

August 2014

**Setting price controls for 2015-20**  
**Draft price control determination notice:**  
**technical appendix A3 – wholesale water and**  
**wastewater**



**OFWAT**

## Contents

Overview	2
A3.1 Introduction	5
A3.2 Structure of the wholesale price controls	6
A3.3 Calculating allowed wholesale expenditure	8
A3.4 Calculating allowed 'pay-as-you-go' (PAYG) expenditure	25
A3.5 Calculating other elements of allowed wholesale revenue	26
A3.6 Reconciling 2010-15 performance	29
Annex 1: Responses to representations on our wholesale cost models and exogenous variables	81

## Overview

**This document sets out the approach used in setting the draft determinations for wholesale water and wastewater price controls for the five years from 1 April 2015, and summarises the results of our review of companies' business plans.**

The cost of delivering wholesale water and wastewater outcomes is a major driver of customer bills, comprising more than 90% of the value chain. At this price review we are using a total expenditure (totex) approach for the first time to address concerns about a bias towards capital expenditure over operational expenditure and encourage companies to develop innovative cost solutions.

The key results of our review of the companies' business plans are as follows.

- **Some companies have reduced their proposed expenditure since December.** Others have increased the scope of what they propose to deliver. The gap between our DD threshold and company proposals for wholesale totex is considerably closer than in December.
- **We tightened the cost threshold against which we challenged companies by more than £3 billion** due to (a) our approach of using an upper quartile rather than an average efficiency challenge on all companies' wholesale costs and (b) our high evidence threshold for companies' special wholesale cost claims.
- **We have intervened where the claims for special costs have not passed the relevant gates we set,** but the scale of our interventions is significantly reduced from April's risk based review, reflecting companies' work to respond to our feedback in submitting their revised plans. There remain material gaps between our DD thresholds and company proposals for three outlier price controls.

Overall, the impact of these judgements reflects the gap between our view and the company plan, illustrated in the table below.

**Table A3.1 Comparison of company plan to draft determination threshold**

	% gap above draft determination threshold	
	Water	Wastewater
Anglian	5	-1
Severn Trent	5	-5
Southern	6	6
Thames (excluding Tideway)	-5	1
United Utilities	10	29
Wessex	4	7
Yorkshire	-5	0
Bristol	57	–
Dee Valley	12	–
Portsmouth	-3	–
Sembcorp Bournemouth	3	–
South East	5	–
South Staffordshire	3	–
Sutton & East Surrey	3	–

### Adjustments for performance during 2010-15

When we last set price controls in 2009 we included a number of incentive mechanisms to encourage companies to improve and deliver services more efficiently and to manage uncertainty. These mechanisms were part our PR09 methodology (and determinations in 2009) and the reconciliation of the incentives would take place at this price review. Companies have had to report their performance against these mechanisms and set out any proposed adjustments to 2015-20 price controls as part of their business plan development.

The key results of our review of the companies' business plans are as follows:

- In a number of cases, companies presented proposed adjustments which matched with our view of the adjustments due.
- For some companies we needed to intervene because the company had not allocated revenue appropriately between rewards and penalties or we disagreed with the company's assessment of its performance and were not convinced by the supporting evidence.
- Our main interventions have been in relation to the service incentive mechanism (SIM), revenue correction mechanism (RCM), capex incentive scheme (CIS) and serviceability.
- Our interventions reduce industry revenue by £192 million and industry RCV by £360 million compared to companies' plans, these interventions will benefit customers and will lead to bill reductions.

The material we have published today sets out our draft proposals. Stakeholders now have the opportunity to comment on the proposals and the approach we have adopted in reaching our decision. We will consider carefully all of the representations ahead of making final determinations in December. In particular, companies will review whether to include further evidence as a result of the feedback we have given them. And we will maintain our high evidential bar to make sure that our final decisions represent the best possible deal for customers.

## A3.1 Introduction

In this appendix, we outline our approach for the wholesale water and wastewater price controls under the following headings.

- Structure of the wholesale price controls.
- Calculating allowed wholesale expenditure.
- Calculating allowed 'pay-as-you-go' (PAYG) expenditure.
- Calculating other elements of allowed wholesale revenue.

We provide further detail in this appendix, including cross-industry comparisons, on the revenue adjustments we are making to companies' 2015-20 wholesale price controls to reflect their performance over 2010-15. This is set out in section A3.6.

Our company-specific proposals for the wholesale water price control, and where applicable, the wholesale wastewater price control, are detailed in the relevant company-specific appendices.

Further detailed information on wholesale costs for each company is provided in the company-specific wholesale cost threshold models published alongside our draft determinations.

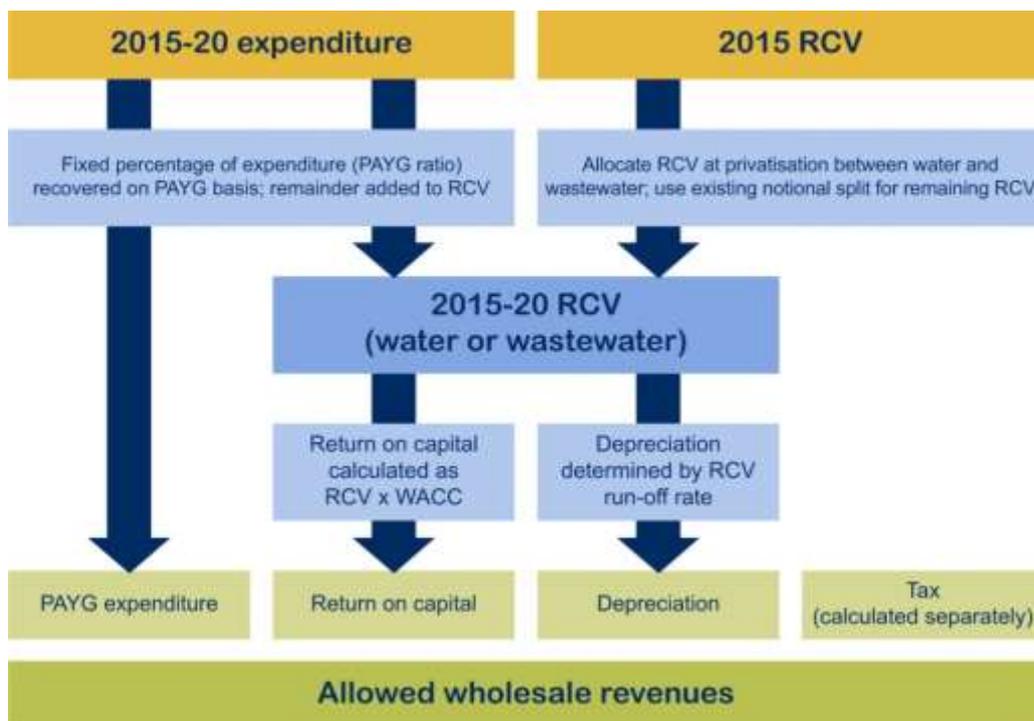
## A3.2 Structure of the wholesale price controls

In ‘Setting price controls for 2015-20: final methodology and expectations for companies’ business plans’ (our ‘final methodology statement’), we explained that the wholesale water price control places an overall limit on the revenue from charges, and cash receipts from connection and infrastructure charges. We also set out that we would retain an RCV approach to the setting of allowed revenue, but that we would make a number of improvements, including:

- using a totex approach, where no distinction is made between capital expenditure (capex) and operating expenditure (opex);
- introducing totex menus, which would provide an additional incentive for companies to reveal accurate information and some scope for managing risks and rewards through the cost sharing factor; and
- providing companies with additional flexibility over cost recovery by allowing them to choose what proportion of their expenditure is recovered through the (regulatory capital value) RCV, and through setting the level of RCV run-off (depreciation).

Figure A3.1 shows how we calculated the allowed wholesale revenues.

**Figure A3.1 Approach to allowed wholesale revenue**



The key components of the allowed wholesale revenue are as follows.

- **Totex baselines** – our own assessment of the efficient level of capex and opex for water and wastewater for each company in the 2015-20 period.
- **PAYG ratio** – the allocation between totex which is recovered in the 2015-20 period and that which is added to the RCV.
- **RCV** – composed of the RCV at the start of the period plus additions from totex that is not recovered in the 2015-20 period minus RCV run-off.
- **Return on the RCV** – the vanilla wholesale weighted average cost of capital (WACC) applied to the RCV during the 2015-20 period.
- **Adjustments for 2010-15 performance** – the impact of incentive tools from the 2010-15 period such as the RCM and the capital expenditure (capex) incentive scheme (CIS);
- **Corporation tax charge** – calculated using the forecast accounting profits.
- **Income from other sources** – income relating to the activities of the regulated business ('other operating income', 'other income' and 'third party income') is taken into account to reduce the revenue required from household and non-household water customers.

Capital contributions, which form the other component of the control, are cash receipts from connection and infrastructure charges.

Companies must set wholesale charges in a way best calculated to recover the revenue specified by the formula:

$$R_t = R_{t-1} \times (1 + RPI + K)$$

Where  $R_t$  is the allowed wholesale revenue for year  $t$  and RPI is the percentage change in the RPI between that published for November in the prior year and that published for the immediately preceding November.

As there are no allowed wholesale revenues set for 2014-15, as a result of the new price control structure, we have set  $K = 0\%$  for 2015-16. This means that in the first year companies would be allowed the 2015-16 wholesale revenues set out in our final determinations, as increased by the change in Retail Prices Index (RPI) published for November 2014.

These draft determinations are stated in 2012-13 average year prices. The wholesale revenues for 2015-16 are also stated in November 2013 prices in the charging technical appendix.

Subject to our charging rules (as provided for in the Water Act 2014), companies will have some flexibility to adjust wholesale charges within the control period – for example, to allow them to manage unexpected changes in demand. We discuss this further in the charging technical appendix.

We have published the conclusions to our consultation on [potential approaches to incentivise companies to accurately forecast their revenues](#) in the risk and reward technical appendix.

## **A3.3 Calculating allowed wholesale expenditure**

We explain our calculation of allowed wholesale expenditure under the following headings.

- Calculating draft determination thresholds.
- Use of company forecasts for certain explanatory variables.
- Changes to wholesale cost models.
- Calculating menu baselines.
- Calculating total allowed expenditure.
- Menus.

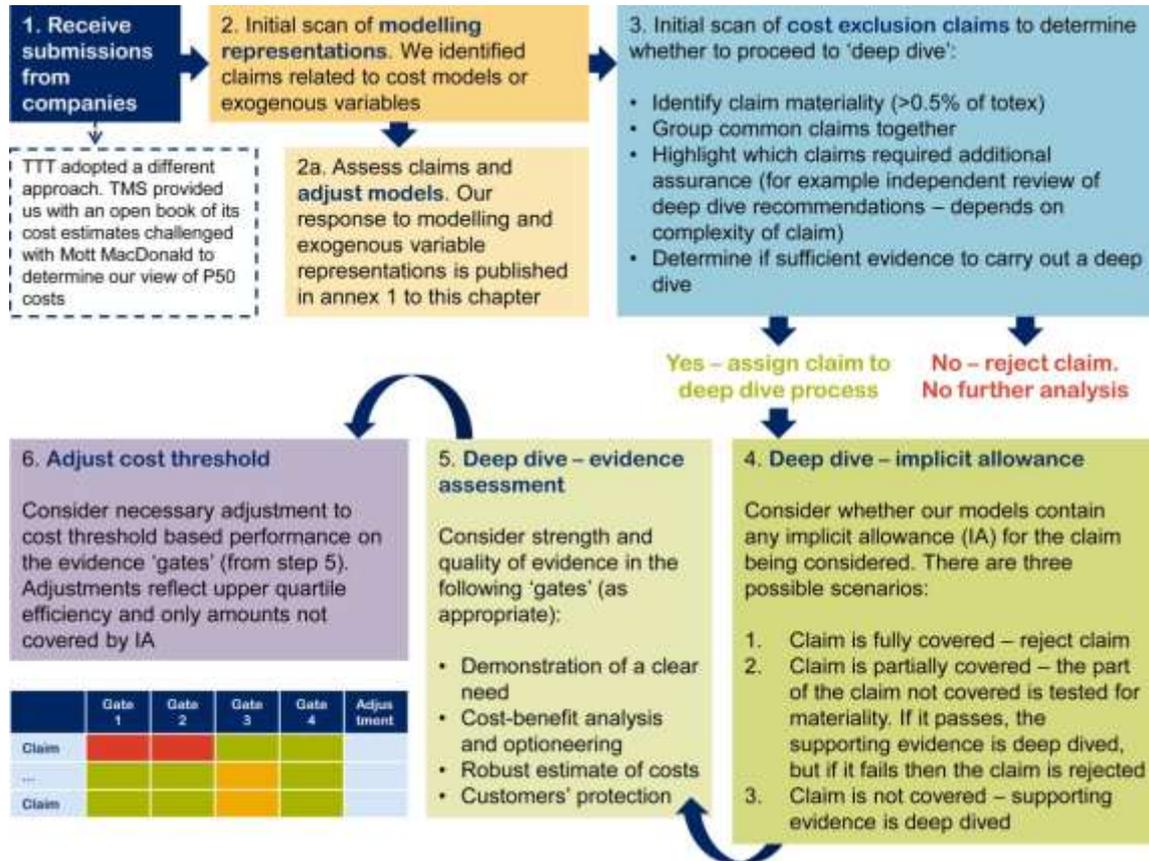
Further details on aspects of this chapter are provided in the annex 1.

### **A3.3.1 Calculating draft determination thresholds**

#### **Intervention framework**

As we set out in our final methodology statement, we have used a totex-based approach to assessing efficient wholesale expenditure. Our work on wholesale costs and decisions on where to intervene in companies' business plans for these draft determinations comprised the steps set out in figure A3.2.

Figure A3.2 Wholesale costs intervention framework



For the purpose of these draft determinations we have made some changes to the wholesale cost models from those we used for the risk-based review (RBR). We discuss this in section A3.3.4.

### Basic cost thresholds

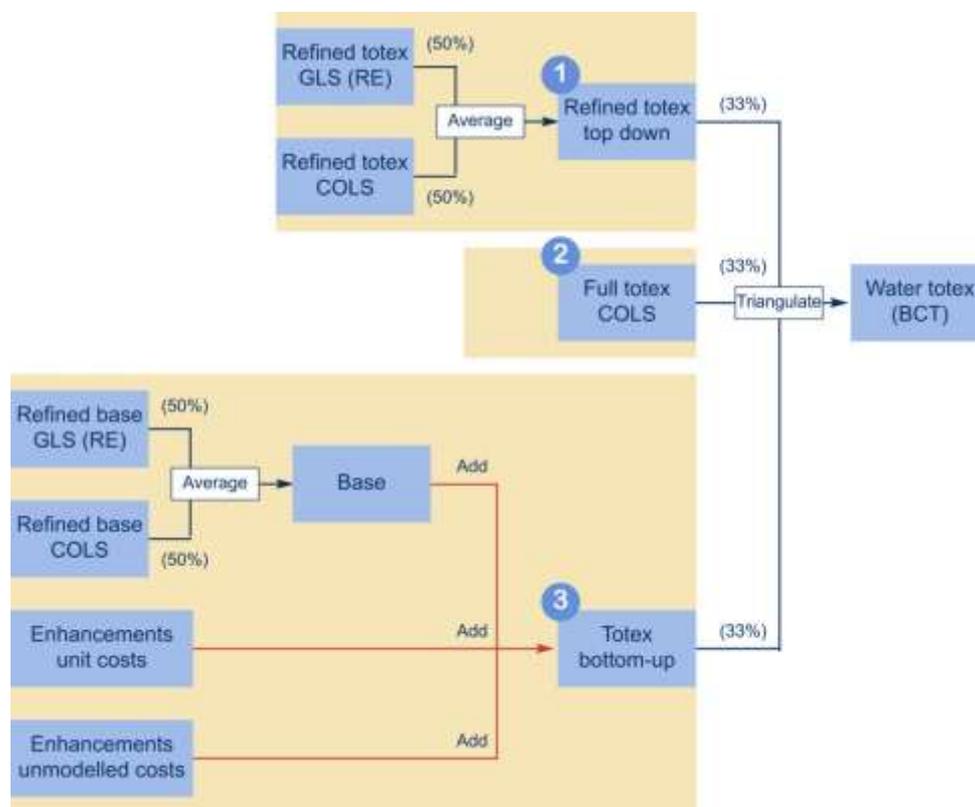
We have developed cost models that explain the patterns of historical costs across companies, and have combined these with forecasts/projections of the model explanatory variables, unmodelled allowances and upper quartile efficiency assumptions to derive basic cost thresholds for each company.

For water we calculated basic cost thresholds (BCT) for each company as the un-weighted average (which we term 'triangulation') of the three modelling approaches:

- (1) a refined top-down totex model;
- (2) a full COLS totex model; and
- (3) a bottom-up totex model.

Figure A3.3 below illustrates how we combined these models to derive our basic cost thresholds for the water element of companies' expenditure.

**Figure A3.3 Modelling approach to create basic cost thresholds for water element**

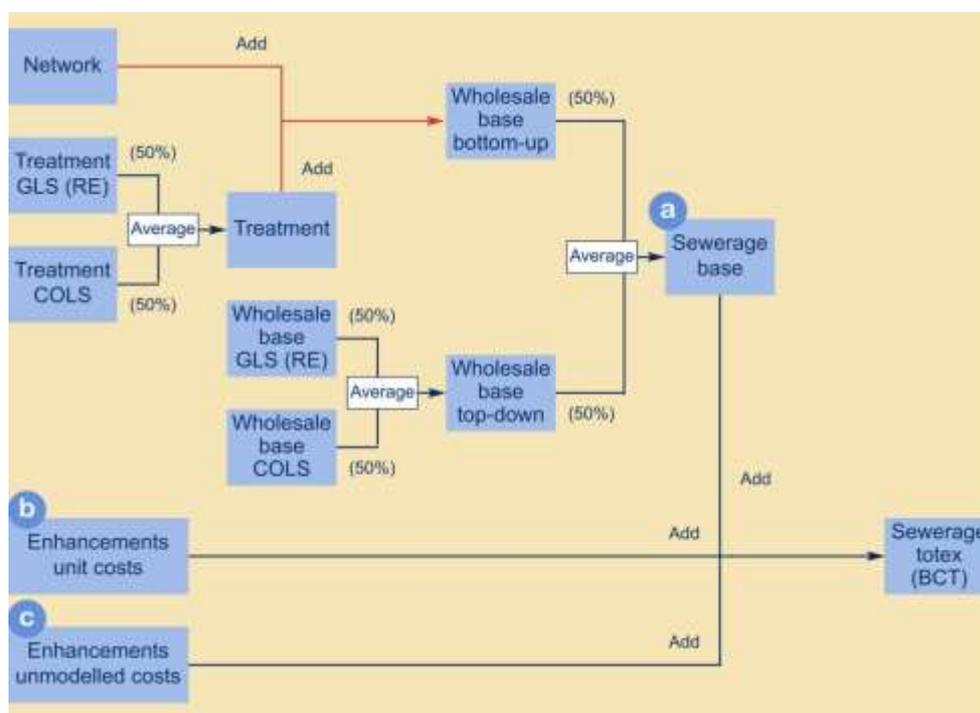


For wastewater, it was not possible to construct individual totex models that would cover all aspects of company expenditure. Therefore, we calculated the BCTs by using a bottom-up modelling approach. This involved adding the following three modelling components:

- (a) a model for base totex;
- (b) aggregated unit cost models for modelled enhancement expenditure; and
- (c) an un-modelled cost adjustment.

Figure A3.4 below illustrates how we combined these models to derive our basic cost thresholds for the wastewater element of companies' expenditure.

**Figure A3.4 Modelling approach to create basic cost thresholds for wastewater element**



Further details can be found in the [basic cost threshold model description](#), ‘Draft price control determination notice: technical appendix’ published alongside the draft determinations for enhanced companies in April 2014 (the enhanced draft determination technical appendix) and the basic cost threshold feeder models published alongside these draft determinations. We have not made any changes to the basic cost threshold models since we published that description.

In the application of an upper quartile efficiency challenge we have not applied a glide path to the efficiency adjustment for wholesale in both water and wastewater. There were a number of factors that we took into account when making this decision.

- Our choice of an upper quartile efficiency target rather than the frontier sets a less challenging efficiency target for the companies.
- The menu allows the companies to choose how and when (during 2015-20) they meet the efficiency challenge.
- The companies have been subject to price control regulation for a sufficiently long time for us to expect them to be able to achieve high levels of efficiency.

## Adjustments to the basic cost thresholds

We have then considered three categories of adjustments to these basic cost thresholds.

- **Policy additions** – these reflect areas of costs excluded from the base modelling across all companies such as business rates, third party costs and defined benefit pension deficit recovery costs. There is further detail on the business rates addition below. We discuss the other policy additions in section A3.3.5.
- **Unmodelled allowances** – an unmodelled allowance is included in the basic cost thresholds to cover areas of enhancement spending not covered by the enhancement modelling. We set out our approach to unmodelled allowances in [basic cost threshold models](#). Where we accepted representations from companies on unmodelled costs, we also made further changes to the unmodelled allowances. These changes related to either: (i) an adjustment downwards to reflect the companies' business plan unmodelled allowance (where it was lower than our estimate); or (ii) where we accepted (fully or partially) a company's claim(s) for unmodelled costs and consequentially made an uplift to its unmodelled allowance. As unmodelled costs are implicitly included in two out of the three approaches to water cost modelling the final adjustment to the water cost threshold is one third of the total.
- **Deep-dive adjustments** – these adjustments capture those aspects of business plans not fully provided for in the BCTs, policy additions and unmodelled allowances. If the basic cost thresholds covers a portion of these costs (an 'implicit allowance'), we calculate the deep dive adjustment as the value of the claim less the implicit allowance. We discuss these adjustments in more detail in annex 1 (particularity section AA1.1) and in the cost templates published alongside this document.

Taken together, these adjustments translate the BCTs to draft determination thresholds. We have summarised the adjustments for each of the categories outlined above for each company in annex 1 of the relevant company-specific appendix.

Where companies made arguments in business plans for special aspects of their plan and we assessed these in detail but decided that it was not appropriate to adjust the cost thresholds (either fully or partially), then these have been categorised as 'deep dives fully or partially not added'. We assessed each deep dive gate as a pass, partial pass or fail. We have then combined these assessments to give our overall assessment of the deep dive. We set out the gates in figure A3.2 and how we have arrived at our overall assessment below.

- **Claims accepted in full** – we have accepted a claim in full where the first three gates, where relevant, are assessed as passed.

We have accepted some claims in full where only one of the gates we have assessed is a partial pass and the others are a pass, but have made our acceptance of the claim for final determination conditional on the company responding to our residual concerns.

- **Claims where we have given a partial allowance** – typically we have made a partial allowance and not the full value of the company's claim where we had concerns over the efficiency of costs or scope of the programme proposed by the company, and have had means of calculating our own view of costs for an acceptable scope (either from using our models or from assessing the detail of the company's evidence).
- **Claims where we have not made an allowance** – we have not made any allowance where the evidence on one or more of the first three gates was assessed as failed. We have two exceptions which are due to claims made by a company with separable components where despite a fail in one of the first three gates we are making a partial allowance for a valid component of the claim.

We set out in table A3.2 some examples of how we have arrived at our overall assessment and the implications that this had for allowed totex.

**Table A3.2 Examples of wholesale costs assessment process**

Company (service) Special cost factor claim	Claim (and Implicit allowance)	Need	CBA	Robustness of estimate	Customer protection	Result	Added to cost threshold
Thames (wastewater) NEP5	£130.2m (£0 implicit allowance)	Pass	Pass	Pass	Pass	Fully accept	£130.2m
Bristol (water) Southern Resilience	£21.4m (Implicit allowance £8.4m)	Pass	Pass	Partial pass	Partial pass	Partially accept	£3.2m after triangulation
Yorkshire (wastewater) Withernsea wastewater treatment works relocation	£17.6m (implicit allowance £0)	Pass	Fail	Fail	n/a	Reject	£0

Annex 1 of the relevant company-specific annex also provides details of revised business plan forecast totex and the difference between the forecast and the draft determination threshold.

Our process of arriving at the draft determination thresholds covers the majority of the companies' wholesale expenditure - over 98% of total water totex proposals and 95% of wholesale wastewater totex proposals. The companies whose business plans have the largest gap to our draft determination thresholds tend to be outliers compared to the rest of the industry.

### **Business rates**

We have not made any allowance for the impact of the 2017 revaluation of rateable values for the water or the wastewater service. In addition, unless companies have provided a robust explanation, we have capped any increase in wastewater rates proposed by companies due to asset growth. We based this cap on an assessment of historic growth in wastewater rates.

### **Additional wholesale cost checks**

We also carried out the following checks.

- For the water and sewerage companies, we reviewed changes in the allocation of costs between water and wastewater compared to companies' June plans. We did not make any changes to the allocations as we were content that any changes were reasonable and supported by the explanation provided by companies.
- To protect the interests of customers, we reviewed the profile of totex to check whether it was consistent with the drivers of need and statutory requirements. We re-profiled investment where the totex profile was front loaded and companies provided no justification for this. We re-profiled totex for Yorkshire Water for the wastewater service and have set out the basis for this re-profiling in the company-specific appendix. We did not intervene for any other company.

### **A3.3.2 Costs thresholds when business plan forecasts of totex are significantly below initial draft determination thresholds**

In chapter A2 of our enhanced DD technical appendix, we highlighted that:

**“where the expenditure within companies’ business plans is below our cost thresholds we need to consider whether the threshold is an appropriate baseline for setting prices. This approach will help to ensure that customers’ interests are protected.”**

We also noted, in respect of other, non-enhanced companies, that:

**“we may need to adapt our initial cost thresholds for use in menu baselines, in particular where other companies’ business plan forecast levels of totex were significantly below the initial risk-based review cost threshold levels.”**

For the enhanced companies, South West Water and Affinity Water, we adapted our initial cost threshold. We did this by substituting the company’s forecasts of their explanatory variables in our calculations. For these two companies, we had relatively high confidence that the cost driver projections were aligned with the companies’ delivery commitments to customers.

We did not adapt the subsequent draft determinations for Northumbrian Water and Dŵr Cymru as our initial cost thresholds were relatively close to their own forecasts of wholesale water and wastewater totex in their business plans.

For the August draft determinations, there are three companies whose forecasts of totex in one of the wholesale price controls are significantly below our own wholesale cost thresholds. These are Thames Water (wholesale water), Yorkshire Water (wholesale water) and Severn Trent Water (wholesale waste water). We have needed to decide how to set wholesale cost baselines for these three price controls for the August draft determinations.

We considered limiting our view of the wholesale cost baseline to what the company had proposed. However, we were concerned that this could have a detrimental impact on customers over time because companies may not be as incentivised to deliver an efficiently priced business plan in subsequent price control periods.

We also considered setting the Ofwat baseline based on our modelled thresholds, which for these companies are materially higher than the amount requested in their business plan for the three controls concerned. However, we were concerned that customers would not be adequately protected as this places a very significant reliance on the outcome of our wholesale cost modelling.

While we have sought to ensure the modelling is as robust as possible it should be seen as the beginning of a process of engagement with the companies on projections of their total wholesale expenditures. We are concerned that information asymmetries could lead to customer detriment if we placed too much reliance on our models when these imply higher costs than the companies' forecasts. If Ofwat's modelling **underestimated** costs, companies may be expected to devote resources seeking to correct any issues with the modelling. However, the position is likely to be different if Ofwat **overestimates** a company's costs, in which case companies are likely to devote fewer resources to seeking to correct any modelling issues.

We acknowledge that owing to the natural imperfections of all modelling, and this information asymmetry, there is a risk that, in the case of the three price controls referred to above, some of the difference between the draft determination cost threshold and the company's business plan is due to the models over-estimating the required totex.

Our 'capping solution' seeks to strike a balance between the interests of maintaining incentives to be more efficient, on the one hand, and ensuring that consumers pay no more than is reasonably necessary for the services they receive.

For this draft determination, we have chosen to 'cap' the difference between company projections and our assessment at 5% above the companies' projections. We consider this approach and the 5% cap appropriate for the PR14 draft determination in light of several factors.

- The impact of the approaches adopted for the two enhanced companies and the two early draft determinations and viewing these as effectively boundaries to what could be allowed (an upper bound of 8% and a lower bound of 4%).
- The need for a consistent approach across companies (excluding the enhanced ones, where it is important to retain a higher cap to reflect the benefit of having achieved enhanced status).
- Providing a strong protection for customers.

- The difference between the upper quartile and average efficiency levels.
- Any specific known modelling impacts, such as scale/density, which, on analysis, could have influenced the modelling results for one or more of the companies.
- The importance of recognising that the companies' estimates for these three controls represent the widest disparity between the companies' own lower estimates and Ofwat's higher estimates, which may suggest real efforts on their part to secure efficiencies over and beyond those expected by Ofwat.

We derive the menu baseline by combining our estimate of efficient costs with the companies' forecasts in the ratio 75:25. Under the 5% capping approach, our estimate of a companies' efficient costs will be constrained to be 105% of the companies' own estimate. After the application of the 75:25 weighting, this means that the baseline is set at 103.75% of their estimate of efficient service delivery cost.

### **A3.3.3 Costs thresholds when business plan forecasts of totex are significantly above initial draft determination thresholds**

We set out in [IB 17/14: 'Protecting customers where there are very material differences between companies' re-submitted plans and Ofwat's wholesale cost assessment'](#) that for three companies for individual price control our draft determination assessment suggests there will be a very material 'gap' between the expenditure sought by the companies and Ofwat's view of efficient expenditure in respect of certain price controls. The gaps were in excess of 20%, and markedly above the gaps observed for other price controls. While our assessment of all companies' plans is not final, because we will take account of any further evidence submitted by companies and further refinement of our own modelling could result in changes, in our judgement this is unlikely to result in changes sufficient to address the scale of the gap for these companies' price controls.

As a result, we decided to give those companies affected as much time as possible to review the relevant parts of their plans ahead of the deadline for re-submitting evidence for our final determinations. The three price controls affected are:

- Bristol Water – wholesale water;
- Thames Water – costs for the Thames Tideway Tunnel; and
- United Utilities – wholesale wastewater.

We wrote to these companies on 6 August 2014 to inform them of our concerns.

### **A3.3.4 Changes to wholesale cost models**

For the purpose of these draft determinations, we have made some changes to reflect the outcomes of both our own ongoing assurance process and feedback from stakeholders on the information we released following the RBR.

In the technical appendix for the enhanced companies' draft determinations, we summarised the resulting changes that we have made to our wholesale cost assessment models since we published the relevant RBR material on 4 April 2014, and the impact these changes have had on the outputs of the wholesale cost modelling we have used for the enhanced company draft determinations.

We asked companies to submit their representations on our wholesale cost models by 3 June 2014 and we received representations from 12 companies. We have considered these modelling representations and the associated special cost factor claims. We have made a company-specific allowances in respect of a small number of representations, but we have retained our modelling approach for these draft determinations. We summarise these representations and our responses annex 1.

### **A3.3.5 Calculating menu baselines**

Our menu baselines exclude those costs and allowances where cost sharing incentives would not be appropriate, namely:

- defined benefit pension deficit recovery costs;
- third party costs; and
- 2014-15 market opening costs.

### **Defined benefit pension deficit recovery costs**

We have calculated pension deficit repair allowances in line with the approach that we outlined in [IN 13/17: 'Treatment of companies' pension deficit repair costs at the 2014 price review'](#). We have allocated costs between the different controls as set out in the information notice with the exception of the allocation of wholesale pension deficit costs between water and wastewater, which we have allocated using the company split in table 7 of the August 2013 data submission. This is consistent with the allowance made at PR09, with shareholders bearing the remaining deficit repair costs. We have also made some minor corrections to the application of efficiency to the pension deficit repair costs set out in the information notice. We have included our updated figures in each company's draft determination.

### **Third party costs**

We have excluded third party costs from our menu baselines, as changes in costs from the business plan projections should be offset by changes in actual associated revenues, which are not covered by the cap on allowed wholesale revenues set out in companies' licences. A base level of these projected costs and associated projected revenues has been included as part of the 'single till' of costs and revenues used for our draft determinations, reflected in the financial model.

We have calculated this base level using the information in company plans on third party income and our calculation of individual companies' historic recovery of third party costs. We have not challenged or adjusted the company projections of third party income given the low materiality of this income relative to the wholesale controls.

### **Costs of the Open Water programme and the set-up of the market operator**

We have agreed to make an allowance for the costs of the Open Water programme and the set-up of the market operator in the allowed wholesale revenues recovered through non-household charges between 2015 and 2020. This allowance is included in the menu baseline. We have updated the allocation of these costs between companies to be consistent with the share of contributions we set out in ['Consultation on Ofwat's section 13 proposal to modify the licences'](#). We have included our updated figures in each company's draft determination.

We have also decided to allow the recovery of the 2014-15 allowance for these costs in the 2015-20 determinations. This is a non-cash item in the totex forecasts relevant for determining the relevant allowed revenues in 2015-20, and so we have excluded this 2014-15 allowance from the menu baselines.

We have not made an allowance for the costs of the Open Water programme and the set-up of the market operator for Dŵr Cymru or Dee Valley Water given that the Welsh Government has not proposed extending retail competition to all non-household customers.

### **A3.3.6 Calculating total allowed expenditure**

To set the price controls, it is also necessary to convert the cost thresholds into total allowed expenditure.

To convert the menu baseline to a totex allowance for the purpose of these draft determinations, we have calculated an implied menu choice, which is the ratio of the company's view of cost and our menu baseline. We set out the menu we have used for the draft determinations in section A3.3.7 below. Each company's implied menu choice is provided in the relevant company-specific appendix for wholesale water and wastewater respectively, as is the calculation of totex allowances.

Separate revenue allowances are made for pension deficit recovery costs and third party costs which, as discussed above, are excluded from the menu baselines, as are 2014-15 market opening costs.

Unless otherwise stated in the company-specific appendix, in arriving at the totex allowances in the relevant company-specific appendix, we have phased the timing of the menu baseline expenditure using the company plan totex profile. We have phased the timing of our view of the menu exclusions expenditure as follows.

- Pension deficit recovery costs are phased equally in each year.
- Third party costs are phased in the same way as companies' business plan view of third party income.
- 2014-15 costs of the Open Water programme and the set-up of the market operator are added onto 2015-16 costs.

### A3.3.7 Menus

We summarised our approach to menu regulation for the non-enhanced companies in ‘[Setting price controls for 2015-20 – policy and information update](#)’. The table below reproduces the draft menu for non-enhanced companies from that document and we confirm that this is the menu we have used for the draft determinations for all non-enhanced companies.

**Table A3.3 Draft menu for non-enhanced companies**

Company menu choice	80	85	90	95	100	105	110	115	120	125	130
Cost sharing rate	54%	53%	52%	51%	50%	49%	48%	47%	46%	45%	44%
Allowed expenditure	95.00	96.25	97.50	98.75	100.00	101.25	102.50	103.75	105.00	106.25	107.50
Additional income	2.30	1.76	1.20	0.61	0.00	-0.64	-1.30	-1.99	-2.70	-3.44	-4.20
Actual expenditure	Reward/penalty										
70	15.8	15.7	15.5	15.3	15.0	14.7	14.3	13.9	13.4	12.9	12.3
80	10.4	10.4	10.3	10.2	10.0	9.8	9.5	9.2	8.8	8.4	7.9
85	7.7	7.7	7.7	7.6	7.5	7.3	7.1	6.8	6.5	6.1	5.7
90	5.0	5.1	5.1	5.1	5.0	4.9	4.7	4.5	4.2	3.9	3.5
95	2.3	2.4	2.5	2.5	2.5	2.4	2.3	2.1	1.9	1.6	1.3
100	-0.4	-0.2	-0.1	0.0	0.0	0.0	-0.1	-0.2	-0.4	-0.6	-0.9
105	-3.1	-2.9	-2.7	-2.6	-2.5	-2.5	-2.5	-2.6	-2.7	-2.9	-3.1
110	-5.8	-5.5	-5.3	-5.1	-5.0	-4.9	-4.9	-4.9	-5.0	-5.1	-5.3
115	-8.5	-8.2	-7.9	-7.7	-7.5	-7.4	-7.3	-7.3	-7.3	-7.4	-7.5
120	-11.2	-10.8	-10.5	-10.2	-10.0	-9.8	-9.7	-9.6	-9.6	-9.6	-9.7
125	-13.9	-13.5	-13.1	-12.8	-12.5	-12.3	-12.1	-12.0	-11.9	-11.9	-11.9
130	-16.6	-16.1	-15.7	-15.3	-15.0	-14.7	-14.5	-14.3	-14.2	-14.1	-14.1
140	-22.0	-21.4	-20.9	-20.4	-20.0	-19.6	-19.3	-19.0	-18.8	-18.6	-18.5

**Note:**

All figures, except for the cost sharing rate represent percentages of the company’s baseline expenditure amount. Cells highlighted in blue represent the maximum reward that can be obtained for a given level of actual expenditure.

Each company will have the opportunity to finalise its menu choice within the range of 80 to 130 after we have published our final determinations for all companies in December. We anticipate that this will take place in mid-January 2015, when companies submit their 2015-16 charges to us for approval, as discussed in the charging technical appendix. The company's menu choice will impact on its allowed revenues and customers' bills. This will influence the company's allowed expenditure and additional income and, consequently, allowed revenue and bills. The allowed revenue is based on a weighted average of our view of the baseline (75%) and the company's menu choice (25%).

We considered the possibility that companies could make their final menu choice before final determination. However, this would require an additional step whereby we publish our final wholesale cost baselines sometime before December. This additional step would not be practical in the timescale. We will carry out a further review of our approach to wholesale cost modelling in preparing final determinations. This will include both further quality assurance on the implementation of the existing model results in wholesale feeder models 3 and 11, and consideration of issues raised by out-turn data for 2013-14 including whether the underlying cost models should be updated to take account of this information.'

As we said in our policy and information update, we propose to limit the range of the menu to choices within 80 to 130 for non-enhanced companies. This means that companies will not be able to make a menu choice outside of this range. Any menu choice below 80 would be treated as if it was 80 and any menu choice above 130 would be treated as a menu choice of 130. We consider that the menu range allows a genuine choice, but within plausible bounds.

For these draft determinations, we have applied the same rules when calculating total allowed expenditure using the implied menu choice. We have only intervened for Bristol Water for the water service, where the implied menu choice was greater than 130.

## **A3.4 Calculating allowed ‘pay-as-you-go’ (PAYG) expenditure**

To determine the allowed revenue based on the menu choice, the wholesale water totex allowance is allocated between:

- the PAYG amount (the amount recovered in 2015-20 PAYG); and
- The amount added to the RCV to be recovered in future periods.

A significant proportion of company expenditure is in long life assets, which benefit current and future consumers. The allowed revenue will also include RCV run-off and the return on the RCV as set out in

Figure A3.1 above, as well as the additional income arising from the company’s menu choice.

Consistent with our final methodology statement, we have allowed all companies to propose their own PAYG ratios and levels of RCV run-off. The company-specific appendices detail the PAYG ratios and associated totex recovery for wholesale water and wastewater respectively, which we have used as the basis for these draft determinations.

## A3.5 Calculating other elements of allowed wholesale revenue

We explain our calculation of the other elements of allowed wholesale revenue under the following headings.

- Return on the RCV.
- Corporation tax.
- Income from other sources.
- Capital contributions from connection charges and revenue from infrastructure charges.
- Reconciling 2010-15 performance.
- Calculating allowed revenue.

### A3.5.1 Return on the RCV

Companies receive a return on the RCV to compensate them for capital value that has not been recovered prior to and in the 2015-20 period. Our risk and reward guidance ([‘Setting price controls for 2015-20 – risk and reward guidance’](#)) set out a single industry cost of capital for both wholesale water and wastewater services of 3.7%. We discuss the returns assumed on the RCV in more detail the risk and reward technical appendix.

The return on capital is calculated by applying the cost of capital to the average RCV for the year. The relevant company-specific appendices show our calculation of the opening RCV at 1 April 2015 for wholesale water and wastewater respectively. We also discuss our company-specific RCV adjustments in more detail in the company-specific appendices.

### **A3.5.2 Corporation tax**

The allowed revenues of the wholesale water and wastewater services include the recovery of the appropriate tax, taking into account complexities such as tax losses arising at the appointee level. To help achieve this aim, wholesale tax has first been calculated at the wholesale level for both services combined, where applicable, and then apportioned to the water and wastewater services for the separate allowed revenues concerned. As set out in our final methodology statement, our approach to calculating tax is similar to the method used for PR09, but with a simplified and less data-intensive approach.

We have used companies' average capital allowance writing-down rates by service for both the brought forward expenditure pools and for new expenditure. We have used each company's estimates of the proportion of base expenditure on underground assets, which is treated as opex in the statutory accounts.

We have based the tax calculation on projected corporation tax rates, profits and assumed levels of tax relief. We have taken account of debt interest payments by using the higher of:

- companies' actual proportion of debt financing; and
- the proportion of debt financing assumed in our notional capital structure.

### **A3.5.3 Income from other sources**

Income from other sources is made up of:

- operating income;
- other income; and
- third party income.

These are revenues that companies charge but that do not form part of the regular water and wastewater bills that customers pay. Unless otherwise stated in the company-specific appendix, these revenues are based on the company's forecasts, which are consistent with recent trends, and are set out in the relevant company-specific appendix for wholesale water and wastewater respectively. Where companies have forecast future revenues from land sales, we have excluded these amounts from the total as these will be adjusted through the RCV at the next price review.

### **A3.5.4 Capital contributions from connection charges and revenue from infrastructure charges**

This comprises revenue and capital contributions from connection and infrastructure charges (including requisitions and self-lay). Unless otherwise stated in the company-specific appendix, these revenues are based on the company's forecasts and are set out in the relevant company-specific appendix for wholesale water and wastewater respectively.

### **A3.5.5 Calculating allowed revenue**

The calculation of allowed revenue for wholesale water and wastewater is set out in the relevant company-specific appendix. As shown in

Figure A3.1, allowed revenue is principally built up from PAYG totex, the return on RCV, RCV run-off and an allowance for corporation tax.

## **A3.6 Reconciling 2010-15 performance**

### **A3.6.1 Overview**

We explained in our final methodology statement that, when we set price controls for 2010-15 at the 2009 price review (PR09), we included a number of incentive tools (see table A3.4) designed to:

- manage the risks to customers and companies from uncertainty in costs and changes in the outputs companies deliver; and
- provide incentives to encourage efficiency and outperformance, and penalise companies that perform poorly.

Companies have taken more ownership and shown more accountability in their business plan resubmissions than ever before. They have been open and honest with their customers, when for example; there has been an under-delivery of programmes or services to customers or the environment.

We established the principles and processes for the PR09 incentive tools as part of our final determinations in 2009 (FD09). We have now assessed companies own proposals for reconciling their performance against these tools.

This consistent application of the principles and processes has resulted in a number of material interventions to companies' business plans. In total, these interventions have resulted in revenue adjustments (reductions) of £192 million compared with those proposed by the companies. Similarly, these interventions have resulted in a reduction in the RCV of £360 million compared with the changes the companies had proposed (from both the CIS reconciliation and from serviceability shortfalls – post-efficiency).

### **A3.6.2 Background**

The following incentive tools were included when we set price controls for 2010-15 in 2009 (see table A3.4).

**Table A3.4 PR09 legacy incentive tools**

Tool	Purpose
Service incentive mechanism (SIM)	Incentive to reward good customer service performance.
Revenue correction mechanism (RCM)	Tool to deal with differences between actual revenue collected and our assumptions for allowed revenue at PR09.
Opex incentive allowance (OIA)	Balancing incentive for savings in operating expenditure designed to counter effect of five-year price controls
Capital expenditure incentive scheme (CIS)	Incentive used for capital expenditure, designed to reward both cost outperformance and accurate business plans.
Change protocol (logging up and down, shortfalls, overlap programme)	Tools used to deal with material changes in delivery

We also confirmed in FD09 that we would need to make adjustments to:

- account for other differences between the RCV projections we made in 2009 and companies' outturn positions;
- recover any assumed costs of issuing new equity during 2010-15 where these costs did not materialise (this only applies to the small number of companies we assumed would need to issue new equity); and
- recover any tax benefits arising from in-period changes in capital structures.

In our final methodology statement for PR14, we confirmed that these tools apply to the 2010-15 period, but that some of these tools will be removed and changed for the next price control period (2015-20). We said that we would use these legacy tools to compare actual performance, costs and revenues against the assumptions we made at FD09. Where appropriate, we would then make adjustments to allowed revenues (and price controls) for 2015-20 to reflect companies' outturn positions.

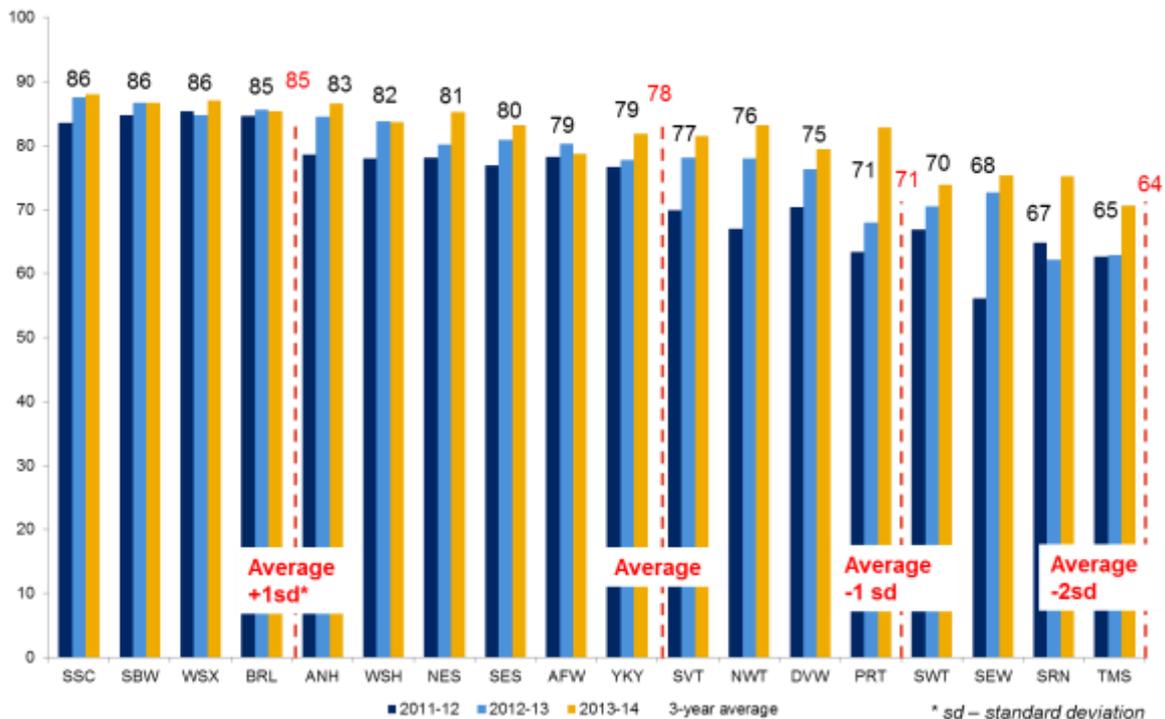
We summarise the revenue and RCV adjustments we are making to each company's 2015-20 wholesale price controls to reflect its performance over 2010-15 in the relevant company-specific appendix for wholesale water and wastewater respectively. Further details of company-specific adjustments are provided in annex 3 of the relevant company-specific appendix.

In the remainder of this chapter, we outline our approach for each incentive tool.

### A3.6.3 Service incentive mechanism

The use of SIM in 2011-14 has improved companies' performance on customer service over the three years within which it has been fully monitored. Industry average scores have improved, as have most company scores (see figure A3.5).

Figure A3.5 SIM scores between 2011-12 and 2013-14 by company



As can be seen in figure A3.5, a higher level of performance has been maintained at the frontier of the sector over the period. Comparative competition from those with above average performance is encouraging other companies to achieve a similar level of customer performance as frontier companies. Finally, there have been some dramatic improvements in customer service for those companies below and significantly below average particularly in the 2013-14 year.

The SIM is a good example of an incentive which has encouraged comparative analysis between companies to deliver better service and outcomes for customers through effective monitoring and reporting over the period. In their business plan resubmissions, companies have taken more ownership and accountability than ever before for proposing rewards and penalties under the SIM. The net effect of the

company proposals was to reduce industry revenue by £62.2 million. We have reviewed the rewards and penalties for the SIM across all of the companies. The net effect of Ofwat's view of the SIM rewards and penalties is to reduce industry revenue by £79.4 million.

Given the results in the current control period, we are retaining the SIM as a retail outcome delivery incentive (ODI) in PR14. The SIM is a good example of how outcome delivery incentives (ODIs) can work with clear accountability for companies' ownership of rewards and penalties; and is an important example for how our new approach to outcomes may deliver benefits during 2015-20.

## **Background**

The SIM was introduced at PR09 for the first time and is a financial incentive mechanism designed to encourage the companies to provide better service to customers. It compares the service delivery performance of companies with other companies; those that perform comparatively well are rewarded, and those that perform comparatively poorly are penalised.

## **Methodology and process for assessment**

We have reviewed each company's three-year SIM performance against the information provided by all companies on 2 May 2014. We have reviewed these data alongside the proposed adjustments made to revenue by each company and have reflected this analysis in our draft determinations.

Our methodology for the SIM has been previously set out and detailed in 'Setting price controls for 2015-20 – prequalification decisions: Appendix 5 – service incentive mechanism (SIM) for 2010-15 and 2015-20'. The process we have used to assess the SIM is detailed in figure A3.6 below.

Figure A3.6 Assessment process for SIM draft determinations

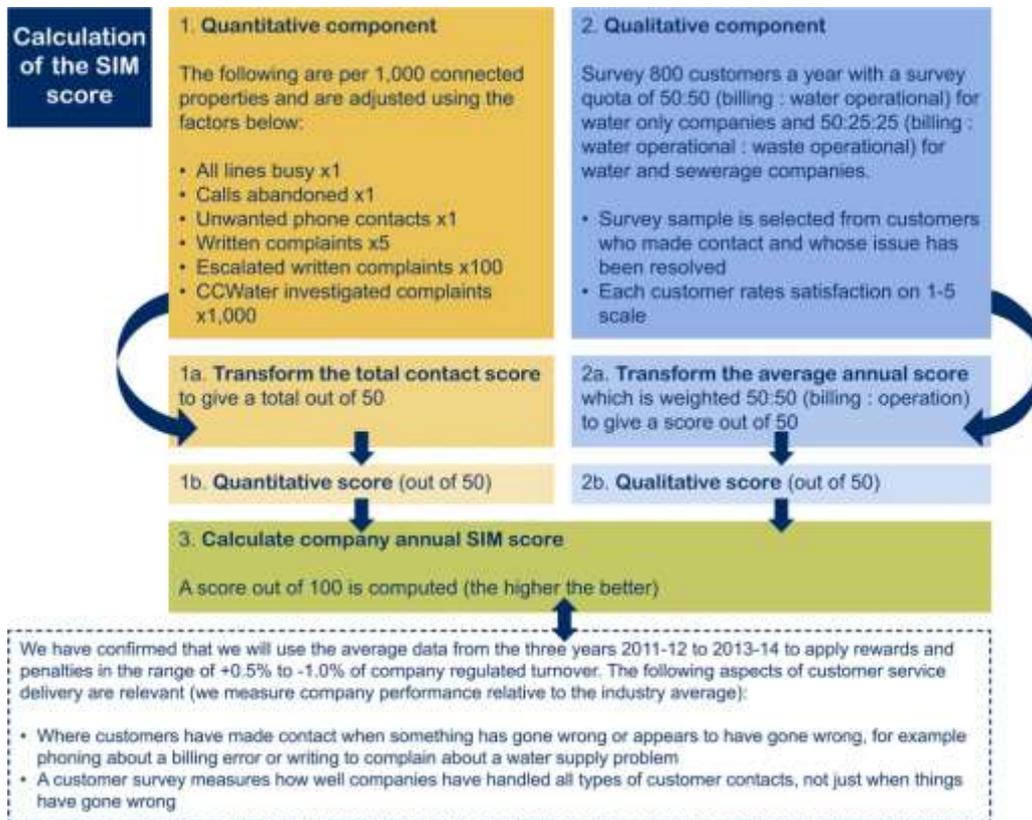
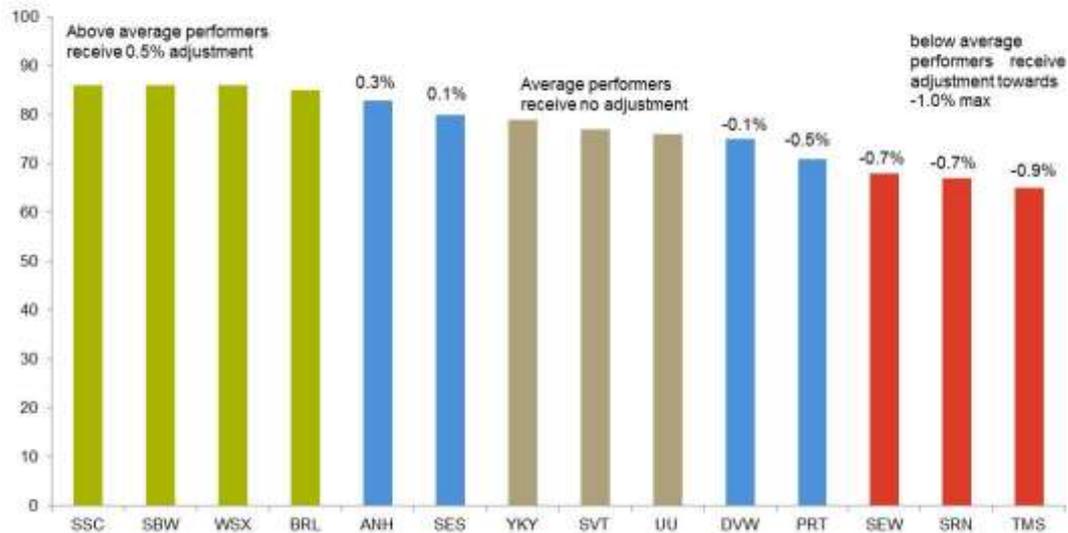


Figure A3.7 below details the three-year average SIM performance of companies for the years 2011-12, 2012-13 and 2013-14 and the resulting rewards or penalties applied within our draft determinations as a percentage adjustment to the price limit.

**Figure A3.7 Three-year average (2010-11 to 2013-14) SIM performance and resulting rewards and penalties**



Each of the coloured bands above represents the company positions around the mean and standard deviations defined in our methodology: green companies are above one standard deviation above the mean; grey companies are at or very close to the industry mean; and red companies being between one and two standard deviations below the mean.

The table A3.5 below also includes this information together with the total financial impact during 2015-20 per company.

**Table A3.5 Three-year average SIM performance and resulting rewards and penalties**

Company	Three year SIM score	%	£m	£m
			Company resubmission	August DD
South Staffordshire	86	0.5	2.9	2.8
Sembcorp Bournemouth	86	0.5	1.1	0.9
Wessex	86	0.5	12.2	12.3
Bristol	85	0.5	2.4	3
Anglian	83	0.3	17.6	17.4
Sutton & East Surrey	80	0.1	0	0.3
Yorkshire	79	0	0	0
Severn Trent	77	0	0	0
United Utilities	76	0	0	0
Dee Valley	75	-0.1	0	-0.1
Portsmouth	71	-0.5	-1.8	-0.9
South East	68	-0.7	-2.8	-7.2
Southern	67	-0.7	-18.6	-26
Thames	65	-0.9	-73.6	-84.2
<b>Total</b>			<b>-60.7</b>	<b>-81.7</b>
<b>Industry</b>			<b>-62.2</b>	<b>-79.5</b>

## Our interventions

In general, companies calculated SIM rewards and penalties in accordance with our final methodology statement. We intervened to apply rewards and penalties according to averaged performance over the three year period within the band described above, which resulted in adjustments to the companies' business plan proposals. For example for Portsmouth Water, we reduced the scale of the penalty where it applied the full penalty at two standard deviations even though the company's performance was at one standard deviation.

### **A3.6.4 Revenue correction mechanism (RCM)**

In PR09, we introduced the RCM to provide companies with a financial incentive to encourage consumers to use water efficiently and to correct for differences between expected and actual tariff basket revenue between 2010 and 2015 at PR14. The mechanism was introduced to remove both the scope for a company either to outperform or underperform on revenue and the disincentive for a company to promote water efficiency to measured consumers.

We confirmed the details of our revenue correction mechanism in [PR09/31, 'Revenue correction mechanism'](#) (July 2009).

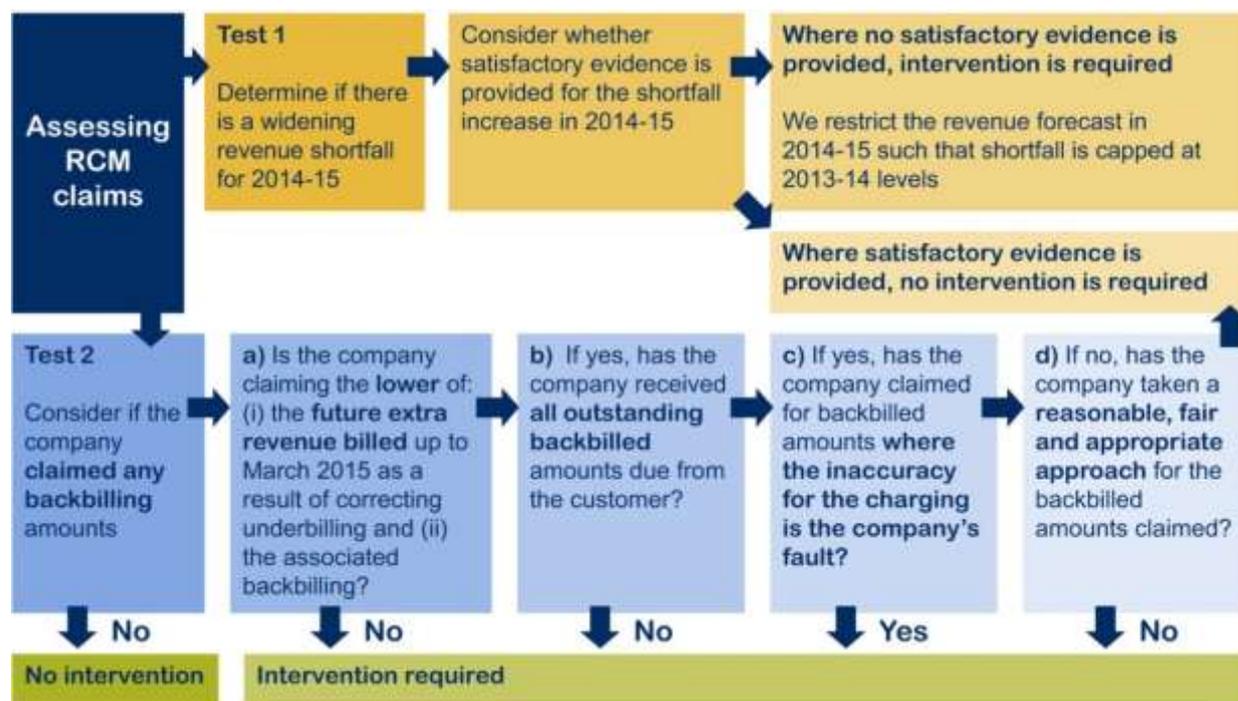
#### **Methodology and process**

In line with the approach we set out in July 2009, we have made revenue adjustments in PR14 to take account of each company's revenue difference relative to the assumptions we made in our final determinations for 2010-11 to 2014-15. This adjustment has been annualised over the five years in net present value (NPV) terms.

In [IN 11/04, 'Simplifying the revenue correction mechanism'](#), we summarised our decision to simplify two areas of the RCM, the 'billing incentive' and 'back billing'. We did this to ensure that only issues outside the company control are recovered and that customers do not bear the costs when the fault is as a result of poor billing management. The supporting information to IN11/04 provides the technical detail to these changes.

Figure A3.8 details our methodology and process for the assessment of the RCM at the draft determination.

Figure A3.8 Assessment process for RCM draft determinations



**Note:**

Where we intervene for back billing we disallow the claim in its entirety. We will give companies an opportunity to provide additional information in their draft determination representations.

Our draft determination interventions concentrate on two primary tests around revenue forecasts and back billing.

**Test 1: 2014-15 revenue forecasts**

We assessed whether the companies' 2014-15 forecasts were substantiated, fair and reasonable. We checked that companies had explained the underlying basis of their forecasts, provided assurance that these are based upon appropriate central estimates and that the forecasts are consistent with actual revenues between 2010-11 and 2013-14.

We intervened if:

- the difference between the 2014-15 revenue forecast and the year by year projection of revenue set at final determinations in 2009 increases beyond the variance in 2013-14 (and earlier years); and
- the company has not explained the reasons for change.

In these cases, we have restricted the revenue difference in 2014-15 to the level or difference recorded in 2013-14.

## **Test 2: Back billing**

The back billing incentive is a refinement to the RCM to include an additional incentive for the companies to identify properties that have been charged less than they should have been ('under-billed properties') – and to recover the amount owed ('back billing').

In RAG4.04, we stated that:

**“For a company to be able to make a claim for the back-billing incentive it would have had to have back-billed the customer and have received all outstanding amounts due from the customer. Where a company wishes to claim for the back-billing incentive, it should provide us with the total amount for the back-billing adjustment that it wishes us to include in the revenue correction mechanism calculation. It should follow the guidance as specified in the supporting information to information note IN11/04.”**

We intervened where the company did not comply with our guidance and have not included the back billed amounts claimed by the company in our determination assumptions. We will give companies an opportunity to provide additional information as part of their draft determination representations.

## **Our interventions**

The RCM impact of an intervention has been assessed using our published RCM feeder model. The value of the intervention is calculated by comparing the before and after positions of the intervention on the RCM calculated.

Figure A3.9 below shows the scale of interventions we have undertaken within the draft determination process and details the reasons for such interventions. As can be seen, we have intervened in a number of company business plans, the primary reason being that of back billing, although we have also intervened where there were material differences around PR09 input assumptions and where we have found data issues in the company business plan tables.

Figure A3.10 below shows the scale of RCM adjustments applied as part of our draft determinations. As can be seen, the most significant RCM adjustments are for Southern Water at £187 million. The largest difference in view between the company resubmission and our draft determination is for Thames Water with a £38 million difference.

As part of the RBR, we challenged Southern Water on the scale of its RCM adjustments. The company reviewed its submission and has been able to provide us with evidence which means that the scale of the intervention is much smaller at our draft determination than was identified at the RBR.

Figure A3.11 and A3.12 shows the companies' RCM turnover impact for water and wastewater within the draft determinations.

**Figure A3.9 RCM interventions within our draft determinations**

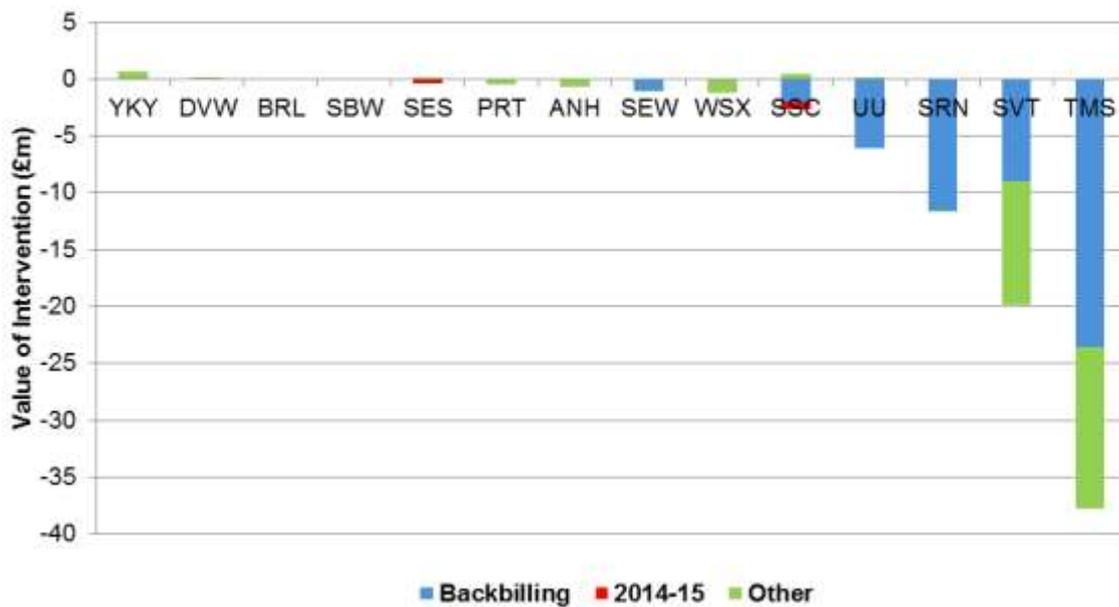


Figure A3.10 Companies' RCM adjustments within the draft determinations

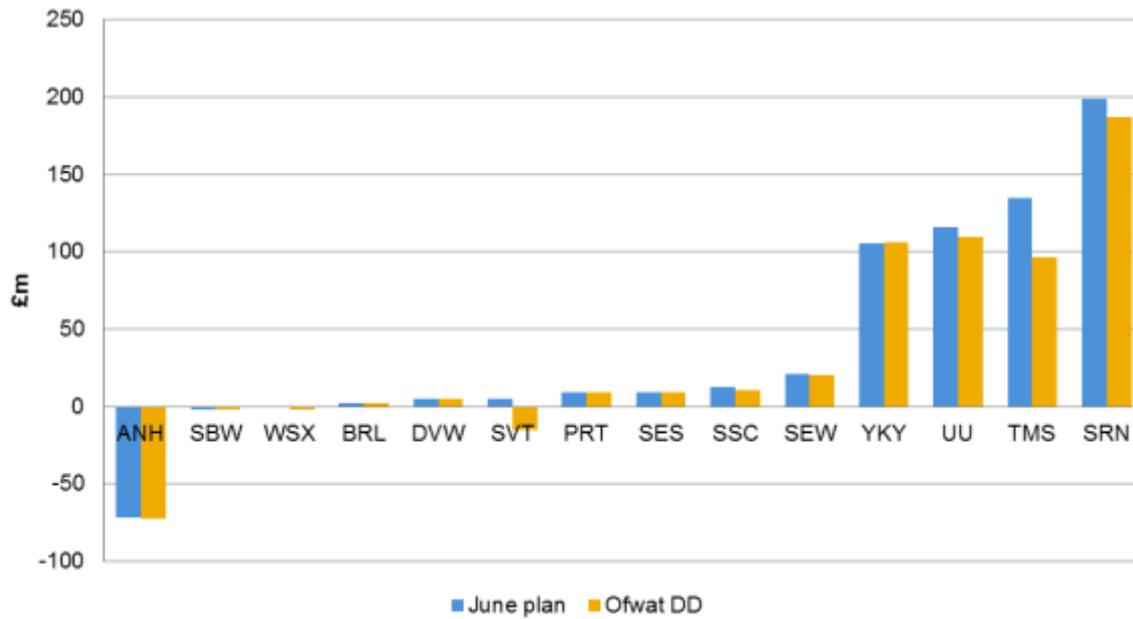
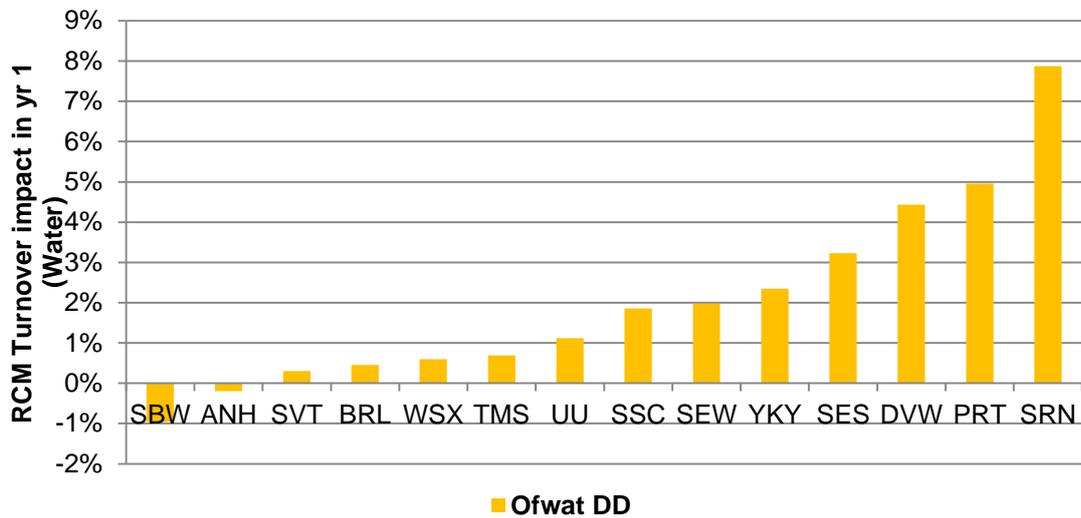
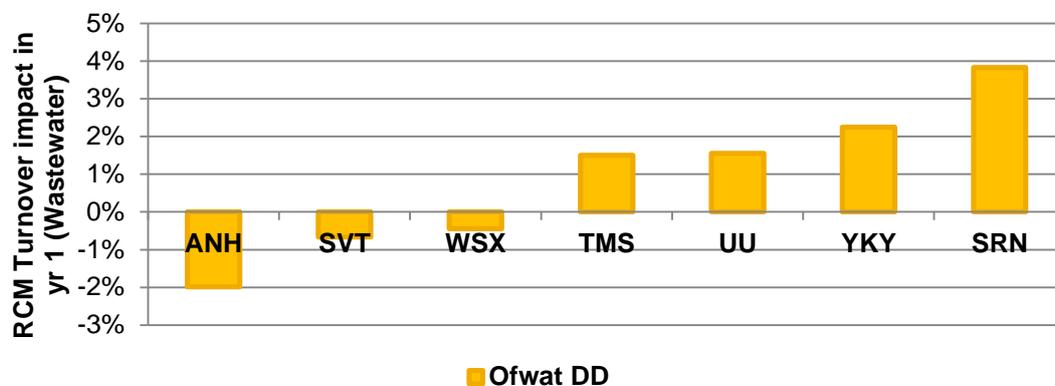


Figure A3.11 Companies' RCM turnover impact (water) within the draft determinations



**Figure A3.12 Companies' RCM turnover impact (wastewater) within the draft determinations**



### A3.6.5 Operating expenditure incentive allowance (OIA)

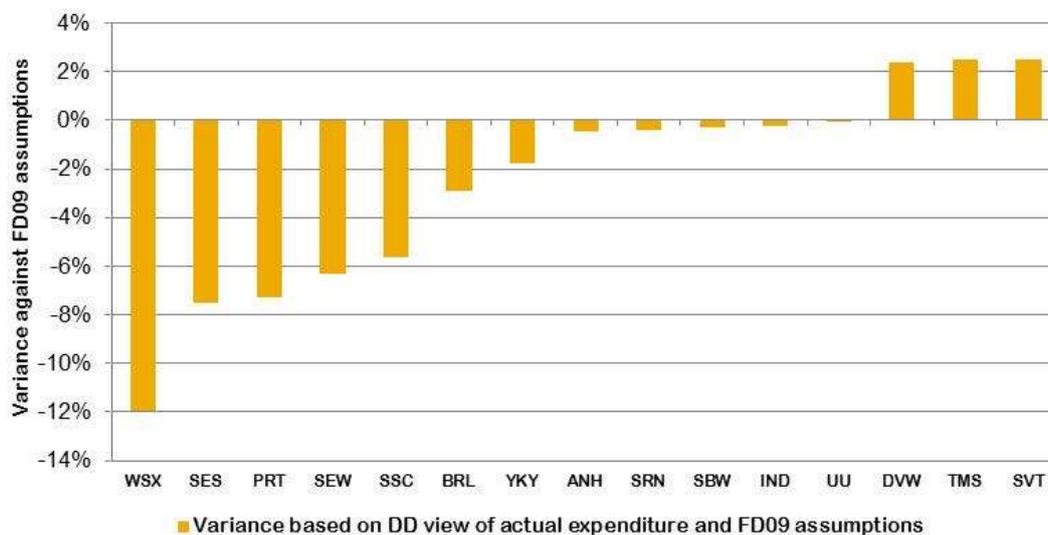
At PR09, we challenged the industry to deliver operating cost savings of around £1.2 billion or 6.6% over the 2010-15 period. Our challenge comprised a single annual continuing efficiency assumption of 0.25% a year for each company for base opex and 0.375% a year for enhancement opex, and a company-specific relative efficiency assumption<sup>1</sup> informed by our econometric models. We expected inefficient companies to close 60% of the assessed gap to the frontier company.

Based on a comparison between actual operating expenditure including pension and other adjustments and our original FD09 assumptions adjusted for recognised changes in operating costs during the 2010-15 period, the industry has met this challenge and outperformed our assumptions by 0.3%.<sup>2</sup>

Figure A3.13 below summarises these variances in operating expenditure at a total service level by company and at industry level (IND). A negative variance indicates a company has outperformed our assumptions.

<sup>1</sup> Catch-up factors ranged between 0% and 2.9% a year for water and 0% and 2.2% a year for sewerage.

<sup>2</sup> We have assumed actual operating expenditure in 2014-15 is at a similar level to 2013-14 for all companies.

**Figure A3.13 Variances in total operating expenditure in 2010-15**

## Background

We introduced the opex incentive allowance (OIA) allowance mechanism at the 1999 price review (PR99) to recognise the full incentive effect of operational savings – regardless of when the savings are made in the price control. Where a company makes operational savings, these are retained and ‘rolled up’ into the price controls for the following price control period as long as the savings result in sustained operating cost reductions. We set out an example of how we calculate the value of these savings in annex A of [PR09/04: ‘The opex incentive allowance and the outperformance multiplier for 2005-10’](#).

The operation of the OIA mechanism is dependent on whether a company has been able to outperform against its regulatory assumptions in 2013-14 (the constraining year). This ensures only sustained operating cost reductions are retained by the company. So for example, a company may have outperformed its regulatory assumptions in every year up to and including 2012-13, but because this could not be sustained into 2013-14, no incentive allowance is received.

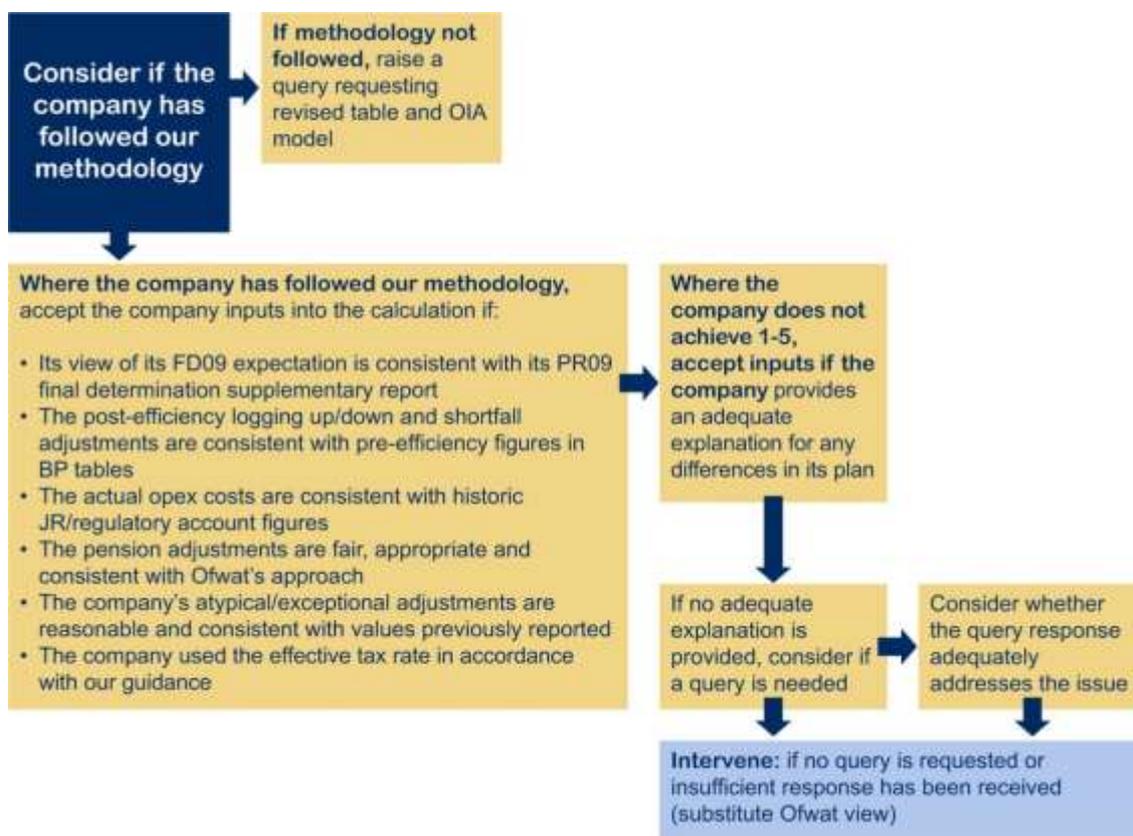
## Methodology and process

In their December 2013 business plans, companies submitted initial views of their OIAs based on actual and forecast expenditure incurred during 2010-14. Our RBR highlighted a number of concerns relating to the calculation of allowances, consistency of inputs into the analysis and issues around compliance with our guidance.

In ‘Setting price controls for 2015-20 – further information on reconciling 2010-15 performance April 2014’, we provided further information for companies on these issues and our expectations for submission of revised business plans. Companies responded positively to our feedback and improved both the quality and consistency of information submitted in their revised plans in relation to this incentive mechanism.

Figure A3.14 below sets out the steps we have followed in reviewing companies’ proposals for operating expenditure incentive allowances.

**Figure A3.14 Steps taken in the review of companies’ OIA proposals**



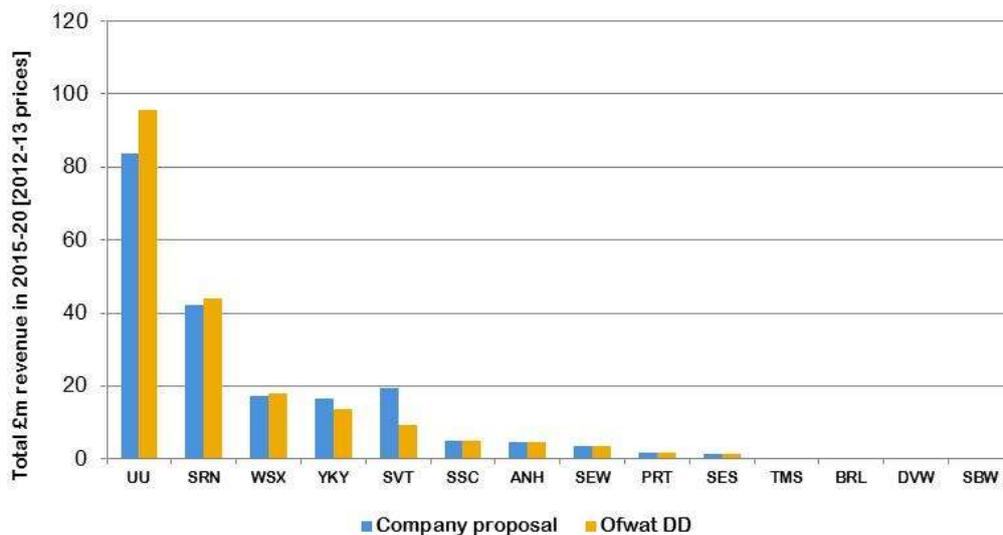
### Our interventions

Our review concentrated on verifying company’s inputs to the calculation against historic information, checking for compliance with the guidance and ensuring key inputs into the analysis are fair and appropriate. We issued queries where we identified issues that were not addressed by the companies’ commentaries.

### Company comparisons

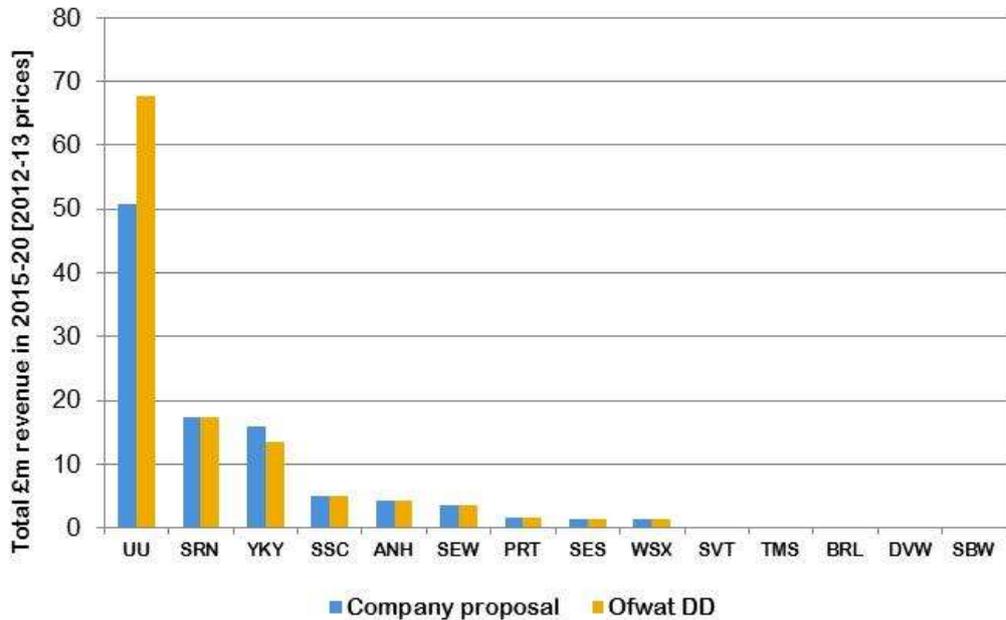
Figures A3.15 to A3.17 below summarise the operating incentive revenue allowances proposed by companies compared to our draft determinations at a total service level and for the water and wastewater services. For the water service, eleven companies receive an incentive allowance and for the wastewater service, five companies receive an incentive allowance. In most cases, we agreed with the companies' proposals.

**Figure A3.15 Total opex incentive revenue allowances post-tax**

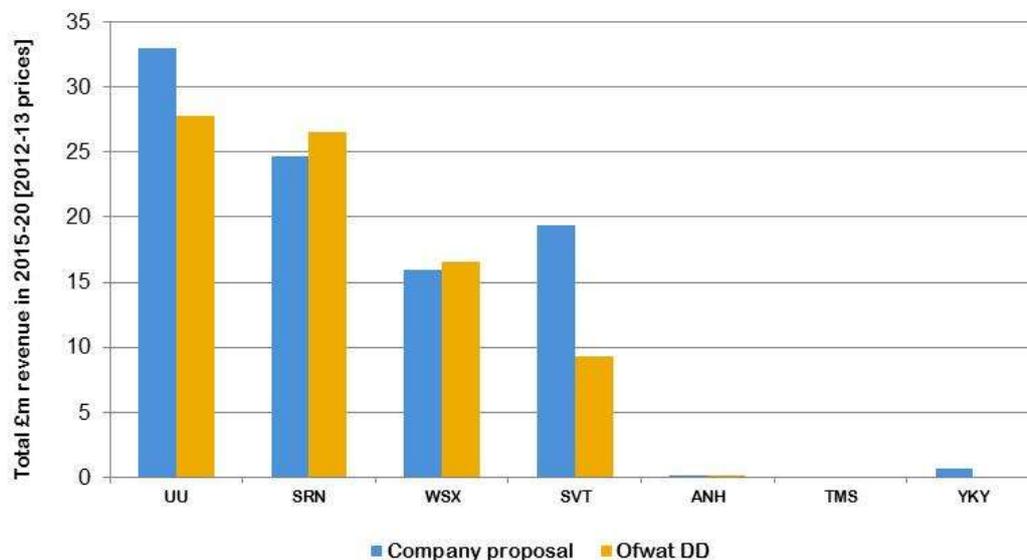


Our intervention for United Utilities produced a larger allowance than the company's proposal (adding a further £17 million on the water service). This was due to correcting the company's calculation using the actual effective tax rate for 2013-14 as required by the guidance.

**Figure A3.16 Total water service opex incentive revenue allowances post-tax**



Our intervention for Severn Trent Water on wastewater produced a significantly lower allowance than the company’s proposal as we did not apply the company’s proposed approach to account for pension deficit costs as this was not in accordance with our methodology. For both United Utilities and Southern Water, our intervention centred on our challenges to the additional operating costs sought by companies which relate to the transfer of private sewers. We have not allowed all the operating costs proposed by the companies as we do not consider these to be economic and efficiently incurred.

**Figure A3.17 Total wastewater service opex incentive revenue allowances post-tax**

### A3.6.6 Change protocol (logging up, logging down and shortfalls)

These are tools within the PR09 methodology that deal with material changes in the investment programme and make adjustments to the capital expenditure incentive scheme (CIS) baselines to appropriately reflect the changed circumstances.

The FD09 change protocol sets out a framework for dealing with the financial implications arising from changes to requirements or improvements companies must deliver up to 2015. A full explanation of the purpose, methodology and rationale for the change protocol can be found in [‘Change protocol for 2010-15: Principles and outline procedures for companies to seek financial adjustments relating to outcomes in the 2010-15 period’](#).

Logging up and down are adjustments where an obligation has changed through the change protocol for non-trivial changes (>2% of service turnover). Logging up and down adjustments are applied as two-sided adjustments (which affect both the baseline and company view within the CIS).

Shortfalls are where an obligation has not been delivered by the company and a financial adjustment is required to recover the costs customers have funded (shortfalls as applied as one-sided adjustment within the CIS and results in the company receiving both revenue penalties and RCV reductions).

Serviceability shortfalls are covered in more detail in section A3.6.6 and applied as an RCV adjustment only.

Table A3.6 summarises our analysis of logging up, logging down and shortfalling at an industry level and by service area. We have assessed and formed a view on over 60 claims and counter-claims associated with logging up/down and shortfalling. This has resulted in £680 million of PR09 capex baseline reductions with costs being returned to customers through the CIS as both revenue and RCV adjustments. The adjustments shown are before FD09 efficiencies are applied through the CIS.

**Table A3.6 Overview of logging up, logging down and shortfalls for capital expenditure**

	Ofwat view of logging up, logging down and shortfalls for capital expenditure (pre efficiency)				
	Water		Sewerage		Total
Adjustment type	No. of adjustments	Value (£m)	No. of adjustments	Value (£m)	
Logging up	1	0.369	13	347.710	348.079
Logging down	5	-78.208	18	-396.948	-475.156
Shortfalls	6	-44.375	6	-113.263	-157.638
Shortfalls (serviceability)	7	-160.863	6	-233.976	-394.839
<b>Industry total</b>	<b>19</b>	<b>-283.077</b>	<b>43</b>	<b>-396.478</b>	<b>-679.555</b>

### Methodology and process

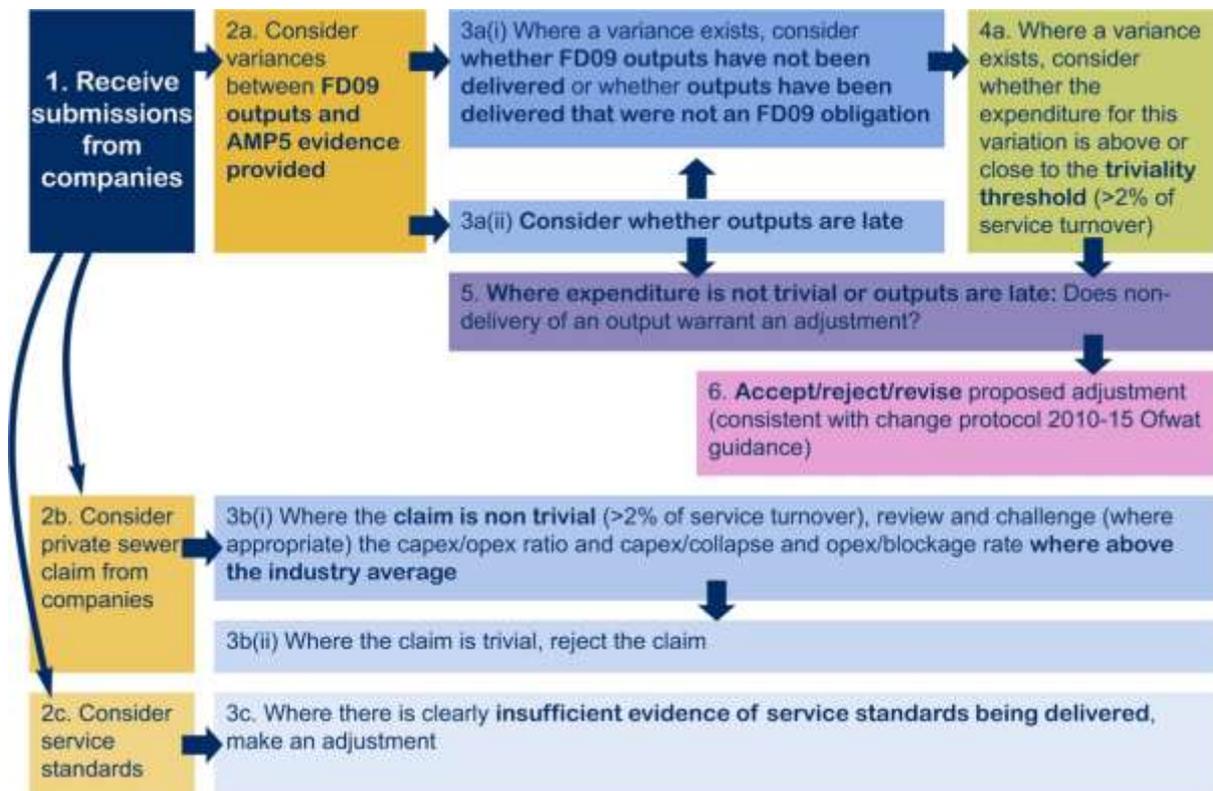
The FD09 change protocol sets out a framework for dealing with the financial implications arising from changes to requirements or improvements companies must deliver up to 2015. A full explanation of the purpose, methodology and rationale for the change protocol can be found in our change protocol document for 2010-15.

In accordance with the FD09 methodology and change protocol, we have conducted a detailed analysis on each company's 2010-15 performance and reconciled this outturn to the targets and delivery expectations set out at FD09. Where there have been material changes to these expectations (>2% of service turnover) We have applied either a logging up, logging down or a shortfall adjustment. In some cases, the companies advised us in their business plan of any relevant material changes

and their financial impact. In other cases, we have applied the adjustment where the company did not propose one in their business plan (a ‘counter-claim’). In both instances, we have assessed the reason for the change, the magnitude of the change and the financial impact of the claims/counter-claims on the company and formed a judgement.

The decision process we have used for the draft determination to set these adjustments is shown in figure A3.18.

**Figure A3.18 Change protocol decision process for draft determinations.**



In order to determine the financial impact of any changes that have occurred within the AMP, we have calculated the net change in capex and opex from the companies’ pre-efficiency expenditure (as set out in FD09) based upon the information provided to us by companies as part of their business plan submission. In order to determine net changes in opex, the original price limit assumptions need to be indexed from 2007-08 prices to 2012-13 prices using RPI (financial year average). For capex, the original price limit assumptions should be indexed to 2012-13 prices using financial year average COPI.

## Service standard outputs

The final determination supplementary reports in 2009 contained defined project(s) where the primary output was the service standard specified<sup>3</sup>. These outputs were set out to recognise that companies may decide to prioritise investment differently in order to achieve the service output in a more innovative and efficient manner, while still holding the company to account for the benefits to customers and the environment.

Where companies have not reported progress on these service standards, we would have expected them to demonstrate achievement of the service standards to both customers and Ofwat as part of the price review process.

We have considered applying shortfalls equal to the cost of the FD09 project(s) with defined service standards. However, in many cases there is some evidence that the projects and activities have been delivered, but there is a lack of compelling evidence that the service standards specified have been achieved.

**For the purposes of these draft determinations, we will not applying shortfalls on this issue conditional upon this information being provided as part of companies' draft determination representations.**

We would expect companies to respond to this issue in their representations. If they do not provide adequate evidence to demonstrate achievement of the service standards set out, then they should assume that we will apply a shortfall equal to the costs assumed for the project(s) at FD09 within our final determinations in December 2014.

### A3.6.7 Serviceability shortfalls

All companies must maintain their asset systems so that they remain fit for purpose over the long term. This is so the companies can continue to maintain services to consumers, while protecting the environment and public health. For PR09, we set out our expectations on the measurement and management of serviceability. We

---

<sup>3</sup> In the final determination supplementary reports we said: "Both the project activity (as proposed in your final business plan) and the service standard are the defined output. You must demonstrate delivery of the stated service standard output through the June return. The service standard output is the primary output. We recognise that companies may decide to prioritise activity differently in order to achieve the service output in a more efficient manner. All material changes to the project activity must be reported and explained through your June return."

defined values for reference levels and control limits for each serviceability indicator that would underpin, and inform our assessment of, the achievement of the required output of stable serviceability. To deliver this output, we expected the company to monitor, manage and maintain its assets so that the serviceability indicators set out in the company's supplementary report remain within a defined range of control limits, oscillating around a central reference level.

In PR09/38 we stated that:

**“A company should assume it is at risk of a shortfall adjustment at the next price review if we assess serviceability as less than stable in any year from the 2012 June return (or equivalent) onwards. Any company whose serviceability we assess as less than stable in 2014 should assume a shortfall at the next price review.”**

The value of the shortfall can be up to 50% of the company's capital maintenance sub-service expenditure assumed at FD09. A serviceability shortfall is a recovery of expected cost from companies where they have not maintained their asset systems and services to customers and the environment (the flow of services). The shortfall is calculated based upon the performance of the measures (the outputs and hence associated outcomes to customers) regardless of whether the companies have expended the capital investment assumed at the FD09 review.

We applied serviceability shortfalls to six companies as part of our draft determinations (see table A3.7 for details). We have also identified a further ten companies where improvements are required in 2014-2015, otherwise a shortfall adjustment may be applied. We are seeking early visibility of this data in company representations and will assess whether a shortfall should be applied as part of our final determinations.

As part of our draft determinations, we have adjusted the RCV by £359 million (£325.6 million post-efficiency) where we do not consider that the companies have delivered their commitments to deliver stable serviceability. This comprises £162.3 million on the water service (£149.3 million post-efficiency) and £234.1 million on the wastewater service (£212.1 million post-efficiency).

**Table A3.7 Overview of serviceability shortfalls**

Company	Serviceability shortfall RCV adjustments			
	Water (£m)		Wastewater (£m)	
	Pre-efficiency	Post-efficiency	Pre-efficiency	Post-efficiency
Anglian				
Severn Trent	-64.1	-56.1	-28.8	-28.8
Southern	-11.3	-12.2	-160.4	-141.0
Thames	-19.5	-18.0	-40.7	-38.1
United Utilities				
Wessex				
Yorkshire			-2.0	-2.2
Bristol	-12.0	-11.9		
Dee Valley				
Portsmouth				
Semcorp Bournemouth				
South East	-20.2	-17.3		
South Staffordshire				
Sutton & East Surrey				
<b>Total</b>	<b>-127.1</b>	<b>-115.5</b>	<b>-231.9</b>	<b>-210.1</b>
<b>Industry</b>	<b>-162.3</b>	<b>-149.3</b>	<b>-234.1</b>	<b>-212.1</b>

### Methodology and process

There are 20 serviceability indicators spread across the four sub-services (see below). There are six in water infrastructure, five in water non-infrastructure, six in sewerage infrastructure and three in sewerage non-infrastructure. The indicators have been developed over a period of 20 years and include a mixture of asset and customer service related measures.

A full list of indicators and definitions was provided in '[PR09/38 Serviceability outputs for the PR09 final determination](#)'. The indicators listed in that document are as follows.

#### **Water infrastructure (6).**

- Burst mains.
- Interruptions to supply greater than 12 hours.
- Iron Mean Zonal Compliance.
- Low pressure.
- Discolouration contacts.
- Distribution Index TIM (turbidity, iron, manganese).

#### **Water non-infrastructure (5).**

- Water treatment works coliforms non-compliance.
- Service reservoir non-compliance.
- Turbidity (cloudy water).
- Enforcement actions .
- Unplanned maintenance.

#### **Sewerage infrastructure (6).**

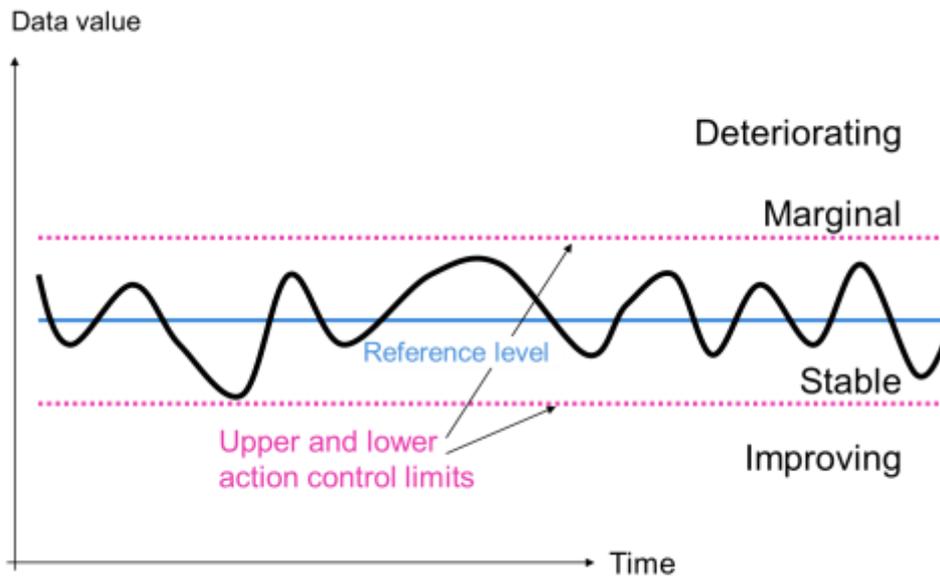
- Sewer collapses.
- Pollution incidents (category 1, 2 & 3).
- Properties flooded – other causes.
- Properties flooded – overloaded sewers.
- Sewer blockages.
- Equipment failures.

#### **Sewerage non-infrastructure (3).**

- Sewage treatment works non-compliance.
- Population equivalent non-compliance.
- Unplanned maintenance.

Each indicator is expected to remain stable, this means that performance should oscillate around a reference level (above and below the level). A set of control limits above and below this reference level are used to determine if performance is becoming less than stable, this is referred to as marginal or deteriorating (see figure A3.19).

**Figure A3.19 Serviceability reference levels and control limits**



The reference levels and control limits agreed for PR09 are set out in each company’s’ FD09 supplementary report. A review of these measures and control limits was undertaken for a number of companies in 2012 and control limits and reference levels were amended as appropriate.

We said in the [guidance to PR09 business planning tables](#)<sup>4</sup> that:

**“...we expect companies to monitor each indicator, manage and maintain assets such that indicator values remain well within the control limits and either side of the reference level and do not drift towards the upper limit; this represents a stable trend in the indicator. The upper control limit identifies the point where the company must consider intervention to correct the trend Values persistently close to or persistently above the upper limit indicate a less than stable trend and will attract intervention by Ofwat.”**

This was supplemented in PR09/38 with the statement:

<sup>4</sup> Table B3 Company guidance PR09 final business plan reporting requirements.

**“We set reference levels and control limits for the 2010-15 period in our final determinations. 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. They should exhibit a stable (as a minimum) or improving trend year on year and demonstrate this in June returns (or equivalent). Where a sub-service is classified as marginal or deteriorating we will require the company to prepare and execute a regulatory action plan to recover stable serviceability.”**

Since 2011, the companies have not been required to routinely provide Ofwat with serviceability performance data. For the 2014 revised business plan submissions, we required companies to provide 2010-15 performance data for all indicators and sub-service assessments in tables W21 and S21. Using this data we have been able to make assessments for each of the years between 2010 and 15.

In forming our judgement on serviceability we have taken into account evidence presented by the companies. Where the case has been justified, performance data has been excluded to mitigate the impacts of exceptional events (for example, significant and unusual winter frost events, which have happened for the first time in 20 years impacting on increased burst numbers). We have accepted the arguments put forward by companies where the company has provided robust data and demonstrated the impact on the performance of the indicator and shown that this is outside the control of the company.

The process used to determine shortfalls within the draft determinations is as set out in PR09/38 and is shown in figure A3.20 below<sup>5</sup>.

---

<sup>5</sup> This does not necessarily reflect the considerations that, in accordance with condition B of a company's licence, would have been used to determine whether to make an adjustment to price limits as part of an interim determinations.

Figure A3.20 Shortfall process for the draft determinations



Step 6 of this diagram discusses the application of a serviceability shortfall, this is the recovery of expected cost included with PR09 price limits for not achieving a required service level or an environmental output. The calculated value of the serviceability shortfall is treated as an adjustment to the RCV.

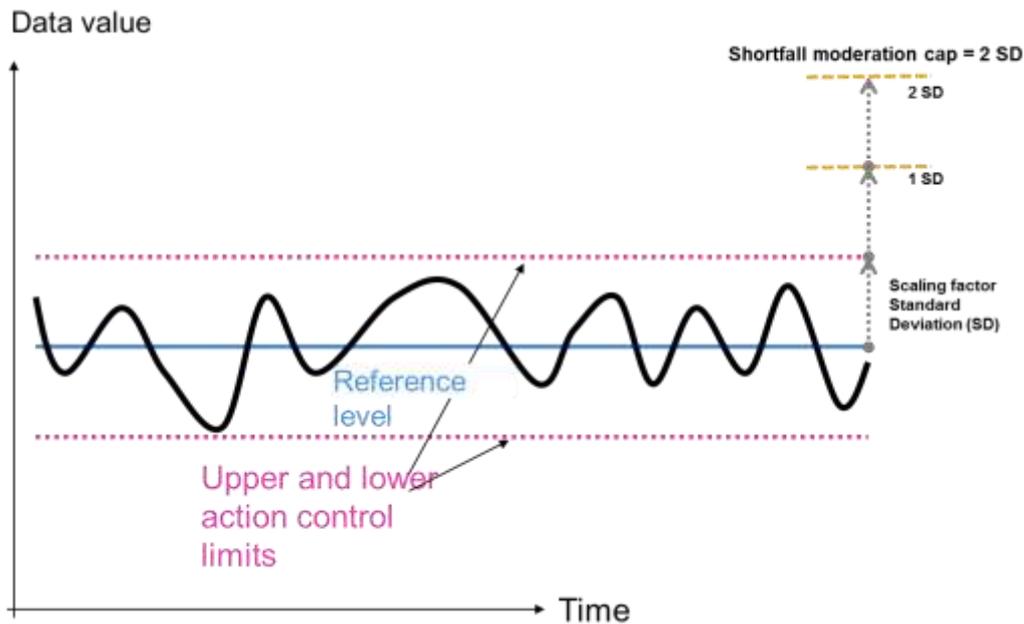
The scale of the shortfall is related to the expected cost assumed in price limits for the sub service, the number of measures in the sub service, the period over which less than stable serviceability occurs and the scale of the service measures which are marginal or deteriorating. The calculated shortfall increases as the performance in any one year increases above the upper control limit. The size of the shortfall is increased linearly up to two standard deviations at which point any further shortfall is capped.

The methodology for calculating a shortfall includes four steps.

- i. Calculate the unscaled yearly shortfall value for each indicator, across the four years to which the shortfall could be applied (2011-12 to 2014-15). The maximum shortfall value for each sub-service is 50% of the capital maintenance sub-service expenditure assumed at FD09. To determine the unscaled yearly shortfall value for each indicator the maximum shortfall value for the sub-service is split evenly across each of the indicators within that sub-service and each of the four years where the shortfall could be applied.
- ii. Calculate the scaling factor based on the distance of performance of the indicator above the upper control limit (UCL). Assess individual indicators (not the overall sub-service). See figure A3.21.

- iii. Calculate the value of the shortfall – multiplying the scaling factor by the unscaled yearly shortfall value from step 1 for each of the indicators that are marginal or deteriorating in each year.
- iv. Moderate the value of the shortfall where actual serviceability performance as represented by the scaling factor is above 2 standard deviations by capping the scaling factor at 2 standard deviations.

**Figure A3.21 Serviceability reference levels and shortfall scaling factors**



A worked example of the shortfall calculation is detailed below.

**Step (i).** Company A has a Water infrastructure FD09 assumed capital expenditure of £100 million over the 2010-15 period; the maximum value of shortfall that can be applied in the water infrastructure sub-service is therefore £50 million (50%). There are six indicators in the water infrastructure sub-service and the shortfall could be applied over four years (2012-15). The unscaled shortfall value for each indicator in each year is £2.083 million (£50 million divided by 6, then divided by 4 is £2.083 million).

Suppose one measure is assessed as marginal: ‘burst mains’ with the reported performance shown in table A3.8.

**Table A3.8 Serviceability shortfall calculation – company performance**

Burst Mains	Ref level	UCL	Performance
2011	5000	6500	5231
2012	5000	6500	6254
2013	5000	6500	6750
2014	5000	6500	7980
2015 (projected)	5000	6500	6550

**Step (ii).** The scaling factor is calculated as the distance above the UCL divided by the distance between the reference level and the UCL (in this example 1500). In this example this calculation results in the following scaling factors for this indicator.

**Table A3.9 Serviceability shortfall calculation step 2**

Burst Mains	Performance	Distance above UCL	Scaling factor
2011	5231	-1269	-0.846
2012	6254	-246	-0.164
2013	6750	250	0.166
2014	7980	1480	0.986
2015 (projected)	6550	50	0.033

**Step (iii).** As burst mains is the only indicator in the sub-service with less than stable performance in 2014, then it is the only indicator where a shortfall will be applied. The shortfall calculation is shown below.

**Table A3.10 Serviceability shortfall calculation step 3**

Burst Mains	Scaling factor	Max shortfall value £m	Shortfall value £m
2011	-0.846	2.083	0
2012	-0.164	2.083	0
2013	0.166	2.083	0.347
2014	0.986	2.083	2.053
2015 (projected)	0.033	2.083	0.069
<b>Total value of shortfall</b>			<b>2.469</b>

In the example above, a shortfall value of £2.469 million is calculated. It should be noted that the shortfall value is also calculated for the projected 2015 performance.

**Step (iv).** The final stage is to consider if the shortfall should be moderated or capped. In this example, the value of the shortfall has not been moderated as the scaling factor does not exceed a factor of 2 in any year (representing two SD). If more than one indicator in the sub-service was less than stable, then the shortfall value in each year for each indicator would be summed in order to calculate the total shortfall value for the sub-service.

A final check is that the sum of all the measure and shortfalls does not exceed the maximum shortfall for the sub-service (that is, 50% of £100m = £50 million), should this occur, the shortfall would be capped at 50% (in this example £50 million).

### Our interventions

We have applied shortfalls to eight companies across thirteen serviceability sub-services in total (seven in the water infrastructure and non-infrastructure sub-services and six in the sewerage infrastructure and non-infrastructure sub-services).

As part of the business plan submissions we asked companies to propose a shortfall where they considered their own performance to be less than stable. Two of the fourteen companies proposed a shortfall in the 2014 revised business plans; those were:

- Severn Trent Water for (i) Interruptions >12h and (ii) WTW Coliforms non-compliance; and
- Thames Water for (i) Pollution Incidents; (ii) Flooding Other Causes and (iii) Blockages ESL (Enhanced Service Level).

Both companies are taking more ownership and accountability for service delivery for their customers through their own recognition of and the need for shortfalling. Our assessment of their own shortfall values showed no need for intervention in interruptions more than 12 hours for Severn Trent Water and for Blockages ESL for Thames Water. We did, however, need to intervene in other areas because the companies' assessments were inconsistent with our view of the appropriate refund to customers.

**The most significant shortfall adjustment has been applied to Southern Water for deteriorating performance in the Population Equivalent non-compliance indicator (sewerage non-infrastructure).** The company has not adequately demonstrated that the significant failures that occurred can be removed from the analysis. The scale of the failures means that the shortfall has been capped to two SDs in each year of failure. Southern Water have also been assessed as deteriorating for Flooding Other Causes and Interruptions to supply >12hours with further shortfalls also being applied. The company has not acknowledged the deteriorating performance for any of these indicators.

**Severn Trent Water has acknowledged failures in Interruptions to supply >12hours on water infrastructure** and although performance has improved, they have proposed a shortfall based on customer willingness to pay values for the level of failure. The value of this shortfall was considered to be appropriate for the level of failure and we have accepted the company proposal.

**Severn Trent Water has had multiple WTW Coliform compliance failures.** The company does not expect performance to get worse in 2014-15 (based on current calendar year failures). While the company acknowledged the failings and have set out an improvement plan, its shortfall valuation for the serviceability assessment was lower than ours. We have therefore intervened and have substituted our assessment.

**Severn Trent Water also had marginal performance for the sewerage infrastructure.** The company acknowledged the marginal performance for the blockages indicator but did not propose a shortfall. The company cites the increase in blockages on their existing legacy network on the transfer of private sewers in 2011. However, even after the removal of the blockages potentially caused by the

impact from the private sewer transfer, the underlying performance is still marginal. We have therefore applied a shortfall for this indicator. The company has also not demonstrated that it will achieve the enhanced service level output for pollution incidents, a shortfall has been applied equal to the value of the additional capital maintenance expenditure received to achieve the enhanced service level.

**Thames Water has deteriorating performance sewerage infrastructure** for the Pollution Incidents and Flooding Other Causes (FOC) indicators. While FOC performance has improved, Pollution Incidents are not expected to recover sufficiently in 2014-15. The company has acknowledged the failures and has offered a shortfall, however, the value of this is below our assessment of the appropriate shortfall. The shortfall adjustment we have calculated is based upon our methodology and has been applied to the Pollution Incidents indicator which is capped to two SDs in each year of failure. The company has also offered a shortfall for failure to achieve an enhanced service level for blockages, which we have accepted.

**Thames Water has had failures for Interruptions to supply >12 hours on water infrastructure.** Covering two years of the AMP, the company attributes the most recent failures to power cuts associated with the severe weather experienced in the winter. However, they have failed to provide sufficient evidence that all possible mitigation measures were in place and initiated in order to restore supplies to the affected customers. We have therefore applied shortfall adjustments for the measures in accordance with our methodology.

**Bristol Water has had deteriorating performance in Interruptions to supply >12 hours and marginal performance for Iron mean zonal compliance on water infrastructure.** For both indicators, the company has failed to demonstrate why they consider to performance to be stable. We have applied a shortfall adjustment to both indicators; Iron MZC has been capped to two SDs.

Table A3.12 shows the 2013-14 serviceability assessments and shortfall values for all companies for the water service. A3.13 shows the 2013-14 serviceability assessments and shortfall values for the sewerage service.

We have placed the companies into one of five categories for each sub-service; table A3.11 provides the key to the categorisation.

**Table A3.11 Serviceability 2014 company categorisation**

Company categorisation		Shortfall
a	There are marginal or deteriorating indicators and the company has not proposed a shortfall adjustment. A shortfall adjustment has been assumed within our draft determination.	Yes
b	There are marginal or deteriorating indicators, the company has recognised this and proposed a shortfall, but there is a difference in scale between Ofwat and Company valuations. A shortfall adjustment has been assumed within our draft determination.	Yes
c	There are marginal or deteriorating indicators, but performance in 2013-14 has improved near to or below the reference level. The company should demonstrate stable performance in 2014-15 otherwise a shortfall may be considered. No shortfall has been assumed in our draft determination.	No
d	All indicators are stable, but at least one indicator is at risk of moving into marginal in 2014-15. The company is required to demonstrate stable performance in 2014-15 otherwise a shortfall may be considered. No shortfall has been assumed in our draft determination.	No
e	All indicators are stable. No shortfall has been assumed in our draft determination.	No

**Table A3.12 Water service serviceability assessments 2013-14 and shortfalls (pre-efficiency)**

	Water Infrastructure (WI)			Company shortfall	Ofwat Shortfall	Water Non-infrastructure (WNI)			Company shortfall	Ofwat Shortfall
	Company view	Ofwat view				Company view	Ofwat view			
Anglian [c,e]	Stable	Stable	c	n/a	n/a	Stable	Stable	e	n/a	n/a
United Utilities [e,d]	Stable	Stable	e	n/a	n/a	Stable	Stable	d	n/a	n/a
Severn Trent <sup>6</sup> [b,b]	Marginal	Marginal	b	£10m	<b>£10.0m</b>	Marginal	Marginal	b	£20m	<b>£54.1m</b>
Southern [a,e]	Stable	Deteriorating	a	£0m	<b>£11.3m</b>	Stable	Stable	e	n/a	n/a
Thames[a,e]	Stable	Marginal	a	£0m	<b>£19.5m</b>	Stable	Stable	e	n/a	n/a
Wessex [e,d]	Stable	Stable	e	n/a	n/a	Stable	Stable	d	n/a	n/a
Yorkshire [e,e]	Stable	Stable	e	n/a	n/a	Stable	Stable	e	n/a	n/a
Bristol [a,e]	Stable	Deteriorating	a	£0m	<b>£12.0m</b>	Stable	Stable	e	n/a	n/a
Dee Valley <sup>7</sup> [c,c]	Marginal	Deteriorating	c	n/a	n/a	Stable	Stable	c	n/a	n/a

<sup>6</sup> The company's proposed shortfall for marginal Interruptions >12h performance has been accepted.

<sup>7</sup> Dee Valley Water has a specific issue with manganese as a result of raw water deterioration, for which they have put mitigation in place in response to a DWI undertaking which completed in December 2013. We expect the actions delivered within the DWI undertaking to improve the marginal performance on discolouration contacts to stable. No shortfall has been assumed for the draft determination as performance is improving, we expect the company to demonstrate improvement to a stable performance as part of its representations.

Portsmouth [e,e]	Stable	Stable	e	n/a	n/a	Stable	Stable	e	n/a	n/a
Sembcorp Bournemouth [e,c]	Stable	Stable	e	n/a	n/a	Stable	Stable	c	n/a	n/a
Sutton & East Surrey [e,e]	Stable	Stable	e	n/a	n/a	Stable	Stable	e	n/a	n/a
South East Water [a,c]	Stable	Deteriorating	a	£0m	<b>£20.2m</b>	Stable	Stable	c	n/a	n/a
South Staffordshire (Cambridge) [c,e]	Stable	Stable	c	n/a	n/a	Stable	Stable	e	n/a	n/a
South Staffordshire (South Staffs) [d,d]	Stable	Stable	d	n/a	n/a	Stable	Stable	d	n/a	n/a

**Table A3.13 Sewerage service serviceability assessments and shortfalls (pre-efficiency)**

	Sewerage Infrastructure (WI)		Company shortfall	Ofwat Shortfall	Sewerage Non-infrastructure (WNI)		Company shortfall	Ofwat Shortfall		
	Company view	Ofwat view			Company view	Ofwat view				
Anglian [c,e]	Stable	Stable	c	n/a	n/a	Stable	Stable	e	n/a	n/a
United Utilities [e,e]	Stable	Stable	e	n/a	n/a	Improving	Improving	e	n/a	n/a
Severn Trent [a,d]	Marginal	Marginal	a	£0m	<b>£28.8m</b>	Stable	Stable	d	n/a	n/a
Southern [a,a]	Stable	Deteriorating	a	£0m	<b>£3.7m</b>	Stable	Deteriorating	a	£0m	<b>£156.7m</b>

Thames [b,e]	Marginal	Deteriorating	b	£17.2m <sup>8</sup>	<b>£40.7m</b>	Stable	Stable	e	n/a	n/a
Wessex [d,e]	Stable	Stable	e	n/a	n/a	Stable	Stable	e	n/a	n/a
Yorkshire [a,c]	Stable	Stable	d	n/a	<b>£2.0m</b>	Stable	Stable	e	n/a	n/a

---

<sup>8</sup> Thames Water identified two small errors post lock down of their business plan and recognised that their serviceability shortfall proposal was understated by £1.1 million and should be £18.2 million.

### **A3.6.8 Capital expenditure incentive scheme**

The capital expenditure (capex) incentive scheme (CIS) was introduced at PR09. It was designed to:

- provide companies with incentives to contain capex and outperform the regulatory settlement; and
- strengthen the incentives for each company to submit realistic business plans containing accurate information that helped Ofwat deliver better value to customers in setting price limits.

The CIS is an example of menu regulation, the approach which is also being adopted in PR14 for wholesale costs. Under the CIS, each company recovers its actual capital expenditure plus or minus rewards or penalties that depend on the expenditure forecast it chooses and how actual expenditure compares to forecast. In practice, the level of the reward or penalty depends on:

- the design of the menu itself;
- Ofwat's view of the efficient capex for each company (the 'baseline' level of expenditure);
- the company's forecast of capex (the bid); and
- the extent to which the company outperform (or underperforms) against its bid.

Our review of the CIS has therefore focused on comparing actual performance to the baseline level of expenditure assumed at the time of the final determination in 2009.

The CIS has incentivised capital outperformance within both the water and sewerage service (see table A3.14 below).

**Table A3.14 CIS outperformance and underperformance**

	CIS – Capital expenditure outperformance and underperformance			
2012-13 prices	Water	Wastewater	Water	Wastewater
(£m)	Restated baseline – actual	Restated baseline – actual	Restated bid – actual	Restated bid – actual
Company	2010-15	2010-15	2010-15	2010-15
Anglian	84.9	145.8	132.7	89.0
Severn Trent	-82.1	14.5	-34.5	67.8
Southern	-174.4	-89.1	-74.0	87.2
Thames	-109.7	12.1	265.3	762.2
United Utilities	111.8	-180.1	27.6	91.4
Wessex	105.1	58.0	125.5	42.9
Yorkshire	85.8	146.7	82.2	59.1
Bristol	-34.8		34.9	
Dee Valley	1.1		0.8	
Portsmouth	-9.0		-5.7	
Sembcorp Bournemouth	-5.2		1.2	
South East	-56.5		52.0	
South Staffordshire	-0.6		5.8	
Sutton & East Surrey	-5.0		18.4	
<b>Total</b>	<b>-88.5</b>	<b>107.8</b>	<b>632.2</b>	<b>1,199.6</b>
<b>Industry</b>	<b>-243.4</b>	<b>-70.6</b>	<b>670.5</b>	<b>1,134.8</b>
Outperformance	493.9	377.0	954.1	1,226.4
Underperformance	-737.3	-447.7	-283.5	-91.6

**Key:**

Positive values denotes outperformance (that is, actual expenditure is lower than the restated positions).  
 Negative values denotes underperformance (that is, actual expenditure is higher than the restated positions).

As the CIS provides a menu of choices for companies, the results of the CIS analysis of outperformance and underperformance depend on the strategy and approach each company has taken to managing cost, risk and efficiency within its programme during the control period.

We can see in table A3.14 that a number of companies have outperformed on against our baseline assessments for both the water and sewerage services delivering £493.9 million outperformance on water and £377 million on wastewater against the baseline assessments Ofwat set at FD09 (2012-13 price base). However, at industry level this outperformance is offset by underperformance of £737.3 million on water and £447.7 million on wastewater. Overall, the industry therefore underperformed against the baseline position set by Ofwat by £243.4 million on water and £70.6 million on wastewater.

When this is considered against the company business plan submissions (the bids – which were typically more than we had assessed) then it can be seen that the industry has outperformed its own projections by £670 million on water and £1134.8 million on wastewater.

As seen in table A3.14, a higher level of performance has been maintained by some companies at the frontier of the sector over the period with many companies outperforming the cost baseline. There is strong competition from those with above average performance to attain the baseline and achieve a level of outperformance. However, there have been a number of companies that are also below the baseline and have incurred penalties for underperformance.

As a result of the way the CIS mechanism was designed to take account of the financing impacts of over and under expenditure, only a small number of companies will receive any additional net revenue through the CIS reconciliation.

For the water service, two companies (Wessex Water and Yorkshire Water) receive an overall revenue adjustment totalling £25.2 million with the remaining companies returning £109.9 million to customers. The net effect being £84.7 million returned to customers.

For the wastewater service, three companies (Anglian Water, Wessex and Yorkshire Water) receive an overall revenue adjustment totalling £14.8 million with the remaining companies returning £146.4 million to customers. The net effect being £131.6 million returned to customers.

The CIS is an example of an incentive which has delivered choice for companies around how they choose to invest and manage risk in their capital programme delivery. This has enabled companies to take more ownership and accountability, balancing investment, rewards and penalties within the CIS menu.

The CIS is an example of how a menu regulation approach can work with clear accountability for companies' ownership of rewards and penalties; and is an important example for how our new approach to totex menus may deliver benefits during 2015-20.

## Background

In chapter 4 of '[Setting price limits for 2010-15: Framework and approach](#)', we set out our approach to identifying the expenditure required to deliver service outcomes. For capital expenditure we confirmed that we would use the CIS to set expenditure assumptions and associated rewards for outperformance associated with the capital investment programme. We saw greatest benefits in adopting this approach for capital expenditure (both maintenance and enhancement) since this is where the information asymmetry, and hence benefits of new incentives, were greatest.

The CIS improved incentives for companies to submit realistic business plans during the 2009 price review. The CIS also retained strong incentives for each company to contain costs and outperform the regulatory settlement, once price limits had been set, with the greatest rewards available for the leading companies. It also delivered other broader benefits – as each company had greater accountability for its decisions.

Under the CIS, each company recovers its actual expenditure plus or minus rewards or penalties that depend on the expenditure forecast it chooses and how actual expenditure has compared with these forecasts. This involves:

1. deciding a 'baseline' level of expenditure for each company;
2. comparing a company's forecast to the baseline and using this to calculate an expenditure allowance for setting prices for the 2010-2015 period;
3. providing an incentive for further outperformance which declines as the ratio of a company's forecast to baseline increases;
4. calculating ex-post rewards/penalties as the difference between the expenditure allowance and actual outturn expenditure multiplied by the incentive rate, plus an additional element structured to ensure that a company secures the greatest benefit from submitting business plan forecasts that are realistic and aligned with the expected outturn level of costs; and

5. making an ex-post reconciliation between the expenditure allowance used to set prices and actual expenditure plus or minus any rewards or penalties. This amount is then carried forward for price setting for 2015-20 period.

The CIS allows for symmetric treatment of capex (over- and under-spends). This means a company can choose to spend more or less than either the baseline we set or the capital expenditure allowance included in price limits. We will reflect this actual expenditure in the RCV of the business during the PR14 price review, but at the cost of lower outperformance incentives and reduced returns within the 2015-20 period (through the CIS rewards/penalty structure).

At FD09, we set out an incentive matrix where a company would earn the cost of capital if it were aligned with the baseline. We also said that the baseline expenditure should represent a reasonable 'central estimate' of the expenditure needed to deliver a best value set of outputs, while taking a balanced view of risk. We set a capital expenditure baseline for 2010-15 for each company for each service (water or sewerage) by aggregating separately derived components for capital maintenance and enhancement.

Ideally, when we set price limits in 2009 we would have had complete certainty over what the companies needed to deliver during the 2010-15 period. For the 2010-15 period we considered that changes could arise which could not have been taken into account or foreseen when price limits were set in 2009. These changes may have affected quality enhancement and other expenditure categories. They could have arisen from:

- new statutory obligations;
- new scientific evidence (for example, on climate change);
- other evidence (for example, on the costs and/or scope of necessary asset improvements); or
- changing customer priorities.

The change protocol therefore sets out a framework for dealing with the financial implications, where significant<sup>9</sup>, arising from changes to the requirements or improvements companies must deliver up to 2015.

---

<sup>9</sup> 'Financially significant' changes are when the net present value of the costs or savings associated with the change between 2010-15 exceeds 2% of the relevant service turnover.

The RCV will automatically include any expenditure arising from changes to required outputs in the 2010-15 period (as the capital expenditure will have been incurred). The significance of logging up and down adjustments relates only to marginal changes to the calculation of final CIS rewards or penalties for 2010-15 (specifically the value of 'allowed expenditure' used in this calculation). Under the CIS, companies retain a given proportion of the difference between actual and 'allowed' capital expenditure through the rewards or penalties.

For the purposes of calculating final CIS rewards and penalties to be implemented through ex post reconciliation payments:

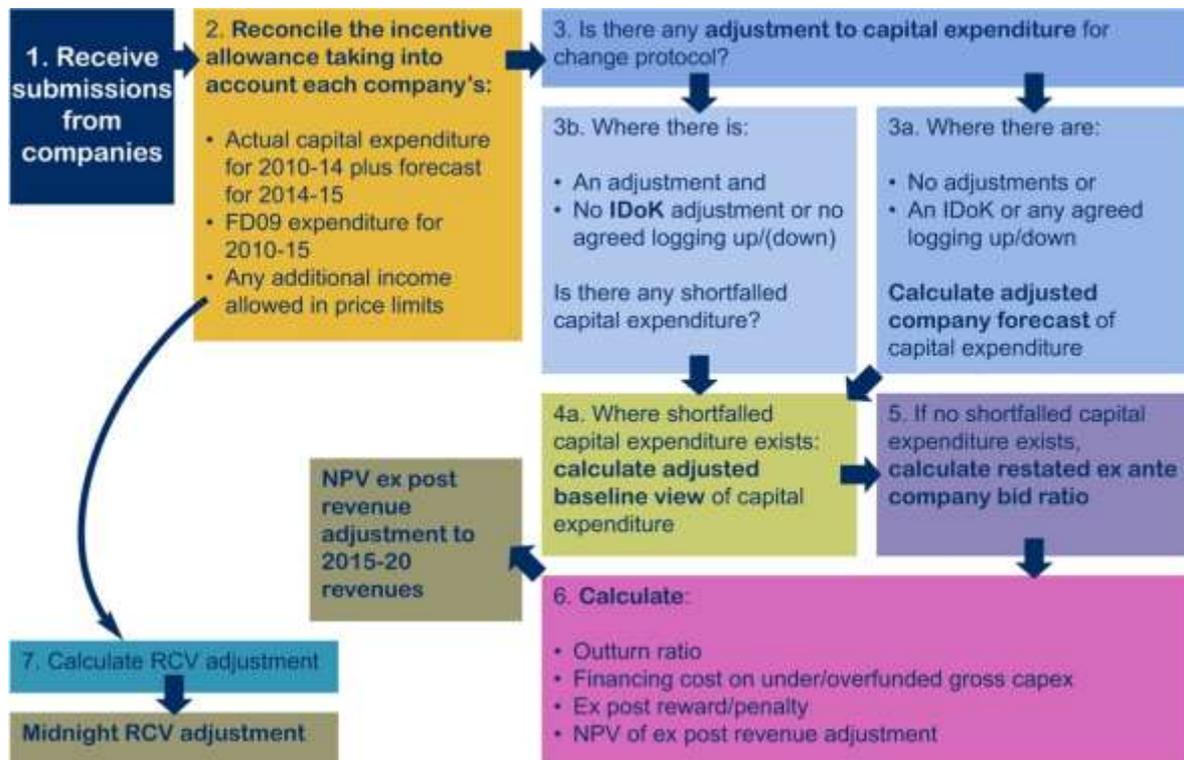
- the amount a company claimed for logging up or down will be added to the 2009 final business plan capital expenditure forecast used in calculating its CIS ratio;
- the amount we accept will be added to the CIS baseline;
- the CIS ratio, efficiency incentive and allowed expenditure will then be adjusted accordingly; and
- these revised values will be used, along with the company's actual reported capital expenditure, in calculating the total value of CIS rewards or penalties.

These draft determinations include the CIS adjustments to revenue and to RCV that arise from our assessment of the company's performance under the CIS mechanism in the 2010-15 period in this way. The CIS adjustments reflect actual capex performance during 2010-11 to 2013-14 and predicted expenditure in 2014-15 (as submitted in tables W15 and S15 in the companies' revised business plans) which is compared with the assumptions for 2010-15 we used in our final determination at PR09 (and, in the case of Bristol Water, the assumptions used in the Competition Commission's final findings determination). The CIS assessment reflects, where necessary, the adjustments under the change protocol and the 2009 agreed overlap programme.

## **Methodology and process**

Our CIS methodology and process were set out and detailed both within the PR09 methodology and as part of the final determination documents (see [published documents relating to the CIS](#) for details). For the draft determinations we have followed the process set out in figure A3.22 to determine both the restated bid ratio for each company (taking into account any change protocol, shortfalling and logging up/down adjustments) and the rewards and penalties in terms of revenue and RCV adjustments.

Figure A3.22 CIS process applied for draft determinations



The relevant company-specific appendix sets out the profiled values of the revenue adjustments in each year in the 2015-20 period. Unless otherwise stated in the relevant company-specific appendix, the profile we have adopted for these draft determinations is consistent with the profile the companies proposed in their revised business plans.

### Our interventions

Our interventions as part of the draft determinations relate to either adjustments to the change protocol, logging up/down and shortfalls or to where a company has inappropriately adjusted the methodology within their own CIS modelling. In such cases, we have applied the methodology and CIS modelling defined on the Ofwat website.

Company comparisons of the CIS bid ratios and outturn ratios are shown below.

**Table A3.15 CIS bid and outturn ratios**

	Water		Wastewater	
	Restated FD09 CIS bid ratio	Outturn CIS ratio	Restated FD09 CIS bid ratio	Outturn CIS ratio
Anglian	105.1	90.9	95.3	87.9
Severn Trent	104.3	107.4	103.9	99.0
Southern	124.5	142.5	113.8	107.1
Thames	125.7	107.5	124.8	99.6
United Utilities	94.1	92.2	112.3	108.2
Wessex	104.1	78.7	97.3	89.8
Yorkshire	99.5	88.5	92.6	87.6
Bristol	127.9	113.9	n/a	n/a
Dee Valley	99.0	96.8	n/a	n/a
Portsmouth	108.6	123.2	n/a	n/a
Sembcorp Bournemouth	114.8	112.0	n/a	n/a
South East	129.0	115.1	n/a	n/a
South Staffordshire:	n/a	n/a	n/a	n/a
Cambridge	101.2	99.5	n/a	n/a
South Staffs	104.4	100.5	n/a	n/a
Sutton & East Surrey	123.6	105.1	n/a	n/a

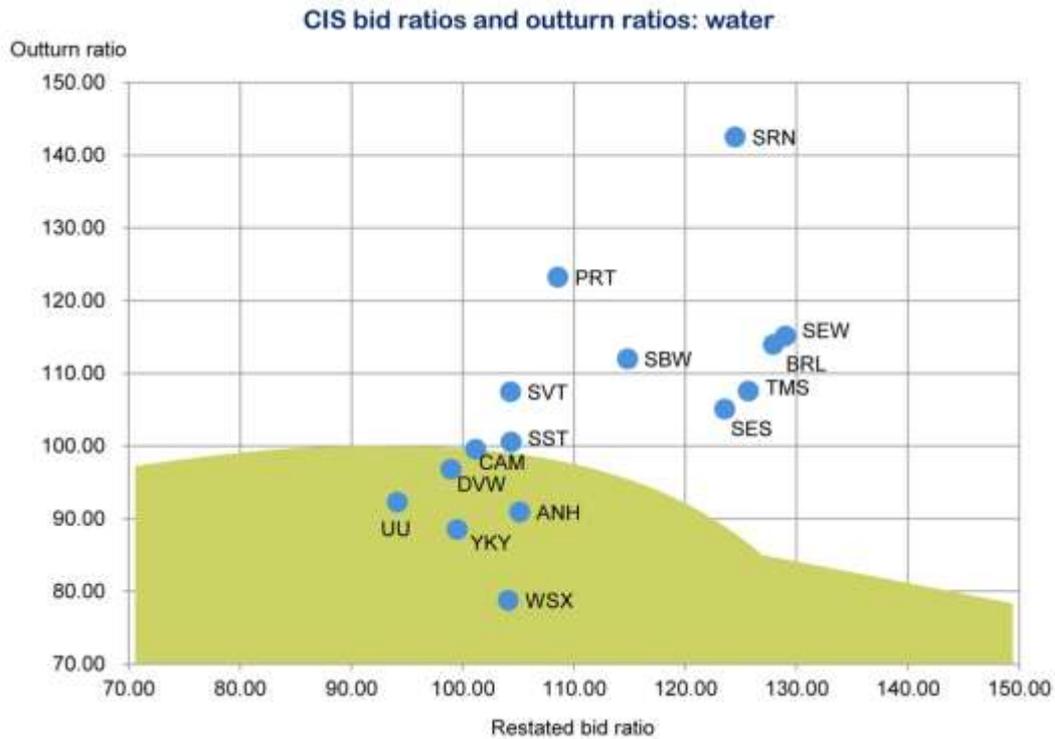
**Note:**

The restated FD09 CIS bid ratio takes account of the adjustments for the change protocol and the 2009 agreed overlap programme.

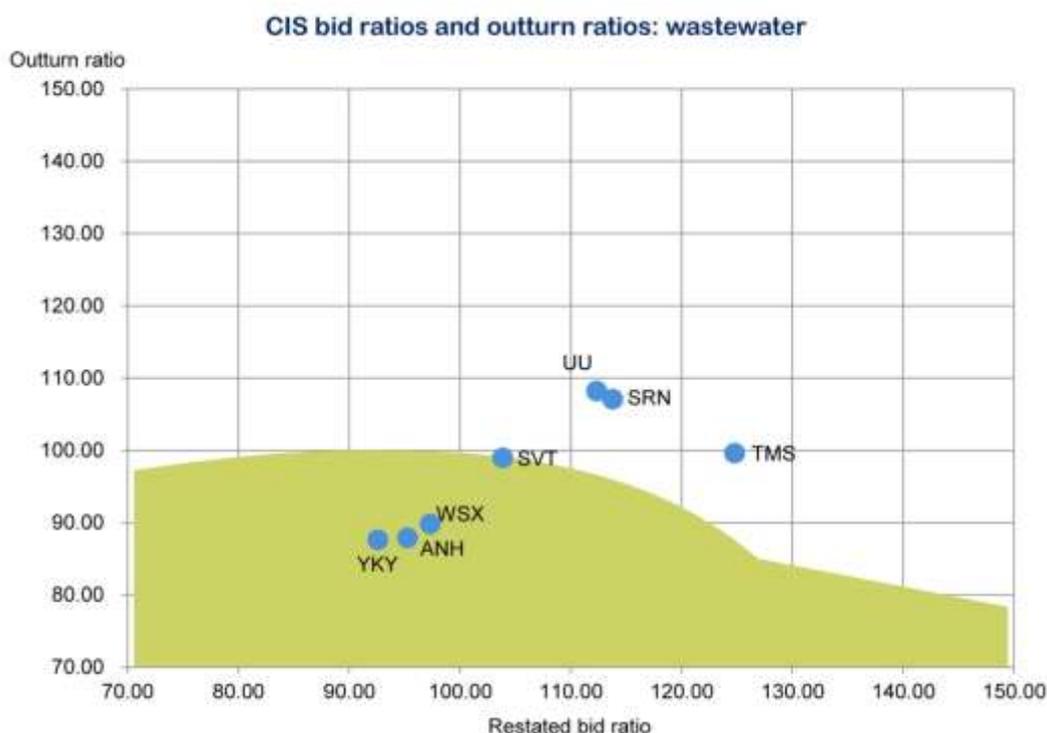
Figures A3.23 and A3.24 compare the outturn and bid ratio for the water companies. Bid ratios are FD09 CIS ratios adjusted for change protocol, shortfalls and logging up/down amendments. Outturn ratios are based upon the company actuals (2010-11 to 2013-14) and forecast expenditure in 2014-15.

The green shaded area on both graphs represents the area of the CIS menu where revenue rewards occur, revenue penalties apply across the remainder of the diagram.

**Figure A3.23 CIS bid ratios and outturn ratios for the water service**



**Figure A3.24 CIS bid ratios and outturn ratios for the wastewater service**



The CIS also reconciles these revenue costs against the financing costs which were assumed as part of price setting at the final determination and reconciles these to determine the revenue adjustments required under the CIS.

Figures A3.25 and A3.26 show the reconciliation of these revenues for both the water and wastewater services.

While it is clear that some companies have delivered outperformance and have received rewards for doing so this has not necessarily resulted in additional funding being required from customers. In many cases, the scale of financing sums assumed at FD09 was greater than the rewards that are calculated through the CIS so that overall there is a net return to customers as part of the CIS reconciliation.

Figure A3.25 CIS rewards and penalties adjusted for financing costs for water

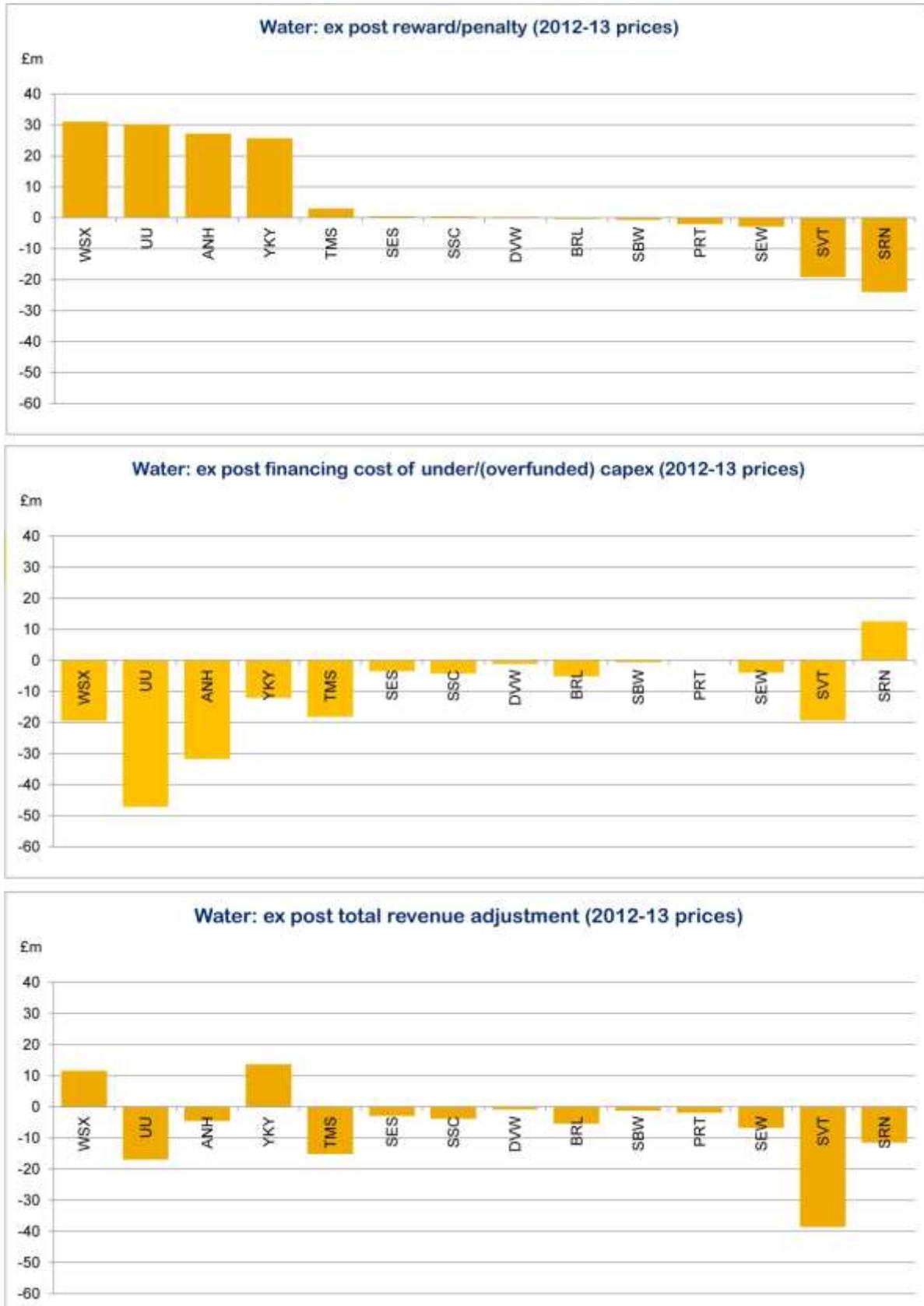
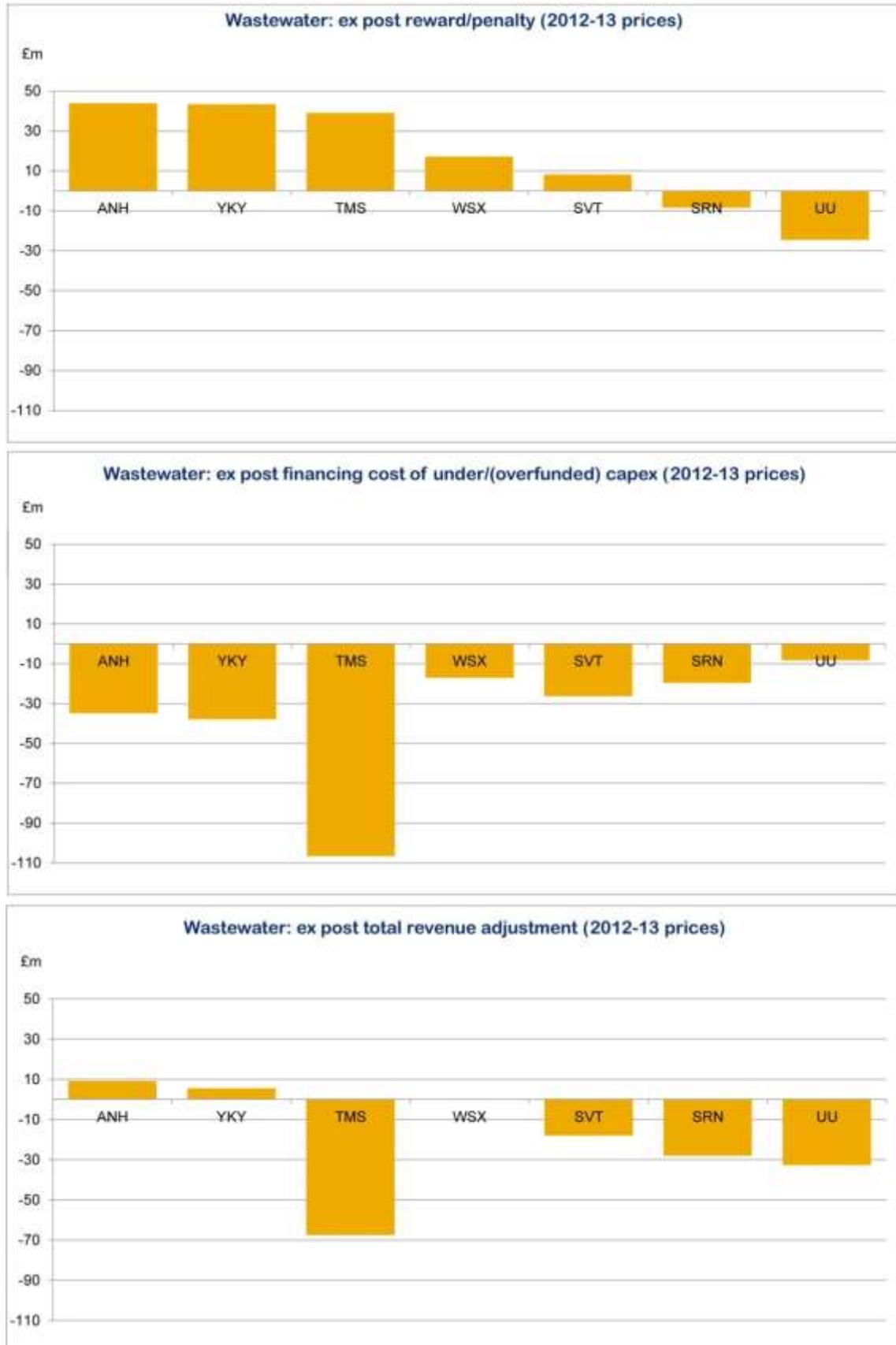


Figure A3.26 CIS rewards and penalties adjusted for financing costs for wastewater



### **A3.6.9 The 2009 agreed overlap programme**

For PR09 we introduced a mechanism to allow companies to put forward projects that started in this current price control period, but did not finish until the next price control period. The objective was to promote better management of investment programmes and to encourage companies to take a long-term approach to planning investment. This would enable companies to identify their optimal pattern of investment over the periods and plan future activity and workload, including with organisations in their supply chain.

We accepted these projects based on companies satisfying a set of strict criteria – for example, the project needed to have a primary objective of delivering an enhancement, have measurable outputs, milestones and specified delivery dates. Certain thresholds also had to be met.

On this basis, six companies had 14 projects potentially agreed within the overlap programme at PR09.

Companies have provided us with an updated forecast expenditure for these projects for the 2010-15 period and the 2015-20 period.

We have reviewed the relevant information alongside our commitments at the FD09 and have reflected changes in both the CIS and in our cost assessment totex modelling for 2015-20. Methodology and process

When we introduced the overlap mechanism, we said that in the business plans for the next price control period (that is, 2015-20), we would ask companies to confirm the capital expenditure they required to complete the projects. If this was more than we had assumed when we set price limits for 2010-15, we would carry out a financial reconciliation to reflect the changed expenditure profile within the envelope across the two periods. The reconciliation is primarily in relation to the rewards/penalties awarded through the CIS and the consequential revenue and RCV adjustments.

The process we have followed is a scheme-by-scheme review of delivery progress and associated costs in both periods. We have taken account of factors such as whether a company has achieved genuine outperformance, whether the company has suffered delays or whether a company has been able to accelerate completion of the scheme. These factors have influenced our decisions of whether to make two sided logging up or logging down adjustments to the CIS baseline in 2010-15, or to allow a company the benefit from any outperformance in the CIS reconciliation.

Table A3.16 below summarises the schemes we have reviewed under this programme for these draft determinations

**Table A3.16 Overlap schemes reconciled in the 2014 price review**

Company	Service	Scheme/project name
Anglian r	Water	Grafham water treatment works resilience
Thames	Wastewater	Deephams sewage treatment works upgrade Swindon network
United Utilities	Water	Vyrnwy large diameter trunk main cleaning
	Wastewater	Davyhulme wastewater treatment works (Freshwater Fish Directive) Sandon Dock (Urban Wastewater Treatment Directive) Unsatisfactory intermittent discharge schemes Stockport wastewater treatment works nitrate vulnerable zone designation
Wessex	Water	Integrated grid
South East	Water	Security and Emergency Measures Direction

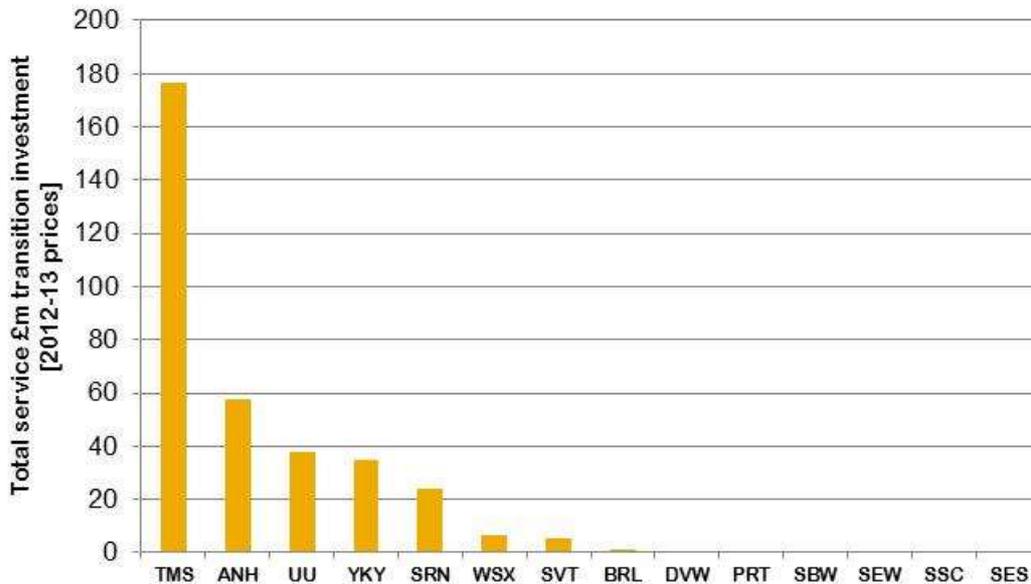
### A3.6.10 The 2014-15 transition mechanism

As with the PR09 overlap programme, the 2014-15 transition mechanism introduced for the 2014 price review seeks to give companies the facility to plan more effectively across the transition between the two price control periods. The mechanism allows companies to make more efficient use of resources and the supply chain by allowing capital investment to deliver outcomes in 2015-20, to be brought forward into 2014-15.

Companies bear the additional costs of financing this dedicated ‘transition investment’ but we will exclude the associated capital expenditure when determining incentive rewards and penalties under the CIS. We placed no restrictions on the types of investment companies could propose.

At an industry level, transition capital investment proposed by companies in 2014-15 totals £357 million with £118 million in the water service and £239 million in the wastewater service. This represents 8% of the total capital expenditure forecast in 2014-15 and 1.5% of the overall total capital investment forecast for the 2015-20 period. Figure A3.26 below summarises the programme at a total level for each company.

**Figure A3.26 Total transition capital investment proposed in 2014-15**



We have accepted, without intervention, all the transition investment proposed by companies in their revised business plans.

### A3.6.11 Other adjustments

In our methodology, we also confirmed that we will need to make adjustments to:

- account for differences between the RCV projections we made in 2009 and companies' outturn positions;
- recover any assumed costs of issuing new equity during 2010-15 where these costs did not materialise (this only applies to the small number of companies we assumed would need to issue new equity); and
- recover any tax benefits arising from in-period changes in capital structures.

## **RCV midnight adjustments**

For all companies we have adjusted the closing RCV at 31 March 2015 that we assumed at PR09 to give an opening value at 1 April 2015 for this review. These opening adjustments were:

- for logging up, logging down and shortfalls (as discussed above)-a net decrease of £616 million (excluding the Thames Tideway);
- for the difference between actual and projected capital expenditure – a net decrease of £903 million;
- for land sales in the period 2010-15 – a decrease of £89 million; and
- to take into account Bristol Water’s Competition Commission referral.

## **New equity assumed during 2010-15**

Where new equity requirements had been assumed during the 2010-15 period in the 2009-final determinations a company was provided additional financing costs. If the company has not issued any equity and has not already returned the additional financing costs to customers in the period then these costs will be returned to customers through the 2015-20 revenue controls.

Thames Water returned the assumed equity issuance transaction costs to customers through its abatement of K in 2012-13 so no further adjustment is needed in these draft determinations.

South East Water has an adjustment in its 2015-20 revenue controls to return the assumed equity issuance transaction costs to customers. The company proposed to return revenue to customers in instalments over the five years totalling £2.3 million. We have reviewed these costs and have determined a return of £2.1 million to be made in full in the first year, the difference in cost being as a result of the profiling of costs.

## **Tax benefits arising from in-period changes in capital structures**

Where companies have gained tax benefits arising from in-period changes in capital structures we set out in our PR09 methodology that these gains should be returned to customers.

None of the draft determinations published in August contained any adjustments relating to tax benefits.

## **Annex 1: Responses to representations on our wholesale cost models and exogenous variables**

On 4 April, we released our wholesale cost models which we have used for wholesale cost assessment in the RBR alongside documentation that provides detail on our calculations and adjustments. We subsequently published a list of changes to these models as part of the enhanced companies' draft determination published on 30 April as well as an updated version of the cost models for these companies.

Following the publication of information supporting our RBR assessments and the enhanced draft determinations, we sought comments on the relevant wholesale cost assessment models, in order to consider these in conjunction with our assessment of affected companies' June business plan resubmissions. Northumbrian Water and Dŵr Cymru requested early draft determinations which we published in May, so that we did not consider the June responses to our request for comments on the models in these early draft determinations. We have however considered companies' June responses to our request for comments on our wholesale cost modelling in conjunction with our assessment of June business plans.

In total, 12 out of the 14 companies scheduled to receive draft determinations by the end of August 2014 made representations on our cost models. The exceptions were Severn Trent and Yorkshire Water. This annex provides a summary of their representations and our response to these representations.

Before making our final determinations, we will consider any further representations that companies will make in response to these draft determinations. In addition, all companies have been asked to provide 2013-14 data to allow us to continue testing and refining our models. The results of updating our models will be considered alongside any further company representations when finalising the models for final determinations.

This annex is organised as follows.

- Section AA1.1 summarises the main points made by companies on our modelling approach together with our response.
- Section AA1.2 summarises representations on our approach for projecting exogenous variables used to set cost thresholds for the period 2015 to 2020 and our response.

## AA1.1 Responses on our cost modelling

In the following sub-sections we present the main concerns, by theme, raised by the companies in their revised business plan submissions of 27 June<sup>10</sup> and our responses.

### AA1.1.1 Enhancement capex in water totex models

#### Company representations

A number of companies raised concern about our use of totex econometric models as part of our suite of models. Their concern stemmed from the fact that totex includes enhancement capex, which, in turn, is inherently lumpy and therefore difficult to capture in a high level model.

- Bristol Water states that: “[Ofwat’s] modelling of enhancement expenditure does not reflect the different risks each company has to manage and therefore does not reflect the efficient expenditure required by each company”.<sup>11</sup> Bristol Water goes on to recommend that “enhancement expenditure should be excluded from the modelling approach and treated separately using a different approach.”<sup>12</sup>
- Dee Valley Water states that: “there are fundamental issues in using the models to determine totex requirements for a company with a lumpy investment profile, such as Dee Valley Water.”<sup>13</sup> Dee Valley Water goes on to note that it does not consider the use of totex models appropriate as they disconnect expenditure from planned investment and this could result in unintended consequences.
- Wessex Water states that it does not consider that the totex models, which only explain costs over a five year period, are able to accurately predict investment cycles. Specifically, it states: “totex modelling which seeks to explain costs over a future five year period through exogenous factors and a

---

<sup>10</sup> None of the four companies with an early draft determination submitted representations on our cost modelling.

<sup>11</sup> Bristol Water, June Submission – Cost Exclusion Case, page 275.

<sup>12</sup> Ibid.

<sup>13</sup> Dee Valley Water, June Submission – Critique of Ofwat’s Totex Modelling Approach, page 175.

relatively short period of historical expenditure will be unlikely to be able to reflect differences in timing of investment cycles in a long-term industry.”<sup>14</sup>

- Southern Water refers to a report by Oxera that highlights four main points regarding enhancement capex in totex models:
  1. Companies can be at different phases in investment cycle.
  2. Cost driver and cost relationships may change between periods.
  3. Enhancement is driven by unique factors.
  4. Enhancement drivers missing from refined models.<sup>15</sup>
  
- Anglian Water considers the approach to incorporating capex in totex models using a smoothed capex profile as problematic despite its ability to reduce lumpiness of capex profiles. It argues that there have been changes in priorities (and in the process of setting priorities) for enhancement capex and that it is unlikely that enhancement capex programmes over 2015-20 will be comparable to those in 2005-10 and/or 2010-15. Anglian Water suggests that model development should have taken account of agreed priorities and that new programmes could be captured by an increase in the unmodelled uplift.<sup>16</sup>
  
- South East Water also cites an Oxera report, noting similar concerns as Southern Water. In particular that the totex models are unsuitable for modelling enhancement expenditure as it is not in a steady state, past expenditure is not a good predictor of future expenditure, drivers are unique, and Ofwat’s current totex models do not include appropriate factors to reasonably explain enhancement expenditure.<sup>17</sup>

## Our response

We undertook a thorough process when developing our approach to wholesale cost assessment and the cost assessment models. We engaged CEPA to support us in the development process and in 2013 we published CEPA’s Cost Assessment Report<sup>18</sup> for consultation, before publishing our final models in April 2014 as part of the RBR. 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. Our assessment of models led

---

<sup>14</sup> Wessex Water, Appendix W1.i Response to Wholesale water cost assessment, page 8.

<sup>15</sup> Southern Water, Chapter 6 – Wholesale Costs – Wastewater – Combined, pages 36-37.

<sup>16</sup> Anglian Water, June Submission, page 218.

<sup>17</sup> South East Water, June submission – Further supporting evidence, pages 64-65.

<sup>18</sup> CEPA, Ofwat: Cost Assessment, January 2013.

us to rule out a totex econometric model for wastewater. In water, however, we considered that we managed to obtain robust totex models that would be a useful addition to our suite of models.

Totex models have important advantages over a more disaggregated approach in assessing comparative efficiency, internalising opex and capex trade-offs, and are relatively immune to cost categorisation issues. Both the Cave review<sup>19</sup> and the Gray review<sup>20</sup> noted that the approach we had taken at previous price reviews to assessing opex and capex costs separately together with the different incentives for companies to deliver opex and capex efficiency savings may have led to the perception that there was a capex bias. We consider that totex models, in conjunction with the change to our approach for cost recovery with a fixed PAYG ratio, help to reduce any capex bias and so lead to solutions being chosen for the right reasons such as environmental benefits. Further, totex models allow better alignment with the menu which is based on total expenditure.

To mitigate the lumpiness of enhancement capex, we have used ‘smoothed’ values of capex. The smoothing is done by averaging annual capex with the capex spend in each of the previous four years.

We recognise that there can be a wide range and specific drivers for enhancement projects. For this purpose, we decided to include in our method for assessing efficient costs a process whereby companies could set out relevant evidence in their business plan which we assessed on a case-by-case basis. 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.

- We note that both Portsmouth Water and Thames Water supported our modelling approach to enhancement expenditure. Thames Water stated that it: “recognise[s] that there is a trade-off between the availability of data on which to form AMP6 totex forecasts and its independence of company business plans. This necessarily entails some reliance on company estimates of cost for those areas of spend that cannot be accurately modelled (for example, capex enhancement projects or company-specific outcomes).”<sup>21</sup>

---

<sup>19</sup> Cave, M., Independent Review of Competition and Innovation in Water Markets: Final Report, April 2009.

<sup>20</sup> Defra, Review of Ofwat and consumer representations in the water sector, 2011.

<sup>21</sup> Thames Water, June submission – cover letter, page 3.

Thames Water goes on to support our approach to dealing with special factor claims, stating that “Ofwat’s cost assessment methodology considers such items outside the Basic Cost Threshold and we support the use of this approach for dealing with enhancement solutions.”<sup>22</sup>

- Thames Water stated that it: “recognise[s] that there is a trade-off between the availability of data on which to form AMP6 totex forecasts and its independence of company business plans. This necessarily entails some reliance on company estimates of cost for those areas of spend that cannot be accurately modelled (eg, capex enhancement projects or company-specific outcomes).”<sup>23</sup> Thames Water goes on to support our approach to dealing with special factor claims, stating that: “Ofwat’s cost assessment methodology considers such items outside the Basic Cost Threshold and we support the use of this approach for dealing with enhancement solutions.”<sup>24</sup>

In the context of special cost factor claims, South East Water has made a special cost claim in relation to enhancement expenditure. It noted that the totex and bottom up models show a difference of up to £76 million (approximately 9% of its business plan totex).<sup>25</sup> It considers that a number of factors contributed to this, but the chief reasons being the lack of notable drivers in the totex models particularly for supply demand balance expenditure and the assertion that these costs are higher for the south-east of England.

On assessment of South East Water’s claim, we did not agree that the models are systemically biased; other companies operating in the south-east of England have not raised similar concerns nor did South East Water demonstrate that companies in the south-east face systematically higher supply demand balance expenditure not already taken into account in the modelling.

### **AA1.1.2 Enhancement opex**

#### **Company representations**

Anglian Water highlighted that opex expenditure related to enhancement capex was not captured in the unit cost models and unmodelled cost categories.

---

<sup>22</sup> Ibid.

<sup>23</sup> Thames Water, June submission – cover letter, page 3.

<sup>24</sup> Ibid.

<sup>25</sup> South East Water, June submission – Further supporting evidence, page 73.

## Our response

On this argument from Anglian Water, we note that while it is correct that this opex was not included in our unit cost models (except for the private sewers model where it was included), it was included instead in the base cost data used to estimate the econometric models. We do not consider that any additional adjustment for enhancement opex is required.

## Triangulation

As we set out in section A3.3.1, in both water and wastewater, we triangulated model results to calculate the BCT.

## Company representations

A number of companies commented on our approach to triangulation. They suggest that triangulation does not imply more accurate estimates of costs; that the statistical robustness should inform the triangulation weights and that the robustness of models should be taken into account when choosing weights.

- Dee Valley Water questions the confidence in cost estimates coming from individual models and the accuracy of the resulting triangulated value. It states that: “[t]aking straight averages of the results of different models (or the same models estimated using COLS or RE) denotes a low confidence level in the theoretical underpinning of each. Moreover, there is no compelling reason to believe that averaging the model results would lead to more accurate and robust results.”<sup>26</sup>
- Wessex Water states that: “triangulation of different models does not necessarily increase the robustness or accuracy of results. In fact, in some cases it may even reduce it. The same applies to averaging different unit cost estimates.”<sup>27</sup>

---

<sup>26</sup> Dee Valley Water, Critique of Ofwat’s Methodology, page 2.

<sup>27</sup> Wessex Water, Appendix W1.i Response to Wholesale water cost assessment, page 7.

- Anglian Water suggests that weightings should be determined by the statistical robustness of the underlying models. Although its analysis shows that changing weights of water models has a marginal effect on their BCT, it suggests that incorporating model robustness would be more logically coherent.<sup>28</sup> It also makes an equivalent claim for wastewater, noting that reweighting of models according to robustness would add to its BCT.<sup>29</sup>
- Southern Water, supported by a report from Oxera, contends that the random effects (GLS) models (WM6, WM10, SW5 and SW9) are more statistically robust and should therefore be given more weight in triangulation.<sup>30</sup>
- United Utilities, based on a report carried out by NERA, advocate “tailoring triangulation weightings to individual unit cost models.”<sup>31</sup>
- South East Water claims that the totex models are the least robust and that placing a 66% weight on them is inappropriate. South East Water state that it considers “that there is a strong justification that the Botex model is a better tool for forecasting Totex”.<sup>32</sup> South East Water suggests “applying a 50:50 weighting across the three models [50% weight on Totex models and 50% weight on Botex models] would be more robust and appropriate.”<sup>33</sup>

We consider that a totex approach provides advantages to consumers and the companies over disaggregated models. By developing and using a suite of models (rather than a single model) we have mitigated the risk of choosing any single model which, for any given company, may have a large variance between the estimate and the ‘correct’ answer. For this reason, we consider that triangulating a suite of models represents a more appropriate approach to setting cost baselines.

We note that Thames Water supported our ‘cautious’ approach to balancing the trade-off between models: “We welcome Ofwat’s cautious approach to balancing this trade-off by using a range of models with a variety of specifications and the use of a simple average of the model outputs to arrive at its Basic Cost Thresholds.”<sup>34</sup>

---

<sup>28</sup> Anglian Water, June 2014 Submission, page 216.

<sup>29</sup> Anglian Water, June 2014 Submission, page 319.

<sup>30</sup> Southern Water, Chapter 6 – Wholesale Costs – Wastewater – Combined, page 16.

<sup>31</sup> United Utilities, RD-C Appendix C NERA report on approach to cost modelling at PR14, pages 26-28.

<sup>32</sup> South East Water, June submission – Further supporting evidence, page 67

<sup>33</sup> Ibid.

<sup>34</sup> Thames Water, June submission – cover letter, page 3.

On the comments from Wessex Water and Dee Valley Water that triangulation of different models does not **necessarily** improve cost estimates; we note that while this is true, we consider that triangulation is **likely** to achieve that in the round. We emphasise that we assessed the properties and predictive power of each and every individual model.

Regarding the point about assigning triangulation weights based on the statistical robustness of the models, in choosing between different modelling streams and different weighting schemes for triangulation CEPA (2014) explained that conventional statistical tests are only one of the criteria to take into account. Our approach to triangulation considered that models that are identical except for their estimation technique – ordinary least squares (OLS) versus generalised least squares (GLS) – are both conceptually and evidently closer to one another relative to models that contained a significantly different set of cost drivers or a different level of cost aggregation (totex models versus bottom up models).<sup>35</sup> We therefore considered that otherwise identical OLS and GLS models should be merged unweighted as a first step. On inspection of the remaining three modelling streams, we considered that there was no compelling evidence to suggest different weights to different models and consequently we applied an equal weight of 1/3 to each modelling stream in the second and final step of the triangulation.

### **AA1.1.3 Use of the upper quartile efficiency target**

#### **Company representations**

A number of companies questioned whether the upper quartile (UQ) efficiency challenge was too stringent to use as a basis for setting cost baselines in draft determinations, particularly given the inherent uncertainties in cost modelling and identifying upper quartile efficiency.

---

<sup>35</sup> CEPA 2014 notes that the parameter estimates of our OLS and GLS models generally converge or otherwise the OLS estimates are within the confidence interval of the GLS (p. 12)

## Company representations

- Dee Valley Water contends that the UQ is not representative of the industry by stating: “in all the models used for water totex benchmarking in PR14, the upper quartile of the efficiency ranking includes at least two small water-only companies.” It suggests that this is contrary to the position taken by Ofwat that: “the potential benchmark must represent a reasonable proportion of the sector”.<sup>36</sup>
- Wessex Water suggests that the uncertainty in the models means that the UQ target should be rolled out over a longer time frame. Specifically: “[for caution in applying the upper quartile efficiency] the best way to adjust for uncertainty would be to apply the upper quartile efficiency challenge over the period up to the end of the price control rather than immediately – that is for the six financial years up to 2020.”<sup>37</sup>
- Southern Water commissioned an Oxera report which contends that the industry wide UQ adjustment does not take account of uncertainty in predicting their costs. Oxera state that Southern Water’s predictions are more uncertain than other companies and for this reason the efficiency adjustment should be less stringent.<sup>38</sup>
- South East Water states that: “[w]e consider using the upper quartile to assess efficiency to be a considerable risk, particularly given the level of uncertainty contained within the models used to assess costs.”<sup>39</sup> South East Water indicates that these uncertainties are around the model weights, policy decisions and lack of suitable explanatory factors.
- United Utilities commissioned a report by NERA in regards to the wholesale cost econometric models. In it NERA contends that while the enforcement of an UQ adjustment may be a sensible regulatory objective the “UQ adjustment from projected totex does not achieve this.” NERA states that the UQ (as applied by Ofwat) “measures the observed costs of some companies relative to the models’ predictions, so it reflects errors in the model predictions as well as any differences in the efficiency of these companies’ costs.” In addition, NERA state that: “the UQ adjustment is ad hoc and too extreme in the case of

---

<sup>36</sup> Dee Valley Water, Critique of Ofwat’s Methodology, page 2.

<sup>37</sup> Wessex Water, Appendix W1.i Response to Wholesale water cost assessment, page 9.

<sup>38</sup> Southern Water, Chapter 6 – Wholesale Costs – Wastewater – Combined, page 78.

<sup>39</sup> South East Water, June submission – Further supporting evidence, pages 73-74.

sewerage” because the sewerage models are less robust compared to the water models. United Utilities suggests we should apply a 3% target for sewerage, while retaining the 6% for water.

## Our response

In setting an efficiency challenge for the companies we needed to find a balance between delivering the best value for customers and ensuring that they receive appropriate levels of service. The most stringent efficiency challenge we could have chosen would have been at the efficiency frontier (as measured by the models). However, there are uncertainties in any modelling approach and using the frontier makes no allowance for these uncertainties. We considered that the modelling results for the water sector were relatively robust; we note that our modelling indicates that for about half of all companies, their cost projection is very close (less than 4% above) or even below our own cost threshold. This is in line with our expectations when using an UQ efficiency challenge. In wastewater, we considered that the modelling results were less robust; however seven out of ten wastewater companies’ projections are below our cost threshold. Therefore, after considering the risks of setting either an unrealistically stringent efficiency challenge against a weak efficiency challenge we considered that, on balance, the UQ for both water and wastewater was an appropriate challenge. Our choice of the efficiency challenge is consistent with our previous price review decisions where we did not adopt a frontier efficiency challenge or a weaker ‘average’ challenge, for reasons similar to those set out above. We note that the use of the UQ is consistent with the efficiency challenge set in other regulated sectors.<sup>40</sup>

In respect of Dee Valley Water’s comment that the UQ is not representative of the industry due to the presence of two small water-only companies, we note that three other companies also outperformed the historical UQ, and all five represented around 15% of industry totex. In addition, we consider that there is no inherent reason to exclude any company, small or large, either from our modelling or from our calculation of the UQ. To do so would weaken the robustness of the approach and could be viewed as regulatory ‘cherry-picking’. Furthermore, when allowing the cost to customers of a small company premium in the cost of capital, we recognised that customers also benefitted from the value of efficient water only company comparators in the area of cost assessment.

---

<sup>40</sup> For example, Ofgem’s RIIO-GD1 price control.

Bristol Water has claimed separately that the UQ was not appropriate as “[d]eterioration in average performance across the industry during 2010-15 in respect of two specific measures reported to DWI, means an UQ is inappropriate as some companies have not been efficient rather they have not maintained service.”<sup>41</sup>

In relation to Bristol Water’s comments, we have considered information on a broader range of twelve quality and serviceability measures, using historical June Return and DWI data. We compared the absolute level of these measures not over AMP5, but rather over a number of time periods, including between 2003-04 and 2010-11. The latter period is broadly in line with that used in our water cost assessment for base costs, which used cost data from 2004-05 to 2012-13. We concluded that there is no evidence of systematic decline in relation to these matters.

#### **AA1.1.4 Service quality and treatment**

##### **Company representations**

A small number of companies made representations suggesting that the totex models do not adequately capture differences in service quality or the complexity associated with treating raw water from certain sources.

- Dee Valley Water states: “[t]he models are almost entirely driven by the length of the mains network and there is no consideration given to the complexity of treatment works due to treatability of the raw water in deriving the basic cost threshold.”<sup>42</sup> Dee Valley Water raised this as special factor claim.
- Bristol Water raises an issue stating that the models used by Ofwat are cost models and not efficiency models because they do not take account of service levels or quality; therefore they should not be used to assess efficiency. Specifically, Bristol Water states that: “[t]he modelling approach undertaken by Ofwat does not include key measures of service quality in its assessment of the ‘efficient’ level of costs.”<sup>43</sup>

---

<sup>41</sup> Bristol Water, June Submission – Cost Exclusion Case, page 12.

<sup>42</sup> Dee Valley Water, Critique of Ofwat’s Methodology, page 2.

<sup>43</sup> Bristol Water, Cost Exclusion Cases, page 275.

- Wessex Water states that its main concern is that: “the cost assessment approach used by Ofwat up to this point is that it does not take proper account of existing levels of service and performance and only limited account of future cost beneficial improvements to services.” Wessex Water states that this has disadvantaged them because “[h]istorical expenditure is by and large assumed to provide a homogenous level of service across companies, and to have been equally effective in delivering the required outcomes.”<sup>44</sup>

## **Our response**

We note that quality of service variables and complexity of treatment variables are included in our WM3 totex water model that receives a 1/3 weight in the BCT. The refined totex and base expenditure models do not include variables for service quality. As outlined in the CEPA report, these variables were dropped from the model as part of the model refinement process that considered five broad criteria including statistical performance and robustness. However, we consider that the models do capture average industry quality and complexity of treatment and, as noted by CEPA, the inclusion of a time trend captures industry wide changes in expenditure related to quality of service over time. Where a company is proposing a properly justified programme that would significantly improve quality over and above what it has done in the past or above what other companies are undertaking then it could either make a special cost factor claim or submit an appropriately calibrated ODI to provide the necessary funding.

We note that all the above points have been raised by the companies as special factor claims and further detail of our responses to these claims can be found in the wholesale cost assessment templates PL14W011/ S011.

### **AA1.1.5 Real price effects**

#### **Company representations**

Dee Valley Water, South Staffordshire Water and Anglian Water raised issues with the treatment of real price effects (RPEs) in the totex models.

---

<sup>44</sup> Wessex Water, Appendix W1.i Response to Wholesale water cost assessment, page 9.

- Dee Valley Water has concerns that RPEs associated with electricity are not captured in the models. It states: “[t]he Ofwat models do not explicitly include the price of electricity in their specification and therefore they would not capture the impact of any real electricity price increase on totex.”<sup>45</sup>
- Anglian Water suggests that, even though a time trend is included in the totex models, its function is uncertain and RPEs are not captured. It states that: “[o]ther commentators have claimed that the time trend provides an allowance for future changes in quality, revealing uncertainty about its function within the modelling.”<sup>46</sup> Anglian Water also expresses concern that the time trend is statistically insignificant in four out of five models, signalling a limited recognition of its effects.<sup>47</sup>
- South Staffordshire Water raises a similar concern to Dee Valley Water, suggesting that the time trend does not account for future increases in power costs.<sup>48</sup>

## Our response

In relation to energy prices, we consider that:

- the historical period over which the time trends were estimated included periods where electricity prices were increasing in real terms;
- in considering protection from future rises in electricity prices it is important to note that the indexation of the wholesale price controls will provide a degree of protection to companies as the basket of goods used to calculate the RPI includes an energy component with a weight of around 8% and our analysis indicates that the companies energy expenditure is typically a similar proportion of their costs; and
- companies can make special cost factor claims if they can demonstrate they face exceptionally high energy costs and that these represent efficient levels.

Bearing the above in mind our view remains that there is no compelling evidence to change the approach to modelling to take account of potential future changes in electricity prices. Our current view is that RPEs are as likely to be positive (relative to RPI) over 2015-20 as they are to be negative. We do not consider that including an adjustment for RPEs would be in the best interests of protecting consumers.

---

<sup>45</sup> Dee Valley Water, Cost Exclusions for Wholesale Water Expenditure, page 115.

<sup>46</sup> Anglian Water, June 2014 Submission, page 320.

<sup>47</sup> Ibid, page 311.

<sup>48</sup> South Staff Water, High Level Overview and Board Assurance, page 8.

With regards to Anglian Water's comment above, the time trend captures movements in productivity, RPEs and other non-company specific time-varying effects. Companies can and should strive to offset all or a substantial proportion of RPEs with productivity gains. Therefore, we would expect the coefficient to be relatively low (between -0.05 and +0.05 according to CEPA 2014).

We have tested our models' performance with the inclusion or exclusion of certain variables and determined that the models perform better with the time trend included.

Further, we see no compelling argument to adjust the estimated time trends upwards for RPEs.

### **AA1.1.6 Specification of exogenous variables**

#### **Company representations**

- Dee Valley Water raised concerns with the use of asset related variables in our totex models because these variables are not outputs but rather intermediate inputs. This, it suggests, can create perverse incentives – for example, “a company could appear more efficient simply by extending the length of its network, even if this was not necessary.”<sup>49</sup>
- Wessex Water makes a similar claim pointing to the inclusion of variables such as length of mains that could create perverse incentives. It also expresses concern over the transformation of variables that have a value of zero, stating: “[t]o ensure the model works a value arbitrarily close to zero has to be modelled, but this choice could have a large impact. 0.001 used [for surface water abstraction sources], but reducing this to 0.00001 would reduce the overall totex by c£15m.”
- Thames Water raises the issue that transformations of variables that were zero in the totex models lacked regulatory precedent. It goes on to say that more conventional transformations may have been more appropriate but it does not suggest it is necessary to change the modelling in respect of these matters.<sup>50</sup>

---

<sup>49</sup> Dee Valley Water, Critique of Ofwat's Approach to Cost Assessment, page 3.

<sup>50</sup> Thames Water, TJ049 Cost Assessment Exclusions, pages 26-27.

## Our response

As described in the CEPA 2014 report our explanatory variables were chosen on the basis of theoretical correctness, statistical performance, robustness, and regulatory best practice. This selection process was also influenced by data quality and availability. While it is true that in theory using asset related variables (for example, length of mains) may create a perverse incentive (for example, to opt for adding mains when other solutions may be more efficient) we considered that this was unlikely to be an effective perverse incentive. This is both due to the companies' statutory duty to operate an efficient network; the long term and high uncertainty under which the incentive will bear fruit; as well as contrasting incentives in our package of incentives, notably the totex efficiency incentive.

Portsmouth Water supported our choice of explanatory variables, noting that: “[t]he explanatory variables appear sensible cost drivers for an individual company and are generally consistent with those established by Ofwat in the past.”<sup>51</sup>

On the transformation of zero-valued variables to (small) positive values in log regression models, we note that there are alternative ways to carry out this transformation. There is no common or agreed way for making this transformation and each approach would inevitably introduce some noise to the estimation. Our transformation was informed by the scale of numbers that we have generally dealt with in our regression. Moreover, we assessed the quality of our models as a whole – given our transformation approach among other things – so that a different approach may have resulted in a different specification of model and the impact noted by Wessex Water could have been reduced.

### AA1.1.7 Implicit allowances

#### Company representations

A few companies raised issues with the way we calculate implicit allowances for special cost factor claims:

- United Utilities commissioned a report by NERA that raises concerns over the way in which the implicit allowances in the base expenditure model are calculated. In particular, it highlights a potential issue of circularity in that the implicit allowances are being calculated by taking the proportion of spending represented by the basic cost threshold compared to the forecast level of

---

<sup>51</sup> Portsmouth Water, June submission – cover letter, page 1.

business plan costs. NERA suggest that implicit allowances should be calculated using same data which was used to calculate the basic cost threshold.<sup>52</sup>

- Thames Water raises concerns that the assessment of implicit allowances based on the allocation of business plan opex and capex may undermine our approach to totex modelling. Thames Water also states that: “[c]ritics of the approach could also argue that it implies a differential burden of materiality for botex cost assessment exclusions, relative to enhancement items. This is because estimated efficiencies in one area of spend within Opex/IRE/MNI are effectively offset against cost assessment exclusions in others.”<sup>53</sup> However, Thames Water goes on to state that Ofwat’s use of flexible model specifications mitigates the risk of systematic bias in the implicit allowance calculations.
- Dee Valley Water expressed concerns with the use of historical industry averages when calculating implicit allowances as “the sample is very heterogeneous as it includes small water-only companies and large water and sewerage companies.” It also suggests that “some investments might be included in the historical data, but not be planned for the subsequent AMP, or vice versa. In both cases the assessment of the models’ implicit allowance will not be accurate.”<sup>54</sup>

## Our response

In relation to the issue raised by United Utilities, we note that we have updated the calculation of implicit allowances after we had published our draft determination for the enhanced and early draft determination companies (we will separately consider the impact of this change on the enhanced companies in their final determinations). Our updated approach to calculating base implicit allowance looks at base total expenditure and compares our view of these costs (per our models) with the company view. This approach avoids the circularity issue raised by NERA.

The new approach identifies implicit allowances for ‘base’ expenditure and ‘enhancement’ expenditure. By splitting these two allowances, we can more robustly allocate implicit allowances to specific cost claims, while not undermining the approach to totex regulation.

---

<sup>52</sup> United Utilities, RD-C Appendix C NERA report on approach to cost modelling at PR14, page 35.

<sup>53</sup> Thames Water, TJ049 Cost Assessment Exclusions, pages 25-26.

<sup>54</sup> Dee Valley Water, Critique of Ofwat’s Approach to Cost Assessment, pages 6-7.

On Dee Valley Water’s point, we consider that water only companies and water and sewerage companies generally carry out similar activities in the water only sector and any systemic difference should not materially detract from our method of using industry averages in the calculation of implicit allowances.

We recognise that expenditure on areas such as capex may not be consistent over time; the evaluation of implicit allowance is intended to reconcile these differences. We consider that the use of historical data in calculating implicit allowances is consistent with the expenditure reflected in our totex forecasts.

We note the issues raised by Thames Water and its conclusions that the flexibility of the approach to cost assessment provides an opportunity to avoid any systematic bias.

### **AA1.1.8 Robustness of coefficients in the econometric models**

#### **Company representations**

- Dee Valley Water raises concerns related to the ability of the models to capture scale and density effects. It argues that the negative effect of the first order density term is not offset by any other variables in the model over a reasonable range of densities.<sup>55</sup>
- Bristol Water highlights the sensitivity of parameter estimates to the inclusion of individual companies stating that the changes in parameter estimates are beyond the confidence intervals of their original estimation. It also questions the robustness of models due to “unexpected parameter estimates” which may have arisen due to multi-collinearity.<sup>56</sup>
- Wessex Water makes similar points relating to multi-collinearity stating: “the models tend to use several variables: while this may reduce the risk of missing important variables, it increases the risk of multi-collinearity. This makes the coefficients less meaningful and might be problematic when making forecasts.”<sup>57</sup>

---

<sup>55</sup> Dee Valley Water, Critique of Ofwat’s Approach to Cost Assessment, pages 7-9.

<sup>56</sup> Bristol Water, Cost Exclusion Cases, page 294-295.

<sup>57</sup> Wessex Water, Appendix W1.i Response to Wholesale water cost assessment, page 7.

## Our response

We note that Dee Valley Water has made a special factor claim in relation to its point above with respect to density. Details around our assessment of its claim can be found in Dee Valley Water’s PL14W011 template, in which, given their special circumstance, we have made an adjustment to counteract any perverse effects of the models.

### AA1.1.9 Model specification

#### Company representations

Most representations around model specification were either related to omitted variables bias, over-specification, or the type of estimation technique used.

- Dee Valley Water suggests that over fitting the model (WM3) may cause the model to be calibrated specifically for the sample used in estimation, thus reducing its predictive power (as well as causing individual parameter estimates to become less reliable). It also suggests that over-specification “increases the likelihood that a company’s efficiency might be overestimated.”<sup>58</sup>
- South East Water also points to mis-specification of the WM3 model. It argues that the model is over-specified and it “displays less-important drivers, counter-intuitive efficiencies and less accurate cost predictions. This can also result in counter-intuitive outcomes, for example, the full model can predict lower costs when the activity increases – whereas our experience suggests the opposite.”<sup>59</sup> Furthermore, drawing on the Oxera report, it argues that the logic behind the retaining the WM3 model is flawed. Specifically, it states that model WM3, despite having several cost drivers, still suffers from omitted variable bias and that a better way to guard against this is to use random effects or stochastic frontier analysis (SFA), rather than a model with too broad a set of drivers.<sup>60</sup>

---

<sup>58</sup> Dee Valley Water, Critique of Ofwat’s Approach to Cost Assessment, pages 3.

<sup>59</sup> South East Water, PR14 Further Supporting Evidence, page 66.

<sup>60</sup> South East Water, PR14 Further Supporting Evidence, page 65.

- United Utilities contends that the omission of relevant variables in the econometric models means that a less challenging efficiency target should be used. This is because the effect of omitted variables would be to wrongly attribute the unobserved heterogeneity of companies to inefficiency.<sup>61</sup>
- Southern Water also draw on an Oxera report and point to weaknesses in OLS with regards to omitted variable bias that it argues means we should pursue random effects or SFA models. They state “[t]he way to mitigate for omitted variable bias is to use panel data models such as RE or stochastic frontier analysis models that account for company specific effect...”<sup>62</sup>

## Our response

The issues raised regarding over-specification are principally concerned with the effects of multi-collinearity on parameter estimates and forecasted costs. As noted above, the possible existence of multi-collinearity in the model was something CEPA identified in its 2014 paper. As CEPA noted, multi-collinearity in itself does not affect the model’s predictions, rather the interpretation of individual coefficients.

We note that both Portsmouth and Thames Water supports our model specifications:

- Portsmouth Water noted that it: “welcome[d] the development of using pooled data reflecting performance over the longer term rather than reliance on one year for the assessment of relative efficiency for price review purposes.”<sup>63</sup>
- Thames Water state that it: “recognise[s] the trade-off in model selection between selecting parsimonious models versus relatively fuller specifications which are less likely to omit relevant variables. In the context of estimating a model to forecast AMP6 totex, it is appropriate to adopt the more cautious approach that minimises the potential for omitted variable bias. If important variables are missing which are correlated with the cost drivers, the resulting parameter estimates will be both biased and inconsistent, making any resulting forecasts unreliable.”<sup>64</sup> Thames Water notes that while Ofwat’s “cautious approach may result in models that include variables that appear to

---

<sup>61</sup> United Utilities, RD107 Water Wholesale cost assessment (Test 4.2), page 5.

<sup>62</sup> Southern Water, Chapter 6 – Wholesale Costs – Wastewater – Combined, page 56.

<sup>63</sup> Portsmouth Water, June submission – cover letter, page 1.

<sup>64</sup> Thames Water, June submission – cover letter, page 3.

be statistically insignificant, or indeed variables with unexpected signs due to multicollinearity, this will not impact on the predictive ability of the model.”<sup>65</sup>

Therefore, given the ability of WM3 to capture a rich set of drivers and forecast costs despite possible multi-collinearity, the previous testing of SFA models and the use of panel methods elsewhere in our suite of models suggests that the use of model WM3 remains appropriate.

In relation to the points raised by United Utilities, the efficiency target is largest in relation to wastewater, where we have a mixture of base and enhancement cost models. On balance we consider that constitutes a reasonably rich approach to modelling and so should avoid the issues identified by United Utilities, particularly as we have adopted an approach to efficiency based on UQ rather than frontier targets.

## **AA1.2 Responses to companies’ representations on the exogenous variables projections**

In this section, we consider company representations in relation to our forecast of the exogenous variables. We have used the forecast of the exogenous variables together with the coefficients from our wholesale cost models to set basic cost thresholds for the period 2015-20. Our forecast of the exogenous variables was largely based on an independent assessment conducted by Jacobs with few amendments as discussed below.<sup>66</sup>

In setting draft determinations for Affinity Water and South West Water we replaced our independent projections with companies’ forecast of exogenous variables for the water service, reflecting the high quality of their plans and the confidence we had that their exogenous variable projections were aligned with their delivery commitments to customers.

Non-enhanced companies were given the opportunity to make representations in relation to the projections of exogenous variables. In our policy and information update of 4 April 2014, we stated that companies would need to provide compelling evidence in support of their representations, and further that:

---

<sup>65</sup> Ibid.

<sup>66</sup> ‘PR14 forecast of exogenous variables’ by Jacobs, Appendix C. This report is appendix D to the report titled ‘Basic cost threshold models’ published 30 April 2014 by Ofwat.

**“representations in respect of the forecasts of exogenous variables need to demonstrate that there is systematic bias in the forecasts not simply that the forecast of a small number of variables might not best reflect the circumstances of an individual company (in addition to demonstrating that proposed activity levels are no more than the efficient level.”<sup>67</sup>**

Some companies made general representations about our approach and argued that it would be more appropriate to use company business plan forecasts of the exogenous variables rather than our own forecast. A number of companies suggested that our forecasts need to be updated to reflect their final water resource management plan (WRMP). Companies also made representations in respect of specific variables where they thought that our forecast were not adequate as a basis for projecting their future costs. We address these issues below.

### **AA1.2.1 General representations on our approach**

A number of companies have suggested that their business plan forecasts of exogenous variables will better reflect the specific circumstances they face and will be more accurate, robust and consistent, than the projections made by Ofwat/Jacobs. We recognise that a bottom-up and more granular approach to forecasting (that companies will have typically adopted in producing business plans) have the potential to better reflect company and region specific circumstances. Nonetheless, in order to have confidence in the business plan forecasts it is important that these are grounded in a high-quality business plan. Those companies with the best plans have received enhanced status and we have already made adjustment to reflect business plan forecasts of exogenous variables. The issue with the remaining companies is whether there are greater advantages than disadvantages in substituting the existing projections of exogenous variables with the forecasts made by companies in business plans.

The advantages of using company forecasts are as follows.

- These forecasts are more likely to be internally consistent with the rest of the plan, namely with costs, outcomes and the associated calibration of incentives.
- These forecasts have the potential to better reflect the specific circumstances of companies' service areas.

---

<sup>67</sup> Ofwat, 'Setting price controls for 2015-20 – policy and information update', April 2014, page 22.

The advantages of using independent forecasts are as follows.

- In formulating business plans, companies may have exaggerated the potential changes in exogenous variables.
- Our projections were made on a broadly consistent basis across companies, which, in turn, match the underlying cost models which were based on averages of historical costs. Business plan forecasts do not necessarily match the approach to cost modelling that has informed the calculation of the BCTs, particularly in relation to the wastewater service where companies have not always consistently attributed NEP quality drivers across different phases of the NEP.

In deciding on our approach we carefully balanced these advantages and disadvantages. In respect of enhanced companies and their water service, our view is that the balance of arguments supported using business plan forecasts, thus reflecting the high level of confidence in the robustness of these plans. For the enhanced companies' wastewater service, there were additional complications such as the inconsistencies between the business plan forecasts and our costs models, particularly in relation to how NEP phase 4 and NEP phase 5 drivers were allocated in the company forecasts. Therefore, we continued to use the Ofwat/Jacobs projections to ensure our modelling was as accurate and robust as possible.

For the non-enhanced companies, we have less confidence in their business plan forecasts, in addition to the reasons already detailed above around consistency and independence. This supports our view that the balance of advantage lies with retaining the Ofwat/Jacobs projections and so our projections have been used in calculating the cost thresholds underlying these draft determinations. Nonetheless, we have considered company specific representations on exogenous variables (along with any associated special cost factor claims) and we have also considered using other published sources of information. In particular, we have considered final WRMPs as these have been subject to independent assessment that either adds further support to the business plan numbers and/or provides relevant updates to business plan information. This is discussed further in Section AA1.2.2 below.

### AA1.2.2 Updating for final WRMPs

At our RBR we used draft water resource management plans (dWRMP) to inform our forecasts for supply demand enhancements, metering and leakage instead of Jacobs' forecasts of these variables. A number of companies have suggested that we update these projections to take account of final WRMP data where it is available. On balance, we consider that there are advantages to this as the process associated with finalising WRMPs provides a degree of further support for business plan numbers and/or provides relevant updates to business planning information. We did not systematically update all dWRMP forecasts because different companies were at different stages of their approval processes. We have updated our SDB (supply/demand balance) projections to account for new information in final WRMPs on a company specific basis where:

- final WRMP information is available;
- the company has requested this update; and
- the company has provided evidence in support of these adjustments.

We made updates to one or more of the supply demand variables set out above for seven of the non-enhanced companies. For the enhanced companies we used their forecasts of variables in their draft determination, reflecting the high quality of their business plans. Neither of the early draft determination companies requested us to update these variables.

Some companies have suggested a more substantial update of our exogenous variable projections to take account of the final WRMP data (that is, beyond the SDB enhancement, metering and leakage variables mentioned above). In the report titled 'PR14 forecast of exogenous variables', we have explained which exogenous variable projections have been taken from the WRMPs<sup>68</sup>. In selecting which variables to update, we have sought to balance the advantages of using information in WRMPs with the advantages associated with retaining consistent sector-wide assumptions on the projections of exogenous variables.

There are a small number of exceptions to the above, including where it has been appropriate to take account of funding from company proposals for ODI rewards. Where applicable, these changes are explained in the company wholesale costs feeder model PL14W011 or PL14S011.

---

<sup>68</sup> 'PR14 forecast of exogenous variables' by Jacobs, Appendix C, page 35 (also page xxi). This report is appendix D to the report titled 'Basic cost threshold models' published 30 April 2014 by Ofwat.

### AA1.2.3 Population estimates and census data

A number of companies have made representations highlighting that our projections of exogenous variables are not based on the most up to date census population data, which we acknowledge. Nonetheless, the new census data has mostly led to step changes in population estimates, reflecting new and better data, rather than a step change in the underlying population. The wholesale cost models were estimated on historical data prior to the census that did not reflect the step changes and so taking account of these revisions only in the projections of exogenous variables may not necessarily produce more reliable projections of costs. On this basis we are not persuaded that there is a compelling argument for change to population figures used to derive our projections of costs.

In the sections that follow, we only address any outstanding substantial points that have not already been addressed above.

### AA1.2.4 Detailed responses to company-specific representations

#### Anglian Water

##### Company representations

Anglian Water raised concerns about how our exogenous variable projections have been generated and the use of historical data, stating that "...AMP5 and AMP6 are not the same."<sup>69</sup> The company also presents analysis that it has conducted which suggests that if their business plan forecasts were used instead of our projections, this would result in an increase to their cost threshold.<sup>70</sup> The company however has not made a claim for this and has only noted this as a 'memo item' to support their concerns about Ofwat's models and exogenous variable projections. We did not consider that this was sufficient evidence to support a change in our approach (beyond the points already covered in section AA1.1 of this annex on modelling representations).

For their water service, Anglian Water contends that our supply demand enhancement model uses out-dated cost driver estimates<sup>71</sup>.

---

<sup>69</sup> 'Our plan 2015 – 20, June 2014 Submission', Anglian Water, page 209. The water representations are at pages 204-232 and wastewater at pages 245-327.

<sup>70</sup> 'Our plan 2015 – 20, June 2014 Submission', Anglian Water, pages 218 and 321.

<sup>71</sup> 'Our plan 2015 – 20, June 2014 Submission', Anglian Water, page 222, section titled 'Issue 5 – specification of the supply demand balance unit cost model'.

For their wastewater service, Anglian Water contends that Ofwat's cost modelling approach only partially allows for required investment at sewage treatment works to support growth.<sup>72</sup> The company has provided supporting evidence and updated their special cost factor claim.

In line with our approach set out in section AA2.1.1 above in relation to companies' final WRMPs, Anglian Water provided sufficient evidence to justify part of its claim SDB enhancements therefore we have updated the exogenous variable 'total enhancements to the supply demand balance (dry year critical/peak conditions)' to be consistent with the company's final WRMP. We have also updated the company's metering projection to be consistent with its final WRMP and its leakage projection to be consistent with its proposed leakage performance commitment, as it was necessary to take account of funding from Anglian Water's proposals for outcome ODI rewards. Further details are provided in the wholesale costs feeder model PL14W011 (deep dive reference DD04), which also refers to the feeder model PL14W003.

As explained in section AA1.2.1 above, we are in general not persuaded to replace the Ofwat/Jacobs exogenous variable projections with company business plan forecasts. Nonetheless, where companies have made a table W11 S11 claim for extra costs associated with a cost driver or exogenous variable, we have considered the evidence using our standard approach to assessing special cost factor claims. In the case of Anglian Water's wastewater service, this includes its S11 special cost factor claim for wastewater growth. Our response, where we consider the evidence provided by Anglian Water on the rate of change of population rather than the absolute population figures, is set out in the wholesale costs feeder model PL14S011 (deep dive reference DD02).

## **Severn Trent Water**

### **Company representations**

This company did not make a representation in relation to our cost models or exogenous variable projections. However, a special cost factor claim was submitted to justify additional expenditure in 2015-20 for SDB enhancements in AMP7.

---

<sup>72</sup> 'Our plan 2015 – 20, June 2014 Submission', Anglian Water, page 246.

## Our response

We have considered the evidence provided on SDB enhancements in line with our standard approach for assessing special cost factor claims and in line with the approach set out at section AA1.2.1 above. Severn Trent Water provided sufficient evidence to justify part of its claim therefore we have updated the exogenous variable for SDB enhancements. Further details are provided in the wholesale costs feeder model PL14W011 (deep dive reference DD06), which also refers to the feeder model PL14W003.

## Southern Water

### Company representations

Southern Water presents analysis of the impact of using their business plan forecasts instead of our projections and they highlight the cost drivers with the most material impact on their cost threshold for both the water and wastewater service.

For the water service, the company contends that our projections are: less accurate; erroneous for the extrapolation of a specific variable; not consistent with their dWRMP or do not account for their Universal Metering Programme. The company contends that if its forecasts were used instead of our projections then the most material impacts on totex for the company's water service are for the variables listed below.<sup>73</sup> The company did not submit associated special cost factor claims for these items.

1. Households connected for water only and water and sewerage – metered.
2. Metering programme – household selective meters – water service.
3. Water delivered (billed measured households).
4. Water delivered (billed measured non-households).
5. Total enhancements to the supply demand balance (dry year critical/peak conditions).
6. Total length of mains renewed.

---

<sup>73</sup> 'Chapter 5 Wholesale Costs Water', Southern Water Services Limited, summarised from pages 18-19.

For the wastewater service, the company suggests that our models do not: reflect the NEP requirements; account for specific circumstances at Peacehaven, Thanet and Millbrook; or use the latest census data.<sup>74</sup>

## Our response

For the water service, the exogenous variables listed at bullet points (i) to (iii) and (v) above relate to the company's universal metering programme and WRMP<sup>75</sup>. In line with our approach set out at section AA1.2.2 above in relation to companies' WRMPs, the final WRMP for this company has not yet been published and an associated special cost factor claim was not submitted therefore we have taken no further action. For the remaining variables listed at bullet points (iv) and (vi) above, we have already set out in section AA1.2.1 above our reservations on the use of business plan forecasts and we are not persuaded by the arguments made by Southern Water for these two variables.

For the wastewater service, our response on the use of the latest census data is already set out at section AA2.1.2 above. All the remaining issues that were raised on Southern Water's wastewater service were also included as special cost factor claims and we have considered these using our standard approach to assessing special cost factor claims. Our responses on the impact of the specific circumstances at Thanet, Millbrook and Peacehaven are set out in the wholesale costs feeder model PL14S011 (deep dive references DD07, DD08 and DD09 respectively).

## Wessex Water

### Company representations

Wessex Water is of the view that Ofwat's exogenous variable projections lead to an underestimate of the cost threshold in both the water and wastewater service.<sup>76</sup> As part of their representations, Wessex Water includes analysis showing the impact on their cost threshold of replacing our projections with their business plan forecasts.

---

<sup>74</sup> 'Chapter 5 Wholesale Costs Water' [which includes wastewater modelling data representations], Southern Water Services Limited, summarised from pages 20-21.

<sup>75</sup> As stated in Southern Water's submission, 'Chapter 5 Wholesale Costs Water', Southern Water Services Limited, page 19.

<sup>76</sup> 'Appendix W1.i – Response to wholesale water cost assessment', Wessex Water, page 4, paragraph 1 and similarly in 'Appendix S1.i – Response to Wholesale Sewerage cost assessment' at page 4, paragraph 1.

For the water service, Wessex Water suggests that their business plan forecasts are superior to our projections for reasons, including:<sup>77</sup>

1. using the most up to date data (for example, 2011 census);
2. using a more accurate bottom up analysis or incorporate more accurate assumptions;
3. consistency with the company's WRMP;
4. accounting for material factors that are not allowed for (for example, the impact of the Grid Project on the 'new mains' variable);
5. alignment with the company's performance commitments; and
6. addressing internal inconsistencies between our projections.

We have already responded to the issues raised in bullet points (i), (ii) and (v) in sections AA1.2.1 and AA1.2.3 above. The remainder bullet points are discussed below in the sub-section titled 'Our response'.

For the wastewater service, Wessex Water makes a case for its business plan forecast to be used instead of our projections for the following exogenous variables: total length of sewers; number of properties; and load to STWs. Our responses to these issues are also set out in sections AA1.2.1 above.

Wessex Water also submitted a special cost factor claim for its carbon footprint reduction programme on the basis that the proposed expenditure is not adequately covered in the unit cost models for wastewater.

## **Our response**

For the water service, Wessex Water contends that several of our projections could be sourced from its WRMP but note that this is only for a sub-set of our projections. Wessex Water also submitted a special cost factor claim on their metering programme. In line with our approach set out at section AA1.2.2 above in relation to companies' final WRMPs, the company provided sufficient evidence and we have updated the number of meters (optants and selective) to reflect their final WRMP. We also updated the leakage forecast to be consistent with the final WRMP. Further details are provided in the wholesale costs feeder model PL14W011 (deep dive reference DD07), which also refers to the feeder model PL14W003.

---

<sup>77</sup> Summarised from 'Appendix W1.i – Response to wholesale water cost assessment', Wessex Water, pages 11-19.

Wessex Water suggests that the impact of the Wessex Water grid project is not accounted for in Ofwat's projections for the 'new mains' and 'total length of mains' variables. We have considered the evidence provided and our view is that this is not sufficiently compelling to make an adjustment on the basis that the Wessex Water grid project is also the subject of a special cost factor claim and therefore we have made an allowance separately for this project (refer to the wholesale costs feeder model PL14W011, deep dive reference DD01).

Regarding the internal inconsistencies highlighted by Wessex Water.

- For the water service, Wessex Water contends that there are inconsistencies between our projections for meters and connected properties. It sets out in Table 6 of its 'Response to wholesale cost assessment' that the impact of this on its RBR threshold is £0.3 million. This is 0.04% of its business plan totex and therefore not material.
- For the wastewater service, Wessex Water contends that an increase to population and the number of properties should result in an increase to the load to STW<sup>78</sup>. Our analysis of the industry historical data showed significant variances in the load to STWs instead of a clear upward trend. This factor influenced how we generated our projection for this variable and we have not received sufficiently compelling evidence from Wessex Water to change our approach, given the points we have already set out in section AA1.2.2 above.

For the wastewater service, we assessed the company's representation on carbon footprint reduction in line with our approach for special cost factor claims. Our response on the impact of growth to quality derived sludge enhancement (on top of population growth derived sludge enhancement) is set out in the wholesale costs feeder model PL14S011 (deep dive reference DD08).

## **Semcorp Bournemouth Water**

### **Company representations**

This company contends that its business plan forecasts should be used instead of our projections because our data is not consistent with their WRMP or their customers' requirements. Our response to these points is already set out in sections AA1.2.1 and AA1.2.2 above.

---

<sup>78</sup> Appendix S1.i – Response to Wholesale Sewerage cost assessment', Wessex Water, page 12, paragraph 45.

Sembcorp Bournemouth Water presents analysis which suggests that if their business plan forecasts were used instead of our projections, this would result in an increase to their basic cost threshold. However, the company focus their representations on three key variables related to their proposed activities for: increased metering; greater length of mains renewal; and increased leakage spend. A special cost factor claim was submitted for each of these variables/activities and a separate claim was also submitted covering the impact of the Fawley industrial complex.

We note the comment that the variable forecast for ‘water delivered (non-potable)’ was set in error. However, this variable is not used in our models. As there is no subsequent impact, we have taken no further action in relation to this matter.

### **Our response**

In respect of its special cost factor claim for the metering programme, Sembcorp Bournemouth Water provided sufficient evidence to justify part of this claim. There was sufficient evidence to retain our RBR assessment to adjust for meter optants in the bottom up modelling approach, to bring this in line with the company’s June business plan, which according to the company is consistent with its WRMP. However, there was insufficient evidence to make an adjustment for selective or change of occupier metering. Further details are provided in the wholesale costs feeder model PL14W011 (deep dive reference DD03).

For the remaining claims highlighted above, we have considered the evidence using our standard approach to assessing special cost factor claims. Our responses are documented in the wholesale costs feeder model PL14W011 (deep dive references ‘DD01, DD05 and DD06’ for Fawley industrial complex, additional leakage spend and increased mains renewal activity respectively).

### **South East Water**

#### **Company representations**

South East Water’s representation in relation to the exogenous variables was specific to its supply demand balance deficit.<sup>79</sup> The company proposes we revise our projection so that it is consistent with their final WRMP. This issue is also partly addressed in their special cost factor claim on enhancement allocation.

---

<sup>79</sup> ‘2014 Price Review Business Plan, Further Supporting Evidence’, South East Water, 27 June 2014, section 5 wholesale costs, page 63, sub-section titled ‘Introduction’.

## Our response

In line with our approach set out at section AA1.2.2 above, the company provided sufficient evidence with their special cost factor claim therefore we have updated the exogenous variables relating to metering, leakage and SDB enhancements so that they are consistent with the company's final WRMP. Further details are provided in the wholesale costs feeder model PL14W011 (deep dive reference DD04), which also refers to the feeder model PL14W003.

## Sutton & East Surrey Water

### Company representations

Sutton & East Surrey Water say that our exogenous variable projections should be replaced with their business plan forecasts. However, rather than replacing all our projections, the company proposes to only “update those [exogenous variables] where there are inaccuracies that lead to material impacts on the totex baseline”.<sup>80</sup> The four variables that the company has highlighted are: population; distribution input; water delivered to billed unmeasured households; and SDB enhancement. In the case of SDB enhancement, the impact on totex of adopting the business plan forecast is negative, which the company acknowledges but has included for a balanced representation of positive and negative impacts.

## Our response

As explained in section AA1.2.3 above, we are not persuaded to change our population projections. Our rationale is also relevant to the company's representation requesting a change to our exogenous variable projections for distribution input and water delivered to billed unmeasured households, along with points set out in section AA1.2.2 above in relation to our use of WRMP data.

The company did not submit a special cost factor claim in relation to their SDB enhancements therefore no further action has been taken.

---

<sup>80</sup> 'Our Business Plan 2015-20', Resubmission 27 June 2014, Sutton & East Surrey Water, page 34 of chapter 7, paragraph 7.4.1.

**Ofwat** (The Water Services Regulation Authority) is a non-ministerial government department. We are responsible for making sure that the water sector in England and Wales provides customers with a good quality and efficient service at a fair price.



**Ofwat**  
Centre City Tower  
7 Hill Street  
Birmingham B5 4UA

**Phone:** 0121 644 7500  
**Fax:** 0121 644 7699  
**Website:** [www.ofwat.gov.uk](http://www.ofwat.gov.uk)  
**Email:** [mailbox@ofwat.gsi.gov.uk](mailto:mailbox@ofwat.gsi.gov.uk)

Photograph © freepixels.com  
Printed on 75% minimum de-inked post-consumer waste paper  
August 2014

© Crown copyright 2014

You may reuse this information (excluding logos) free of charge in any format or medium, under the terms of the Open Government Licence v2.0. To view this licence, visit <http://www.nationalarchives.gov.uk/doc/open-government-licence/version/2> or email [psi@nationalarchives.gsi.gov.uk](mailto:psi@nationalarchives.gsi.gov.uk).

Where we have identified any third party copyright information, you will need to obtain permission from the copyright holders concerned.

Any enquiries regarding this publication should be sent to us at [mailbox@ofwat.gsi.gov.uk](mailto:mailbox@ofwat.gsi.gov.uk).

This document is also available from our website at [www.ofwat.gov.uk](http://www.ofwat.gov.uk).



[www.ofwat.gov.uk](http://www.ofwat.gov.uk)