AffinityWater

AFW42 - PR24 Cost Adjustment Claims

Contents

Executive Summary

We propose a symmetrical Cost Adjustment Claim (CAC) £42.2m for base expenditure in the wholesale water network plus control, for regional wages. This is stated after application of catch-up efficiency and deduction of implicit allowance. Our claim relates to the network plus control because this business segment is most labour intensive and for the most part, labour needs to be located near to the water supply system assets, not outside the region.

- **Unique circumstances -** We use reliable data sources to show that regional wages are 14% higher than average in our area of operation, above upper quartile and 3rd highest across the industry.

- **Need for adjustment -** There is a clear economic rationale that companies located in high wage areas will face higher costs and we show the correlation between regional wages and average costs. Econometric estimators of regional wages are statistically significant, improve adjusted R-squared, lead to more plausible efficiency ranges and bring additional information to cost models not already captured by density variables. The strength of our econometric results shows that regional wages cannot be ignored in cost assessment work. Failing to adjust for regional wages either in cost models or CACs risks over-assessment of costs for companies in lower wage areas and under-assessment for those in higher cost areas.

  Management Control – In forming our claim, we have considered how far labour costs can be reduced or avoided through management action. We show how we have acted to mitigate labour costs and in estimating our claim, limited our claim to the most labour intensive segment and for the extent that labour must be sourced locally

- **Materiality -** Our net claim relates to labour, a significant input and driver of costs. Our CAC amounts to around 4% of 5-year base costs, fully satisfying the materiality threshold**.**

- **Adjustment to allowances (including implicit allowance) -** We have estimated implicit allowance and our claim remains material after its deduction.

- **Cost efficiency -** We tested our claim against labour cost indices used in electricity and gas distribution and found it consistent. We applied the catch-up efficiency implied by Ofwat's PR24 models to ensure cost efficiency of our claim.

Regional Wages

Introduction

We have prepared our CAC in accordance with the guidance in Ofwat's Final Methodology section 2.4.4 and Appendix 9. We structure the document to provide the evidence, argument and discussion in the order of Ofwat's assessment criteria.

> For CACs rejected at PR19, we expect to see a material change in circumstances surrounding the cost adjustment claim.

We proposed regional wages CAC at PR19 but this was not accepted. Ofwat has said that where it rejected claims in PR19, it expects to see a material change in evidence, or a material change in circumstances surrounding the claim for it to be accepted at PR24. The reasons why it is appropriate to re-consider the case are:

- Updating econometric analysis, we found statistically significant estimators for regional wages in treated water distribution models and narrower efficiency score ranges. Our Variance Inflation Factor (VIF) measurements strongly suggest that inclusion of a regional wages variable brings additional information to the models that has not already been captured by density variables.

- Since FD19, Ofgem has published its ED2 determinations[1] where it made regional adjustments to cost data prior to econometric estimation. This has provided fresh regulatory precedent for including regional wage effects in cost estimation work. Gas distribution[2] provides another example where the regulator treated for regional wages with pre-modelling adjustments. Gas and electricity distribution networks are similar in nature to water networks, in that all are asset intensive and rely heavily on local specialist labour.

- Compared to PR19, there is now a longer times series of data available (new evidence) which allows us to identify better the relationship between regional wages and base costs.

Need for Adjustment

a) Is there compelling evidence that the company has unique circumstances that warrant a separate cost adjustment?

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[1] RIIO-ED2 Draft Determinations Core Methodology (1).pdf
[2] https://www.ofgem.gov.uk/sites/default/files/docs/2020/12/final_determinations_technical_annexes_part_two.zip

Water companies face different local labour market conditions which influence their costs directly through wages paid to water company employees plus associated employment costs (e.g. pensions) and indirectly through costs of services bought from suppliers. The existence and persistence of regional wage disparities is evidenced in ONS statistics, such as the Annual Survey of Hours and Earnings (ASHE).

There is ample evidence to show that labour market conditions vary across the country. We have focussed on ASHE as a reliable, independent, and authoritative source for regional labour market information. ASHE presents wages by local authority district, so it is possible to allocate ASHE wage rates to water company areas using allocation factors published by Ofwat.

Chart 1 summarises the position and shows that wage rates are highest in water company areas in and nearest to London. The four company areas where labour market rates are above upper quartile, TMS, SES, AFW and SEW are all in or around London, which suggests a London effect where companies need to compete for skilled labour with the capital city.

Chart 1: ASHE Gross Weekly Regional Wages 2011-12 to 2021/22, by company area
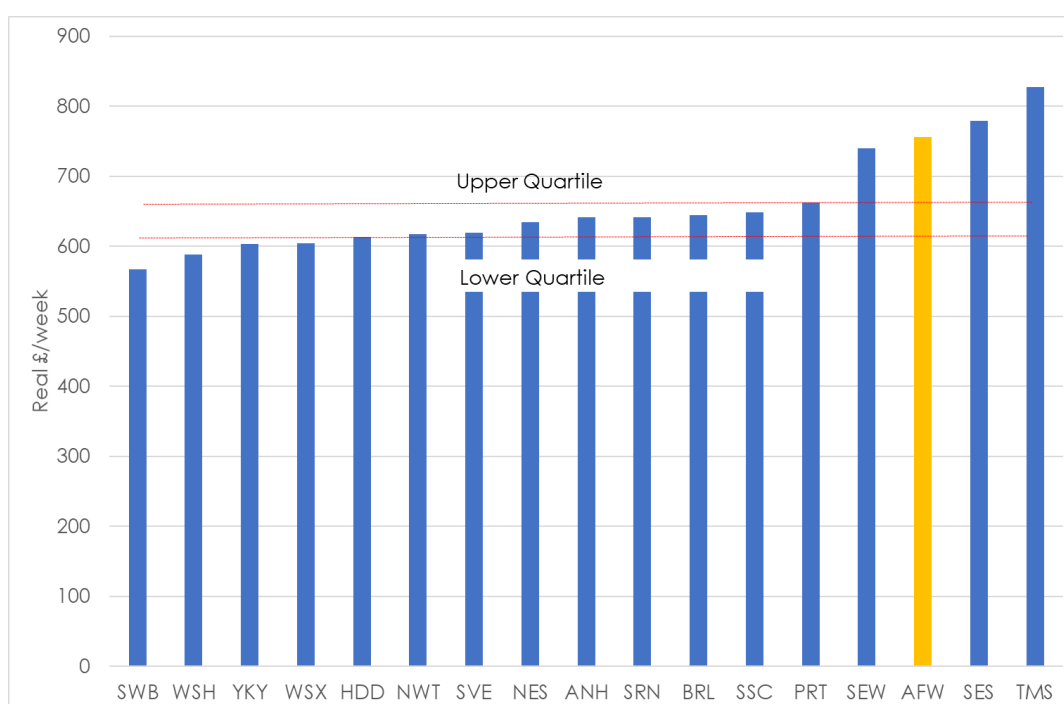
b) Is there compelling evidence that the company faces higher efficient costs in the round compared to its peers (considering, where relevant, circumstances that drive higher costs for other companies that the company does not face)?

In the round, there is a relationship between regional wages and costs. Chart 2 plots treated water distribution cost per km of mains against regional wages in each water

company area and shows positive correlation coefficient, 0.65[3]. In this business segment, companies operating in high wage cost areas tend to have higher unit base costs[4].

Chart 2: Relationship between treated water distribution costs and regional wages
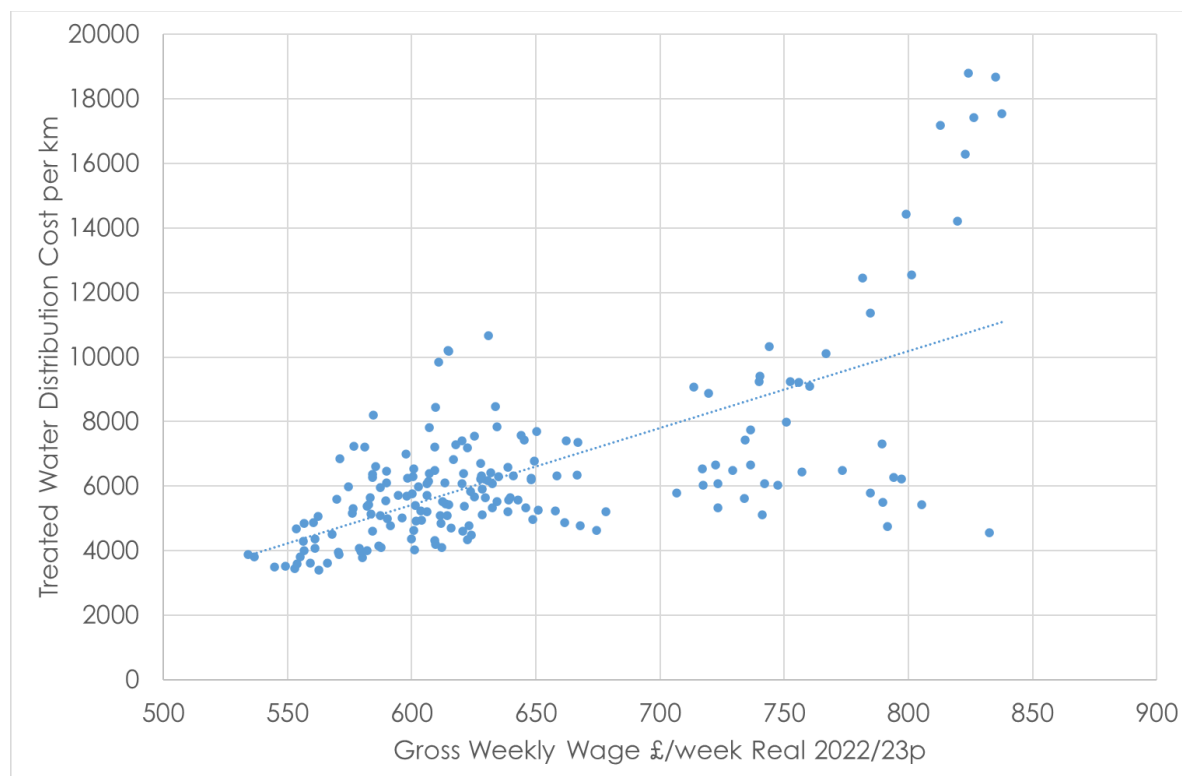
c) Is there compelling evidence of alternative options being considered, where relevant?

We concluded that this CAC criterion is not relevant because there is no reasonable alternative option to employing labour to provide wholesale water base services.

d) Is the investment driven by factors outside of management control?

CEPA (2018) concluded that the degree to which regional labour markets influence costs is driven by 'structural differences in labour costs across regions, the type of labour being procured and the ability of companies to source labour from outside local (or regional) markets.'

We have made reasonable adjustments to our claim for management control. We show evidence in e) below of mitigating our exposure to labour costs and further, we are not extending our regional wages claim to the retail price control, as many retail activities such as call centre operations and back office functions do not necessarily

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[3] We found a similar correlation coefficient, 0.63 between water network plus costs per km and gross weekly regional wages

[4] We calculated correlation coefficients excluding i) TMS and ii) SES and returned results 0.43 and 0.77 respectively. Our result that companies in high wage cost areas tend to have higher TWD and N+ unit costs per km is insensitive to exclusion of 'outliers'

need to be located inside our supply area. Also we do not extend our claim to the water resources price control as this segment is less labour intensive than network plus.

e) Have steps been taken to control costs and have potential cost savings (e.g. spend to save) been accounted for?

Since labour is more expensive in our area of supply, it would be reasonable to see differences in our input mix, responding to the high price of labour. In Table App24 of PR19 business plans we reported that 26% of our network plus costs were labour. This is below the industry average, 31% consistent with our reducing exposure to the most expensive inputs.

Table 1 shows that since PR19 water companies have increased labour input overall, as the number of FTE employees is increasing. By contrast, our workforce has grown more slowly than seen elsewhere. This is consistent with our control of labour inputs and optimisation of input shares based on their relative expense.

Table 1: Full-time equivalent employees in the E&W water industry

	E&W Water Industry FTE employees (excl. AFW)	Affinity Water FTE employees
2019	39,908	1,364
2020	41,265	1,296
2021	42,119	1,262
2022	43,768	1,373
% Change	**+9.7%**	**+0.7%**

Source : E&W Water Company Annual Reports and Accounts

Table 2 shows that we have taken management steps to control labour costs, having reduced our staff costs (incl. pensions and other employment costs) by over 7% in real terms, and around 8% on cost per FTE basis.

Table 2: Real Staff Costs (£m) and real staff costs per FTE (£/a) 2022/23p

	Real Staff Costs £m	Real Staff Costs £ per FTE
2017/18	87.51	64,500
2018/19	91.22	66,900
2019/20	85.26	65,800
2020/21	83.60	66,200
2021/22	84.27	61,400
2022/23	81.27	59,100
Change	**-7.1%**	**-8.3%**

Source : Affinity Water Company Annual Reports and Accounts, Note 3

f) Is there compelling evidence that the factor is a material driver of expenditure with a clear engineering / economic rationale?

Direct labour costs are a major component of water company costs, amounting to £2.188bn[5] across the industry in 2021. In 2019, Ofwat assessed that 38.6%[6] of water company totex could be attributed to labour. The high proportion of costs made up by labour makes it safe to conclude that labour is a material driver of expenditure, meeting this assessment criterion. In section i) below we show that our valuation of the factor, after deduction of implicit allowance, exceeds Ofwat's materiality threshold.

There is a clear economic reason to expect that persistent regional differences in wages, as evidenced in the ASHE, drive regional differences in costs across water companies, as noted for instance by CEPA (2018)[7].

g) Is there compelling quantitative evidence of how the factor impacts the company's expenditure?

We have triangulated different approaches to assess and evidence the effects of regional wages on our expenditure.

- Econometric evidence (1) (inclusion of regional wages variable)
- Econometric evidence (2) (regression on pre-adjusted costs)
- Proportion of labour costs approach

Econometric evidence (1) inclusion of regional wages variable

Our first approach to estimating the effects of regional wage variations compares predicted costs using Ofwat's PR24 treated water distribution model specifications (which do not include an explicit regional wages variable) with alternative specifications that do include a variable. Differences in the predicted level of costs under the different model specifications yield econometric estimates of the regional wages effect. We estimated models in this way, based on Ofwat's Master Dataset v4, having converted costs from 2017/18 prices to 2022/23 real terms, to align with the PR24 price base.

To construct our regional wage variable, we used the ASHE series Table 8.1a[8] which provides gross weekly earnings at local authority level. We allocated local authorities to water company supply areas using allocation factors published by Ofwat and used the logarithm of weekly wages by company area in our models. Our dataset is tabulated in Appendix B.

We noted that in previous cost assessment work, Ofwat, CEPA and Ofgem have used hourly wages to evaluate regional wage effects. However, most of our employees are

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[5] Source: England and Wales Water Company Annual Reports and Accounts.
[6] Section 11.6.6, p197 https://www.ofwat.gov.uk/wp-content/uploads/2019/12/PR19-final-determinations-Securing-cost-efficiency-technical-appendix.pdf
[7] Microsoft Word - CEPA cost assessment report (clean) (ofwat.gov.uk) p118 notes "The relative cost of labour in different regions of the country has the potential to influence the underlying cost base of companies operating in different regions."
[8] Earnings and hours worked, place of residence by local authority: ASHE Table 8 - Office for National Statistics (ons.gov.uk)

salaried rather than paid hourly and we concluded that weekly wages better reflect employment arrangements in water companies.

Turning to estimation, we estimated all 6 variations of treated water distribution models published by Ofwat, then re-estimated those models that differed only in that they included a regional wages variable. We applied catch-up efficiency, applying the upper quartile efficiency score (0.9949) to the expenditures predicted by models. Our full econometric results are shown in Appendix A.

The table below shows triangulated predicted costs for 2017-18 to 2021-22 under Ofwat's PR24 specifications and compares them with predicted costs under our specifications. We triangulated across the 6 models using equal weightings. Our result is that AFW's predicted TWD costs are £85.7m higher than Ofwat's prediction, over 5 years.

Table 3: Summary of cost adjustment claim – method 1 - £m 2022/23p

	Ofwat PR24 specification - predicted costs 17/18 to 21/22 Post efficiency £m	With addition of regional wages in TWD - predicted costs 17/18 to 21/22 Post efficiency £m	Difference £m
2017-18	124.0	142.0	18.0
2018-19	124.0	140.5	16.5
2019-20	125.7	141.2	15.5
2020-21	130.6	147.2	16.6
2021-22	128.6	147.7	19.0
Total	**632.9**	**718.6**	**85.7**

Econometric evidence (2) regression of pre-adjusted costs

A second approach is to pre-adjust cost data to remove relevant expenditure (regional wages effects) and re-estimate the models to obtain predicted costs. This provides an estimated cost function as if wages were uniform across the country. The pre-adjustment amounts can then be added back to the uniform prediction. Comparing this result with the costs predicted by Ofwat's models produces valuation of the cost adjustment claim.

To adjust costs we used assumed that 38.6% of treated water distribution costs are accounted for by labour, the share determined at PR19 for wage costs reconciliation. For example, for AFW in 2021/22, actual treated water distribution modelled expenditure was £170.96m in 2022/23 prices. We derive adjusted costs by taking the share of base costs for labour 38.6%[9] and ASHE data that shows that in that year, regional wages in AFW's area of operations were 1.1412 times the E&W average:

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[9] We have not further adjusted the input data used in our modelling to apply a factor for proportions of labour sourced locally versus labour that could be sourced elsewhere(as for example Ofgem in ED2). The deduction we make to our claim for implicit allowance is similarly estimated on an 'unadjusted' basis.

$$\text{Adj. costs} = \pounds170.96m \times [\,(0.614 * 1.000) + (0.386 / 1.1412)\,] = \underline{\pounds162.80m}$$

This adjustment normalises costs for regional wage differences by increasing the costs of companies in low wage areas and decreasing those in high wage areas. For our estimations, we regressed the adjusted costs against the same explanatory variables as Ofwat's PR24 specification. We added back the adjustments to the predicted costs, applied catch-up efficiency and compared the results with Ofwat's outcome to yield a valuation of the CAC. As seen in the table below, we assess with this approach that regional wage effects increase our costs by £30.3m over 5 years, equal to £6.1m per year.

Table 4: Summary of cost adjustment claim – method 2 - £m 2022/23p

	Ofwat PR24 Specifications Predicted TWD Costs, post efficiency	Predicted TWD Costs using pre-adjusted data, post efficiency	Add back adjustment	Predicted costs post efficiency	Difference = CAC estimate
2017-18	124.0	122.5	8.3	130.8	6.8
2018-19	124.0	122.5	7.6	130.1	6.1
2019-20	125.7	123.9	7.3	131.2	5.6
2020-21	130.6	128.7	7.5	136.2	5.5
2021-22	128.6	126.8	8.2	134.9	6.3
Total	**632.9**	**624.3**	**39.0**	**663.3**	**30.3**

Proportion of labour costs approach

Under this approach, we assume that 38.6%[10] of botex costs are accounted for by labour, as PR19 determination, and apply this factor to post efficiency botex, to estimate the proportion of efficient costs accounted for by labour. Next we multiply that result by the % wages premium observed in each company area to calculate the cost adjustment claim value. Under this approach, we estimate a gross claim value £36.4m.

Table 5: Summary of cost adjustment claim, method 3 - £m 2022/23p

	Post Efficiency TWD Botex £m	Proportion (38.6%) labour cost £m	ASHE Regional Wage Premium %	CAC estimate £m
ANH	866	334	-2.6%	-9
NES	720	278	-3.7%	-10
NWT	1231	475	-6.2%	-29
SRN	459	177	-2.5%	-4
SWB	457	176	-13.8%	-24

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[10] We have not further adjusted the input data used in our modelling to apply a factor for proportions of labour sourced locally versus labour that could be sourced elsewhere (as for example Ofgem in ED2). The deduction we make to our claim for implicit allowance is similarly estimated on an 'unadjusted' basis.

TMS	2709	1046	25.7%	269
WSH	699	270	-10.7%	-29
WSX	324	125	-8.2%	-10
YKY	886	342	-8.3%	-28
AFW	633	244	14.9%	36
BRL	224	86	-2.1%	-2
PRT	107	41	0.6%	0
SES	103	40	18.3%	7
SEW	382	147	12.4%	18
SSC	288	111	-1.4%	-2
SVE	1590	614	-5.9%	-36
HDD	73	28	-6.8%	-2

Triangulating between the three approaches we calculate the gross cost adjustment claim, post catch-up efficiency, pre-implicit allowance, to be £50.8m.

Table 6: Triangulated cost adjustment claim - £m 2022/23p

	Method 1	Method 2	Method 3	Triangulated
Cost Adj. Claim £m 22/23p	85.7	30.3	36.4	50.8

h) Is there compelling evidence that the cost claim is not included in our modelled baseline (or, if the models are not known, would be unlikely to be included)? Is there compelling evidence that the factor is not covered by one or more cost drivers included in the cost models?

Ofwat contends that inclusion of density variables in models will include regional wage differences, as the two are correlated. Density alone may fail to fully explain regional wage differentials since wages are also driven by additional factors such as differences in living and housing costs, the level of education, urbanisation, productivity, geographical and cultural factors and the presence and concentration of different industries.

The chart shows the high level relationship between population density and median income, by UK region (excluding London). For example, Scotland is the most sparsely populated region of the UK, with 70 people per sq km, however it has the third highest median wage, so the relationship between density and income is not straightforward.

Chart 3: Relationship between population density and median income by region
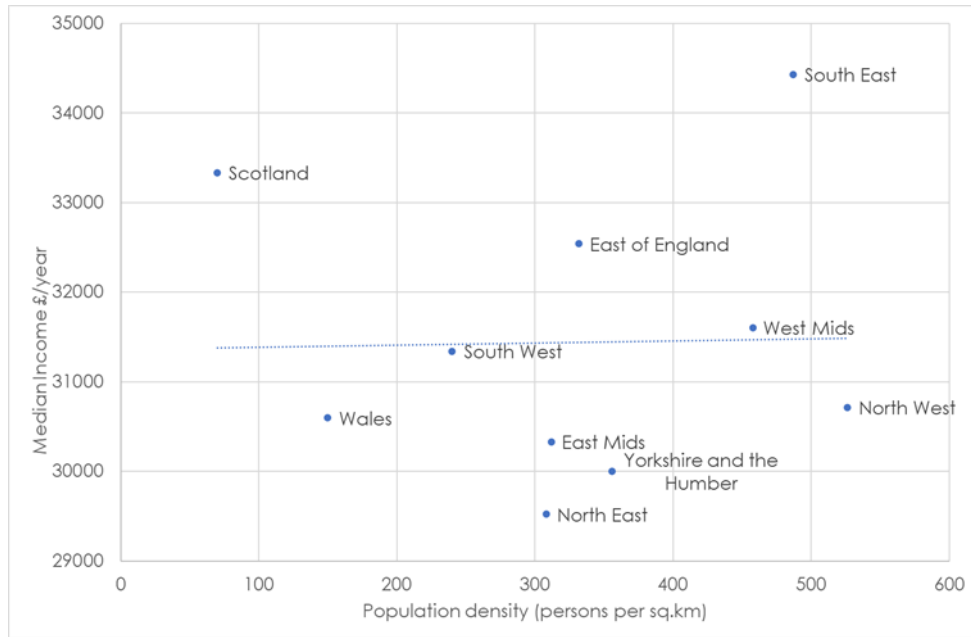
Focussing on the econometric models and wholesale cost master data, we tested the correlation between the 3 density measures used by Ofwat, and regional wages. We are not aware of a commonly agreed rule for a critical value for correlation, although we note that CEPA (2018)[11] considered 0.90 to be a suitable threshold. To some, CEPA's threshold might appear on the high side and we prefer 0.75. Testing the correlation between the logarithm of regional wages on weekly basis with the logarithm of each of the 3 alternative density measurements. There are no cases where the threshold is breached as correlations are broadly in the 0.5 to 0.6 range.

Table 7: Correlation matrix for regional wages and density measures

	l_WADLADfromMSOAwater	l_WADMSOAwaterpopulation	l_density	l_GrossWeeklyRegionalWagesRea
l_WADLADfromMSOAwater	1.000	-	-	-
l_WADMSOAwaterpopulation	0.955	1.000	-	-
l_density	0.914	0.916	1.000	-
l_GrossWeeklyRegionalWagesRea	0.551	0.595	0.622	1.000

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[11] Microsoft Word - CEPA cost assessment report (clean) (ofwat.gov.uk) "we have not included any two variables in a model that are correlated by more than 90%."

We noted also Southern Water's[12] calculations of correlation coefficients between the three different proposed density measures used in econometric models with hourly manufacturing wages across different regions. Similar to our results, Southern found correlation in the range 0.42 to 0.49, providing further evidence that the density measurements do not adequately control for regional wage effects.

Second, we tested whether there is likely to be multi-collinearity in our models that include regional wages and density, using the VIF statistic. CEPA (2023)[13] concluded that 'models with a max and/or mean VIF above 10 are considered to have a relatively high risk of suffering from multicollinearity, i.e. some of the variables are providing similar information into the model.'

In our estimations, when we included regional wages variables, we observed VIF scores in the range 1.8 – 2.1. These are similar to the VIF scores released by Ofwat for its PR24 models and well below the critical value 10.

Table 8: VIF result for models including regional wages variable

	VIF on Gross Weekly Regional Wages variable
	VIF (<10)
TWD1 + Reg Wages	1.870
TWD2 + Reg Wages	1.943
TWD3 + Reg Wages	1.902
TWD4 + Reg. Wages	1.992
TWD5 + Reg. Wages	2.027
TWD6 + Reg. Wages	2.106

We interpret this evidence to mean that the regional wages variable **is not** providing the same information in the model as other explanatory variables, i.e. density measures.

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i) Is the claim material after deduction of an implicit allowance? Has the company considered a range of estimates for the implicit allowance?

The implicit allowance is the amount of the cost adjustment claim that can be considered already to be included in Ofwat's econometric models, and which can therefore be deducted from gross CAC value to produce net value of claim.

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[12] https://www.ofwat.gov.uk/wp-content/uploads/2023/06/Cost-Adjustment-Claim-Regional-Labour-Costs-For-submission.pdf

[13] CEPA (2023) p13. https://www.ofwat.gov.uk/wp-content/uploads/2023/04/CEPA_Ofwat_Base_Cost_Models_Final_Report.pdf

We have used the PR24 Final Methodology 'Remove relevant expenditure' approach[14] to estimate the implicit allowance. To do this we estimated Ofwat PR24 specification models:

i) as they stand in the PR24 Econometric Base Cost Models consultation, having uplifted costs for inflation to 2022/23 price base; and

ii) with removal of relevant expenditure as described in g) above

The difference between the predicted costs estimated under i) and ii) provides an estimate of the implicit allowance as it compares the costs predicted where regional wage differences are present in historic data, with the costs predicted from an adjusted dataset that simulates uniform wages across the country.

We triangulate the estimated implicit allowance across all 6 treated water distribution specifications to produce our valuation. This is set out in the Table 6 below.

Table 9: Estimated implicit allowance for Affinity Water

	Ofwat PR24 Specification	Ofwat PR24 – relevant expenditure removed	Implicit Allowance
	£m 22/23p	£m 22/23p	£m 22/23p
2011-12	119.1	118.1	
2012-13	119.5	118.5	
2013-14	120.3	119.2	
2014-15	121.0	119.8	
2015-16	122.5	121.2	
2016-17	123.6	122.2	
2017-18	124.6	123.1	-1.5
2018-19	124.6	123.1	-1.5
2019-20	126.3	124.5	-1.8
2020-21	131.3	129.3	-2.0
2021-22	129.3	127.4	-1.9
5-year Total	**636.2**	**627.5**	**-8.6**

We assess the value of the implicit allowance to be £8.6m. Our post-efficiency CAC, £50.8m, after deduction of implicit allowance, £8.6m becomes £42.2m. This exceeds the 1% threshold value for materiality.

The implicit allowance, calculated in the same way for the industry produces the results tabulated below.

Table 10: Estimated implicit allowance for industry

	Ofwat PR24 Specification post efficiency	Ofwat PR24 – relevant expenditure removed post efficiency	Implicit Allowance

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[14] https://www.ofwat.gov.uk/publication/pr24-final-methodology-appendix-9-setting-expenditure-allowances/ section A 1.3.1 p159

	£m 22/23p	£m 22/23p	£m 22/23p
ANH	875	911	35
NES	724	730	6
NWT	1231	1244	13
SRN	459	458	-1
SWB	457	469	12
TMS	2723	2499	-224
WSH	702	733	31
WSX	325	337	11
YKY	891	910	19
AFW	636	627	-9
BRL	225	223	-2
PRT	107	103	-4
SES	104	101	-2
SEW	384	394	10
SSC	290	286	-4
SVE	1590	1604	14
HDD	74	76	2
5- year Total	**11796**	**11704**	**92**

Where the table shows negative values, this can be interpreted as Ofwat's models capturing a part of the regional wages effect through density variables, so cost adjustment claims can be reduced by that amount to avoid double count. Where the value is positive, the density variable is not fully capturing the effect of regional wages and symmetrical adjustments should be reduced by the implicit allowance amount to avoid double counting downwards adjustments.

j) Has the company accounted for cost savings and/or benefits from offsetting circumstances, where relevant?

Ofwat notes that with cost adjustment claims, companies are not incentivised to propose beneficial factors that might fully or partly offset cost adjustment claims. We have considered cost savings and benefits from offsetting circumstances, making use of the early symmetrical cost adjustment claims submitted by other companies and published on Ofwat's website. Where other companies propose symmetrical adjustments that have a negative effect on Affinity Water's costs, these should be considered as candidates for cost savings or offsetting circumstances. Our assessment of the early claims is tabulated below.

Table 11: Summary of early cost adjustment claims effects on Affinity Water

Ref	Claim	Proposer	5-year effect on Affinity Water £m
1	Regional Wages	AFW	-
2	Transience	AFW	-
3	Average Pumping Head	ANH	-45.5
4	Leakage	ANH	Not stated

5	Boundary Boxes	ANH	Not stated
6	Network spend for I2S	HDD	0.0
7	Reservoir Maintenance	HDD	0.0
8	Lumpy Maintenance	PRT	0.0
9	New Head Office	PRT	0.0
10	Pumping	SES	Not stated
11	Retail Scale	SES	Not stated
12	Water softening	SES	0.0
13	Network Complexity	SVE	36.0
14	Meter renewals	SEW	Small
15	Network reinforcement	SEW	14.1
16	Economies of scale treatment	SEW	32.5
17	Topography	SSC	-20.0
18	Frontier leakage performer	SWB	-26.0
19	Meter replacement	SRN	Small
20	Regional wages	SRN	14.5
21	Transience	TMS	3.8
22	Reservoir maintenance	UUW	3.0

Of the symmetric claims put forward by other companies, we note the majority would either produce zero, upwards or immaterially small adjustments to AFW's costs.

Of those proposed with material negative effects, we consider items numbered 3 and 17 to be the same, as both essentially argue for a greater role for average pumping head in models, or a role in adjustment to modelled outcomes. We are not ready to accept this case as half of Ofwat's proposed water models directly include distribution average pumping head as a specific explanatory variable. We think it hard then to maintain the argument that this factor is not already adequately included in Ofwat's modelled baseline. We also said in our response to the base cost models consultation, we are concerned about the quality of distribution pumping head data, and we maintain that use of this data does not fit with Ofwat's principles for cost assessment.

We are unable to accept SWB's case for cost adjustment based on frontier leakage performance at this time, because the proposer's leakage reporting is the subject of ongoing regulatory investigation.

k) Is it clear the cost allowances would, in the round, be insufficient to accommodate the factor without a claim?

Our evidence suggests that failure to account for regional wages differences could overfund companies in low wage areas and underfund companies in high wage areas. As our post implicit allowance estimate of this CAC (around 4% of relevant botex) exceeds the materiality threshold, our assessment is that unadjusted cost allowances would be insufficient.

l) Has the company taken a long-term view of the allowance and balanced expenditure requirements between multiple regulatory periods? Has the company considered whether our long-term allowance provides sufficient funding?

The persistence of regional wage differentials over long time series as seen in ASHE gives reason to think that companies will continue to face different local labour market conditions over multiple regulatory periods. Historic evidence, which shows little convergence in regional wages gives rise to expectations that regional wage differences will continue to be a driver of cost differences between water companies costs over the long term.

m) If an alternative explanatory variable is used to calculate the cost adjustment, why is it superior to the explanatory variables in our cost models?

Rather than substitute a variable used by Ofwat, we have added a regional wages variable. Our full econometric results are presented in Appendix A, however we highlight the following econometric evidence that supports inclusion of the variable as a technique to estimate CAC value.

Adjusted R-square and efficiency range

Table 7 shows that our model specifications increase adjusted R square relative to Ofwat's specifications, by a minimum 0.1% up to 1.4%.

Table 12: Adjusted R-squared with regional wages variable

	Ofwat PR24 specification	With addition of regional wages variable
TWD1	0.955	0.969
TWD2	0.952	0.966
TWD3	0.958	0.969
TWD4	0.961	0.964
TWD5	0.965	0.967
TWD6	0.966	0.967

In addition, with inclusion of regional wages the efficiency range narrows in models TWD1-TWD5 to a more plausible range. It remains practically the same in model TWD6.

Table 13: Efficiency range with regional wages variable

	Ofwat PR24 specification	With addition of regional wages variable
TWD1	0.605	0.441
TWD2	0.675	0.556
TWD3	0.641	0.514
TWD4	0.593	0.554
TWD5	0.610	0.478
TWD6	0.536	0.540

Value of estimator & Statistical significance.

Ofwat expects that coefficients on regional wages should be less than 1.00, so that a 1% increase in wage costs would lead to less than 1% increase in total costs. Of the six models we estimated, our coefficient estimates are distributed around 1.00, (max 1.29

and min 0.80), and we acknowledge that this is higher than might be expected. That said the coefficient estimators are statistically significant at 99% level in 3 cases, at 90% level in another case, and marginally below 90% in two others, so it would be unsafe to simply ignore the variable in cost assessments. Further, as we triangulate this econometric approach with two other approaches, we are mitigating the effect of a higher than expected coefficient estimate.

Table 14: Summary of coefficients and p-values for regional wages estimators

	Coefficient on (log) Regional Wage Estimator	P-value
TWD1 + Reg Wages	1.291	0.0007***
TWD2 + Reg Wages	1.248	0.0029***
TWD3 + Reg Wages	1.149	0.0012***
TWD4 + Reg. Wages	1.003	0.0602*
TWD5 + Reg. Wages	0.880	0.1017
TWD6 + Reg. Wages	0.803	0.1287

Cost efficiency

a) Is there compelling evidence that the cost estimates are efficient (for example similar scheme outturn data, industry and/or external cost benchmarking, testing a range of cost models)?

As we apply the same efficiency challenge on our modelling results as Ofwat would, (as described in section g) above), this ensures that the adjustment represents efficient costs. We have not applied frontier shift as the business plan table requires submission of claims prior to adjustment for frontier shift and real price effects.

We have tested our CAC results against a similar adjustment made in the electricity distribution industry. Table 10 below shows the regional adjustments determined by Ofgem[15] for electricity distributors in its RIIO-ED2 draft determinations, which were carried forward unchanged in the final determination. Ofgem decided that labour cost adjustments were necessary in 3 DNO regions, and used the factors to pre-adjust cost data, prior to econometric modelling. We found that our proposed uplift to treated water distribution costs for regional wages (around 7% of TWD costs and 4% of N+), plausible against external regulatory adjustments made for the Eastern, London and Southern DNO areas.

Table 15: Ofgem Table 88 Regional Labour Indices (2017-2021) DNO Indices

Distribution Network Operator	Regional labour adjustment factor
ENWL	1.00
NPgN	1.00
NPgY	1.00

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[15] RIIO-ED2 Draft Determinations Core Methodology (1).pdf

WMID	1.00
EMID	1.00
SWALES	1.00
SWEST	1.00
LPN	1.24
SPN	1.10
EPN	1.06
SPD	1.00
SPMW	1.00
SSEH	1.00
SSES	1.00

Ofgem made similar adjustments in its December 2020 GD2 determination[16], in the East of England, London and Southern areas. Our proposed regional wage adjustment is of similar size to the ranges determined for gas distribution in 2020.

Table 16: Ofgem GD2 Regional Labour Indices

Gas Distribution Network Operator	Regional labour adjustment factor
EOE	1.01
LON	1.18
NW	1.00
WMID	1.00
NGN	1.00
SC	1.00
SO	1.10
WWU	1.00

As noted in g) above, we tested 6 variations of treated water botex models to inform our estimates. This shows that we have tested a range of cost models and triangulated between them to produce our results.

b) Does the company clearly explain how it arrived at the cost estimate? Can the analysis be replicated? Is there supporting evidence for any key statements or assumptions?

We have explained our econometric and pre-adjustment of data approaches to estimating in cost adjustment claims in section g) above. In order that Ofwat may assess our claim, and as necessary replicate our results, we attach supporting data files setting out our data, calculations and econometric estimation results files. The index to supporting files is given below.

Table 17: Index of supporting files

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[16]https://www.ofgem.gov.uk/sites/default/files/docs/2020/12/final_determinations_technical_annexes_part_two.zip

File	Contents
CAC PR24-Cost-Assessment-Master-Dataset-Wholesale-Water-Base-Costs-v4.xls	Dataset used in our econometric models plus support for some of the tables and charts in this report
Gross Earnings Dataset (Weekly Wages).xlsx	Excel spreadsheet showing the construction of our regional wages variable from ASHE source data
TWD1 Regression Results.rtf	Random Effects estimation of Ofwat's specification
TWD1 Fitted.rtf	Actual, fitted values and residuals for above
TWD1 + GWW Regression Results.rtf	RE estimation of Ofwat's specification with the addition of the log(Gross Weekly Wage) variable
TWD1 + GWW Fitted.rtf	Actual, fitted values and residuals for above
TWD1 Adj.rtf	RE estimation of Ofwat's specification with adjusted dependent variable, removing regional wages effect on expenditure, used to estimate implicit allowance
TWD1 Adj Fitted.rtf	Actual, fitted values and residuals for above
We use the same file naming convention for models TWD2, TWD3, TWD4, TWD5 and TWD6	

c) Does the company provide third party assurance for the robustness of the cost estimates?

We appointed external experts to review our regional wages cost adjustment claim and provide critical assessment. Our reviewers suggested a number of refinements and extensions to our analysis. We have been able to address these observations for our final business plan.

Symmetrical Cost adjustment Claims

In our June early submission we presented an initial assessment of symmetrical adjustment, but this result deviated from a near zero sum outcome that would be expected. We indicated that we would further develop our calculation to address this and present our updated assessment below.

Our approach to calculating symmetrical adjustments was

1) Calculate the post-catch-up cost adjustment claim for each company, by triangulating equally between our three estimation methods i) addition of

regional wages variable ii) estimation of cost functions based on pre-adjusted costs, and iii) proportion of labour costs.

2) Subtract the implicit allowance from the claim value reached in 3) above, to reach a net CAC value for each company.

3) The result from 2) yields the symmetrical adjustments across the industry, that we analyse to determine its fit with a zero-sum outcome

As seen in the table, our revised symmetrical adjustments sum to near zero.

Table 17: Summary of Symmetrical Adjustments £m 2022/23p

	Post efficiency CAC method 1 - £m	Post efficiency CAC method 2 - £m	Post efficiency CAC method 3 - £m	Triangulated - £m	Implicit Allowance - £m	Symmetrical Adjustment £m
ANH	88.7	22.2	-13.2	32.6	35.3	67.8
NES	-0.3	-5.1	-10.3	-5.2	6.0	0.8
NWT	-31.3	-17.2	-29.5	-26.0	12.9	-13.1
SRN	-8.2	-5.5	-4.4	-6.1	-1.0	-7.0
SWB	-30.7	-10.0	-24.3	-21.7	12.0	-9.7
TMS	-15.1	0.5	268.8	84.7	-223.0	-138.3
WSH	10.0	-9.0	-28.9	-9.3	30.5	21.2
WSX	8.3	-0.7	-10.2	-0.9	11.4	10.5
YKY	-15.3	-18.5	-28.4	-20.7	19.3	-1.4
AFW	85.7	30.3	36.4	50.8	-8.6	42.2
BRL	-8.5	-5.0	-1.8	-5.1	-2.2	-7.3
PRT	-6.7	-2.9	0.2	-3.1	-3.5	-6.6
SES	15.0	4.5	7.3	8.9	-2.4	6.5
SEW	89.7	27.7	18.3	45.2	9.7	55.0
SSC	-9.0	-5.1	-1.6	-5.2	-3.9	-9.1
SVE	-48.1	-26.3	-36.2	-36.9	13.9	-23.0
HDD	1.0	-0.2	-1.9	-0.4	2.0	1.6
Total	**125**	**-20**	**140**	**82**	**-92**	**-10**

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Appendix A

Econometric Results – Ofwat PR24 specifications and with addition of regional wages variable

	Ofwat PR24 Specifications						Ofwat PR24 with regional wages variable					
	TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	TWD1+RW	TWD2+RW	TWD3+RW	TWD4+RW	TWD5+RW	TWD6+RW
Dependent Variable	I_BotexNR_TWD	I_BotexNR_TWD	I_BotexNR_TWD	I_BotexNR_TWD	I_BotexNR_TWD	I_BotexNR_TWD	I_BotexNR_TWD	I_BotexNR_TWD	I_BotexNR_TWD	I_BotexNR_TWD	I_BotexNR_TWD	I_BotexNR_TWD
const	4.321	15.809	25.227	2.158	16.749	26.298	-6.430	3.072	9.483	-5.777	8.867	16.738
	0.01***	0.00***	0.00***	0.180	0.00***	0.00***	0.03***	0.460	0.05*	0.230	0.240	0.04**
I_lengthsofmain	1.070	1.026	1.072	1.062	1.017	1.045	1.089	1.060	1.088	1.079	1.044	1.057
	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
I_boosterperlength	0.461	0.433	0.489				0.516	0.465	0.526			
	0.00***	0.00***	0.00***				0.00***	0.00***	0.00***			
I_mhdAveragepumpingheadadistr				0.357	0.411	0.357				0.308	0.351	0.305
				0.00***	0.00***	0.00***				0.00***	0.00***	0.00***
I_WADLADfromMSOAwater	-2.729			-2.975			-1.916			-2.447		
	0.00***			0.00***			0.00***			0.00***		
sq_I_WADLADfromMSOAwater	0.219			0.229			0.154			0.185		
	0.00***			0.00***			0.00***			0.00***		
I_WADMSOAwaterpopulation		-5.562			-6.541			-4.211			-5.831	
		0.00***			0.00***			0.00***			0.00***	
sq_I_WADMSOAwaterpopulation		0.393			0.445			0.294			0.391	
		0.00***			0.00***			0.00***			0.00***	
I_density			-14.919			-16.625			-10.650			-14.257
			0.00***			0.00***			0.00***			0.00***
sq_I_density			1.898			2.055			1.357			1.748
			0.00***			0.00***			0.00***			0.00***
I_GrossWeeklyRegionalWagesRea							1.296	1.248	1.149	1.003	0.881	0.803
							0.00***	0.00***	0.00***	0.06*	0.100	0.130
Adjusted R-square	0.955	0.952	0.958	0.961	0.965	0.966	0.969	0.966	0.969	0.964	0.967	0.967
Efficiency Range	0.605	0.675	0.641	0.593	0.610	0.536	0.441	0.566	0.514	0.554	0.478	0.540

Appendix B

Affinity Water calculation of regional wages by company area, based on ASHE series

	Real (2022/23p) Mean Weekly Wage - £/week Gross - All employees - By Water Company Area												
	2011-12	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**2023-24**
ANH	609	616	600	601	601	620	624	628	628	651	658	-	-
HDD	555	582	554	557	571	587	591	606	610	595	643	-	-
NES	615	614	602	609	624	623	625	632	620	639	646	-	-
NWT	587	588	583	579	596	598	604	614	606	621	630	-	-
SRN	622	613	612	612	622	634	633	641	628	648	649	-	-
SVE	600	601	584	585	606	611	603	618	607	613	639	-	-
SWB	556	545	536	534	562	559	553	566	549	571	584	-	-
TMS	820	801	785	781	799	823	826	835	824	813	838	-	-
WSH	557	562	553	560	580	576	571	584	574	590	604	-	-
WSX	584	581	568	579	590	583	601	598	583	607	628	-	-
YKY	577	570	561	561	576	582	587	598	590	609	617	-	-
AFW	740	740	719	713	736	744	760	752	751	756	767	-	-
BRL	620	615	615	611	628	621	625	634	631	645	666	-	-
PRT	649	633	639	640	662	707	678	658	648	668	674	-	-
SES	833	792	773	757	790	785	805	794	734	797	789	-	-
SEW	736	722	717	717	723	734	723	742	729	747	741	-	-
SSC	609	607	590	600	631	635	662	644	634	667	650	-	-

Summary of Results - Adding a Regional Wages Variable

Table 1   **Treated Water Distribution Models - Affinity Water**

	a					b	
	AFW Actual Costs	Ofwat PR24 Predicted Costs Post Efficiency	Catch-up efficiency (TWD UQ)	Predicted costs incl. Regional Wages variable Post Efficiency	Difference = gross CAC	As Ofwat but with pre-adjusted costs	Difference b - a = implicit allowance
	£m 2022/3p	£m 2022/3p	n	£m 2022/3p	£m 2022/3p	£m 2022/3p	£m 2022/3p
2011-12	152.7	118.5	0.9949	133.6	15.1	117.5	
2012-13	155.6	118.9	0.9949	133.9	15.1	117.9	
2013-14	147.3	119.7	0.9949	130.4	10.8	118.6	
2014-15	150.5	120.4	0.9949	129.8	9.4	119.2	
2015-16	128.9	121.9	0.9949	135.5	13.6	120.5	
2016-17	171.9	123.0	0.9949	137.9	14.9	121.6	
2017-18	151.8	124.0	0.9949	142.0	18.0	122.5	1.5
2018-19	154.6	124.0	0.9949	140.5	16.5	122.5	1.5
2019-20	134.0	125.7	0.9949	141.2	15.5	123.9	1.8
2020-21	155.2	130.6	0.9949	147.2	16.6	128.7	2.0
2021-22	171.0	128.6	0.9949	147.7	19.0	126.8	1.9
5yr total	766.7	632.9		718.6	85.7	624.3	8.6

Table 2   **Treated Water Distribution Models - Industry**

	a					b	
	AFW Actual Costs	Ofwat PR24 Predicted Costs	Catch-up efficiency (TWD UQ)	Predicted costs incl. Regional Wages varaible	Difference = gross CAC	As Ofwat but with pre-adjusted costs	Difference b - a = implicit allowance
	£m 2022/3p	£m 2022/3p	n	£m 2022/3p	£m 2022/3p	£m 2022/3p	£m 2022/3p
ANH	1116	871	0.9949	959	89	906	-35
NES	751	720	0.9949	720	0	726	-6
NWT	1151	1231	1.0000	1200	-31	1244	-13
SRN	448	459	1.0000	451	-8	458	1
SWB	352	457	1.0000	426	-31	469	-12
TMS	2835	2709	0.9949	2694	-15	2486	223
WSH	831	699	0.9949	708	10	729	-30
WSX	356	324	0.9949	332	8	335	-11
YKY	1057	886	0.9949	871	-15	905	-19
AFW	767	633	0.9949	719	86	624	9
BRL	278	224	0.9949	215	-9	221	2
PRT	91	107	1.0000	100	-7	103	4
SES	115	103	0.9949	118	15	101	2
SEW	429	382	0.9949	472	90	392	-10
SSC	325	288	0.9949	279	-9	285	4
SVE	1596	1590	1.0000	1542	-48	1604	-14
HDD	77	73	0.9949	74	1	75	-2
Total	12576	11755		11880	125	11664	92

Summary of Results - Pre-adjustment of costs approach

Table 1   **Treated Water Distribution Models - Affinity Water**

	a			b		c		b-a
	AFW Actual Costs	Ofwat PR24 Predicted Costs	Catch-up efficiency (TWD UQ)	As Ofwat but with pre-adjusted costs	Add back Adjustments	As Ofwat but with pre-adjusted costs + add back	Difference c - a = Gross CAC	Implicit Allowance
	£m 2022/3p	£m 2022/3p	n	£m 2022/3p	£m 2022/3p	£m 2022/3p	£m 2022/3p	£m 2022/3p
2011-12	152.7	118.5	0.9949	117.5		125.5		
2012-13	155.6	118.9	0.9949	117.9		126.5		
2013-14	147.3	119.7	0.9949	118.6		126.2		
2014-15	150.5	120.4	0.9949	119.2		126.5		
2015-16	128.9	121.9	0.9949	120.5		126.9		
2016-17	171.9	123.0	0.9949	121.6		130.0		
2017-18	151.8	124.0	0.9949	122.5	8.3	130.8	6.8	-1.5
2018-19	154.6	124.0	0.9949	122.5	7.6	130.1	6.1	-1.5
2019-20	134.0	125.7	0.9949	123.9	7.3	131.2	5.6	-1.8
2020-21	155.2	130.6	0.9949	128.7	7.5	136.2	5.5	-2.0
2021-22	171.0	128.6	0.9949	126.8	8.2	134.9	6.3	-1.9
5yr total	766.7	632.9		624.3	39.0	663.3	30.3	-8.6

Table 2   **Treated Water Distribution Models - Industry**

	a			b		c		b-a
	Actual Costs	Ofwat PR24 Predicted Costs	Catch-up efficiency (TWD UQ)	As Ofwat but with pre-adjusted costs	Add back Adjustments	As Ofwat but with pre-adjusted costs + add back	Difference c - a = Gross CAC	Implicit Allowance
	£m 2022/3p	£m 2022/3p	n	£m 2022/3p	£m 2022/3p	£m 2022/3p	£m 2022/3p	£m 2022/3p
ANH	1116	871	0.9949	906	-13	893	22	-35
NES	751	720	0.9949	726	-11	715	-5	-6
NWT	1151	1231	1.0000	1244	-30	1214	-17	-13
SRN	448	459	1.0000	458	-5	453	-6	1
SWB	352	457	1.0000	469	-22	447	-10	-12
TMS	2835	2709	0.9949	2486	225	2711	2	223
WSH	831	699	0.9949	729	-40	689	-9	-30
WSX	356	324	0.9949	335	-12	323	-1	-11
YKY	1057	886	0.9949	905	-38	867	-19	-19
AFW	767	633	0.9949	624	39	663	30	9
BRL	278	224	0.9949	221	-3	219	-5	2
PRT	91	107	1.0000	103	1	104	-3	4
SES	115	103	0.9949	101	7	108	5	2
SEW	429	382	0.9949	392	18	410	28	-10
SSC	325	288	0.9949	285	-1	283	-5	4
SVE	1596	1590	1.0000	1604	-40	1564	-26	-14
HDD	77	73	0.9949	75	-2	73	0	-2
Total	12576	11755		11664	72	11736	-20	92

Summary of Results - Pre-adjustment of costs approach

Table 1

	Ofwat PR24 Predicted Costs £m	Catch-up effiency to TWD UQ	Post Efficiency Botex £m	Proportion (38.6%) labour cost £m	Regional Wage Premium %	Post efficiency Botex uniform wage	CAC estimate £m
ANH	871	0.995	866	334	-2.6%	857	-8.7
NES	724	0.995	720	278	-3.7%	710	-10.3
NWT	1231	1.000	1231	475	-6.2%	1202	-29.5
SRN	459	1.000	459	177	-2.5%	454	-4.4
SWB	457	1.000	457	176	-13.8%	432	-24.3
TMS	2723	0.995	2709	1046	25.7%	2978	268.8
WSH	702	0.995	699	270	-10.7%	670	-28.9
WSX	325	0.995	324	125	-8.2%	313	-10.2
YKY	891	0.995	886	342	-8.3%	858	-28.4
AFW	636	0.995	633	244	14.9%	669	36.4
BRL	225	0.995	224	86	-2.1%	222	-1.8
PRT	107	1.000	107	41	0.6%	107	0.2
SES	104	0.995	103	40	18.3%	111	7.3
SEW	384	0.995	382	147	12.4%	400	18.3
SSC	290	0.995	288	111	-1.4%	287	-1.6
SVE	1590	1.000	1590	614	-5.9%	1554	-36.2
HDD	74	0.995	73	28	-6.8%	71	-1.9
Total	11792		11751	4536	-0.3%	11896	144.8

Calculation of Implicit Allowances and Symmetrical Adjustments

	£m 22/23p	Dec	£m 22/23p	£m 22/23p	Dec	£m 22/23p	£m 22/23p	£m 22/23p	Dec	£m 22/23p	£m 22/23p	£m 22/23p	Dec	£m 22/23p	£m 22/23p	£m 22/23p	£m 22/23p	£m 22/23p	£m 22/23p	£m 22/23p	£m 22/23p	£m 22/23p	£m 22/23p
	Ofwat Predicted Costs	Catch-up Eff.	Post-Eff	Predicted Costs With Adj Costs	Catch-up Eff.	Post Eff	Impl.All	Predicted Costs With Reg Wage Variable	Catch-up Eff.	Post Eff	CAC(1)	With Add back Adj	Catch-up Eff.	Post Eff	CAC(2)	Post Eff.	CAC(3)	CAC(1)	CAC(2)	CAC(3)	Triangulated	Implicit Allowance	Symmetrical Adjustments
ANH	875.1	0.9949	870.6	911	0.995	906	35.3	964	0.995	959	88.7	897	0.995	893	22.2	857	-13.2	88.7	22.2	-13.2	32.6	35.3	67.8
NES	723.8	0.995	720.1	730	0.995	726	6.0	723	0.995	720	-0.3	719	0.995	715	-5.1	710	-10.3	-0.3	-5.1	-10.3	-5.2	6.0	0.8
NWT	1231.3	1.000	1231.3	1244	1.000	1244	12.9	1200	1.000	1200	-31.3	1214	1.000	1214	-17.2	1202	-29.5	-31.3	-17.2	-29.5	-26.0	12.9	-13.1
SRN	458.9	1.000	458.9	458	1.000	458	-1.0	451	1.000	451	-8.2	453	1.000	453	-5.5	454	-4.4	-8.2	-5.5	-4.4	-6.1	-1.0	-7.0
SWB	456.6	1.000	456.6	469	1.000	469	12.0	426	1.000	426	-30.7	447	1.000	447	-10.0	432	-24.3	-30.7	-10.0	-24.3	-21.7	12.0	-9.7
TMS	2723.3	0.995	2709.3	2499	0.995	2486	-223.0	2708	0.995	2694	-15.1	2724	0.995	2710	0.5	2978	268.8	-15.1	0.5	268.8	84.7	-223.0	-138.3
WSH	702.1	0.995	698.5	733	0.995	729	30.5	712	0.995	708	10.0	693	0.995	690	-9.0	670	-28.9	10.0	-9.0	-28.9	-9.3	30.5	21.2
WSX	325.3	0.995	323.6	337	0.995	335	11.4	334	0.995	332	8.3	325	0.995	323	-0.7	313	-10.2	8.3	-0.7	-10.2	-0.9	11.4	10.5
YKY	890.6	0.995	886.0	910	0.995	905	19.3	875	0.995	871	-15.3	872	0.995	868	-18.5	858	-28.4	-15.3	-18.5	-28.4	-20.7	19.3	-1.4
AFW	636.2	0.995	632.9	627	0.995	624	-8.6	722	0.995	719	85.7	666	0.995	663	30.1	669	36.4	85.7	30.1	36.4	50.7	-8.6	42.1
BRL	224.9	0.995	223.7	223	0.995	221	-2.2	216	0.995	215	-8.5	220	0.995	219	-5.0	222	-1.8	-8.5	-5.0	-1.8	-5.1	-2.2	-7.3
PRT	106.7	1.000	106.7	103	1.000	103	-3.5	100	1.000	100	-6.7	104	1.000	104	-2.9	107	0.2	-6.7	-2.9	0.2	-3.1	-3.5	-6.6
SES	103.8	0.995	103.3	101	0.995	101	-2.4	119	0.995	118	15.0	108	0.995	108	4.5	111	7.3	15.0	4.5	7.3	8.9	-2.4	6.5
SEW	384.1	0.995	382.1	394	0.995	392	9.7	474	0.995	472	89.7	412	0.995	410	27.7	400	18.3	89.7	27.7	18.3	45.2	9.7	55.0
SSC	289.9	0.995	288.5	286	0.995	285	-3.9	281	0.995	279	-9.0	285	0.995	283	-5.1	287	-1.6	-9.0	-5.1	-1.6	-5.2	-3.9	-9.1
SVE	1590.3	1.000	1590.3	1604	1.000	1604	13.9	1542	1.000	1542	-48.1	1564	1.000	1564	-26.3	1554	-36.2	-48.1	-26.3	-36.2	-36.9	13.9	-23.0
HDD	73.6	0.995	73.2	76	0.995	75	2.0	75	0.995	74	1.0	73	0.995	73	-0.2	71	-1.9	1.0	-0.2	-1.9	-0.4	2.0	1.6
Total	11796		11755	11704		11664	-92	11923		11880	124.9	11776		11735	-20.4	11896	140.3	124.9	-20.4	140.3	81.6	-92	-10

	Ofwat PR24 Specifications						Ofwat PR24 with adj costs @ 38% labour share					
	TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	TWD1+RW	TWD2+RW	TWD3+RW	TWD4+RW	TWD5+RW	TWD6+RW
Dependent Variable	l_BotexNR_TWD	l_BotexNR_TWD	l_BotexNR_TWD	l_BotexNR_TWD	l_BotexNR_TWD	l_BotexNR_TWD	l_BotexNR_TWD Adj.	l_BotexNR_TWD Adj.	l_BotexNR_TWD Adj.	l_BotexNR_TWD Adj.	l_BotexNR_TWD Adj.	l_BotexNR_TWD Adj.
const	4.321 0.01***	15.809 0.00***	25.227 0.00***	2.158 0.180	16.749 0.00***	26.298 0.00***	3.621 0.0078***	14.484 0.0015***	22.923 0.00***	1.663 0.289	16.000 0.000***	24.682 0.000***
l_lengthsofmain	1.070 0.00***	1.026 0.00***	1.072 0.00***	1.062 0.00***	1.017 0.00***	1.045 0.00***	1.076 0.00***	1.036 0.00***	1.078 0.00***	1.069 0.00***	1.029 0.00***	1.052 0.0000***
l_boosterperlength	0.461 0.00***	0.433 0.00***	0.489 0.00***				0.478 0.0002***	0.446 0.00***	0.502 0.000***			
l_mhdAveragepumpingheadadistr				0.357 0.00***	0.411 0.00***	0.357 0.00***				0.344 0.00***	0.392 0.00***	0.338 0.00***
l_WADLADfromMSOAwater	-2.729 0.00***			-2.975 0.00***			-2.502 0.00***			-2.802 0.00***		
sq_l_WADLADfromMSOAwater	0.219 0.00***			0.229 0.00***			0.201 0.00***			0.214 0.00***		
l_WADMSOAwaterpopulation		-5.562 0.00***			-6.541 0.00***			-5.177 0.00***			-6.297 0.00***	
sq_l_WADMSOAwaterpopulation		0.393 0.00***			0.445 0.00***			0.365 0.00***			0.426 0.00***	
l_density			-14.919 0.00***			-16.625 0.00***			-13.722 0.00***			-15.739 0.00***
sq_l_density			1.898 0.00***			2.055 0.00***			1.745 0.00***			1.938 0.00***
l_GrossWeeklyRegionalWagesRea												
Adjusted R-square	0.955	0.952	0.958	0.961	0.965	0.966	0.961	0.958	0.963	0.963	0.966	0.967
Efficiency Range	0.605	0.675	0.641	0.593	0.610	0.536	0.580	0.647	0.578	0.593	0.635	0.563

				Ofwat PR24 Specifications								Ofwat PR24 with addition of Regional Wages Variable							
Company		Index	Actual	TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	Pred	Actual	TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	Pred	Actual
				Fitted	Fitted	Fitted	Fitted	Fitted	Fitted	£m	£m	Fitted	Fitted	Fitted	Fitted	Fitted	Fitted	£m	£m
			l_BotexNR_TWD																
ANH	2011-12	01:01	5.071	5.028	5.042	5.027	5.237	5.220	5.235	170.1	159.3	5.071	5.103	5.069	5.295	5.277	5.279	179.0	159.3
ANH	2012-13	01:02	5.187	5.037	5.053	5.037	5.238	5.222	5.236	171.0	178.9	5.094	5.126	5.091	5.306	5.288	5.289	181.9	178.9
ANH	2013-14	01:03	5.113	5.038	5.056	5.040	5.237	5.222	5.235	171.2	166.1	5.061	5.096	5.063	5.279	5.264	5.267	177.1	166.1
ANH	2014-15	01:04	5.175	5.040	5.060	5.044	5.235	5.221	5.233	171.3	176.8	5.065	5.101	5.069	5.279	5.264	5.266	177.4	176.8
ANH	2015-16	01:05	5.033	5.048	5.072	5.054	5.235	5.223	5.234	172.1	153.4	5.074	5.112	5.080	5.279	5.265	5.266	178.3	153.4
ANH	2016-17	01:06	5.176	5.060	5.086	5.066	5.236	5.225	5.236	173.3	176.9	5.128	5.165	5.128	5.312	5.295	5.294	185.6	176.9
ANH	2017-18	01:07	5.413	5.066	5.093	5.078	5.240	5.230	5.239	174.3	224.2	5.141	5.178	5.145	5.321	5.304	5.300	187.6	224.2
ANH	2018-19	01:08	5.483	5.068	5.096	5.083	5.248	5.238	5.247	175.3	240.7	5.152	5.189	5.157	5.335	5.317	5.312	189.9	240.7
ANH	2019-20	01:09	5.498	5.061	5.089	5.079	5.250	5.240	5.250	175.1	244.3	5.144	5.182	5.151	5.338	5.319	5.314	189.6	244.3
ANH	2020-21	01:10	5.317	5.078	5.106	5.094	5.242	5.231	5.241	175.6	203.7	5.209	5.244	5.210	5.366	5.343	5.336	197.7	203.7
ANH	2021-22	01:11	5.314	5.085	5.112	5.103	5.229	5.216	5.228	174.9	203.2	5.231	5.264	5.231	5.366	5.340	5.334	199.5	203.2
NES	2011-12	02:01	4.903	4.919	4.927	4.982	4.859	4.849	4.909	135.4	134.7	4.884	4.893	4.936	4.852	4.846	4.894	132.2	134.7
NES	2012-13	02:02	4.863	4.939	4.949	4.962	4.857	4.843	4.875	135.0	129.4	4.901	4.911	4.924	4.853	4.844	4.872	132.2	129.4
NES	2013-14	02:03	4.835	4.950	4.960	4.960	4.928	4.922	4.936	140.2	125.8	4.883	4.895	4.900	4.894	4.894	4.909	133.7	125.8
NES	2014-15	02:04	4.709	4.959	4.970	4.967	4.941	4.937	4.947	141.7	111.0	4.905	4.917	4.919	4.917	4.917	4.928	136.6	111.0
NES	2015-16	02:05	4.751	4.967	4.979	4.981	4.969	4.968	4.980	144.6	115.7	4.943	4.954	4.957	4.965	4.964	4.975	142.6	115.7
NES	2016-17	02:06	4.816	4.978	4.992	4.994	4.959	4.957	4.971	144.8	123.5	4.950	4.963	4.967	4.954	4.953	4.965	142.4	123.5
NES	2017-18	02:07	4.991	4.987	5.002	4.991	4.925	4.918	4.927	142.5	147.1	4.963	4.976	4.970	4.929	4.923	4.933	141.1	147.1
NES	2018-19	02:08	5.120	4.997	5.013	4.998	4.968	4.967	4.968	146.3	167.4	4.985	4.998	4.989	4.976	4.974	4.976	145.9	167.4
NES	2019-20	02:09	5.072	5.004	5.020	5.006	4.971	4.969	4.972	147.0	159.5	4.967	4.981	4.974	4.961	4.960	4.965	143.7	159.5
NES	2020-21	02:10	4.917	4.998	5.016	5.003	4.942	4.936	4.945	144.6	136.6	4.997	5.012	5.002	4.965	4.958	4.966	146.0	136.6
NES	2021-22	02:11	4.948	4.995	5.013	5.001	4.930	4.921	4.934	143.5	140.9	5.008	5.022	5.013	4.967	4.956	4.967	146.8	140.9
NWT	2011-12	03:01	5.149	5.480	5.449	5.465	5.365	5.304	5.344	222.1	172.2	5.378	5.363	5.379	5.320	5.282	5.316	208.6	172.2
NWT	2012-13	03:02	5.141	5.485	5.454	5.469	5.402	5.346	5.380	226.7	170.9	5.382	5.369	5.384	5.353	5.318	5.348	212.5	170.9
NWT	2013-14	03:03	5.419	5.490	5.459	5.477	5.399	5.343	5.380	227.3	225.7	5.376	5.363	5.382	5.342	5.308	5.341	211.0	225.7
NWT	2014-15	03:04	5.138	5.502	5.472	5.488	5.411	5.357	5.391	230.0	170.5	5.380	5.367	5.385	5.346	5.314	5.345	212.0	170.5
NWT	2015-16	03:05	5.347	5.532	5.504	5.519	5.456	5.409	5.435	239.1	210.0	5.449	5.433	5.450	5.414	5.384	5.407	226.6	210.0
NWT	2016-17	03:06	5.477	5.544	5.519	5.528	5.404	5.351	5.380	234.4	239.1	5.463	5.450	5.461	5.371	5.336	5.362	223.3	239.1
NWT	2017-18	03:07	5.337	5.550	5.528	5.537	5.481	5.440	5.459	244.6	208.0	5.480	5.469	5.480	5.448	5.422	5.437	234.2	208.0
NWT	2018-19	03:08	5.440	5.556	5.537	5.552	5.444	5.400	5.429	241.9	230.4	5.507	5.496	5.511	5.432	5.401	5.425	235.8	230.4
NWT	2019-20	03:09	5.491	5.563	5.547	5.565	5.471	5.432	5.461	246.6	242.5	5.496	5.488	5.506	5.443	5.417	5.441	236.5	242.5
NWT	2020-21	03:10	5.435	5.574	5.562	5.582	5.456	5.418	5.450	247.0	229.4	5.539	5.533	5.550	5.455	5.427	5.452	243.2	229.4
NWT	2021-22	03:11	5.485	5.577	5.565	5.589	5.484	5.450	5.482	251.1	241.1	5.559	5.552	5.571	5.494	5.467	5.491	250.4	241.1
SRN	2011-12	04:01	4.593	4.481	4.590	4.487	4.292	4.383	4.300	83.8	98.8	4.457	4.522	4.464	4.273	4.342	4.288	81.1	98.8
SRN	2012-13	04:02	4.328	4.488	4.600	4.493	4.312	4.408	4.319	84.9	75.8	4.441	4.509	4.450	4.274	4.349	4.292	80.6	75.8
SRN	2013-14	04:03	4.201	4.492	4.611	4.504	4.324	4.425	4.335	85.9	66.8	4.443	4.515	4.457	4.282	4.362	4.304	81.2	66.8
SRN	2014-15	04:04	4.038	4.499	4.623	4.509	4.320	4.424	4.331	86.2	56.7	4.449	4.524	4.462	4.280	4.361	4.301	81.5	56.7
SRN	2015-16	04:05	4.095	4.508	4.636	4.516	4.320	4.426	4.328	86.7	60.1	4.477	4.555	4.486	4.295	4.377	4.312	83.2	60.1
SRN	2016-17	04:06	4.339	4.517	4.648	4.529	4.342	4.454	4.354	88.2	76.6	4.508	4.587	4.518	4.334	4.417	4.349	86.2	76.6
SRN	2017-18	04:07	4.436	4.521	4.653	4.542	4.353	4.467	4.372	89.1	84.5	4.508	4.588	4.524	4.340	4.426	4.362	86.7	84.5
SRN	2018-19	04:08	4.480	4.525	4.660	4.556	4.363	4.479	4.389	90.1	88.2	4.529	4.610	4.551	4.362	4.448	4.387	88.7	88.2
SRN	2019-20	04:09	4.541	4.570	4.703	4.611	4.372	4.490	4.404	92.9	93.8	4.552	4.630	4.583	4.349	4.439	4.382	89.6	93.8
SRN	2020-21	04:10	4.470	4.554	4.689	4.598	4.393	4.515	4.429	93.2	87.4	4.575	4.654	4.604	4.400	4.489	4.429	92.7	87.4
SRN	2021-22	04:11	4.543	4.549	4.685	4.617	4.392	4.516	4.447	93.6	94.0	4.573	4.652	4.619	4.399	4.489	4.443	93.1	94.0
SVT	2011-12	05:01	5.592	5.778	5.659	5.679	5.769	5.682	5.673	301.2	268.4	5.714	5.629	5.650	5.705	5.649	5.639	288.5	268.4
SVT	2012-13	05:02	5.720	5.787	5.669	5.686	5.789	5.705	5.691	305.7	304.8	5.723	5.638	5.657	5.724	5.669	5.655	292.4	304.8
SVT	2013-14	05:03	5.680	5.794	5.677	5.696	5.773	5.687	5.677	304.4	292.8	5.693	5.610	5.633	5.682	5.628	5.620	282.8	292.8
SVT	2014-15	05:04	5.734	5.800	5.684	5.702	5.790	5.706	5.693	308.1	309.3	5.699	5.617	5.639	5.698	5.646	5.635	286.1	309.3
SVT	2015-16	05:05	5.501	5.810	5.696	5.710	5.795	5.711	5.696	310.3	245.1	5.752	5.669	5.686	5.737	5.681	5.666	298.6	245.1
SVT	2016-17	05:06	5.480	5.815	5.704	5.723	5.793	5.709	5.701	311.6	239.9	5.765	5.684	5.704	5.743	5.685	5.676	301.9	239.9
SVT	2017-18	05:07	5.641	5.819	5.711	5.731	5.816	5.736	5.726	316.6	281.9	5.749	5.671	5.693	5.748	5.696	5.686	301.1	281.9
	2018-19	05:08																	
	2019-20	05:09																	

Company	Year	Index	Actual I_BotexNR_TWD	TWD1 Fitted	TWD2 Fitted	TWD3 Fitted	TWD4 Fitted	TWD5 Fitted	TWD6 Fitted	Pred £m	Actual £m	TWD1 Fitted	TWD2 Fitted	TWD3 Fitted	TWD4 Fitted	TWD5 Fitted	TWD6 Fitted	Pred £m	Actual £m
						Ofwat PR24 Specifications								Ofwat PR24 with addition of Regional Wages Variable					
	2020-21	05:10																	
	2021-22	05:11																	
SWB	2011-12	06:01	4.343	4.458	4.449	4.351	4.530	4.545	4.505	87.8	76.9	4.349	4.354	4.286	4.441	4.473	4.460	81.1	76.9
SWB	2012-13	06:02	4.145	4.462	4.453	4.353	4.524	4.538	4.497	87.6	63.1	4.325	4.330	4.263	4.414	4.448	4.436	79.2	63.1
SWB	2013-14	06:03	4.229	4.465	4.459	4.356	4.537	4.553	4.508	88.4	68.7	4.308	4.316	4.248	4.410	4.447	4.433	78.5	68.7
SWB	2014-15	06:04	4.249	4.470	4.464	4.359	4.541	4.557	4.509	88.7	70.0	4.306	4.314	4.245	4.409	4.446	4.430	78.3	70.0
SWB	2015-16	06:05	4.121	4.476	4.469	4.364	4.541	4.556	4.508	88.9	61.6	4.378	4.383	4.310	4.461	4.491	4.470	82.9	61.6
SWB	2016-17	06:06	4.184	4.487	4.481	4.378	4.557	4.574	4.522	90.2	65.6	4.382	4.387	4.317	4.469	4.501	4.477	83.4	65.6
SWB	2017-18	06:07	4.141	4.496	4.491	4.390	4.551	4.567	4.515	90.3	62.9	4.377	4.383	4.316	4.453	4.485	4.462	82.6	62.9
SWB	2018-19	06:08	4.194	4.504	4.498	4.403	4.579	4.599	4.544	92.1	66.3	4.415	4.420	4.354	4.502	4.534	4.505	86.2	66.3
SWB	2019-20	06:09	4.167	4.467	4.463	4.365	4.588	4.607	4.553	91.0	64.5	4.335	4.345	4.279	4.480	4.516	4.489	82.4	64.5
SWB	2020-21	06:10	4.292	4.474	4.471	4.375	4.594	4.615	4.559	91.7	73.1	4.392	4.400	4.332	4.524	4.556	4.524	86.3	73.1
SWB	2021-22	06:11	4.447	4.474	4.471	4.378	4.590	4.608	4.555	91.4	85.4	4.422	4.429	4.361	4.544	4.572	4.539	88.3	85.4
TMS	2011-12	07:01	6.094	6.103	6.104	6.071	6.084	6.090	6.048	438.5	443.1	6.121	6.120	6.084	6.128	6.132	6.085	451.2	443.1
TMS	2012-13	07:02	5.970	6.120	6.125	6.088	6.099	6.108	6.062	446.1	391.6	6.104	6.107	6.070	6.117	6.128	6.078	446.2	391.6
TMS	2013-14	07:03	5.868	6.137	6.146	6.111	6.138	6.155	6.107	460.7	353.5	6.088	6.095	6.062	6.127	6.148	6.099	447.5	353.5
TMS	2014-15	07:04	5.961	6.159	6.173	6.132	6.165	6.189	6.133	472.8	388.0	6.098	6.109	6.072	6.145	6.173	6.117	454.7	388.0
TMS	2015-16	07:05	6.113	6.184	6.202	6.151	6.205	6.235	6.167	488.4	451.5	6.146	6.159	6.112	6.200	6.231	6.164	477.9	451.5
TMS	2016-17	07:06	6.236	6.202	6.224	6.169	6.225	6.259	6.187	498.4	510.9	6.197	6.211	6.159	6.246	6.277	6.204	500.9	510.9
TMS	2017-18	07:07	6.306	6.220	6.242	6.199	6.250	6.288	6.224	511.7	547.9	6.218	6.232	6.189	6.271	6.306	6.239	514.4	547.9
TMS	2018-19	07:08	6.379	6.239	6.265	6.236	6.298	6.345	6.290	533.5	589.3	6.244	6.262	6.227	6.322	6.364	6.303	538.1	589.3
TMS	2019-20	07:09	6.387	6.252	6.279	6.265	6.310	6.358	6.316	543.1	594.3	6.237	6.256	6.234	6.318	6.363	6.314	538.2	594.3
TMS	2020-21	07:10	6.301	6.259	6.289	6.284	6.376	6.435	6.393	567.7	545.3	6.223	6.246	6.230	6.362	6.417	6.368	550.4	545.3
TMS	2021-22	07:11	6.325	6.255	6.285	6.307	6.363	6.419	6.406	567.4	558.5	6.257	6.279	6.280	6.380	6.430	6.403	567.1	558.5
WSH	2011-12	08:01	4.888	4.998	4.987	4.997	4.894	4.900	4.931	141.5	132.7	4.953	4.952	4.956	4.850	4.873	4.903	136.4	132.7
WSH	2012-13	08:02	4.928	4.992	4.982	4.990	4.875	4.881	4.908	139.7	138.1	4.959	4.958	4.961	4.843	4.863	4.890	136.1	138.1
WSH	2013-14	08:03	4.845	4.990	4.982	4.987	4.882	4.889	4.914	140.0	127.2	4.936	4.937	4.940	4.832	4.856	4.882	134.0	127.2
WSH	2014-15	08:04	4.892	4.990	4.983	4.987	4.881	4.888	4.913	140.0	133.2	4.952	4.953	4.954	4.844	4.866	4.891	135.8	133.2
WSH	2015-16	08:05	4.641	4.991	4.985	4.987	4.884	4.891	4.914	140.2	103.7	4.997	4.998	4.994	4.881	4.898	4.920	141.1	103.7
WSH	2016-17	08:06	4.984	4.998	4.994	4.993	4.837	4.836	4.869	137.6	146.0	4.996	4.997	4.992	4.835	4.846	4.877	137.9	146.0
WSH	2017-18	08:07	5.243	4.999	4.994	4.993	4.873	4.877	4.902	139.9	189.2	4.984	4.986	4.982	4.856	4.873	4.898	138.5	189.2
WSH	2018-19	08:08	5.173	5.000	4.996	4.995	4.875	4.880	4.903	140.2	176.4	5.015	5.016	5.009	4.882	4.895	4.917	142.2	176.4
WSH	2019-20	08:09	5.111	5.004	5.000	4.998	4.876	4.880	4.903	140.5	165.9	4.996	4.998	4.993	4.865	4.881	4.903	139.9	165.9
WSH	2020-21	08:10	5.037	4.995	4.992	4.988	4.888	4.895	4.914	140.7	154.0	5.020	5.021	5.012	4.902	4.916	4.933	143.9	154.0
WSH	2021-22	08:11	4.983	4.991	4.988	4.984	4.896	4.903	4.920	140.8	145.9	5.045	5.046	5.035	4.933	4.944	4.958	147.6	145.9
WSX	2011-12	09:01	4.551	4.151	4.157	4.123	4.134	4.091	4.087	61.8	94.7	4.151	4.152	4.129	4.120	4.070	4.080	61.4	94.7
WSX	2012-13	09:02	4.427	4.153	4.162	4.126	4.137	4.095	4.090	62.0	83.7	4.145	4.149	4.125	4.118	4.069	4.078	61.2	83.7
WSX	2013-14	09:03	3.963	4.158	4.169	4.131	4.139	4.099	4.091	62.3	52.6	4.120	4.127	4.105	4.097	4.051	4.061	60.0	52.6
WSX	2014-15	09:04	3.841	4.157	4.173	4.132	4.141	4.104	4.093	62.4	46.6	4.146	4.154	4.128	4.119	4.072	4.078	61.4	46.6
WSX	2015-16	09:05	4.074	4.165	4.183	4.141	4.146	4.110	4.099	62.9	58.8	4.178	4.187	4.158	4.143	4.095	4.099	63.1	58.8
WSX	2016-17	09:06	4.112	4.174	4.194	4.150	4.157	4.122	4.112	63.6	61.1	4.173	4.183	4.155	4.143	4.096	4.103	63.0	61.1
WSX	2017-18	09:07	4.165	4.179	4.201	4.156	4.159	4.126	4.115	63.8	64.4	4.217	4.227	4.195	4.175	4.126	4.130	65.3	64.4
WSX	2018-19	09:08	4.316	4.182	4.208	4.160	4.198	4.172	4.152	65.3	74.9	4.213	4.226	4.193	4.204	4.161	4.158	66.2	74.9
WSX	2019-20	09:09	4.217	4.188	4.213	4.166	4.200	4.174	4.153	65.5	67.8	4.187	4.200	4.170	4.181	4.141	4.139	64.7	67.8
WSX	2020-21	09:10	4.347	4.190	4.217	4.169	4.181	4.154	4.136	65.0	77.2	4.241	4.254	4.220	4.205	4.159	4.156	67.1	77.2
WSX	2021-22	09:11	4.269	4.198	4.224	4.178	4.192	4.166	4.144	65.6	71.5	4.294	4.305	4.268	4.249	4.200	4.190	70.2	71.5
YKY	2011-12	10:01	5.421	5.134	5.213	5.239	5.164	5.239	5.233	182.1	226.2	5.092	5.146	5.175	5.115	5.175	5.170	171.7	226.2
YKY	2012-13	10:02	5.167	5.134	5.219	5.241	5.076	5.142	5.146	174.4	175.3	5.075	5.134	5.162	5.026	5.080	5.086	163.2	175.3
YKY	2013-14	10:03	4.920	5.138	5.226	5.245	5.080	5.149	5.150	175.2	137.0	5.059	5.121	5.148	5.015	5.072	5.077	161.2	137.0
YKY	2014-15	10:04	4.852	5.133	5.225	5.243	5.083	5.153	5.155	175.4	128.0	5.053	5.117	5.144	5.016	5.075	5.082	161.1	128.0
YKY	2015-16	10:05	5.095	5.139	5.236	5.248	5.063	5.133	5.135	174.4	163.1	5.092	5.159	5.179	5.026	5.082	5.086	164.9	163.1
YKY	2016-17	10:06	5.136	5.146	5.249	5.257	5.047	5.119	5.120	174.0	170.0	5.111	5.182	5.198	5.022	5.078	5.081	166.3	170.0
YKY	2017-18	10:07	5.242	5.146	5.254	5.261	5.090	5.171	5.166	178.2	189.0	5.123	5.196	5.211	5.069	5.130	5.128	171.4	189.0
YKY	2018-19	10:08	5.405	5.151	5.264	5.268	5.127	5.218	5.205	182.5	222.6	5.150	5.226	5.237	5.119	5.185	5.175	178.2	222.6
YKY	2019-20	10:09	5.272	5.153	5.272	5.276	5.071	5.157	5.153	178.2	194.8	5.135	5.215	5.228	5.057	5.121	5.120	172.1	194.8

Company		Index	Actual	TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	Pred	Actual	TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	Pred	Actual
				Fitted	Fitted	Fitted	Fitted	Fitted	Fitted	£m	£m	Fitted	Fitted	Fitted	Fitted	Fitted	Fitted	£m	£m
			l_BotexNR_TWD																
YKY	2020-21	10:10	5.443	5.142	5.269	5.263	5.046	5.133	5.128	175.3	231.1	5.163	5.249	5.251	5.069	5.129	5.126	175.3	231.1
YKY	2021-22	10:11	5.392	5.132	5.259	5.257	5.065	5.155	5.151	176.3	219.6	5.167	5.253	5.257	5.098	5.158	5.155	178.2	219.6
AFW	2011-12	11:01	5.029	4.845	4.780	4.889	4.720	4.675	4.753	119.1	152.7	4.998	4.933	5.010	4.827	4.777	4.831	134.3	152.7
AFW	2012-13	11:02	5.047	4.851	4.790	4.898	4.717	4.673	4.752	119.5	155.6	5.002	4.940	5.018	4.824	4.775	4.830	134.6	155.6
AFW	2013-14	11:03	4.993	4.855	4.798	4.905	4.722	4.682	4.760	120.3	147.3	4.967	4.909	4.988	4.799	4.756	4.813	131.1	147.3
AFW	2014-15	11:04	5.014	4.861	4.808	4.909	4.727	4.689	4.763	121.0	150.5	4.959	4.904	4.981	4.795	4.755	4.810	130.4	150.5
AFW	2015-16	11:05	4.859	4.867	4.818	4.919	4.741	4.707	4.780	122.5	128.9	5.004	4.951	5.024	4.837	4.797	4.849	136.2	128.9
AFW	2016-17	11:06	5.147	4.873	4.828	4.938	4.743	4.711	4.794	123.6	171.9	5.021	4.969	5.049	4.849	4.809	4.868	138.6	171.9
AFW	2017-18	11:07	5.023	4.871	4.829	4.943	4.755	4.727	4.812	124.6	151.8	5.047	4.997	5.077	4.881	4.841	4.900	142.7	151.8
AFW	2018-19	11:08	5.041	4.882	4.840	4.965	4.735	4.704	4.802	124.6	154.6	5.044	4.994	5.083	4.854	4.813	4.883	141.2	154.6
AFW	2019-20	11:09	4.898	4.854	4.817	4.944	4.784	4.763	4.859	126.3	134.0	5.010	4.966	5.055	4.895	4.862	4.930	141.9	134.0
AFW	2020-21	11:10	5.045	4.874	4.840	4.979	4.830	4.818	4.916	131.3	155.2	5.040	4.996	5.094	4.941	4.915	4.984	147.9	155.2
AFW	2021-22	11:11	5.141	4.880	4.846	4.996	4.786	4.766	4.882	129.3	171.0	5.065	5.021	5.126	4.918	4.884	4.967	148.4	171.0
BRL	2011-12	12:01	3.896	3.679	3.786	3.668	3.774	3.905	3.783	43.3	49.2	3.634	3.698	3.632	3.704	3.808	3.726	40.5	49.2
BRL	2012-13	12:02	4.220	3.692	3.801	3.679	3.692	3.811	3.698	41.7	68.1	3.634	3.700	3.632	3.625	3.719	3.647	38.9	68.1
BRL	2013-14	12:03	4.226	3.703	3.815	3.685	3.764	3.894	3.766	43.5	68.4	3.642	3.710	3.637	3.686	3.790	3.705	40.3	68.4
BRL	2014-15	12:04	4.194	3.721	3.833	3.699	3.766	3.895	3.765	43.9	66.3	3.651	3.718	3.643	3.682	3.786	3.700	40.4	66.3
BRL	2015-16	12:05	3.543	3.736	3.850	3.715	3.766	3.895	3.764	44.2	34.6	3.700	3.767	3.689	3.709	3.810	3.722	41.8	34.6
BRL	2016-17	12:06	3.767	3.745	3.861	3.722	3.797	3.931	3.794	45.2	43.3	3.691	3.760	3.681	3.724	3.830	3.737	42.0	43.3
BRL	2017-18	12:07	3.944	3.754	3.872	3.729	3.772	3.902	3.767	44.8	51.6	3.708	3.778	3.695	3.710	3.812	3.721	42.0	51.6
BRL	2018-19	12:08	4.061	3.761	3.883	3.740	3.791	3.927	3.790	45.5	58.1	3.731	3.803	3.719	3.740	3.845	3.751	43.2	58.1
BRL	2019-20	12:09	4.294	3.762	3.886	3.752	3.761	3.893	3.768	44.9	73.3	3.726	3.801	3.723	3.710	3.813	3.729	42.6	73.3
BRL	2020-21	12:10	3.937	3.768	3.894	3.754	3.762	3.895	3.766	45.1	51.3	3.760	3.835	3.751	3.734	3.834	3.746	43.7	51.3
BRL	2021-22	12:11	3.783	3.762	3.888	3.757	3.742	3.871	3.754	44.6	44.0	3.795	3.869	3.789	3.750	3.843	3.762	44.8	44.0
DVW	2011-12	13:01	2.015	2.217	2.173	2.154	2.240	2.165	2.054	8.7	7.5	2.067	2.063	2.040	2.154	2.113	1.985	7.9	7.5
DVW	2012-13	13:02	2.070	2.217	2.176	2.157	2.248	2.176	2.064	8.8	7.9	2.129	2.125	2.098	2.209	2.165	2.032	8.4	7.9
DVW	2013-14	13:03	1.960	2.217	2.177	2.162	2.243	2.172	2.064	8.8	7.1	2.065	2.064	2.044	2.156	2.119	1.991	8.0	7.1
DVW	2014-15	13:04	2.072	2.232	2.193	2.182	2.247	2.179	2.071	8.9	7.9	2.088	2.087	2.070	2.164	2.130	2.002	8.1	7.9
DVW	2015-16	13:05	2.047	2.235	2.195	2.188	2.253	2.185	2.078	8.9	7.7	2.124	2.121	2.105	2.195	2.158	2.028	8.4	7.7
DVW	2016-17	13:06	2.320	2.233	2.194	2.192	2.261	2.196	2.091	9.0	10.2	2.159	2.156	2.140	2.231	2.192	2.062	8.7	10.2
DVW	2017-18	13:07	2.266	2.267	2.229	2.224	2.271	2.209	2.099	9.2	9.6	2.206	2.201	2.183	2.248	2.211	2.076	8.9	9.6
DVW	2018-19	13:08																	
DVW	2019-20	13:09																	
DVW	2020-21	13:10																	
DVW	2021-22	13:11																	
PRT	2011-12	14:01	2.784	3.070	3.136	3.134	2.839	2.869	2.927	20.2	16.2	2.966	3.006	3.023	2.794	2.820	2.889	18.5	16.2
PRT	2012-13	14:02	2.860	3.074	3.147	3.155	2.856	2.894	2.959	20.5	17.5	2.938	2.982	3.010	2.784	2.819	2.895	18.3	17.5
PRT	2013-14	14:03	2.905	3.076	3.150	3.162	2.888	2.931	2.995	20.9	18.3	2.952	2.998	3.026	2.821	2.860	2.934	18.8	18.3
PRT	2014-15	14:04	2.922	3.083	3.157	3.174	2.882	2.923	2.994	20.9	18.6	2.959	3.004	3.037	2.818	2.854	2.934	18.9	18.6
PRT	2015-16	14:05	2.779	3.093	3.169	3.185	2.864	2.902	2.976	20.9	16.1	3.011	3.056	3.084	2.836	2.866	2.947	19.5	16.1
PRT	2016-17	14:06	2.956	3.105	3.186	3.194	2.851	2.889	2.960	20.9	19.2	3.105	3.151	3.167	2.890	2.913	2.987	20.9	19.2
PRT	2017-18	14:07	2.856	3.112	3.190	3.202	2.878	2.918	2.990	21.2	17.4	3.056	3.103	3.126	2.873	2.901	2.979	20.3	17.4
PRT	2018-19	14:08	3.053	3.114	3.191	3.209	2.898	2.938	3.013	21.5	21.2	3.021	3.068	3.098	2.861	2.894	2.976	19.9	21.2
PRT	2019-20	14:09	3.035	3.114	3.189	3.204	2.888	2.926	3.000	21.3	20.8	3.000	3.047	3.077	2.837	2.870	2.952	19.4	20.8
PRT	2020-21	14:10	2.779	3.114	3.189	3.207	2.884	2.919	2.997	21.3	16.1	3.040	3.085	3.114	2.864	2.892	2.975	20.1	16.1
PRT	2021-22	14:11	2.748	3.116	3.191	3.215	2.872	2.906	2.991	21.3	15.6	3.055	3.099	3.131	2.865	2.889	2.978	20.2	15.6
SES	2011-12	15:01	2.752	2.863	2.794	2.785	3.120	3.085	3.094	19.4	15.7	3.116	3.059	3.033	3.312	3.260	3.259	24.0	15.7
SES	2012-13	15:02	2.798	2.871	2.804	2.796	3.116	3.080	3.091	19.5	16.4	3.056	3.003	2.982	3.256	3.210	3.215	22.8	16.4
SES	2013-14	15:03	3.110	2.882	2.814	2.802	3.140	3.106	3.112	19.8	22.4	3.034	2.982	2.961	3.254	3.212	3.215	22.6	22.4
SES	2014-15	15:04	3.106	2.890	2.823	2.811	3.144	3.109	3.116	19.9	22.3	3.013	2.961	2.943	3.236	3.195	3.201	22.2	22.3
SES	2015-16	15:05	2.955	2.900	2.835	2.814	3.130	3.093	3.096	19.8	19.2	3.075	3.023	2.994	3.266	3.219	3.219	23.1	19.2
SES	2016-17	15:06	3.004	2.904	2.841	2.827	3.135	3.099	3.109	20.0	20.2	3.070	3.019	2.996	3.263	3.217	3.223	23.0	20.2
SES	2017-18	15:07	2.938	2.908	2.847	2.842	3.161	3.130	3.143	20.4	18.9	3.106	3.056	3.037	3.311	3.266	3.273	24.1	18.9
SES	2018-19	15:08	3.089	2.914	2.857	2.842	3.169	3.140	3.146	20.5	21.9	3.093	3.046	3.022	3.304	3.263	3.265	23.9	21.9
SES	2019-20	15:09	3.265	2.936	2.881	2.867	3.181	3.155	3.160	20.9	26.2	3.013	2.971	2.956	3.237	3.207	3.215	22.4	26.2

				Ofwat PR24 Specifications								Ofwat PR24 with addition of Regional Wages Variable							
Company		Index	Actual	TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	Pred	Actual	TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	Pred	Actual
				Fitted	Fitted	Fitted	Fitted	Fitted	Fitted	£m	£m	Fitted	Fitted	Fitted	Fitted	Fitted	Fitted	£m	£m
			l_BotexNR_TWD																
SES	2020-21	15:10	3.088	2.927	2.876	2.859	3.189	3.166	3.170	20.9	21.9	3.108	3.065	3.039	3.326	3.288	3.288	24.4	21.9
SES	2021-22	15:11	3.248	2.926	2.876	2.883	3.185	3.162	3.186	21.0	25.7	3.095	3.053	3.045	3.313	3.276	3.293	24.2	25.7
SEW	2011-12	16:01	4.561	4.182	4.266	4.245	4.332	4.406	4.367	73.9	95.7	4.472	4.524	4.488	4.540	4.566	4.516	91.7	95.7
SEW	2012-13	16:02	4.563	4.185	4.273	4.250	4.327	4.401	4.364	73.9	95.9	4.449	4.505	4.470	4.516	4.545	4.498	89.8	95.9
SEW	2013-14	16:03	4.546	4.189	4.279	4.255	4.332	4.409	4.370	74.3	94.3	4.444	4.501	4.467	4.513	4.544	4.498	89.6	94.3
SEW	2014-15	16:04	4.469	4.192	4.287	4.263	4.344	4.425	4.385	75.1	87.3	4.447	4.508	4.473	4.525	4.558	4.511	90.4	87.3
SEW	2015-16	16:05	4.482	4.192	4.292	4.265	4.345	4.428	4.387	75.3	88.4	4.457	4.520	4.484	4.534	4.567	4.519	91.3	88.4
SEW	2016-17	16:06	4.404	4.198	4.301	4.280	4.346	4.431	4.393	75.8	81.8	4.482	4.547	4.513	4.549	4.582	4.535	93.2	81.8
SEW	2017-18	16:07	4.358	4.204	4.309	4.291	4.353	4.440	4.402	76.4	78.1	4.470	4.536	4.506	4.541	4.577	4.531	92.5	78.1
SEW	2018-19	16:08	4.489	4.206	4.311	4.297	4.341	4.427	4.394	76.1	89.0	4.504	4.570	4.541	4.557	4.588	4.544	94.7	89.0
SEW	2019-20	16:09	4.563	4.210	4.317	4.304	4.350	4.436	4.404	76.7	95.8	4.486	4.553	4.527	4.548	4.582	4.539	93.7	95.8
SEW	2020-21	16:10	4.494	4.212	4.319	4.305	4.364	4.451	4.417	77.3	89.5	4.520	4.586	4.555	4.586	4.618	4.572	96.8	89.5
SEW	2021-22	16:11	4.337	4.223	4.329	4.318	4.362	4.448	4.416	77.6	76.5	4.520	4.586	4.559	4.577	4.609	4.565	96.5	76.5
SSC	2011-12	17:01	3.989	3.909	3.761	3.946	4.115	4.033	4.162	54.4	54.0	3.801	3.698	3.841	4.005	3.957	4.061	49.5	54.0
SSC	2012-13	17:02	3.936	3.917	3.769	3.952	4.101	4.017	4.147	54.1	51.2	3.804	3.701	3.843	3.989	3.940	4.045	49.1	51.2
SSC	2013-14	17:03	3.988	3.921	3.773	3.982	4.117	4.033	4.183	55.1	53.9	3.770	3.668	3.832	3.974	3.928	4.052	48.4	53.9
SSC	2014-15	17:04	3.963	3.927	3.778	3.997	4.125	4.041	4.200	55.7	52.6	3.798	3.695	3.864	3.999	3.951	4.080	49.7	52.6
SSC	2015-16	17:05	3.949	3.932	3.782	4.002	4.124	4.037	4.198	55.8	51.9	3.865	3.759	3.924	4.047	3.991	4.118	52.3	51.9
SSC	2016-17	17:06	3.974	3.944	3.793	4.010	4.143	4.056	4.213	56.6	53.2	3.885	3.778	3.940	4.071	4.014	4.137	53.4	53.2
SSC	2017-18	17:07	4.143	3.961	3.808	4.028	4.159	4.073	4.231	57.5	63.0	3.955	3.845	4.005	4.128	4.066	4.187	56.7	63.0
SSC	2018-19	17:08	4.167	3.971	3.818	4.029	4.165	4.078	4.229	57.8	64.5	3.929	3.819	3.976	4.105	4.046	4.164	55.3	64.5
SSC	2019-20	17:09	4.209	3.975	3.822	4.036	4.162	4.073	4.228	57.8	67.3	3.913	3.804	3.964	4.088	4.029	4.152	54.5	67.3
SSC	2020-21	17:10	4.151	3.978	3.825	4.040	4.166	4.077	4.233	58.1	63.5	3.981	3.870	4.026	4.143	4.078	4.197	57.7	63.5
SSC	2021-22	17:11	4.201	3.982	3.829	4.040	4.185	4.097	4.248	58.7	66.8	3.952	3.842	3.997	4.134	4.074	4.191	56.7	66.8
SVE	2011-12	18:01																	
SVE	2012-13	18:02																	
SVE	2013-14	18:03																	
SVE	2014-15	18:04																	
SVE	2015-16	18:05																	
SVE	2016-17	18:06																	
SVE	2017-18	18:07																	
SVE	2018-19	18:08	5.834	5.780	5.677	5.710	5.828	5.753	5.754	314.6	341.7	5.736	5.663	5.690	5.782	5.730	5.726	305.5	341.7
SVE	2019-20	18:09	5.910	5.780	5.680	5.716	5.820	5.746	5.751	314.2	368.5	5.713	5.643	5.674	5.759	5.709	5.710	299.5	368.5
SVE	2020-21	18:10	5.668	5.819	5.719	5.759	5.828	5.755	5.760	321.8	289.6	5.770	5.697	5.731	5.777	5.727	5.727	310.6	289.6
SVE	2021-22	18:11	5.750	5.827	5.726	5.763	5.831	5.756	5.759	323.0	314.1	5.830	5.754	5.782	5.820	5.764	5.760	325.6	314.1
HDD	2011-12	19:01																	
HDD	2012-13	19:02																	
HDD	2013-14	19:03																	
HDD	2014-15	19:04																	
HDD	2015-16	19:05																	
HDD	2016-17	19:06																	
HDD	2017-18	19:07																	
HDD	2018-19	19:08	2.763	2.841	2.774	2.823	2.712	2.668	2.758	15.9	15.8	2.853	2.807	2.831	2.695	2.671	2.756	16.0	15.8
HDD	2019-20	19:09	3.096	2.844	2.778	2.828	2.717	2.674	2.766	16.0	22.1	2.862	2.818	2.841	2.706	2.683	2.767	16.1	22.1
HDD	2020-21	19:10	2.712	2.860	2.794	2.844	2.720	2.679	2.768	16.1	15.1	2.848	2.803	2.831	2.684	2.665	2.750	15.9	15.1
HDD	2021-22	19:11	2.688	2.861	2.795	2.848	2.759	2.723	2.812	16.5	14.7	2.950	2.902	2.923	2.796	2.772	2.851	17.6	14.7

5-year totals 2017-18 to 2021-22

Company		Index	Actual	TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	Pred	Actual	TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	Pred	Actual
ANH		1	1116	797	819	810	945	935	944	875	1116	885	917	888	1048	1027	1021	964	1116
NES		2	751	739	752	742	704	701	705	724	751	730	740	735	713	709	714	723	751
NWT		3	1151	1304	1283	1306	1184	1139	1171	1231	1151	1244	1233	1253	1169	1137	1163	1200	1151
SRN		4	448	470	538	490	397	447	411	459	448	472	511	486	395	432	408	451	448

			Ofwat PR24 Specifications								Ofwat PR24 with addition of Regional Wages Variable							
Company	Index	Actual	TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	Pred	Actual	TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	Pred	Actual
			Fitted	Fitted	Fitted	Fitted	Fitted	Fitted	£m	£m	Fitted	Fitted	Fitted	Fitted	Fitted	Fitted	£m	£m
		l_BotexNR_TWD																
SWB	6	352	443	441	400	488	497	471	457	352	403	405	379	451	465	452	426	352
TMS	7	2835	2577	2649	2614	2779	2921	2801	2723	2835	2554	2603	2545	2810	2940	2797	2708	2835
WSH	8	831	740	738	736	659	663	677	702	831	751	752	747	663	673	687	712	831
WSX	9	356	329	338	322	329	320	314	325	356	344	348	337	335	320	319	334	356
YKY	10	1057	858	966	967	804	877	871	891	1057	860	932	941	806	858	854	875	1057
AFW	11	767	653	629	717	595	582	642	636	767	773	738	810	670	648	694	722	767
BRL	12	278	215	243	212	216	246	217	225	278	211	227	210	208	230	211	216	278
PRT	14	91	113	121	124	89	93	100	107	91	104	109	112	87	90	98	100	91
SES	15	115	93	88	87	120	117	118	104	115	109	104	102	135	130	131	119	115
SEW	16	429	337	375	370	389	424	410	384	429	450	481	467	479	495	473	474	429
SSC	17	325	266	228	283	323	296	345	290	325	259	232	271	308	289	326	281	325
SVE	18	1596	1660	1499	1549	1693	1570	1571	1590	1596	1587	1474	1517	1615	1533	1528	1542	1596
HDD	19	77	79	74	77	71	68	72	74	77	80	77	79	70	69	73	75	77
		12576	11674	11780	11805	11784	11894	11841	11796	12576	11818	11886	11878	11962	12043	11949	11923	

Efficiency Scores

Company	Index		TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	Pred		TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	Pred	
ANH	1		1.400	1.362	1.378	1.181	1.194	1.182	1.283		1.261	1.217	1.257	1.065	1.087	1.093	1.163	
NES	2		1.017	1.000	1.013	1.067	1.073	1.065	1.039		1.029	1.015	1.023	1.055	1.060	1.053	1.039	
NWT	3		0.883	0.897	0.882	0.973	1.011	0.983	0.938		0.925	0.933	0.919	0.985	1.012	0.990	0.961	
SRN	4		0.952	0.833	0.914	1.128	1.001	1.090	0.986		0.949	0.876	0.921	1.133	1.037	1.099	1.002	
SWB	6		0.796	0.799	0.880	0.722	0.708	0.748	0.775		0.874	0.868	0.929	0.782	0.757	0.779	0.832	
TMS	7		1.100	1.070	1.085	1.020	0.971	1.012	1.043		1.110	1.089	1.114	1.009	0.964	1.014	1.050	
WSH	8		1.123	1.127	1.130	1.261	1.255	1.228	1.187		1.107	1.105	1.113	1.253	1.235	1.211	1.171	
WSX	9		1.081	1.053	1.104	1.082	1.112	1.133	1.094		1.034	1.022	1.056	1.064	1.113	1.116	1.068	
YKY	10		1.232	1.094	1.093	1.315	1.205	1.213	1.192		1.229	1.134	1.124	1.311	1.232	1.237	1.211	
AFW	11		1.174	1.219	1.069	1.290	1.318	1.195	1.211		0.992	1.038	0.947	1.144	1.184	1.104	1.068	
BRL	12		1.294	1.144	1.313	1.288	1.129	1.284	1.242		1.316	1.223	1.327	1.336	1.208	1.319	1.288	
PRT	14		0.809	0.750	0.737	1.018	0.981	0.908	0.867		0.876	0.837	0.813	1.043	1.013	0.933	0.919	
SES	15		1.234	1.304	1.315	0.956	0.982	0.972	1.127		1.050	1.098	1.119	0.847	0.880	0.874	0.978	
SEW	16		1.272	1.144	1.161	1.103	1.012	1.046	1.123		0.953	0.892	0.918	0.896	0.867	0.906	0.905	
SSC	17		1.223	1.425	1.150	1.007	1.100	0.943	1.141		1.256	1.403	1.198	1.056	1.123	0.996	1.172	
SVE	18		0.961	1.065	1.030	0.943	1.016	1.016	1.005		1.005	1.083	1.052	0.988	1.041	1.044	1.036	
HDD	19		0.981	1.044	0.999	1.092	1.141	1.069	1.054		0.964	1.004	0.985	1.101	1.128	1.066	1.041	
Range			0.605	0.675	0.641	0.593	0.610	0.536			0.441	0.566	0.514	0.554	0.478	0.540		

					Ofwat PR24 specification on Adj. Costs											Calc
													Add			Implicit
	Index	Actual	Gross CAC		TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	Triangulated	Actual Cost £m	Back Adj	Predicted Cost6	Gross CAC	Allowance
Company				Actual	Fitted	Fitted	Fitted	Fitted	Fitted	Fitted						
		l_BotexNR_TWD														
ANH	2011-12	01:01	5.071	8.9	5.089	5.064	5.081	5.063	5.281	5.265	5.277	177.2	162.3	-3.0	174.2	4.09	-7.1
ANH	2012-13	01:02	5.187	11.0	5.198	5.073	5.091	5.073	5.282	5.267	5.278	178.1	181.0	-2.1	176.0	5.01	-7.1
ANH	2013-14	01:03	5.113	5.9	5.128	5.074	5.095	5.076	5.281	5.267	5.277	178.2	168.6	-2.5	175.8	4.59	-7.1
ANH	2014-15	01:04	5.175	6.1	5.189	5.075	5.098	5.080	5.279	5.266	5.275	178.3	179.3	-2.5	175.8	4.52	-7.0
ANH	2015-16	01:05	5.033	6.2	5.059	5.084	5.109	5.090	5.279	5.267	5.275	179.1	157.4	-4.0	175.2	3.08	-7.0
ANH	2016-17	01:06	5.176	12.3	5.193	5.096	5.124	5.102	5.280	5.269	5.277	180.4	180.0	-3.1	177.3	3.97	-7.1
ANH	2017-18	01:07	5.413	13.3	5.429	5.102	5.130	5.113	5.284	5.274	5.280	181.4	228.0	-3.8	177.6	3.29	-7.1
ANH	2018-19	01:08	5.483	14.6	5.500	5.104	5.133	5.118	5.291	5.282	5.287	182.4	244.7	-4.0	178.4	3.03	-7.1
ANH	2019-20	01:09	5.498	14.5	5.508	5.097	5.126	5.113	5.294	5.284	5.290	182.1	246.7	-2.4	179.7	4.62	-7.0
ANH	2020-21	01:10	5.317	22.1	5.323	5.115	5.144	5.130	5.286	5.274	5.282	182.7	205.0	-1.3	181.4	5.87	-7.1
ANH	2021-22	01:11	5.314	24.6	5.323	5.121	5.150	5.138	5.273	5.260	5.270	182.1	204.9	-1.7	180.4	5.48	-7.2
NES	2011-12	02:01	4.903	-3.2	4.918	4.928	4.936	4.985	4.874	4.865	4.919	136.8	136.7	-2.0	134.8	-0.60	-1.4
NES	2012-13	02:02	4.863	-2.8	4.875	4.948	4.957	4.968	4.873	4.860	4.891	136.6	131.0	-1.6	135.0	0.01	-1.6
NES	2013-14	02:03	4.835	-6.4	4.848	4.958	4.968	4.967	4.941	4.936	4.949	141.6	127.5	-1.7	140.0	-0.21	-1.5
NES	2014-15	02:04	4.709	-5.1	4.718	4.966	4.977	4.973	4.954	4.950	4.960	143.1	112.0	-1.0	142.0	0.34	-1.4
NES	2015-16	02:05	4.751	-2.0	4.761	4.974	4.985	4.986	4.980	4.979	4.990	145.8	116.9	-1.2	144.6	0.04	-1.2
NES	2016-17	02:06	4.816	-2.4	4.832	4.985	4.998	4.999	4.970	4.968	4.981	146.0	125.5	-2.0	144.0	-0.79	-1.2
NES	2017-18	02:07	4.991	-1.4	5.007	4.993	5.007	4.997	4.938	4.931	4.941	143.8	149.5	-2.4	141.4	-1.07	-1.3
NES	2018-19	02:08	5.120	-0.4	5.135	5.003	5.018	5.004	4.979	4.978	4.979	147.5	169.8	-2.4	145.0	-1.23	-1.2
NES	2019-20	02:09	5.072	-3.3	5.086	5.009	5.025	5.011	4.982	4.980	4.983	148.2	161.8	-2.3	145.8	-1.17	-1.2
NES	2020-21	02:10	4.917	1.4	4.931	5.003	5.020	5.007	4.954	4.948	4.957	145.8	138.5	-1.9	143.9	-0.67	-1.2
NES	2021-22	02:11	4.948	3.3	4.964	4.999	5.017	5.005	4.942	4.934	4.948	144.7	143.1	-2.2	142.5	-1.00	-1.2
NWT	2011-12	03:01	5.149	-13.5	5.183	5.488	5.460	5.473	5.383	5.328	5.365	225.4	178.2	-6.0	219.5	-2.69	-3.3
NWT	2012-13	03:02	5.141	-14.2	5.171	5.492	5.464	5.477	5.418	5.368	5.399	229.8	176.1	-5.2	224.6	-2.13	-3.1
NWT	2013-14	03:03	5.419	-16.2	5.445	5.497	5.469	5.486	5.415	5.365	5.399	230.3	231.7	-6.0	224.4	-2.91	-3.1
NWT	2014-15	03:04	5.138	-18.1	5.168	5.509	5.482	5.496	5.427	5.378	5.409	233.1	175.5	-5.0	228.0	-2.01	-3.0
NWT	2015-16	03:05	5.347	-12.6	5.376	5.540	5.514	5.528	5.470	5.428	5.451	242.0	216.1	-6.1	235.9	-3.21	-2.9
NWT	2016-17	03:06	5.477	-11.1	5.509	5.551	5.528	5.536	5.419	5.371	5.399	237.4	246.8	-7.7	229.7	-4.71	-3.0
NWT	2017-18	03:07	5.337	-10.5	5.367	5.556	5.536	5.544	5.493	5.457	5.473	247.3	214.3	-6.3	241.0	-3.65	-2.7
NWT	2018-19	03:08	5.440	-6.1	5.466	5.562	5.545	5.559	5.458	5.418	5.445	244.6	236.4	-6.0	238.6	-3.30	-2.7
NWT	2019-20	03:09	5.491	-10.2	5.515	5.569	5.555	5.571	5.484	5.449	5.475	249.2	248.3	-5.8	243.3	-3.31	-2.5
NWT	2020-21	03:10	5.435	-3.8	5.460	5.580	5.569	5.587	5.470	5.435	5.465	249.5	235.0	-5.6	243.9	-3.08	-2.5
NWT	2021-22	03:11	5.485	-0.7	5.511	5.583	5.572	5.594	5.497	5.465	5.495	253.6	247.4	-6.3	247.3	-3.82	-2.4
SRN	2011-12	04:01	4.593	-2.7	4.603	4.489	4.586	4.494	4.298	4.379	4.307	84.0	99.8	-1.0	83.0	-0.76	-0.2
SRN	2012-13	04:02	4.328	-4.3	4.341	4.495	4.595	4.499	4.317	4.403	4.325	85.1	76.8	-1.0	84.1	-0.80	-0.2
SRN	2013-14	04:03	4.201	-4.7	4.208	4.499	4.604	4.509	4.328	4.418	4.340	86.0	67.2	-0.4	85.6	-0.32	-0.1
SRN	2014-15	04:04	4.038	-4.8	4.045	4.506	4.616	4.514	4.324	4.418	4.336	86.3	57.1	-0.4	85.9	-0.31	-0.1
SRN	2015-16	04:05	4.095	-3.4	4.108	4.514	4.628	4.521	4.324	4.419	4.333	86.7	60.8	-0.7	86.0	-0.70	0.0
SRN	2016-17	04:06	4.339	-2.0	4.348	4.522	4.639	4.533	4.345	4.445	4.358	88.1	77.3	-0.7	87.4	-0.76	0.1
SRN	2017-18	04:07	4.436	-2.5	4.447	4.526	4.644	4.544	4.356	4.457	4.374	89.0	85.4	-0.9	88.1	-1.05	0.1
SRN	2018-19	04:08	4.480	-1.4	4.489	4.530	4.650	4.558	4.365	4.469	4.391	89.9	89.0	-0.8	89.1	-0.95	0.2
SRN	2019-20	04:09	4.541	-3.4	4.551	4.577	4.695	4.613	4.374	4.480	4.404	92.8	94.7	-0.9	91.8	-1.08	0.1
SRN	2020-21	04:10	4.470	-0.5	4.477	4.560	4.680	4.599	4.394	4.504	4.427	93.0	88.0	-0.6	92.3	-0.84	0.2
SRN	2021-22	04:11	4.543	-0.5	4.557	4.555	4.676	4.616	4.393	4.504	4.444	93.3	95.3	-1.3	92.0	-1.61	0.3
SVT	2011-12	05:01	5.592	-12.7	5.617	5.788	5.679	5.698	5.775	5.698	5.686	305.4	275.1	-6.7	298.7	-2.51	-4.2
SVT	2012-13	05:02	5.720	-13.3	5.741	5.797	5.688	5.705	5.795	5.720	5.704	309.7	311.3	-6.5	303.2	-2.48	-4.0
SVT	2013-14	05:03	5.680	-21.7	5.705	5.804	5.696	5.714	5.779	5.702	5.689	308.5	300.3	-7.5	301.1	-3.39	-4.1
SVT	2014-15	05:04	5.734	-22.0	5.759	5.809	5.703	5.719	5.795	5.720	5.705	311.9	317.0	-7.7	304.3	-3.82	-3.9
SVT	2015-16	05:05	5.501	-11.7	5.523	5.819	5.713	5.727	5.800	5.724	5.708	314.0	250.5	-5.4	308.6	-1.72	-3.7
SVT	2016-17	05:06	5.480	-9.7	5.503	5.822	5.720	5.739	5.798	5.722	5.711	315.0	245.4	-5.5	309.5	-2.08	-3.5
SVT	2017-18	05:07	5.641	-15.5	5.672	5.827	5.727	5.746	5.820	5.747	5.735	319.8	290.6	-8.7	311.1	-5.54	-3.2
	2018-19	05:08													0.0	0.00	0.0
	2019-20	05:09													0.0	0.00	0.0

Company		Index	Actual	Gross CAC	Actual	TWD1 Fitted	TWD2 Fitted	TWD3 Fitted	TWD4 Fitted	TWD5 Fitted	TWD6 Fitted	Triangulated	Actual Cost £m	Add Back Adj	Predicted Cost6	Gross CAC	Calc Implicit Allowance
			l_BotexNR_TWD														
	2020-21	05:10													0.0	0.00	0.0
	2021-22	05:11													0.0	0.00	0.0
SWB	2011-12	06:01	4.343	-6.6	4.398	4.483	4.476	4.386	4.552	4.570	4.540	90.3	81.3	-4.4	85.9	-1.85	-2.5
SWB	2012-13	06:02	4.145	-8.4	4.206	4.487	4.480	4.388	4.547	4.563	4.532	90.1	67.1	-4.0	86.1	-1.48	-2.5
SWB	2013-14	06:03	4.229	-9.9	4.289	4.490	4.485	4.390	4.559	4.578	4.542	90.9	72.9	-4.2	86.6	-1.75	-2.5
SWB	2014-15	06:04	4.249	-10.4	4.311	4.495	4.490	4.393	4.563	4.581	4.544	91.2	74.5	-4.5	86.7	-2.00	-2.5
SWB	2015-16	06:05	4.121	-6.0	4.173	4.500	4.494	4.399	4.564	4.580	4.542	91.4	64.9	-3.3	88.1	-0.81	-2.5
SWB	2016-17	06:06	4.184	-6.7	4.244	4.511	4.507	4.412	4.579	4.597	4.555	92.6	69.7	-4.1	88.6	-1.62	-2.4
SWB	2017-18	06:07	4.141	-7.7	4.208	4.521	4.516	4.424	4.573	4.591	4.548	92.8	67.2	-4.3	88.5	-1.86	-2.5
SWB	2018-19	06:08	4.194	-5.9	4.253	4.528	4.524	4.436	4.601	4.621	4.575	94.6	70.3	-4.0	90.6	-1.56	-2.4
SWB	2019-20	06:09	4.167	-8.6	4.231	4.491	4.488	4.398	4.609	4.630	4.584	93.4	68.8	-4.3	89.1	-1.93	-2.4
SWB	2020-21	06:10	4.292	-5.4	4.350	4.498	4.496	4.407	4.615	4.637	4.589	94.0	77.5	-4.4	89.6	-2.06	-2.4
SWB	2021-22	06:11	4.447	-3.1	4.503	4.498	4.496	4.409	4.611	4.631	4.585	93.8	90.3	-4.9	88.9	-2.57	-2.4
TMS	2011-12	07:01	6.094	12.6	6.006	6.021	6.025	5.993	6.018	6.026	5.985	408.1	405.7	37.4	445.5	6.95	30.5
TMS	2012-13	07:02	5.970	0.1	5.887	6.037	6.045	6.009	6.031	6.043	5.998	414.6	360.2	31.4	445.9	-0.17	31.6
TMS	2013-14	07:03	5.868	-13.2	5.786	6.053	6.064	6.030	6.067	6.088	6.040	427.1	325.6	27.9	455.1	-5.59	33.5
TMS	2014-15	07:04	5.961	-18.2	5.880	6.073	6.088	6.049	6.093	6.120	6.064	437.6	357.9	30.1	467.7	-5.11	35.2
TMS	2015-16	07:05	6.113	-10.5	6.034	6.096	6.116	6.067	6.130	6.163	6.096	451.1	417.2	34.3	485.4	-2.99	37.3
TMS	2016-17	07:06	6.236	2.5	6.151	6.113	6.135	6.083	6.149	6.186	6.115	459.8	469.3	41.6	501.3	2.91	38.7
TMS	2017-18	07:07	6.306	2.7	6.221	6.130	6.153	6.112	6.173	6.213	6.149	471.4	503.4	44.5	515.8	4.20	40.3
TMS	2018-19	07:08	6.379	4.5	6.293	6.147	6.174	6.146	6.219	6.267	6.211	490.3	540.6	48.7	538.9	5.38	43.3
TMS	2019-20	07:09	6.387	-4.9	6.300	6.159	6.187	6.173	6.230	6.279	6.236	498.4	544.4	49.9	548.4	5.27	44.6
TMS	2020-21	07:10	6.301	-17.3	6.227	6.166	6.197	6.189	6.294	6.352	6.308	519.8	506.1	39.2	559.0	-8.69	47.8
TMS	2021-22	07:11	6.325	-0.3	6.246	6.161	6.192	6.210	6.281	6.337	6.320	519.3	516.1	42.4	561.8	-5.64	48.1
WSH	2011-12	08:01	4.888	-5.1	4.943	5.042	5.032	5.041	4.933	4.943	4.974	147.7	140.2	-7.5	140.2	-1.26	-6.3
WSH	2012-13	08:02	4.928	-3.5	4.976	5.036	5.027	5.034	4.915	4.924	4.952	145.9	144.9	-6.8	139.1	-0.61	-6.2
WSH	2013-14	08:03	4.845	-6.0	4.893	5.034	5.027	5.032	4.922	4.932	4.957	146.2	133.3	-6.1	140.1	0.03	-6.2
WSH	2014-15	08:04	4.892	-4.2	4.934	5.034	5.028	5.031	4.921	4.931	4.956	146.1	138.9	-5.7	140.4	0.42	-6.2
WSH	2015-16	08:05	4.641	0.9	4.681	5.035	5.030	5.031	4.923	4.934	4.958	146.4	107.9	-4.2	142.1	1.92	-6.1
WSH	2016-17	08:06	4.984	0.3	5.030	5.041	5.038	5.037	4.878	4.882	4.915	143.7	153.0	-7.0	136.7	-0.82	-6.2
WSH	2017-18	08:07	5.243	-1.4	5.296	5.042	5.038	5.037	4.912	4.920	4.946	146.1	199.5	-10.3	135.8	-4.10	-6.2
WSH	2018-19	08:08	5.173	2.0	5.218	5.043	5.040	5.039	4.915	4.923	4.947	146.4	184.6	-8.2	138.1	-2.08	-6.2
WSH	2019-20	08:09	5.111	-0.6	5.157	5.047	5.043	5.042	4.915	4.923	4.947	146.6	173.6	-7.7	138.9	-1.56	-6.2
WSH	2020-21	08:10	5.037	3.2	5.083	5.038	5.035	5.032	4.928	4.937	4.957	146.8	161.2	-7.2	139.6	-1.05	-6.1
WSH	2021-22	08:11	4.983	6.8	5.025	5.033	5.031	5.027	4.935	4.945	4.963	146.9	152.2	-6.3	140.6	-0.23	-6.1
WSX	2011-12	09:01	4.551	-0.4	4.586	4.190	4.193	4.164	4.168	4.119	4.122	64.1	98.1	-3.4	60.7	-1.14	-2.2
WSX	2012-13	09:02	4.427	-0.8	4.462	4.192	4.198	4.166	4.171	4.124	4.125	64.3	86.7	-3.0	61.3	-0.74	-2.2
WSX	2013-14	09:03	3.963	-2.3	4.000	4.197	4.205	4.172	4.173	4.127	4.126	64.5	54.6	-2.0	62.6	0.27	-2.2
WSX	2014-15	09:04	3.841	-1.0	3.869	4.196	4.209	4.172	4.175	4.131	4.128	64.6	47.9	-1.3	63.3	0.92	-2.2
WSX	2015-16	09:05	4.074	0.2	4.106	4.204	4.219	4.181	4.180	4.138	4.133	65.1	60.7	-1.9	63.2	0.33	-2.3
WSX	2016-17	09:06	4.112	-0.6	4.154	4.213	4.230	4.191	4.191	4.149	4.147	65.8	63.7	-2.6	63.2	-0.33	-2.3
WSX	2017-18	09:07	4.165	1.5	4.197	4.218	4.237	4.197	4.193	4.153	4.149	66.1	66.5	-2.1	64.0	0.19	-2.3
WSX	2018-19	09:08	4.316	0.9	4.352	4.221	4.243	4.201	4.231	4.197	4.185	67.6	77.6	-2.7	64.8	-0.45	-2.3
WSX	2019-20	09:09	4.217	-0.8	4.256	4.227	4.248	4.207	4.233	4.199	4.186	67.8	70.5	-2.7	65.1	-0.40	-2.3
WSX	2020-21	09:10	4.347	2.1	4.381	4.229	4.252	4.210	4.215	4.180	4.169	67.3	79.9	-2.7	64.7	-0.38	-2.3
WSX	2021-22	09:11	4.269	4.6	4.296	4.237	4.259	4.218	4.225	4.191	4.177	67.9	73.4	-1.9	66.0	0.36	-2.3
YKY	2011-12	10:01	5.421	-10.3	5.462	5.165	5.236	5.261	5.190	5.256	5.247	186.1	235.6	-9.4	176.7	-5.36	-4.1
YKY	2012-13	10:02	5.167	-11.2	5.209	5.165	5.242	5.262	5.105	5.163	5.165	178.6	182.9	-7.6	171.0	-3.38	-4.2
YKY	2013-14	10:03	4.920	-14.0	4.961	5.169	5.249	5.266	5.109	5.169	5.168	179.4	142.8	-5.8	173.7	-1.57	-4.2
YKY	2014-15	10:04	4.852	-14.2	4.893	5.164	5.247	5.264	5.111	5.173	5.173	179.5	133.4	-5.4	174.0	-1.35	-4.1
YKY	2015-16	10:05	5.095	-9.5	5.137	5.169	5.257	5.269	5.092	5.154	5.154	178.5	170.2	-7.1	171.4	-2.96	-4.1
YKY	2016-17	10:06	5.136	-7.6	5.179	5.176	5.269	5.277	5.076	5.140	5.140	178.1	177.5	-7.5	170.6	-3.38	-4.1
YKY	2017-18	10:07	5.242	-6.8	5.283	5.176	5.273	5.281	5.118	5.189	5.183	182.2	196.9	-7.9	174.3	-3.89	-4.0
YKY	2018-19	10:08	5.405	-4.3	5.442	5.180	5.283	5.287	5.154	5.234	5.220	186.3	230.8	-8.2	178.1	-4.39	-3.8
YKY	2019-20	10:09	5.272	-6.1	5.306	5.183	5.290	5.295	5.099	5.175	5.171	182.1	201.6	-6.8	175.3	-2.90	-3.9

Company	Index	Actual	Gross CAC	Actual	TWD1 Fitted	TWD2 Fitted	TWD3 Fitted	TWD4 Fitted	TWD5 Fitted	TWD6 Fitted	Triangulated	Actual Cost £m	Add Back Adj	Predicted Cost6	Gross CAC	Calc Implicit Allowance
		l_BotexNR_TWD														
YKY	2020-21	10:10	5.443	0.0	5.475	5.171	5.286	5.281	5.076	5.153	5.148	179.2	238.6	-7.5	171.7	-3.63	-3.9
YKY	2021-22	10:11	5.392	1.9	5.425	5.161	5.276	5.275	5.095	5.173	5.169	180.1	227.1	-7.5	172.6	-3.75	-3.8
AFW	2011-12	11:01	5.029	15.2	4.975	4.840	4.778	4.879	4.710	4.669	4.740	118.1	144.8	7.9	126.1	7.03	0.9
AFW	2012-13	11:02	5.047	15.1	4.990	4.845	4.786	4.888	4.707	4.666	4.739	118.5	147.0	8.6	127.1	7.61	1.0
AFW	2013-14	11:03	4.993	10.8	4.939	4.848	4.793	4.893	4.712	4.674	4.746	119.2	139.7	7.6	126.8	6.52	1.1
AFW	2014-15	11:04	5.014	9.4	4.964	4.853	4.802	4.896	4.716	4.681	4.749	119.8	143.2	7.3	127.1	6.11	1.2
AFW	2015-16	11:05	4.859	13.7	4.808	4.859	4.811	4.906	4.729	4.697	4.765	121.2	122.5	6.4	127.5	5.05	1.3
AFW	2016-17	11:06	5.147	14.9	5.097	4.864	4.820	4.923	4.731	4.701	4.777	122.2	163.5	8.4	130.6	6.97	1.4
AFW	2017-18	11:07	5.023	18.1	4.966	4.862	4.821	4.928	4.742	4.716	4.794	123.1	143.5	8.3	131.4	6.78	1.5
AFW	2018-19	11:08	5.041	16.6	4.990	4.873	4.832	4.948	4.723	4.695	4.784	123.1	147.0	7.6	130.7	6.13	1.5
AFW	2019-20	11:09	4.898	15.6	4.842	4.844	4.808	4.926	4.771	4.751	4.838	124.5	126.7	7.3	131.9	5.58	1.8
AFW	2020-21	11:10	5.045	16.6	4.995	4.864	4.830	4.960	4.815	4.803	4.892	129.3	147.7	7.5	136.8	5.51	2.0
AFW	2021-22	11:11	5.141	19.1	5.093	4.870	4.836	4.976	4.773	4.754	4.860	127.4	162.8	8.2	135.6	6.30	1.9
BRL	2011-12	12:01	3.896	-2.8	3.908	3.681	3.777	3.671	3.765	3.882	3.773	43.0	43.0	-0.6	42.4	-0.95	0.3
BRL	2012-13	12:02	4.220	-2.8	4.233	3.695	3.791	3.681	3.686	3.792	3.693	41.4	68.9	-0.8	40.6	-1.09	0.3
BRL	2013-14	12:03	4.226	-3.2	4.231	3.704	3.804	3.687	3.755	3.872	3.758	43.2	68.8	-0.4	42.8	-0.74	0.4
BRL	2014-15	12:04	4.194	-3.6	4.202	3.722	3.821	3.701	3.757	3.873	3.757	43.5	66.8	-0.5	43.0	-0.90	0.4
BRL	2015-16	12:05	3.543	-2.4	3.550	3.736	3.837	3.716	3.757	3.872	3.756	43.8	34.8	-0.2	43.6	-0.65	0.4
BRL	2016-17	12:06	3.767	-3.1	3.784	3.744	3.847	3.723	3.786	3.907	3.783	44.7	44.0	-0.7	44.0	-1.20	0.5
BRL	2017-18	12:07	3.944	-2.7	3.959	3.753	3.858	3.730	3.763	3.879	3.759	44.3	52.4	-0.8	43.6	-1.21	0.4
BRL	2018-19	12:08	4.061	-2.3	4.074	3.760	3.868	3.740	3.781	3.902	3.780	45.0	58.8	-0.7	44.3	-1.23	0.5
BRL	2019-20	12:09	4.294	-2.4	4.303	3.761	3.871	3.751	3.752	3.870	3.759	44.5	73.9	-0.6	43.9	-1.08	0.4
BRL	2020-21	12:10	3.937	-1.4	3.945	3.766	3.878	3.753	3.753	3.872	3.758	44.6	51.7	-0.4	44.2	-0.89	0.5
BRL	2021-22	12:11	3.783	0.2	3.786	3.760	3.872	3.756	3.734	3.849	3.746	44.2	44.1	-0.1	44.0	-0.57	0.4
DVW	2011-12	13:01	2.015	-0.8	2.067	2.231	2.195	2.171	2.263	2.196	2.074	8.9	7.9	-0.4	8.5	-0.21	-0.2
DVW	2012-13	13:02	2.070	-0.4	2.104	2.232	2.197	2.175	2.271	2.207	2.084	9.0	8.2	-0.3	8.7	-0.09	-0.2
DVW	2013-14	13:03	1.960	-0.8	2.001	2.232	2.198	2.179	2.267	2.204	2.083	9.0	7.4	-0.3	8.7	-0.11	-0.2
DVW	2014-15	13:04	2.072	-0.8	2.116	2.247	2.215	2.199	2.270	2.211	2.090	9.1	8.3	-0.4	8.7	-0.17	-0.2
DVW	2015-16	13:05	2.047	-0.6	2.092	2.250	2.217	2.205	2.276	2.216	2.097	9.1	8.1	-0.4	8.8	-0.16	-0.2
DVW	2016-17	13:06	2.320	-0.3	2.361	2.248	2.216	2.208	2.284	2.227	2.108	9.2	10.6	-0.4	8.8	-0.23	-0.2
DVW	2017-18	13:07	2.266	-0.3	2.303	2.283	2.251	2.241	2.294	2.240	2.117	9.4	10.0	-0.4	9.0	-0.16	-0.2
DVW	2018-19	13:08													0.0	0.00	0.0
DVW	2019-20	13:09													0.0	0.00	0.0
DVW	2020-21	13:10													0.0	0.00	0.0
DVW	2021-22	13:11													0.0	0.00	0.0
PRT	2011-12	14:01	2.784	-1.6	2.779	3.038	3.097	3.098	2.816	2.844	2.906	19.6	16.1	0.1	19.6	-0.51	0.6
PRT	2012-13	14:02	2.860	-2.2	2.862	3.043	3.107	3.116	2.833	2.867	2.935	19.9	17.5	0.0	19.8	-0.67	0.6
PRT	2013-14	14:03	2.905	-2.1	2.896	3.044	3.110	3.123	2.864	2.903	2.969	20.2	18.1	0.2	20.4	-0.49	0.7
PRT	2014-15	14:04	2.922	-2.1	2.912	3.051	3.116	3.134	2.858	2.895	2.968	20.3	18.4	0.2	20.4	-0.49	0.7
PRT	2015-16	14:05	2.779	-1.4	2.766	3.061	3.128	3.144	2.840	2.875	2.951	20.2	15.9	0.2	20.4	-0.46	0.7
PRT	2016-17	14:06	2.956	0.0	2.923	3.072	3.143	3.153	2.828	2.862	2.937	20.2	18.6	0.6	20.9	-0.06	0.7
PRT	2017-18	14:07	2.856	-0.9	2.839	3.078	3.147	3.160	2.854	2.889	2.964	20.5	17.1	0.3	20.8	-0.42	0.7
PRT	2018-19	14:08	3.053	-1.6	3.049	3.080	3.148	3.167	2.873	2.909	2.987	20.8	21.1	0.1	20.8	-0.64	0.7
PRT	2019-20	14:09	3.035	-1.9	3.030	3.080	3.147	3.163	2.864	2.897	2.974	20.6	20.7	0.1	20.7	-0.61	0.7
PRT	2020-21	14:10	2.779	-1.2	2.773	3.080	3.147	3.165	2.860	2.892	2.972	20.6	16.0	0.1	20.7	-0.59	0.7
PRT	2021-22	14:11	2.748	-1.0	2.747	3.082	3.148	3.173	2.849	2.879	2.967	20.6	15.6	0.0	20.6	-0.68	0.7
SES	2011-12	15:01	2.752	4.6	2.660	2.841	2.778	2.770	3.098	3.066	3.076	19.1	14.3	1.4	20.5	1.01	0.4
SES	2012-13	15:02	2.798	3.3	2.721	2.848	2.787	2.779	3.093	3.060	3.073	19.1	15.2	1.2	20.3	0.83	0.4
SES	2013-14	15:03	3.110	2.8	3.035	2.858	2.796	2.785	3.116	3.085	3.093	19.4	20.8	1.6	21.0	1.23	0.4
SES	2014-15	15:04	3.106	2.2	3.035	2.866	2.804	2.793	3.120	3.088	3.097	19.5	20.8	1.5	21.1	1.13	0.4
SES	2015-16	15:05	2.955	3.3	2.879	2.875	2.815	2.796	3.106	3.072	3.079	19.4	17.8	1.4	20.8	1.00	0.4
SES	2016-17	15:06	3.004	3.1	2.934	2.879	2.820	2.808	3.111	3.078	3.090	19.5	18.8	1.4	20.9	0.93	0.4
SES	2017-18	15:07	2.938	3.7	2.862	2.883	2.827	2.822	3.135	3.107	3.122	19.9	17.5	1.4	21.3	0.91	0.5
SES	2018-19	15:08	3.089	3.3	3.020	2.888	2.835	2.822	3.143	3.116	3.125	20.1	20.5	1.4	21.5	0.98	0.5
SES	2019-20	15:09	3.265	1.5	3.215	2.910	2.859	2.847	3.155	3.131	3.139	20.4	24.9	1.3	21.7	0.80	0.5

Company	Index	Actual (l_BotexNR_TWD)	Gross CAC	Ofwat PR24 specification on Adj. Costs Actual	TWD1 Fitted	TWD2 Fitted	TWD3 Fitted	TWD4 Fitted	TWD5 Fitted	TWD6 Fitted	Triangulated	Actual Cost £m	Add Back Adj	Predicted Cost6	Gross CAC			Calc Implicit Allowance
SES	15:10	3.088	3.4	3.020	2.900	2.853	2.838	3.163	3.141	3.147	20.4	20.5	1.4	21.9	0.93			0.5
SES	15:11	3.248	3.1	3.190	2.900	2.853	2.860	3.159	3.137	3.162	20.5	24.3	1.4	22.0	0.92			0.5
SEW	16:01	4.561	17.8	4.510	4.217	4.294	4.274	4.362	4.426	4.388	75.9	90.9	4.8	80.7	6.83			-2.0
SEW	16:02	4.563	15.9	4.515	4.220	4.300	4.279	4.357	4.422	4.385	75.9	91.4	4.5	80.4	6.49			-2.0
SEW	16:03	4.546	15.3	4.494	4.224	4.307	4.285	4.362	4.429	4.391	76.3	89.5	4.8	81.1	6.81			-2.0
SEW	16:04	4.469	15.3	4.418	4.227	4.314	4.292	4.374	4.444	4.405	77.1	82.9	4.4	81.5	6.38			-2.0
SEW	16:05	4.482	16.0	4.437	4.227	4.318	4.294	4.375	4.447	4.407	77.3	84.5	3.9	81.2	5.86			-2.0
SEW	16:06	4.404	17.5	4.358	4.233	4.327	4.308	4.375	4.449	4.412	77.7	78.1	3.7	81.4	5.64			-2.0
SEW	16:07	4.358	16.1	4.319	4.240	4.335	4.318	4.382	4.458	4.421	78.4	75.1	3.0	81.3	4.94			-2.0
SEW	16:08	4.489	18.6	4.444	4.241	4.337	4.324	4.371	4.445	4.412	78.0	85.1	3.9	82.0	5.90			-2.0
SEW	16:09	4.563	17.0	4.516	4.245	4.342	4.331	4.380	4.454	4.422	78.6	91.5	4.3	82.9	6.28			-2.0
SEW	16:10	4.494	19.6	4.449	4.247	4.344	4.331	4.393	4.469	4.435	79.2	85.5	4.0	83.3	5.96			-2.0
SEW	16:11	4.337	18.9	4.300	4.258	4.355	4.344	4.392	4.466	4.435	79.6	73.7	2.8	82.4	4.74			-2.0
SSC	17:01	3.989	-4.9	4.007	3.901	3.764	3.934	4.099	4.026	4.140	53.8	55.0	-1.0	52.8	-1.61			0.6
SSC	17:02	3.936	-5.1	3.953	3.908	3.772	3.940	4.086	4.010	4.126	53.5	52.1	-0.9	52.7	-1.47			0.6
SSC	17:03	3.988	-6.8	4.009	3.912	3.775	3.967	4.100	4.026	4.159	54.5	55.1	-1.2	53.3	-1.85			0.7
SSC	17:04	3.963	-6.0	3.978	3.917	3.781	3.981	4.108	4.033	4.175	55.0	53.4	-0.8	54.2	-1.52			0.7
SSC	17:05	3.949	-3.4	3.955	3.922	3.784	3.986	4.107	4.030	4.173	55.1	52.2	-0.3	54.8	-1.03			0.7
SSC	17:06	3.974	-3.2	3.982	3.934	3.795	3.994	4.126	4.048	4.188	55.8	53.6	-0.4	55.4	-1.16			0.8
SSC	17:07	4.143	-0.9	4.137	3.950	3.810	4.012	4.142	4.064	4.205	56.7	62.6	0.4	57.1	-0.41			0.8
SSC	17:08	4.167	-2.5	4.174	3.960	3.819	4.013	4.147	4.069	4.204	57.0	65.0	-0.5	56.5	-1.25			0.8
SSC	17:09	4.209	-3.3	4.215	3.964	3.823	4.020	4.144	4.064	4.203	57.0	67.7	-0.4	56.6	-1.22			0.8
SSC	17:10	4.151	-0.4	4.148	3.968	3.827	4.024	4.149	4.069	4.208	57.3	63.3	0.2	57.5	-0.57			0.8
SSC	17:11	4.201	-2.0	4.214	3.971	3.830	4.024	4.167	4.088	4.223	57.9	67.6	-0.8	57.1	-1.63			0.8
SVE	18:01													0.0	0.00			
SVE	18:02													0.0	0.00			
SVE	18:03													0.0	0.00			
SVE	18:04													0.0	0.00			
SVE	18:05													0.0	0.00			
SVE	18:06													0.0	0.00			
SVE	18:07													0.0	0.00			
SVE	18:08	5.834	-9.2	5.857	5.785	5.691	5.721	5.831	5.763	5.760	317.2	349.7	-8.0	309.2	-5.47			-2.6
SVE	18:09	5.910	-14.7	5.933	5.786	5.694	5.727	5.824	5.756	5.757	316.7	377.1	-8.6	308.2	-5.99			-2.6
SVE	18:10	5.668	-11.3	5.698	5.826	5.733	5.770	5.831	5.765	5.766	324.6	298.2	-8.6	316.0	-5.85			-2.8
SVE	18:11	5.750	2.6	5.770	5.833	5.741	5.774	5.834	5.767	5.766	325.9	320.4	-6.3	319.5	-3.48			-2.8
HDD	19:01													0.0	0.00			
HDD	19:02													0.0	0.00			
HDD	19:03													0.0	0.00			
HDD	19:04													0.0	0.00			
HDD	19:05													0.0	0.00			
HDD	19:06													0.0	0.00			
HDD	19:07													0.0	0.00			
HDD	19:08	2.763	0.1	2.791	2.869	2.808	2.854	2.731	2.694	2.784	16.3	16.3	-0.5	15.9	-0.01			-0.4
HDD	19:09	3.096	0.2	3.118	2.872	2.812	2.858	2.736	2.700	2.792	16.4	22.6	-0.5	15.9	-0.04			-0.4
HDD	19:10	2.712	-0.2	2.754	2.888	2.828	2.875	2.739	2.704	2.794	16.6	15.7	-0.6	15.9	-0.19			-0.5
HDD	19:11	2.688	1.1	2.708	2.890	2.829	2.879	2.777	2.747	2.836	16.9	15.0	-0.3	16.6	0.15			-0.4

5-year totals 2017-18 to 2021-22

Company	Index	Actual	Gross CAC	Actual	TWD1	TWD2	TWD3	TWD4	TWD5	TWD6	Triangulated	Actual Cost £m	Add Back Adj	Predicted Cost6	Gross CAC			Calc Implicit Allowance
ANH	1	1116	89.1		827	851	839	987	977	984	911	1129	-13	897	22	56		-35
NES	2	751	-0.3		743	755	746	712	709	714	730	763	-11	719	-5	-3		-6
NWT	3	1151	-31.3		1312	1293	1313	1200	1158	1188	1244	1181	-30	1214	-17	-24		-13
SRN	4	448	-8.2		473	533	491	398	442	411	458	452	-5	453	-6	-7		1

Ofwat PR24 specification on Adj. Costs

Company	Index	Actual	Gross CAC	Actual Fitted	TWD1 Fitted	TWD2 Fitted	TWD3 Fitted	TWD4 Fitted	TWD5 Fitted	TWD6 Fitted	Triangulated	Actual Cost £m	Add Back Adj	Predicted Cost6	Gross CAC		Calc Implicit Allowance
			l_BotexNR_TWD														
SWB	6	352	-30.7		453	452	413	498	508	486	469	374	-22	447	-10	-20	-12
TMS	7	2835	-15.2		2350	2417	2383	2565	2699	2582	2499	2611	225	2724	1	-7	224
WSH	8	831	10.0		773	771	769	686	692	707	733	871	-40	693	-9	0	-31
WSX	9	356	8.3		342	350	336	340	328	325	337	368	-12	325	-1	4	-11
YKY	10	1057	-15.4		883	984	986	827	893	887	910	1095	-38	872	-19	-17	-19
AFW	11	767	86.1		647	623	704	587	575	629	627	728	39	666	30	58	9
BRL	12	278	-8.6		215	240	212	214	241	215	223	281	-3	220	-5	-7	2
PRT	14	91	-6.7		109	116	119	87	90	98	103	91	1	104	-3	-5	4
SES	15	115	15.0		91	86	85	117	114	115	101	108	7	108	5	10	2
SEW	16	429	90.2		349	385	380	401	432	418	394	411	18	412	28	59	-10
SSC	17	325	-9.1		263	228	278	317	293	336	286	326	-1	285	-5	-7	4
SVE	18	1596	-48.1		1671	1521	1568	1698	1586	1582	1604	1636	-40	1564	-26	-37	-14
HDD	19	77	1.0		81	77	80	72	70	74	76	80	-2	73	0	0	-2
		12576			11582	11680	11700	11706	11806	11751	11704	12504	72	11776	-20	53	92

Efficiency Scores

Company	Index	Actual Fitted	TWD1 Fitted	TWD2 Fitted	TWD3 Fitted	TWD4 Fitted	TWD5 Fitted	TWD6 Fitted	Triangulated	Predicted Cost6
ANH	1		1.350	1.312	1.331	1.130	1.143	1.135	1.233	1.24369
NES	2		1.011	0.995	1.008	1.055	1.060	1.052	1.030	1.045644
NWT	3		0.877	0.890	0.877	0.960	0.994	0.969	0.928	0.9483
SRN	4		0.947	0.840	0.912	1.126	1.012	1.091	0.988	0.987795
SWB	6		0.777	0.779	0.852	0.707	0.693	0.725	0.755	0.788519
TMS	7		1.207	1.173	1.190	1.105	1.051	1.098	1.137	1.040897
WSH	8		1.076	1.079	1.082	1.212	1.202	1.175	1.138	1.199536
WSX	9		1.039	1.017	1.060	1.046	1.084	1.096	1.057	1.095953
YKY	10		1.197	1.075	1.072	1.278	1.184	1.191	1.166	1.212178
AFW	11		1.185	1.230	1.089	1.306	1.334	1.219	1.227	1.150358
BRL	12		1.295	1.161	1.314	1.300	1.155	1.295	1.253	1.264956
PRT	14		0.837	0.783	0.768	1.043	1.009	0.932	0.895	0.87786
SES	15		1.267	1.332	1.343	0.982	1.006	0.993	1.154	1.058465
SEW	16		1.228	1.115	1.130	1.071	0.994	1.027	1.094	1.041307
SSC	17		1.236	1.423	1.169	1.025	1.109	0.967	1.155	1.141151
SVE	18		0.955	1.049	1.018	0.940	1.006	1.009	0.996	1.020351
HDD	19		0.954	1.010	0.971	1.071	1.112	1.043	1.027	1.055078
Range			0.574	0.643	0.574	0.600	0.642	0.570	0.498	