficient cost allowance and Bristol's actual costs.

404. [CONFIDENTIAL]

A3.3.3 Calculation of PAYG rates

405. As set out in our referral of Bristol Water's case to the CMA (pages 39-41), we made an adjustment to the PAYG rate we allowed for Bristol Water at the final determination.

406. In its Statement of Case to the CMA, Bristol Water has indicated that the PAYG rate that it has been allowed is at the lower end of the range that the companies have been allowed and that it should be increased.

407. The PAYG rates that Bristol Water submitted in its business plans and the rates that we used at both the draft and final determinations are shown below:

Table A3.4

PAYG Rates	2015-16	2016-17	2017-18	2018-19	2019-20	Average
December 2013 plan	52.1%	52.1%	52.1%	52.1%	52.1%	52.1%
June 2014 plan	53.7%	53.7%	53.7%	53.7%	53.7%	53.7%
Draft determination	53.7%	53.7%	53.7%	53.7%	53.7%	53.7%
Final determination	59.9%	54.0%	54.1%	54.1%	54.2%	55.3%
Bristol Water submission of case to CMA	66.0%	59.5%	59.4%	59.4%	59.3%	60.7%

408. Bristol Water did not request an increase in its PAYG rates in its initial representations on our draft determination. The adjustments made to the PAYG rates in the final determination were made following a late submission

to us by Bristol Water in November 2014, the reasons for the changes will be considered later in this section.

409. As Bristol Water has highlighted in table 167 within its Statement of Case to the CMA, the PAYG rate for Bristol is one of the lowest in the industry. This reflects Bristol Water's policy of expensing a relatively low level of IRE in each year (average 25%), with the balance of the IRE being capitalised in the accounts.
410. The PAYG rates that we allowed at the final determination averaged 55.3%. Operating expenditure plus IRE expensed to the profit and loss account as a proportion of totex is 50.29% which shows that the amount that we have allowed Bristol Water to recover through PAYG in the AMP is higher than the amount that the company has expensed.
411. It is also worth noting at this point that companies were also able to select an appropriate rate of RCV run off in respect of the 2015 RCV and appropriate asset lives for new additions to RCV post 2015, both of these items also have an impact on the level of allowed revenue in each year.
412. The company's RCV run off rate is 6%, which is in line with the rate submitted in their business plans. Only two companies had a higher water RCV run off rate than Bristol Water with the range of rates running from 2.36% to 7.56%.
413. In respect of asset lives for the additions to RCV in the AMP, we used a rate of 30 years in line with Bristol Water's business plan. For water services, new asset lives ranged from 13 years to 68 years with four companies selecting a longer asset live than Bristol Water.
414. In November 2014, Bristol Water made a late representation requesting that we recalculate their PAYG rate based on the formula.

$$\text{PAYG} = (233 + 0.2 * (\text{totex} - 233)) / \text{totex}$$

415. The figure 233 in Bristol Water's formula is equivalent to the operational expenses figure which was included in its June 2014 business plan.
416. Using our value for totex at the final determination this resulted in a calculated PAYG rate of 62.6%. We ran a model which used this level of PAYG to look at the impact on both allowed revenue and the associated financial indicators, this model also applied an NPV neutral bill smoothing adjustment to achieve the bill profile that the company set out in its representation which was

average bills of £178 in 2015-16 and average bills of £163 in each of the subsequent years in 2012/13 prices.

417. The impact of this adjustment was that financial ratios using this PAYG rate were significantly higher than for any other company with average FFO to debt being in excess of 15% and average ACICR being above 2.3 times. It also assumes that Bristol Water has an efficient level of operating cost within its June 2014 business plan, despite, the evidence from our cost assessment that Bristol Water's costs are well in excess of efficient levels. It is our view that this level of headroom is not in the interest of customers and therefore we rejected Bristol Water's representation.
418. The implication from the way that Bristol Water has designed the PAYG formula in its November 2014 representation is that if there was a reduction in totex as a result of Ofwat's assessment of efficient costs then it considers that any reduction should be to capex or IRE and not to operating expenditure.
419. As set out in Table A5.7 in Bristol Water's company specific appendix, following Bristol Water's representation on the draft determination we carried out an exercise to allocate the costs that we had disallowed from totex between capital projects and operating costs to provide a more accurate assessment of the level of operational and capital expenditure within our allowed totex. This showed that while our intervention did result in a reduction in capital expenditure there was also a reduction in operating costs. Therefore the formula being used by Bristol Water to calculate PAYG is giving the company excess revenue through PAYG when compared to the expenditure that it is including in its profit and loss account.
420. The level of wholesale operating expenditure we calculated for each year is c.£40 million in 2012/13 prices, this compared with total operating expenditure £40.1million in 2013/14 and £42.7 million in 2014/15 (all in 2012/13 prices).
421. Given the exceptionally large difference between allowed expenditure and Bristol Water's business plan and the differences between revenue allowed in final year of previous control, 2014/15 and first year of new control, 2015/16, we accepted Bristol Water's representation that it would be difficult for them to reduce their expected level of expenditure to meet our view of efficient costs immediately, but did not accept their view that it would take three years for them to reduce their expenditure to an efficient level. We have not allowed any other company a PAYG glide path. As set out in Table A5.6 in the Bristol Water company specific appendix to our final determination, we allowed them a one year financing glide path to reach efficient cost levels. To achieve this

we increased the PAYG rate in 2015/16 and made minor adjustments to the PAYG rates to hold revenues consistent over 2016/17 to 2019/20. Further details are set out in the company specific appendix to our draft determination for Bristol Water.

422. In its Statement of Case to the CMA, Bristol Water has suggested alternative PAYG rates which average 60.7%. It has not provided us with details as to how it has calculated these figures; however we note that it is still above the level of operational expenditure and IRE expensed.

A3.3.4 New information

423. Bristol Water has provided additional information in its Statement of Case and the supporting report from KPMG in connection with its financeability on an actual basis, but has not provided any further information in connection with its financeability on a notional basis.

A3.3.5 Beyond Bristol Water's final determination

424. Our assessment of financeability within this section is based on our view of an appropriate notional structure and assessment of an appropriate level of efficient costs.
425. Should the CMA determine an alternative level of efficient costs, then the assessment of financeability will need to be revisited; however we consider the methodology that we have applied in to date in assessing financeability would remain an appropriate approach.

Appendix 4: Outcomes

A4.1 Background

426. In section A1.2 of our opening statement we provided an explanation of our price control framework as it relates to outcomes. We included a list of all the documents relevant to wholesale costs in Table A2.1 of our Final Determination policy chapter A2 on outcomes.
427. In its Statement of Case to the Competition Market Authority, Bristol Water states that there is little dispute between itself and Ofwat on outcomes (paragraph 2051, page 509) except for the performance targets for Unplanned customer minutes lost, Negative water quality contacts and Mean zonal compliance. These were the three Bristol Water performance commitments covered by our comparative assessments. Bristol Water also sets out some objections to the comparative assessment approach.
428. We deal first with Bristol Water's observations on our overall approach to comparative assessments and then deal in turn with each of unplanned customer minutes lost, negative water quality contacts and finally mean zonal compliance.

A4.2 Points raised by Bristol Water and our responses

A4.2.1 Ofwat's approach to comparative assessments

429. Bristol Water sets out five main objections to our comparative assessments (paragraphs 1929, pages 485-486). Bristol Water adds two more points in paragraphs 1935 and 1936 on page 487. Bristol Water says points 3 and 4 are the most important (paragraph 1938, page 487). We address all the seven points below:
- 1) The comparative assessments do not take account of the specific circumstances of each company (paragraph 1929, first bullet point, page 485).
430. As explained in policy chapter A2 - outcomes we applied three criteria to assessing the company-specific factors raised. These three criteria were: whether the factor highlighted was a material driver of performance; whether the factor was outside management control; and whether the factor impacts the company (or companies) in a materially different way to other companies.

431. Our assessment of the 24 company-specific factors against these three criteria is set out at pages 44 to 46 of policy chapter A2. We considered three issues in more detail: the impact of urbanisation on sewer flooding; the impact of source water types on water quality contacts; and the impact of interconnectivity of networks on supply interruptions (pages 47-52). While we did not consider it was appropriate to adjust the upper quartile measures following our assessment of the company-specific factors, we do not agree that we took no account of them.
- 2) Ofwat's targets are unrealistic for Bristol Water (paragraph 1929, second bullet point, page 486). Two years is an insufficient glide-path to achieve upper quartile performance (paragraph 1931, page 486).
432. We expect all the water companies to be able to catch up with historical upper quartile performance in terms of service performance on the five comparative assessment measures and cost efficiency. Other companies have attained these levels of service at the cost levels that have been used to inform our modelling of PR14 costs and we expect both cost and service efficiency to improve over time. Nonetheless, we recognise that outcomes are new for companies. As a result, we have based the upper quartile on historical (2011-12 to 2013-14) upper quartile performance (not projected upper quartile performance) and have allowed companies a further two year glide-path before the incentives bite for not achieving historical levels of upper quartile performance.
- 3) Ofwat's targets do not take account of the preferences expressed by Bristol Water's customers and the economic level of service (paragraph 1929, third bullet point, page 486).
433. We explained in policy chapter A2 that when customers expressed their views to specific companies during the preparation of business plans, they generally did so without a full understanding of relative performance across the sector (page 37).
434. Bristol Water says that it presented the industry range of performance for unplanned customer minutes lost, leakage and negative water quality contacts within the research on incentives carried out in November 2013 (paragraph 1956, page 491). Bristol Water refers to section 6.5.7 of its Statement of Case for further information on the incentive research. However, we cannot find further information on the comparative information provided to customers in this section. Therefore, we have not seen evidence that Bristol Water's customers had a full understanding of performance across the sector when they expressed their views to Bristol Water.

435. In relation to unplanned customer minutes lost, we know that Bristol Water could not have fully engaged with its customers about its comparative performance on this performance commitment because its June 2014 revised business plan states that 'comparative industry data is not available on this metric [unplanned customer minutes lost for all durations] to assess our relative performance. Instead we have used available historic data for interruptions greater than 3 hours to assess our performance. This does not include the interruptions that are less than 3 hours which are included in our target.' (Company Wide Plan, page 88)
- 4) Ofwat is incorrect to link upper quartile performance with upper quartile cost performance (paragraph 1929, fourth bullet point, page 486).
436. As noted above, we based our measures of upper quartile performance on historical performance. We expect companies to improve both cost and service efficiency over time, and hope that companies performing at the average level of service will exceed our targets over the 2015-2020 period. As set out in our final determinations, across the sector companies have responded, and committed to deliver significant improvements in service performance alongside real reductions in bills.
- 5) Ofwat had not applied its comparative assessment to leakage because it said performance commitments were set at an economic level and were significantly impacted by local conditions. This also applies to negative water quality contacts (paragraph 1929, fifth bullet point, page 486).
437. Bristol Water is correct that we took a different approach to leakage compared with the approach we took to the five comparative assessments. This is because there is long-established and compelling evidence supporting the sustainable economic level of leakage (SELL) and that local issues significantly influence the SELL and the associated WRMPs. For example, it would not make economic sense to apply the same leakage target to Welsh Water as to South East Water, given the difference in water scarcity between the two companies' regions.
438. We do not consider that such stark differences apply to negative water quality contacts and we have not seen comparable evidence on company-specific differences in the economic levels of service as exists for leakage. In their representations on our comparative assessments some companies suggested company-specific factors that we should take into account for our upper quartile target on water quality contacts. Our assessment of the seven company-specific factors for water quality contacts is set out on page 44 of policy chapter A2 - outcomes. We found that six of the factors failed our assessment criteria. We considered the seventh area - impact of source water types on water quality contacts - in more detail, but concluded it would not be

appropriate to adjust the upper quartile measure for this factor (Page 51, policy chapter A2 - outcomes).

- 6) For companies currently below upper quartile performance levels, setting the reward deadband at upper quartile performance level means companies have a disincentive to improve performance due to totex efficiency sharing (paragraph 1935, page 487).
439. Companies currently below upper quartile performance levels will have incentives to improve their performance to avoid penalties from below upper quartile performance and to achieve rewards if they reach better than upper quartile performance.
- 7) Ofwat has sought, in its comparative assessments, to keep the penalty and reward ranges the same as companies initially proposed in their business plans. This means the companies furthest from the targets set as a result of the comparative assessments will face the largest penalties (paragraph 1936, page 487)
440. We agree that companies with performance furthest away from their performance commitments should face larger penalties.

A4.2.2 Unplanned customer minutes lost (supply interruptions)

441. Unplanned customer minutes lost are the total number of minutes that customers have been without a supply of water in the year, through unplanned interruptions, divided by the total of number of properties served by the company in the year. In Bristol Water's plan it states 'Customers ranked making sure water is always 'on tap' with no interruptions as their equal top priority for service.' (Bristol Water Company Wide Plan, page 87, June 2014). Note that this quotation makes no distinction between unplanned and planned supply interruptions. Due to the importance of supply interruptions to customers, it is an Ofwat Key Performance Indicator (KPI) and before that was an Ofwat level of service indicator for many years.
442. Bristol Water is disputing two main points, which we address below:
- 1) Bristol Water considers it is already an upper quartile performer on unplanned supply interruptions greater than 3 hours (Figure 103, page 498) and that therefore Ofwat was wrong to intervene in relation to supply interruptions.
443. Bristol Water presents evidence that it is already an upper quartile performer on unplanned supply interruptions greater than 3 hours (Figure 103, page 498). Bristol Water's performance commitment is based on unplanned supply

interruptions of all durations, i.e., it is different from the data in Figure 103 which relates to greater than 3 hours. Bristol Water does not have comparable data for its all durations measure and we do not know if Bristol Water is an upper quartile performer on its performance commitment measure of unplanned supply interruptions of all durations.

444. Planned and unplanned supply interruptions are related. A company can avoid unplanned interruptions by carrying out more maintenance which can involve more planned supply interruptions. Whilst customers tend to dislike unplanned supply interruptions more than planned supply interruptions, customers still dislike planned supply interruptions.
445. Bristol Water's data shows that it is a poor performer on planned and total supply interruptions. In Figure 104 Bristol Water shows that the proportion of unplanned minutes lost to all minutes lost in 2012/13 varies across the industry. Bristol Water has not labelled the x-axis, but document SOC382 shows that Bristol Water is the second company from the left with 18% of unplanned interruptions. This means that 82% of Bristol Water's supply interruptions are planned. SOC382 further shows that Bristol Water's planned supply interruptions are the second worst in the industry at 18.66 minutes (based on data on 17 companies) and its total supply interruptions are the fourth worst in the industry at 23.58 minutes (based on data on 19 companies).
- 2) Bristol Water says we were incorrect to adjust the Ofwat Key Performance Indicator (KPI) supply interruptions measure by the ratio of the KPI measure to Bristol Water's measure in 2013/14 as the basis of our intervention. Bristol Water proposes an alternative adjustment mechanism, which results in no intervention being required.
446. We intervened on unplanned supply interruptions at final determination as follows:

Table A4.1 Our intervention in relation to unplanned supply interruptions at final determination (figures in strike through are Bristol Water's proposal).

	Unit	Starting level	Committed performance level				
		2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
PC	Minutes / prop / year	13.7	13.4 11.5	13.1 9.4	12.8 7.2	12.5 7.2	12.2 7.2
Penalty collar	Minutes / prop / year		15.4 14.7	15.1 14.7	14.8 8.2	14.5 8.2	14.2 8.2

Penalty deadband	Minutes / prop / year		14.4 13.7	14.1 13.7	13.8 7.2	13.5 7.2	13.2 7.2
Reward deadband	Minutes / prop / year		12.4 7.2	12.1 7.2	11.8 7.2	11.5 7.2	11.2 7.2
Reward cap	Minutes / prop / year		11.1 5.9	10.8 5.9	10.5 5.9	10.2 5.9	9.9 5.9

447. The key part of the intervention is the 7.2 minutes performance commitment in 2017-18 to 2019-20. The interventions on the performance commitment in 2015-16 and 2016-17 are a glide-path between 2014-15 forecast performance and 7.2 minutes. The reward deadband is set at the upper quartile performance commitment of 7.2 minutes throughout the period. The penalty deadband is set at the 2014-15 forecast performance in 2015-16 and 2016-17 and at the upper quartile performance commitment in 2017-18 to 2019-20. We maintained the difference between the penalty collar and penalty deadband proposed by Bristol Water in our intervention. We did the same for the difference between the reward deadband and the reward cap.
448. Bristol Water was one of four companies at draft determination, and two at final determination, which did not use the Ofwat KPI measure for supply interruptions as its performance commitment. To adjust the standard upper quartile measure of 12 minutes (10 minutes at draft determination) for these four companies we used the ratio of the KPI measure to the companies' measures in 2013-14. In Bristol Water's case the ratio of the KPI to the Bristol Water measure in 2013-14 was 23.46 / 14 which implied a performance commitment of 7.2 minutes.
449. Our interventions on supply interruptions were part of our comparative assessments. 15 of the 16 non-enhanced companies accepted the upper quartile challenge for supply interruptions, either because they were already proposing upper quartile performance commitments or because they accepted our interventions. Thames Water was the only other company that adopted a supply interruptions performance commitment different from the Ofwat KPI at final determination. Thames Water accepted the adjustment approach we used for Bristol Water.
450. Bristol Water considers our approach to be inherently less accurate than the approach it proposes because it is based on an extrapolation of 2013/14 data (paragraph 1993, page 498). We have revisited our approach using data for 2011/12 to 2013/14, which covers the same period that we used for

calculating the industry upper quartile measure of 12 minutes. Our new calculations are in the third column below:

Table A4.2 Adjustment to Bristol Water's unplanned supply interruptions performance commitment to take account of the upper quartile measure of 12 minutes based on the KPI measure

	2013-14	2011/12 to 2013/14 (average)	Units
KPI data for Bristol Water	23.46	22.74	Minutes
Outturn on Bristol Water measure	14.0	11.65	Minutes
Ratio	0.59676044	0.5123131	
UQ on normalised data	12	12	Minutes
UQ on Bristol Water measure	7.16	6.14	Minutes

451. The table above shows that if we used an approach based on 2011/12 to 2013/14 data we would have intervened to set a tougher performance commitment of 6.1 minutes from 2017-18 to 2019-20 rather than 7.2 minutes.
452. Bristol Water proposes an alternative adjustment mechanism for applying our assessment of the upper quartile on the KPI measure of 12 minutes to its own measure. We agree that adjustments are required:
1. to move from planned and unplanned interruptions to unplanned only; and
 2. to move from interruptions greater than 3 hours to interruptions of all durations.
453. Bristol Water's approach employs two steps. In step 1, Bristol Water looked at data over 10 years to show that on average 62% of its supply interruptions of greater than 3 hours are unplanned (paragraph 1996 and SOC381). In step 2, Bristol Water looked at data over 10 years to show that on average 55% of unplanned interruptions are greater than 3 hours (paragraph 1998 and SOC381). Therefore, Ofwat's 12 minutes upper quartile figure should be adjusted as follows: $12 * 0.62 / 0.55 = 13.5$ minutes. We consider that using data for the last 10 years is inappropriate, given how performance and relative performance change over time. We based our upper quartile calculation on 2011-12 to 2013-14 data so it would be better for Bristol Water to use data for that period instead in its calculation. If we use the data for the last three years only (2011-12 to 2013-14), and employ the same formula as Bristol Water, we obtain $12 * 0.37 / 0.72 = 6.15$ minutes. This is tougher than the Ofwat performance commitment of 7.2 minutes for 2017-18 to 2019-20.

454. In light of the above, we remain of the view that the final determination interventions for unplanned customer minutes lost remain appropriate.

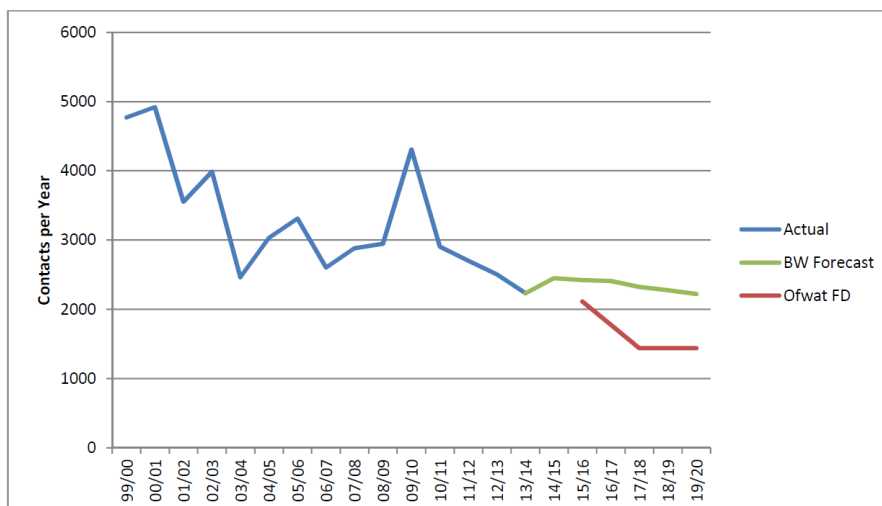
A4.2.3 Negative water quality contacts

455. Negative water quality contacts occur when a customer is dissatisfied with the taste, odour or appearance of the water that comes out of their tap, and they complain to their water company. They are an important measure of how well a company is performing in providing its customers with high quality drinking water. The Drinking Water Inspectorate (DWI) collects data from water companies every year on how many complaints they have received about, for example, discoloured water, particles in the water, or a smell of chlorine or petrol. The DWI publishes the data for the water companies in its annual reports.¹¹⁷
456. Bristol Water states that our intervention, which requires a 41% reduction in the number of contacts by 2017-18, is unrealistic, given the level of allowed expenditure, and is not consistent with the results of its customer research (paragraph 2001 on page 500 of its Statement of Case).
457. Our consistent view has been that water companies' customers have to receive efficient performance which can be assessed using upper quartile performance levels already achieved in the sector, and therefore it is reasonable to expect water companies to perform at that level from 2017-18 onwards.
458. Whilst we encouraged companies to talk with and listen to their customers in order to find out what their priorities are, we think that if Bristol Water's customers were aware of what levels of service other companies' customers were receiving they might reassess their views on what is acceptable performance.
459. Bristol Water's recent performance suggests, if it continues its positive trend over the last four years, it will reach the upper quartile performance level by 2017-18 and therefore will avoid any penalty. The graph below is an extract from Bristol Water's Statement of Case, page 503, and shows that in each of the four years from 2010-11 to 2013-14 it has improved its performance from around 4,400 contacts to around 2,200 (equivalent to a 50% reduction).

¹¹⁷ <http://dwi.defra.gov.uk/about/annual-report/index.htm>

Figure A4.1 Reproduction of Bristol Water's Figure 105: Negative Water Quality Contacts Performance Commitment

Figure 105: Negative Water Quality Contacts Performance Commitment



Source: Bristol Water¹²⁶⁸, Ofwat¹²⁶⁹

460. Our interventions on negative water quality contacts were part of our comparative assessments. All companies that were subject to interventions following our comparative assessments accepted those interventions, with the exception of Bristol Water.

A4.2.4 Mean zonal compliance

461. Mean zonal compliance (MZC) is the measure that the Drinking Water Inspectorate (DWI) uses to assess public water supply compliance with the EU Drinking Water Directive in England and Wales. Overall in 2013 (the 2014 results are not yet available) the industry average for MZC was 99.97%. The DWI states that '...the compliance figure is not a 'performance target.' The Directive lays down the minimum standards that must be achieved therefore action to address the 0.03% of failures is mandatory. Some of these actions were completed shortly after the time of the failure or the event; however, some require more substantive improvement works and these have been incorporated within statutory instruments that form part of water companies' business plans submitted to Ofwat as part of the price review. These improvements will, therefore, be funded and delivered during the Asset Management Plan period 2015 to 2020 (AMP6).¹¹⁸

¹¹⁸ <http://dwi.defra.gov.uk/about/annual-report/2013/letter-england.pdf>

462. Bristol Water states it has two specific concerns regarding our intervention in relation to mean zonal compliance (paragraph 2044, page 508). We address these below.
1. The tightening in the lead standard means historical water quality data is not a reasonable basis for setting future targets.
463. Bristol Water states that changes to the lead standard taking effect from 31 December 2013 mean that historical levels of performance on mean zonal compliance need to be adjusted to be compared with future performance. Bristol Water argues that we set the performance level below that which a penalty would occur at 99.96% [our final determination penalty deadband is actually set at 99.95%] based on the range of average historical industry performance. Bristol Water argues that in 2015-20, the impact of the lead standard change would be to make the equivalent performance 99.94% and therefore to be consistent with our approach, the new penalty threshold should be 99.94 (paragraph 2031 on page 506 of Bristol Water's Statement of Case).
464. It is the penalty deadband and collar which are used for calculating penalties. Bristol Water is proposing a deadband of 99.94% and collar of 99.93% in every year between 2015 and 2020. In our final determination, we set Bristol Water a deadband of 99.95% and collar of 99.94%, in both cases just 0.01% higher than Bristol Water proposed.
465. The tightened lead standard is a statutory requirement which companies have had to comply with since 31 December 2013. Water companies have known about the tightening of the lead standard since 1998. The change in standard is incorporated in the Water Supply (Water Quality) Regulations 2000. The standard was first tightened from 50µg/l to 25µg/l and then was further tightened to 10µg/l on 31 December 2013. Bristol Water received funding at the last price review to ensure compliance with the new standard of 10µg/l. Companies have implemented risk-based strategies to achieve compliance with 10µg/l by December 2013.
2. The measure of mean zonal compliance is sensitive to failures in small zones.
466. In our final determination policy chapter A2 – outcomes we considered the argument that failures in small water zones having a disproportionate effect on overall mean zonal compliance. Sutton and East Surrey Water, Sembcorp Bournemouth Water and Dŵr Cymru all raised this issue in their draft

determination representations and, whilst we agreed that this issue is outside of management control, we also concluded that small zones are not a material driver of performance, neither should they affect certain companies in a materially different way to others. On this basis, we rejected it as a factor for which we should make a company-specific adjustment.

467. Our interventions on mean zonal compliance were part of our comparative assessments. All companies that were subject to interventions following our comparative assessments accepted those interventions, with the exception of Bristol Water.

A4.3 Summary

A4.3.1 Ofwat's approach to comparative assessments

468. We do not consider that Bristol Water has provided sufficient or compelling evidence for us to change our approach to comparative assessments. We consider that our assessments are an appropriate way of ensuring that water companies are incentivised to deliver the efficient performance that their customers have paid for.

A4.3.2 Unplanned customer minutes lost (supply interruptions)

469. Bristol Water's Statement of Case provides no persuasive evidence that we have made an error or treated Bristol Water in an unfair way compared with other companies. We made the same adjustment to Bristol Water's measure for historical upper quartile performance as we did for Thames Water which also had a performance commitment different to the Ofwat key performance indicator on supply interruptions. In addition, all the other 15 non-enhanced companies accepted historical upper quartile performance commitments for supply interruptions from 2017-18 to 2019-20, either through our interventions or through their own business plan proposals. The alternative calculations of performance targets put forward by Bristol Water would not appear to be robust or protect the interests of customers.

A4.3.3 Negative water quality contacts

470. Similarly to supply interruptions above Bristol Water's Statement of Case provides no persuasive evidence that we have made an error or treated them in an unfair way compared with other companies. We also note the improving trend in Bristol's historical performance suggests significant improvements in

its performance are possible. We continue to maintain that customers have paid to receive efficient performance and that is what we expect Bristol Water to deliver by 2017-18.

A4.3.4 Mean zonal compliance

471. The differences in the targets proposed by Bristol and those in the final determination for mean zonal compliance are relatively modest. Nonetheless, we continue to maintain that customers have paid to receive efficient performance and that is what we expect Bristol Water to deliver by 2017-18.

Appendix 5: Reconciling 2010-15 performance

A5.1 2009-10 RCV adjustment

A5.1.1 Background

472. At price reviews we do not know the expenditure of the final year of the last period as the review process coincides with this year and the year is still in progress. We also do not know final inflation indices. We therefore have to make estimates in reconciling the previous price control. Any inaccuracy in forecasts of this 'blind year' cannot be taken into account until the following price review (so 6 years later). So at PR14 we had to make an adjustment for the estimates we had made at PR09
473. For the price setting periods up to and including 2005-10 actual capital expenditure included in the RCV was subject to a 'ceiling on investment' or 'cap'. So if a company spent more than that assumed in the determination, then those excess amounts would not be allowed to be added into the RCV.
474. At PR09 we used latest information on construction output price index (COPI) to inflate our PR04 assumption on capital expenditure to compare against the latest estimate for Bristol Water. This included an estimate of inflation, as measured by the (COPI) which increased our PR04 assumption. This index can take up to 2 years to be confirmed after the year has finished. We expected that Bristol Water would spend more than our cap and so we only reflected the capped expenditure in the RCV.
475. As the economic downturn effects became more serious, the PR09 forecast looked increasingly optimistic. When the CC looked at BRL in 2010 they used a much lower index for 2009-10 (although there were still estimates in this data). This meant that the AMP 4 capital expenditure amount inflated to outturn prices became lower due to the lower COPI index. The outturn capital expenditure continued to be above this cap. The lower recalculated cap was used to calculate the RCV.
476. The finalised COPI index was only available after the CC's decision. This showed that actual inflation as measured by COPI was lower still. We were only able to use the finalised index when we looked again at this at PR14.

A5.1.2 Key points raised by Bristol Water

477. The progressively lower COPI has led to correspondingly lower capital expenditure caps when inflated to outturn prices. On page 125 of its statement

of case Bristol Water suggest that the impact of the revised COPI and actual 2009/10 capital expenditure means that capping should not apply.

A5.1.3 Our response to points raised by Bristol Water

478. We disagree, revised COPI is lower than assumed at the time of the CC's decision which can only reduce the cap further. Actual 2009/10 capital expenditure was known at the time of the CC's decision and so should not change further.

Table A5.1 Total ceiling on investment (cap)

	PR04 capital expenditure assumptions inflated to outturn prices by latest view of COPI (£m)
PR09	101.045
CC 2010	100.056
PR14	100.025

A5.2 Serviceability

A5.2.1 Background

479. A description of the AMP5 serviceability methodology and process (governing the period 2010-2015) is set out in [FD14 Policy Chapter A4 – reconciling 2010-15 performance](#).

A5.2.2 Points raised by Bristol Water

480. In its Statement of Case to the Competition Market Authority, Bristol Water disputed a number of issues relevant to the serviceability shortfall. The main points are summarised as follows:

- Whilst Ofwat has assessed Bristol Water's infrastructure serviceability as 'deteriorating' based on performance against the sub-service indicator 'DG3 [Unplanned] Interruptions >12 Hours' (DG3 UI>12) and, as a result, has applied an RCV shortfall of £4.1m (post efficiency). Bristol Water considers that its infrastructure serviceability

assessment should be 'stable', for which a shortfall penalty would not be applicable.

- Whilst Ofwat has assessed Bristol Water's infrastructure serviceability as 'deteriorating' based on performance against the sub-service indicator 'DG3 [Unplanned] Interruptions >12 Hours' (DG3 UI>12) and, as a result, has applied an RCV shortfall of £4.1m (post efficiency). Bristol Water considers that its infrastructure serviceability assessment should be 'stable', for which a shortfall penalty would not be applicable.
- Specifically, it considers that its performance against the lead indicator of bursts was clearly stable and that the performance of the DG3 UI>12 indicator has been impacted by a number of events outside management control.
- Bristol Water considers that Ofwat's application of a serviceability shortfall is incorrect.

481. There are four key aspects that underpin this conclusion:

- Ofwat has not followed the process it set out at FD09 and that was in place for CC10. If Ofwat had followed that process at PR14 to assess serviceability, Bristol Water would be assessed as 'stable' and would not incur a serviceability shortfall.
- Bristol Water's exceedances of Ofwat's infrastructure serviceability reference levels relating to DG3 UI>12 do not represent an underlying lack of maintenance in the network of the kind that the serviceability penalty is intended to protect against. Given this, a penalty is inappropriate.
- Bristol Water considers that its infrastructure serviceability target levels, particularly relating to DG3 UI>12, are inappropriate and unrealistically low. If corrected, Bristol Water would not be classed as 'deteriorating'.
- Ofwat wrote to Bristol Water at FD09 and said that it would take account of "any factors outside the control of a company". Bristol Water does not consider that Ofwat has followed this approach.

A5.2.3 Our response to Bristol Water's points

482. We respond to the first three underlying points by considering the methodology that we set out at PR09, before we consider the new evidence provided by Bristol Water on management control.

A5.2.3.1 PR09 methodology

483. A summary of what we established in the PR09 final determinations with reference to serviceability is set out at section A4.8.4.1 '[Policy chapter A4 – reconciling performance for 2010-15](#)' ("Historical serviceability documentation")
484. The key point to note is that the detailed confidential supplementary reports sent to each individual appointed company on 25 November 2009 with Ofwat's final PR09 determinations (FD09) set out (i) the company-specific standards by which serviceability performance was to be judged for the 2010-2015 period and (ii) the parameters for the application of shortfalls when 2010-2015 serviceability performance would be reconciled at the end of that period. The serviceability standards were expressed in terms of reference levels and control limits for each individual serviceability indicator.
485. In its Statement of Case, Bristol Water includes tables of its serviceability indicator reference levels and control limits in the form of tables 120 and 121 taken from its supplementary report, and cross-references its supplementary report (which is document SOC 371, provided to the CMA by Bristol Water) in the footnotes to those tables. Bristol Water appears therefore to accept that its indicator reference levels and control limits are as set out in its supplementary report.
486. If reference levels or control limits were not subsequently revised, the serviceability standards set out in each company's FD09 supplementary report stood as the standards against which its performance would be judged at the end of the price control period. Bristol Water did not raise its serviceability standards as an issue before the Competition Commission in 2010. Bristol Water did not make any submissions, except in a section marked "Background and Regulatory Framework", which it quotes in paragraph 1836 in its latest Statement of Case. In its final report on the Bristol Water reference in 2010, the Competition Commission made no comment on Bristol Water's serviceability standards for the period 2010-2015.
487. We also provided the opportunity to all appointed companies in 2012 to put the case for revisions to individual serviceability standards during a review of serviceability in 2012. In March 2012 we invited all companies (via company-specific letters) to review reference levels and control limits that we set at FD09 and documented in the supplementary reports. Bristol Water did not avail itself of this opportunity. There were no subsequent revisions to Bristol water's service standards as a result of this correspondence, or otherwise.

488. Whilst quoting from its FD09 supplementary report in its current Statement of Case with regard to the serviceability standards set, what Bristol Water does not refer to is our expectation, also set out in that document, for each company to monitor its performance against the indicators and to manage and maintain assets such that **all** indicator values remain well within the control limits and that they exhibit a stable or improving trend year on year. In particular, we said:

“Should you fail to demonstrate a stable or improving trend in **any indicator** in 2014 our starting point will be a shortfall in output”. (emphasis added).

489. Also whilst quoting from our technical summary document [PR09/38](#) in its current Statement of Case, Bristol Water does not refer to the pertinent statement we made in that document on individual indicators:

“We expect the companies to monitor **each indicator** and to manage and maintain assets so that **all indicator values** remain well within the control limits”. (-emphasis added).

490. Nor does Bristol Water mention the timeline published in [PR09/38](#) in which we said on shortfalling consequences:

“- Stable serviceability required for **all indicators** from 2012, if less than stable company should assume it is at risk of shortfall
- Shortfall will be applied at the next periodic review if marginal or deteriorating in 2014”. (-emphasis added).

491. As we said at [A4.8.4.1](#) (“[Historical serviceability documentation](#)”) in Policy chapter A4 to FD14, we consider it was clear that each company was aware, by virtue of [PR09/38](#) and its specific supplementary report, of its serviceability indicators, that it was under an obligation to ensure stability with respect to the stipulated indicators, and that it would expect shortfalling consequences as our starting point if by 2014 instability was present in respect of any of the individual indicators.

492. Whilst Ofwat's serviceability policy has long been aimed at 'maintaining the flow of services to customers and the environment', Ofwat's approach to regulation has changed over successive price controls, focussing initially around inputs (length of main, number of treatment works etc.) then around outputs (with standards being set on compliance and burst mains frequencies) and then around the outcomes for customers. Ofwat's approach to regulating

serviceability has also developed over this same period, focussing initially around asset serviceability standards between 2000-2010, then moving to a focus on an outcome of 'maintaining the flow of services to customers and the environment' from 2010-15.

493. At the 2009 price review Ofwat reconciled the performance of serviceability for 2005-10 based upon the principles within RD15/06 published in 2006. This approach used a basket of serviceability indicators with judgements being driven by a lead indicator which was typically based upon asset serviceability or a compliance indicator. Whilst these were important indicators, they did not necessarily best reflect an outcome to customers and the environment.
494. As part of the 2009 price review, Ofwat re-assessed the serviceability indicators in order to focus on outcomes to customers and to the environment. This involved reviewing the indicators and adding additional measures (such as discolouration contacts) and also changing the focus of how serviceability would be assessed and shortfalled at the PR14 price review. Instead of focussing on lead indicators (which were asset and output focussed), the emphasis changed to being outcomes focussed and a requirement for companies to maintain stable serviceability for **all** of the indicators as this better reflected the full range of services that companies are funded for and deliver to customers and the environment. This change was communicated to companies through the confidential FD09 final determination supplementary reports sent to them alongside their final determination letters and through information letter [PR09/38](#).
495. We consider that this change is aligned with our primary statutory objectives both to further the consumer objective and to secure that the companies properly carry out their functions; the range of serviceability indicators are reflective of the duties the companies are required to perform to 'maintain the flow of services to customers and the environment'.
496. We also note that Bristol considers the shortfall as a penalty and continually references the shortfall as a penalty throughout the document. We disagree. The serviceability shortfall is a claw back of monies that had been assumed in price limits at PR09, but which were either not spent or were spent but had not achieved the specific objectives desired, that is the specified service standards. In either case it is important to protect customers and recover the costs that were assumed to deliver the specified service levels.
497. Bristol Water considers that it was following the methodology stated in RD15/06. However, this was superseded by PR09/38 and the specific

company FD09 supplementary report as we changed the methodology in PR09 relevant to our assessment of performance between 2010 to 2015, as set out above. Bristol Water considers that serviceability should be assessed at the basket level, paying particular attention to the lead serviceability indicator (e.g. Bursts for water infrastructure). On this basis, the company believes that it should be classified as stable. However, the company has not identified or acknowledged in its Statement of Case the references in both PR09/38 and company FD09 documents that **all** indicator values need to be maintained in a stable position.

498. The company argues that the DG3> 12 hrs indicator is marginal, not deteriorating, using rules within RD15/06 published in 2006 rather than the principles set out in our final determination report and PR09/38. Again Bristol Water is relying on older superseded guidance rather than the latest guidance relevant to the regulatory framework that is now in place.

A5.2.3.2 Management Control

499. Bristol Water provided very little evidence in advance of our final determination to support its arguments that events were outside management control. We consider management control to include prudent preparation that management can take in advance to “maintain the flow of service to consumers”, which includes mitigating the risk of failures occurring, increasing the speed and effectiveness of any operational response and putting in place other measures to maintain supplies despite incidents occurring.
500. An example of a scenario we considered to be exceptional and outside management control is an event that occurred within the Southern Water operational area. In 2013, severe storms that hit the south coast of England led to the loss of supply to over 1500 properties in the Ventnor water supply area downstream of Lowtherville service reservoir on the Isle of Wight for more than 12 hours. This breached Southern Water's DG3 upper control limit. The company provided evidence that it had proactively put in place four lines of resilience, but due to external circumstances each line of resilience failed. We were satisfied by this evidence from Southern Water and accepted that the incident should be excluded. After removing this incident, the performance in 2013-14 was below the upper control limit.
501. The key to why this was outside management control was that primarily this event was as a consequence of a severe weather event and that Southern Water demonstrated four levels of management control that had failed as part of the response to the event driven by the severe weather. Clearly this was an

exceptional circumstance and that prudent and effective responses had been deployed and were unable to restore supplies.

502. Bristol Water has introduced new evidence with additional engineering reports from CH2M Hill (SOC334) and from McCallum Layton undertaking customer survey information (two reports on Kingswood and Burnham on Sea incidents –SOC272 and SOC273).
503. The CH2M Hill report is dated December 2014, with the Burnham on Sea report completed in July 2014 and the Kingswood report completed in November 2014. None of these reports were presented to Ofwat within the price review even though some of these reports would have been available to the company before the final determinations were made.
504. The evidence provided is narrow and in particular it is focussed on repairing water mains and not on restoring supplies to customers. Bristol Water has not provided evidence that it has taken sufficient prudent management action to mitigate the risk of failures occurring, increase the speed and effectiveness of any operational response, or sufficiently considered how it can put in place other measures to maintain supplies despite asset failures occurring.
505. The definitions applied within the CH2M Hill report (on pages 14-15) through the definitions of "in full control", "in partial control", and "with no control" are terms that have been defined with particular, narrow meanings and are about the immediate operational control of the incident, not the wider concept of management control. As such we disagree that the report shows that the events were beyond wider management control that Bristol Water could and should have placed on these incidents.
506. For evidence to give us confidence that events were beyond management control we would have expected to see a critical comparison of the business processes used by Bristol Water to industry best practice. Other water companies in the industry operate policies around 'continuous supplies' whereby the first activity on the site is to restore supplies to customers through innovative approaches using overland emergency bypasses, pressurised tankers and approaches based upon real time network management and monitoring. Once supplies are restored to customers, the repair of the burst main is no longer on the critical path and can be undertaken in a controlled manner without impacting on the flow of services to customers. This cultural and process change in practice has led to improvements in interruption performance across many water companies. We consider the application of

these processes and procedures to be within the management control of all water companies.

507. The approach of 'continuous supplies' described above is one which Bristol Water could have considered to avoid or control the events that occurred.
508. The company states that the burst mains could not have been predicted, however there are factors associated with a number of events which are within the management control of the company and could have been averted or managed differently;
- a) In changing supply arrangements with regard to the 15in BTM Chewton Keynsham main the company placed additional pressure on this main which then failed (impacting 120 properties for 13 hours). As the cause of this failure was driven by management action, the company should recognise that this was wholly within their management control.
 - b) The Burnham on Sea interruption was on a 450mm Asbestos Cement main (affecting 12270 for 14hrs and 15mins). Asbestos Cement is a material which is known to fail at a much higher frequency than other materials, yet the report does not identify whether there was a separate risk based operational practice for this main or whether the main was even considered higher risk than others particularly given the high number of properties served by this main. Such a risk assessment and operational focus is clearly within management control and an effective contingency plan to manage such an event should have been identified and enacted.
 - c) The report also highlights that when the Kingswood event occurred in 2014 (impacting 28,388 properties for 43hrs) that the wider network of assets was less resilient due to planned outages of numerous principle trunk mains as a result of the delivery of the 2010-15 capital programme. The management control choices made by the company in the delivery of its capital programme therefore made the Kingswood area at greater risk of interruption. Had these choices not been made then the resultant interruption would have been either a shorter duration or have affected fewer properties. The company chose to manage these risks in this manner and therefore had a greater degree of management control than it is acknowledging.
509. In conclusion, we do not consider that Bristol Water has provided sufficient evidence that the interruption events over 12 hours were outside management control in the wide sense that we apply it.

510. Even on a narrow consideration of whether Bristol Water repaired water mains in an appropriate way we would not consider this evidence to support that this was the case in each circumstance— for instance:
- the incident on 26 March 2014 at Luckington Bridge affecting 801 properties for 17 hours was due to one of the company's valves being closed; and
 - the incident on 22 August 2014 at Wedmore Vale affecting 450 properties for 15 hours was due to staff not having appropriate training or competence.

These incidents alone would place the indicator above the upper control limit and given the successive previous years' performance for this indicator at or above the upper control limit, the indicator should clearly be given a deteriorating assessment for 2014-15.

511. Bristol Water have also provided reports from McCallum Layton undertaking customer survey information (two reports on Kingswood and Burnham on Sea incidents – SOC272 and SOC273). These reports consider the customer impact of the interruptions to supply and particularly consider the customer service of the company response to these incidents. It is appropriate for companies to undertake reviews of this nature and to learn from customer feedback. Whilst these reports measure the feedback from customers on the incident they do not assess the customer satisfaction with the underlying service delivery. So whilst customers appear to be satisfied with the company response, it does not assess whether customers are content to be impacted by the interruption in the first place.

A5.3 Reconciliation Rulebook and Capital Incentive Scheme (CIS)

512. We stated in the PR14 final determinations we would publish a PR14 reconciliation rulebook that would set out how we will take account of performance and incentives set in the PR14 price control at PR19. We intend to publish a consultation document in late March which will consult on our proposals in this area. We consider that providing companies with early clarity will foster trust and confidence in the sector, to the benefit of customers.
513. As part of this consultation we will be considering any outstanding issues from the PR09 reconciliation undertaken as part of PR14 review. As part of the final determinations we identified an issue with the way in which the indexation was undertaken as part of the PR09 CIS RCV adjustment. In the final determinations we highlighted the issue and stated that we could have taken a

different approach to the treatment of indexation which would have resulted in a lower RCV. However we did not make an adjustment in final determinations as we considered that making an adjustment at that time would have risked creating regulatory certainty. We had also “made our final determination in the round, taking account of the RCV adjustment that companies have received through the 2010-15 CIS true-up, and allowing investors a reasonable return (with scope for out- and underperformance) on that basis”¹¹⁹. We therefore decided to retain the approach to indexation that we had proposed in the draft determinations for the 2015-2020 period.

514. For the period beyond 2015-20 we stated that “we would like to engage with stakeholders and consider whether this approach to adjusting for inflation, which may have resulted in a slightly different 2015 opening RCV (as a result of indexation) for all companies, is in the long term interests of customers” and stated we would consult shortly and any adjustment would be forward looking. We are consulting on our proposals to address this issue as part of the PR14 reconciliation rulebook. This issue affects all companies and is in proportion to their capex allowance in PR09.
515. The issue with the CIS RCV adjustment is that it uses a different RPI indexation approach (based on outturn rather than forecast RPI) than used in the financing cost adjustment. We consider that the most appropriate approach would be to use forecast RPI for both measures. This would mean that the RCV has been artificially inflated due to this issue. For Bristol Water the RCV is around £9.3 million higher than it would otherwise be. We are intending to consult on whether we remove the amount remaining in the RCV at the end of PR19, which would be consistent with our commitment to only make a forward looking adjustment. For Bristol Water the equivalent figure is £6.9m after taking account of the RCV run off (depreciation) during 2015-20 (all figures 2012/13 prices).

A5.4 Overall conclusions

516. The case presented by Bristol Water is dominated by two aspects:
- 1) Methodological – around the process and principles of the serviceability shortfall (that this should be based upon a basket analysis rather than individual indicators).

¹¹⁹ ‘Final price control determination notice: policy chapter A4 – reconciling 2010-15 performance’ p. 43

2) Engineering judgements - that the failures of many of the events were outside management control.

517. We do not agree with the company of these issues and consider that the methodology we applied at the final determination reflects the correct application whereby all indicators are expected to be maintained in a stable position. This position was clearly set out both within the Company specific supplementary report and PR09/38 both published in December 2009.

518. We do not consider that the additional evidence provided by the company adjusts our view on whether events should be excluded and as such all events should be included within the shortfall calculation.

Appendix 6: Glossary

Glossary	
ACTS	Average cost to serve. The average cost per customer for the retail household element. The ACTS is the basis of our retail price control.
AMP	A plan submitted by a water company to Ofwat for a five-year period.
AMP period	<p>A five-year period in relation to which an AMP is submitted by water companies to Ofwat. Also known as a price control period.</p> <ul style="list-style-type: none"> • AMP2—the AMP period April 1995 until March 2000, i.e. the PR94 price control period; • AMP3—the AMP period April 2000 until March 2005, i.e. the PR99 price control period; • AMP4—the AMP period April 2005 until March 2010, i.e. the PR04 price control period; • AMP5—the AMP period April 2010 until March 2015, i.e. the PR09 price control period; • AMP6— the AMP period April 2015 until March 2020, i.e. the PR14 price control period; and • AMP7— the AMP period April 2020 until March 2025, i.e. the PR19 price control period.
BP	Business Plan.
Bristol Water	Bristol Water plc.
BRL	A term occasionally used by Ofwat to refer to Bristol Water and which hence appears in certain Ofwat comments about Bristol Water.
Capex	Capital expenditure. For Bristol Water, capex may be categorized as either capital maintenance (or base capex), which is the capex needed to maintain Bristol Water's assets in the condition necessary to deliver stable levels of serviceability, and enhancement capex, which is capex to create new assets to deliver improved levels of supply demand balance, resilience, and water quality.
CC	Competition Commission
CCG	Customer Challenge Group.

Glossary	
CCWater	The Consumer Council for Water. A statutory consumer body representing water and sewerage consumers in England and Wales.
DD	Draft Determination: produced by Ofwat during each periodic review, serving as the basis for consultation on the price limits for each company. The PR14 DDs were published on 30 April 2014 for the enhanced companies, 30 May 2014 for the early DD companies and 29 August 2014 for all other companies.
DWI	Drinking Water Inspectorate.
EA	Environment Agency.
Enhanced company	A company selected for enhanced status, due to the high quality of its business plan. The benefits of being awarded enhanced status include a higher totex allowance, acceptance of the business plan 'in the round' and an earlier publication date for the draft determination. Also known as a fast-tracked company.
FD	Final determination: produced by Ofwat at the end of each periodic price review, setting out the price limits for each water company. The PR14 FDs were published on 12 December 2014.
Gearing	A company's net debt expressed as a percentage of its total capital. For Bristol Water, this is calculated as: net debt/RCV.
GLS	Generalised Least Squares. GLS is a technique for estimating the unknown parameters in a linear regression model. It is applied, for example, when some of the assumptions of the classical regression model break down – such as when the variance of the disturbances is assumed to be non-constant across observations (heteroskedasticity) or when there may be correlation between the disturbances (autocorrelation)
GMEAV	Gross Modern Equivalent Asset Values
HH	Household.
IDoK	Interim Determination of K: a new determination of the K factor by Ofwat between periodic price reviews in response to changes in circumstance as set out in Condition B of the licence.
K or K factor	At each periodic review Ofwat determines K factors for each year of the five-year price control period. K factors are different for each

Glossary	
	water company and represent the amount by which a company is allowed to increase the amount it recovers from customers in real terms. The price limits Ofwat sets for companies are accompanied by a set of outcomes that Ofwat expects the company to deliver within those price limits. Also known as an adjustment factor.
Licence	An instrument appointing a water undertaker (or water and sewerage undertaker) under Part II of the WIA 91.
Methodology Consultation	Ofwat (January 2013), 'Setting price controls for 2015-20 – framework and approach - A consultation'
Methodology Statement	Ofwat (July 2013), 'Setting price controls for 2015-20 – final methodology and expectations for companies' business plans'
NHH	Non-Household
Notified Item	An item listed by Ofwat in a final determination which, if its cost changed, could be used by water companies as a reason for a request for an IDoK. A 'one way' NI allows the water company to request that Ofwat make an allowance before the next periodic price review if certain conditions are met. A 'two way' NI also allows Ofwat to intervene to reduce an allowance.
ODI	Outcome Delivery Incentive
OLS	Ordinary Least Squares. OLS is a method by which linear regression analysis seeks to derive a relationship between company performance and characteristics of the production process. This method is used when companies have relatively similar inputs and outputs. Using available information to estimate a line of best fit (by minimising the sum of squared errors) the average cost or production function is calculated.
Opex	Operating expenditure. For Bristol Water, opex may be categorized as base opex, which is the expenditure necessary to maintain stable serviceability or current service, and enhancement opex, which is either the expenditure necessary to support enhancement capex (in terms of supply demand balance, resilience and water quality) or operating expenditure to wholly deliver an enhancement by itself.
PAYG rate	Pay-as-you-go rate, the proportion of 2015-20 totex that is recovered during the 2015-20 price control period. The remainder

Glossary	
	is added to the RCV and recovered in future periods. This rate is set by the company as part of its business plan. Also known as fast money rate.
Periodic Review	The process undertaken every five years by Ofwat to determine water company price limits for the next five years. <ul style="list-style-type: none"> • PR04 covered the period from 2005 until 2010; • PR09 covered the period from 1 April 2010 until 31 March 2015; • PR14 covers the period from 2015 to 2020; and • PR19 will cover the period from 2020 to 2025.
Price limit	The maximum amount a water company may charge under the terms of its licence. Condition B 8.4 of Bristol Water's licence defines the charges limit as $RPI + K$ where RPI is the percentage change in the retail prices index between November in the prior year and the immediately preceding November and K is the adjustment factor.
RBR	Risk-based review. The risk-based review we carried out between December 2013 and March 2014 in order to select enhanced companies.
RCV	Regulatory capital value. The capital base used in setting price limits. The RCV was the market value initially assigned to each company prior to PR94 and now includes the net movement from this opening position of any additional net capital expenditure, less current cost depreciation and infrastructure renewal charges.
RCV Run-off rate	The proportion of the regulatory capital value that is recovered in period, equivalent to depreciation. This rate is set by the company as part of its business plan.
Risk and Reward Guidance	Ofwat (January 2014), 'Setting price controls for 2015-20 – risk and reward guidance'.
RoRE	Return on Regulated Equity. A concept introduced in PR14 as a key metric of returns to shareholders. Calculated as: Return due to shareholders/equity component of RCV assumed in notional capital structure Return due to shareholders calculated as $EBIT - tax - (cost\ of\ debt \times average\ net\ debt)$
Serviceability	Ofwat measures serviceability by reviewing the trend in the number

Glossary	
	of actual incidents on the companies' networks, such as regulatory compliance failures at water treatment works for aboveground assets, and burst water mains for underground assets. The reference level of service is determined from a specific subset of public health, environmental and customer service indicators.
SIM	Service Incentive Mechanism. An incentive scheme designed to incentivise a high degree of customer service quality.
Totex	Total expenditure. A concept introduced in PR14 to replace opex and cape where no distinction is made between capex and opex.
UQ	Upper Quartile
WACC	The weighted average cost of capital of a company, taking account of its various sources of finance. The 'vanilla WACC' is the weighted average real pre-tax cost of debt and real post-tax cost of equity, where tax is UK corporation tax. There are various approaches to calculating WACC and the appropriate method depends upon the context.
WaSC	Water and sewerage company. WaSCs provide water and sewerage services.
WIA91	Water Industry Act 1991 (as amended).
WOC	A water-only company. WOCs provide water but not sewerage services. In our determinations, we tend to distinguish between the large WOCs, Affinity Water and South East Water, and the small WOCs, Bristol Water, Dee Valley Water, Portsmouth Water, Sembcorp Bournemouth Water, South Staffordshire Water and Sutton & East Surrey Water. While the former are comparable in size to the smallest WaSCs, the latter are significantly smaller.
Company abbreviations	
ANH	Anglian Water
WSH	Dŵr Cymru
NES	Northumbrian Water
SVT	Severn Trent Water
SWT	South West Water
SRN	Southern Water

Glossary	
TMS	Thames Water
UU	United Utilities
WSX	Wessex Water
YKY	Yorkshire Water
AFW	Affinity Water
BRL	Bristol Water
DVW	Dee Valley Water
PRT	Portsmouth Water
SBW	SembCorp Bournemouth Water
SEW	South East Water
SSC	South Staffordshire Water
SES	Sutton & East Surrey Water