Affinity Water

Our Business Plan for 2020 – 2025

Appendix 10 : Ensuring Affordability and Financeability

September 2018

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Overview

This appendix contains supporting material for the Ensuring Affordability and Financeability Chapter and provides further information on our vision and strategic themes.

10.1. Wholesale price control revenue requirement

The tables below show the main components of the wholesale price control in total and split between Water Resources and Network Plus.

Total

Wholesale revenue requirement in £m	2020/21	2021/22	2022/23	2023/24	2024/25
PAYG %	*63.20%*	*61.90%*	*64.00%*	*68.40%*	*73.40%*
PAYG Totex	197.5	195.9	197.9	201.7	198.8
RCV Depreciation	52.9	58.8	64.4	69.3	73.3
Post Tax Return on RCV	39.5	42.7	45.7	48.1	49.7
Sharing Mechanism	(2.0)	(2.0)	(2.1)	(2.1)	(2.2)
PR14 Reconciliation Adjustments	(5.6)	0.0	0.0	0.0	0.0
Tax Charge	32.2	4.6	4.9	4.0	3.7
Third Party & Principal service revenues	(2.5)	(2.5)	(2.6)	(2.6)	(2.7)
Total Revenue Requirement	**282.0**	**297.4**	**308.2**	**318.3**	**320.6**

Water Resources

Wholesale revenue requirement in £m	2020/21	2021/22	2022/23	2023/24	2024/25
PAYG Totex	39.0	40.1	39.3	42.5	27.4
RCV Depreciation	6.2	7.3	8.3	9.2	9.8
Post Tax Return on RCV	4.5	5.2	5.9	6.5	6.8
PR14 Reconciliation Adjustments	(0.6)	0.0	0.0	0.0	0.0
Tax Charge	0.7	1.2	1.3	1.0	1.0
Total	**49.8**	**53.9**	**54.8**	**59.3**	**45.0**

Network Plus

Wholesale revenue requirement in £m	2020/21	2021/22	2022/23	2023/24	2024/25
PAYG Totex	158.6	155.7	158.6	159.1	171.4
RCV Depreciation	46.7	51.4	55.9	59.9	63.4
Post Tax Return on RCV	34.9	37.5	39.8	41.6	42.9
Sharing Mechanism	(2.0)	(2.0)	(2.1)	(2.1)	(2.2)
PR14 Reconciliation Adjustments	(5.0)	0.0	0.0	0.0	0.0
Tax Charge	1.5	3.4	3.6	3.0	2.7
Third Party & Principal service revenues	(2.5)	(2.5)	(2.6)	(2.6)	(2.7)
Total Revenue Requirement	**232.2**	**243.5**	**253.4**	**259.0**	**275.6**

10.2. Other income – Wholesale

The table below shows the main components of other income – Wholesale for AMP7.

Other income - wholesale

Other Income in £m	2020/21	2021/22	2022/23	2023/24	2024/25
Third party revenue - non-price control	**2.5**	**2.5**	**2.6**	**2.6**	**2.7**
Bulk supplies	2.4	2.4	2.5	2.4	2.5
Chargeable services	0.1	0.1	0.1	0.2	0.2
Mobile telephone aerial rentals	1.0	1.0	1.1	1.3	1.5
Hydrants	0.6	0.6	0.7	0.8	0.9
Rental income	0.4	0.4	0.4	0.5	0.6

10.3. Financial Statements – Actual and Notional

The Income Statement, Balance sheet and Cashflow are shown for both the actual and notional structures below.

Actual structure – Income Statement and Balance Sheet

Profit & Loss	2020-21	2021-22	2022-23	2023-24	2024-25
Revenue	313.0	328.9	340.3	351.1	353.6
Opex	(193.2)	(193.4)	(194.0)	(202.0)	(203.2)
Depreciation	(64.2)	(70.2)	(76.2)	(81.7)	(86.1)
Amortisation of capitalised debt fees	0.9	0.9	0.9	1.0	1.0
Operating profit	**56.5**	**66.2**	**71.0**	**68.4**	**65.2**
Other Income (incl. 3rd party income)	2.5	2.5	2.6	2.6	2.7
Interest income /(expense) excl. indexation of index-linked loans	(38.4)	(38.5)	(40.0)	(42.4)	(43.9)
Indexation of index-linked loans	(10.3)	(10.5)	(10.8)	(11.1)	(11.3)
Profit before tax	**10.4**	**19.7**	**22.8**	**17.6**	**12.7**
Current tax charge	(3.7)	(4.5)	(4.9)	(4.3)	(3.9)
Movement in deferred tax provision	19.5	0.3	0.1	0.3	0.7
Profit after tax	**26.2**	**15.5**	**18.0**	**13.6**	**9.5**
Dividend	(11.0)	(2.6)	(5.5)	(17.4)	(16.3)
Net profit	**15.2**	**12.9**	**12.5**	**(3.8)**	**(6.8)**
Retained earnings balance					
Retained earnings balance	238.6	253.8	266.7	279.2	275.4
Net profit	15.2	12.9	12.5	(3.8)	(6.8)
Retained earnings balance	**253.8**	**266.7**	**279.2**	**275.4**	**268.6**

Balance sheet	2020-21	2021-22	2022-23	2023-24	2024-25
Non-current assets					
Fixed Assets balance	1,504.4	1,587.8	1,658.0	1,700.9	1,714.4
Intangible assets & investments balance	51.4	51.4	51.4	51.4	51.4
Total origination fee - Asset - Wholesale	4.7	4.4	4.1	3.7	3.4
Non-current assets	**1,560.6**	**1,643.6**	**1,713.4**	**1,756.1**	**1,769.2**
Current assets					
Inventories balance	2.2	2.2	2.2	2.3	2.3
Trade debtor and other receivables balance	64.1	67.5	69.9	72.1	72.7
Retained cash balance	77.7	16.3	13.8	17.4	19.4
Current assets	**144.0**	**86.0**	**85.9**	**91.8**	**94.4**
Liabilities					
Trade creditors and other payables balance	227.9	230.4	232.4	241.6	243.7
Capex creditor balance	24.6	25.2	24.1	20.4	16.4
Dividend creditor balance	-	-	-	-	-
Total interest balance - Wholesale	13.8	13.8	13.8	13.8	13.8
Debt balance	1,083.7	1,094.2	1,152.0	1,200.5	1,227.0
Total origination fee - Liability - Wholesale	20.8	19.5	18.2	16.9	15.6
Preference share capital balance	-	-	-	-	-
Current tax liabilities balance	(2.1)	(2.1)	(2.1)	(2.1)	(2.1)
Retirement benefit obligations liabilities balance	(105.6)	(105.6)	(105.6)	(105.6)	(105.6)
Provision liabilities balance	-	-	-	-	-
Others liabilities balance	3.2	3.2	3.2	3.2	3.2
Liabilities	**1,266.3**	**1,278.8**	**1,336.1**	**1,388.8**	**1,412.1**
Net assets before deferred tax	**438.3**	**450.9**	**463.2**	**459.1**	**451.6**
Net assets					
Deferred tax balance	(158.0)	(157.7)	(157.5)	(157.2)	(156.4)
Net assets	**280.3**	**293.2**	**305.7**	**301.9**	**295.1**
Equity					
Called up share capital, including share premium balance	26.5	26.5	26.5	26.5	26.5
Non-distributable reserves balance	-	-	-	-	-
Retained earnings and other distributable reserves balance	253.8	266.7	279.2	275.4	268.6
Total equity	**280.3**	**293.2**	**305.7**	**301.9**	**295.1**

Actual structure – Cashflow Statement

Cash flow	2020-21	2021-22	2022-23	2023-24	2024-25
Cash flow from operating activities					
Operating profit	56.5	66.2	71.0	68.4	65.2
Depreciation POS	64.2	70.2	76.2	81.7	86.1
Amortisation of origination fee	(0.9)	(0.9)	(0.9)	(1.0)	(1.0)
Movement in inventories	(0.3)	0.0	0.0	(0.1)	(0.0)
Change in trade and other receivables	0.8	(3.4)	(2.4)	(2.2)	(0.7)
Change in trade creditors and other payables	23.4	3.2	0.8	5.5	(1.9)
Pension contributions	-	-	-	-	-
Provision	-	-	-	-	-
Other liability movement	-	-	-	-	-
Net cash generated / (used) in operations	143.8	135.4	144.7	152.3	147.8
Other Income (incl. 3rd party income)	2.5	2.5	2.6	2.6	2.7
Interest (income) /expense excl. indexation of index-linked loans	(38.4)	(38.5)	(40.0)	(42.4)	(43.9)
Tax paid	(3.7)	(4.5)	(4.9)	(4.3)	(3.9)
Net cash generated / (used) in operating activities	**104.2**	**94.9**	**102.3**	**108.3**	**102.6**
Cash flow from investing activities					
Capex	(149.5)	(153.6)	(146.4)	(124.6)	(99.6)
Investment in other non-current assets	-	-	-	-	-
Net cash generated / (used) in investing activities	**(149.5)**	**(153.6)**	**(146.4)**	**(124.6)**	**(99.6)**
Net cash generated before financing activities	**(45.3)**	**(58.7)**	**(44.1)**	**(16.3)**	**3.0**
Cash flow from financing activities					
Dividend paid	(11.0)	(2.6)	(5.5)	(17.4)	(16.3)
Proceeds from share issues	-	-	-	-	-
Net loans received	-	-	47.0	37.4	15.2
Net cash generated / (used) in financing activities	**(11.0)**	**(2.6)**	**41.5**	**20.0**	**(1.1)**
Increase / (decrease) in cash	**(56.3)**	**(61.3)**	**(2.6)**	**3.6**	**2.0**
Retained cash balance					
Retained cash balance	134.0	77.7	16.3	13.8	17.4
Increase / (decrease) in cash	(56.3)	(61.3)	(2.6)	3.6	2.0
Retained cash balance	**77.7**	**16.3**	**13.8**	**17.4**	**19.4**

Notional structure – Income Statement and Balance Sheet

Profit & Loss	2020-21	2021-22	2022-23	2023-24	2024-25
Revenue	315.3	331.6	343.2	354.2	356.6
Opex	(193.2)	(193.4)	(194.0)	(202.0)	(203.2)
Depreciation	(64.2)	(70.2)	(76.2)	(81.7)	(86.1)
Amortisation of capitalised debt fees	-	-	-	-	-
Operating profit	**57.9**	**68.0**	**73.0**	**70.5**	**67.3**
Other Income (incl. 3rd party income)	2.5	2.5	2.6	2.6	2.7
Interest income /(expense) excl. indexation of index-linked loans	(25.0)	(25.0)	(25.7)	(27.2)	(28.4)
Indexation of index-linked loans	-	-	-	-	-
Profit before tax	**35.4**	**45.5**	**49.8**	**45.9**	**41.5**
Current tax charge	(6.3)	(7.2)	(7.8)	(7.3)	(7.0)
Movement in deferred tax provision	19.5	0.3	0.1	0.3	0.7
Profit after tax	**48.5**	**38.6**	**42.2**	**38.9**	**35.3**
Dividend	(21.0)	(8.7)	(14.1)	(33.1)	(34.4)
Net profit	**27.5**	**30.0**	**28.2**	**5.8**	**0.9**
Retained earnings balance					
Retained earnings balance	496.4	523.9	553.9	582.0	587.8
Net profit	27.5	30.0	28.2	5.8	0.9
Retained earnings balance	**523.9**	**553.9**	**582.0**	**587.8**	**588.7**

Balance sheet	2020-21	2021-22	2022-23	2023-24	2024-25
Non-current assets					
Fixed Assets balance	1,504.4	1,587.8	1,658.0	1,700.9	1,714.4
Intangible assets & investments balance	51.4	51.4	51.4	51.4	51.4
Total origination fee - Asset - Wholesale	-	-	-	-	-
Non-current assets	**1,555.8**	**1,639.2**	**1,709.4**	**1,752.3**	**1,765.8**
Current assets					
Inventories balance	2.2	2.2	2.2	2.3	2.3
Trade debtor and other receivables balance	64.6	68.0	70.5	72.7	73.4
Retained cash balance	80.4	26.6	12.6	12.6	12.6
Current assets	**147.3**	**96.8**	**85.4**	**87.7**	**88.3**
Liabilities					
Trade creditors and other payables balance	228.3	230.9	232.9	242.1	244.3
Capex creditor balance	24.6	25.2	24.1	20.4	16.4
Dividend creditor balance	-	-	-	-	-
Total interest balance - Wholesale	12.6	12.6	12.6	12.6	12.6
Debt balance	833.6	833.6	863.5	897.7	913.6
Total origination fee - Liability - Wholesale	-	-	-	-	-
Preference share capital balance	-	-	-	-	-
Current tax liabilities balance	(2.1)	(2.1)	(2.1)	(2.1)	(2.1)
Retirement benefit obligations liabilities balance	(105.6)	(105.6)	(105.6)	(105.6)	(105.6)
Provision liabilities balance	-	-	-	-	-
Others liabilities balance	3.2	3.2	3.2	3.2	3.2
Liabilities	**994.7**	**998.0**	**1,028.7**	**1,068.5**	**1,082.5**
Net assets before deferred tax	**708.4**	**738.0**	**766.0**	**771.5**	**771.6**
Net assets					
Deferred tax balance	(158.0)	(157.7)	(157.5)	(157.2)	(156.4)
Net assets	**550.4**	**580.4**	**608.5**	**614.3**	**615.2**
Equity					
Called up share capital, including share premium balance	26.5	26.5	26.5	26.5	26.5
Non-distributable reserves balance	-	-	-	-	-
Retained earnings and other distributable reserves balance	523.9	553.9	582.0	587.8	588.7
Total equity	**550.4**	**580.4**	**608.5**	**614.3**	**615.2**

Notional structure – Cashflow Statement

Cash flow	2020-21	2021-22	2022-23	2023-24	2024-25
Cash flow from operating activities					
Operating profit	57.9	68.0	73.0	70.5	67.3
Depreciation POS	64.2	70.2	76.2	81.7	86.1
Amortisation of origination fee	-	-	-	-	-
Movement in inventories	(0.3)	0.0	0.0	(0.1)	(0.0)
Change in trade and other receivables	0.6	(3.4)	(2.5)	(2.2)	(0.7)
Change in trade creditors and other payables	23.9	3.3	0.8	5.6	(1.9)
Pension contributions	-	-	-	-	-
Provision	-	-	-	-	-
Other liability movement	-	-	-	-	-
Net cash generated / (used) in operations	146.3	138.1	147.6	155.4	150.8
Other Income (incl. 3rd party income)	2.5	2.5	2.6	2.6	2.7
Interest (income) /expense excl. indexation of index-linked loans	(25.0)	(25.0)	(25.7)	(27.2)	(28.4)
Tax paid	(6.3)	(7.2)	(7.8)	(7.3)	(7.0)
Net cash generated / (used) in operating activities	**117.4**	**108.4**	**116.7**	**123.5**	**118.1**
Cash flow from investing activities					
Capex	(149.5)	(153.6)	(146.4)	(124.6)	(99.6)
Investment in other non-current assets	-	-	-	-	-
Net cash generated / (used) in investing activities	**(149.5)**	**(153.6)**	**(146.4)**	**(124.6)**	**(99.6)**
Net cash generated before financing activities	**(32.1)**	**(45.2)**	**(29.8)**	**(1.1)**	**18.5**
Cash flow from financing activities					
Dividend paid	(21.0)	(8.7)	(14.1)	(33.1)	(34.4)
Proceeds from share issues	-	-	-	-	-
Net loans received	-	-	29.9	34.3	15.9
Net cash generated / (used) in financing activities	**(21.0)**	**(8.7)**	**15.8**	**1.1**	**(18.5)**
Increase / (decrease) in cash	**(53.1)**	**(53.9)**	**(13.9)**	**0.0**	**(0.0)**
Retained cash balance					
Retained cash balance	133.6	80.4	26.6	12.6	12.6
Increase / (decrease) in cash	(53.1)	(53.9)	(13.9)	0.0	(0.0)
Retained cash balance	**80.4**	**26.6**	**12.6**	**12.6**	**12.6**

10.4. Wholesale operating costs

The tables below set out our opex projections for the line items included in our Wholesale operating costs table.

Power costs

Power Costs in £m	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2017/18
Absolute	20.3	21.5	21.7	22.9	22.0	22.0	21.1	21.1
Year on year	N/A	1.2	0.2	1.2	(0.9)	0.0	(0.9)	0.0

We have modelled these costs, based on our energy demand from AMP6, remaining stable and prices increasing in line with inflation. We have then included the additional energy demands that will result from new and improved production sites developed to deliver the 36.31 ml/d sustainability reductions in our Central Region throughout AMP7.

We have also modelled the reduction in price we will achieve as our self-generation energy Capex schemes are delivered from year 2 onwards.

Refer also to the Wholesale Technical Appendix for further details.

Abstraction Charges

Abstraction charges in £m	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Absolute	3.8	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Year on year	N/A	0.6	-	-	-	-	-	-

We do not expect our abstraction costs to deviate from inflationary price rises throughout AMP7, using our AMP6 exit point to model our costs.

Bulk Supply

Bulk Supply charges in £m	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Absolute	7.5	8.8	7.2	9.2	8.0	7.7	12.6	12.6
Year on year	N/A	1.3	(1.6)	2.0	(1.2)	(0.3)	4.9	-

We have modelled our AMP6 exit demand before adding in the uplift in costs associated with the additional import we will require as our Central Region sustainability reductions are phased in.

Our sole source of import to mitigate against the loss of water owing to these reductions is Anglian Water's Grafham reservoir. During AMP7 we anticipate up to 36.31ml/d of sustainability reductions which, owing to the location of these sites on our network cannot be replaced by our sources. Although leakage reductions will mitigate against the loss for some

of this water, this will not compensate for the majority of the reduction. We will therefore need to import more water to compensate for the reduction in our own production capacity.

We have assumed this price will remain in line with inflation throughout AMP7.

Other operating expenditure

Other operating expenditure in £m	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Absolute	93.0	87.9	86.4	89.3	85.3	81.9	78.8	76.6
Year on year	N/A	(5.1)	(1.5)	2.9	(4.0)	(3.4)	(3.1)	(2.2)

The key cost drivers within our other operating costs are people, subcontractor costs and chemicals.

Using our AMP6 exit for the basis of our modelling, we have then built in the efficiency programme identified previously. This will deliver substantial people cost savings to our customers' demands in AMP7.

Subcontractor costs will also fall as we build upon the unit rate reductions we have seen in AMP6 for the delivery of our maintenance and renewals programme. We have assumed that price rises will be in line with inflation, although we have experienced substantially above inflation price rises in AMP6. This is because our labour market is in close proximity to London, where construction projects continue at pace and the labour pool is finite. The impact of Brexit on this labour market has also not been modelled.

We have assumed chemical costs will only increase in line with inflation. However, as projects at Sundon in our East region come on line, these costs will increase substantially in year 5.

Local Authority and Cumulo Rates

Local Authority and Cumulo Rates in £m	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Absolute	15.9	15.3	14.5	14.6	14.7	14.8	14.9	15.0
Year on year	N/A	(0.6)	(0.8)	0.1	0.1	0.1	0.1	0.1

Our business rates are inclusive of Local Authority Rates (Hub Rates – charge for our head office building) and Cumulo Rates which are based on the Rateable Value (RV) of operating buildings.

As a result of the revaluation exercise in 2017/18, our RV was re-based from £32m to £29.2m. Therefore, we were entitled to transitional relief that will gradually phase our bills to the correct amount by 2020/21.

From AMP7 onwards we have assumed RV remains the same and our bills will only be impacted by inflation.

Third party services

Third party services in £m	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Absolute	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Year on year	N/A	-	-	-	-	-	-	-

We incur these costs as a result of exporting bulk supplies to South East Water and we have assumed these costs to remain the same throughout the AMP as we do not expect a deviation in the export volume.

10.5. Pension costs

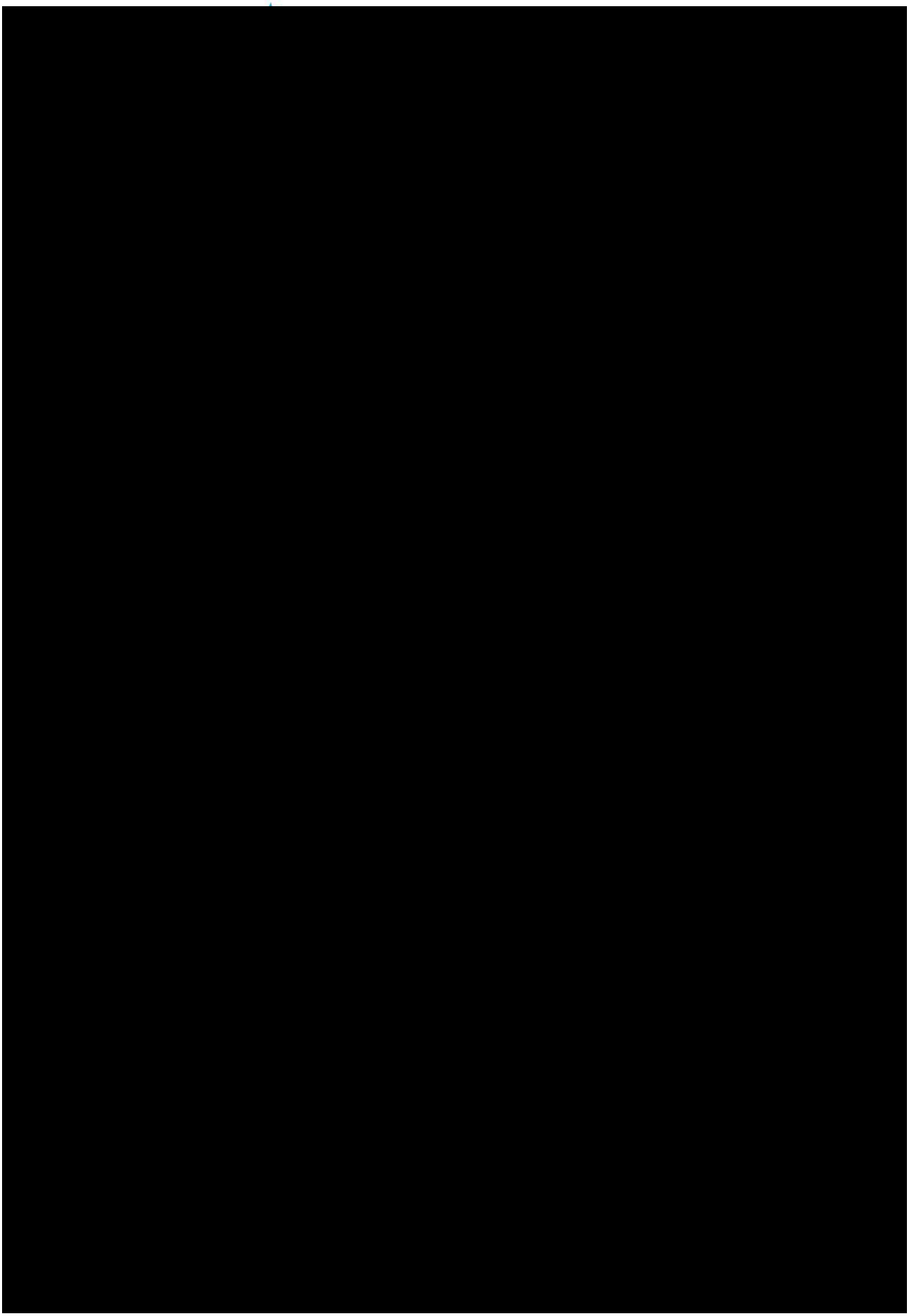
The tables below include summary information on cash contributions included in detail in data table App 22.

Defined benefit cash contributions

In £m	2020/21	2021/22	2022/23	2023/24	2024/25
Ordinary contributions	**4.708**	**4.622**	**4.537**	**4.454**	**4.372**
Residential Retail	0.577	0.567	0.556	0.546	0.536
Wholesale water resources	0.434	0.426	0.418	0.410	0.403
Wholesale water network plus	3.697	3.629	3.563	3.497	3.433
Additional contributions	**-**	**-**	**-**	**-**	**-**
Residential Retail	-	-	-	-	-
Wholesale water resources	-	-	-	-	-
Wholesale water network plus	-	-	-	-	-
Total cash contributions	**4.708**	**4.622**	**4.537**	**4.454**	**4.372**

Defined contribution cash contributions

In £m	2020/21	2021/22	2022/23	2023/24	2024/25
Residential Retail	0.614	0.614	0.614	0.614	0.614
Wholesale water resources	0.257	0.257	0.257	0.257	0.257
Wholesale water network plus	2.193	2.193	2.193	2.193	2.193
Total cash contributions	**3.064**	**3.064**	**3.064**	**3.064**	**3.064**



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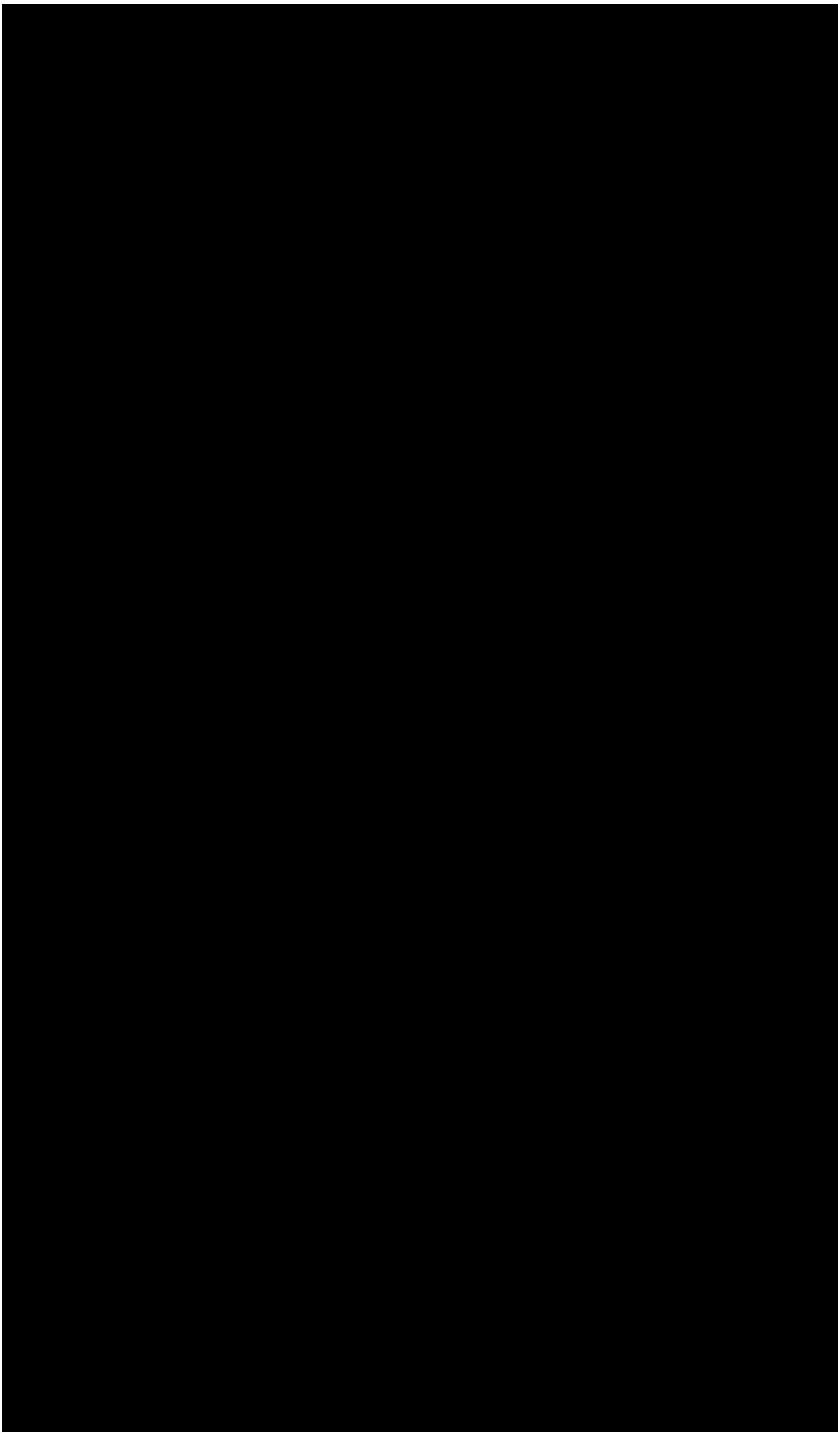

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10.7. PR19 retail household IPP analysis and evidence

The following documentation provides supporting information on the PR19 retail household IPP analysis performed by Economic Insight.

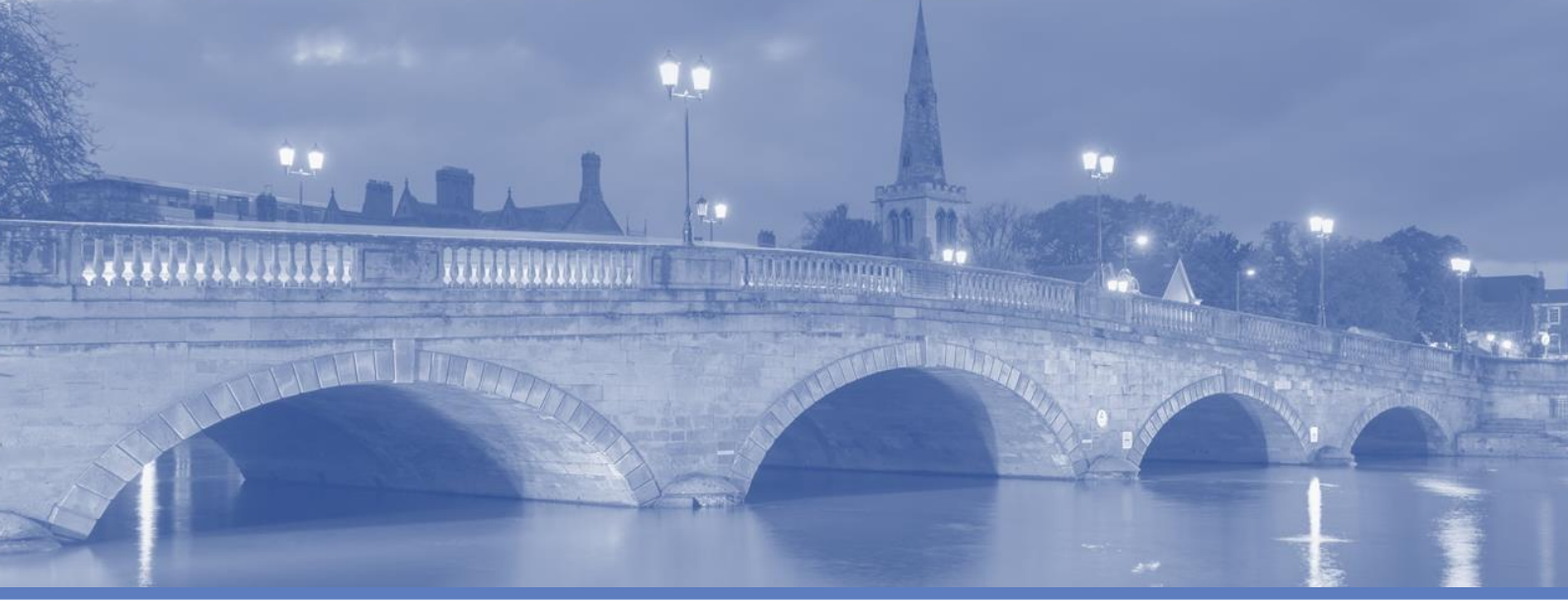
Economic Insight

April 2018

Economic Insight Ltd

PR19 Retail Household IPP Analysis and Evidence

Draft report for Affinity Water



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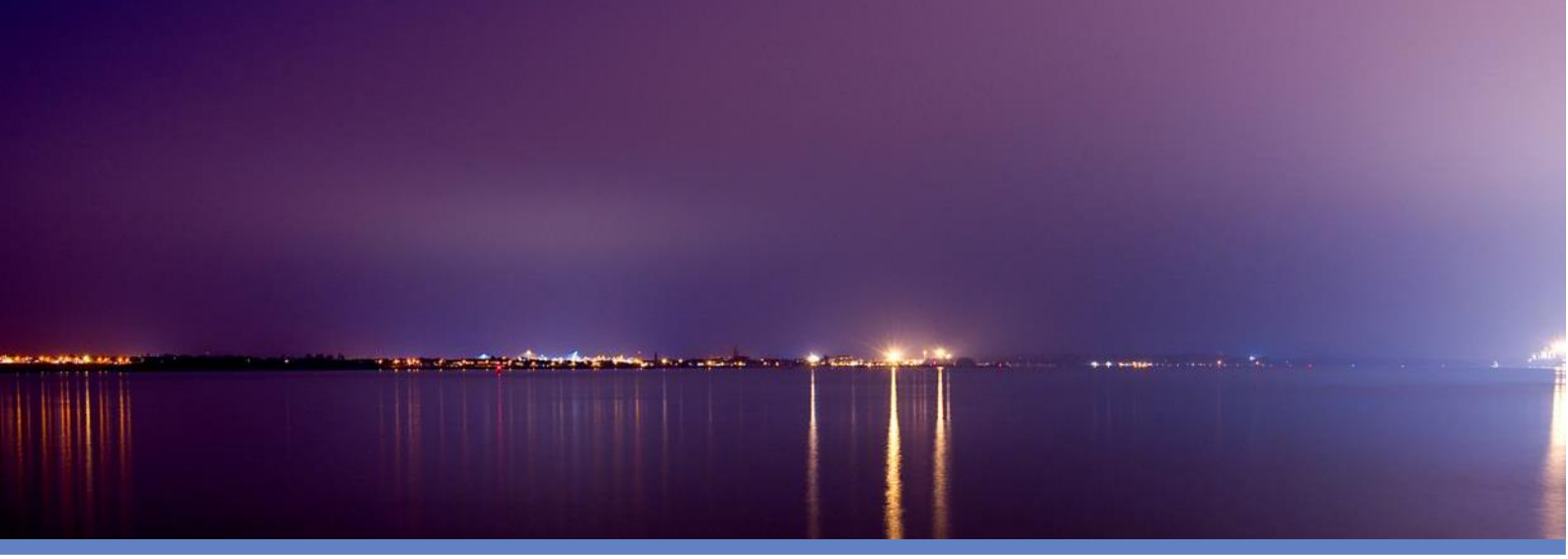


1. Executive summary

This report contains an analysis of the retail input price pressure (IPP) Affinity Water (Affinity) will face during PR19. The evidence provided here can be used to help the company determine appropriate baseline costs for its retail business and can further be used as supporting evidence for the relevant data tables stipulated by Ofwat. Relatedly, we note that in its Final Methodology, whilst Ofwat has elected not to index the retail controls for inflation, it has left open the possibility of allowing for inflation within totex, applying a 'common method' for all companies. Consequently, the analysis contained here might be of assistance in applying such a method. Similarly, in the event that Ofwat does not include inflation within forward-looking totex, this report could be used to support a cost adjustment claim by Affinity.

1.1 Background and introduction

'We will review evidence on forecast IPP in retail for the duration of the price control. If appropriate, we will make a cost allowance for inflation as part of totex. This approach ensures companies stay incentivised to manage the risk of IPP.' - Ofwat

Ofwat has confirmed that, at PR19, it will not automatically index for inflation in relation to the household (HH) retail control. In its Final Methodology, the regulator set out its position as follows: "*we will not index the retail controls to a general measure of inflation. We consider that this approach is most appropriate for the retail controls, and provides appropriate incentives for companies to manage input costs. This is consistent with the incentives for businesses in more competitive markets.*"[1] However, Ofwat indicated that it *might* still consider allowing for retail inflation within its forward-looking totex allowances – as set out below:

"We will review evidence on forecast IPP in retail for the duration of the price control. If appropriate, we will make a cost allowance for inflation as part of totex. This approach ensures companies stay incentivised to manage the risk of IPP… We will consider evidence on IPP submitted by companies. We will also consider independent data sources and forecasts, such as data from the Office for National Statistics on wage growth rates. Given that our PR19 approach involves setting an efficient cost allowance

[1] *'Delivering Water 2020: Our final methodology for the 2019 price review.' Ofwat (December 2017), Appendix 11: Securing cost efficiency, page 23.*

for all companies, we intend to apply a common method for determining an inflation allowance for all companies, if we consider that such an allowance is appropriate."[2]

Ofwat further stated that the evidence it will review from companies (as referred to in the above quotations) relates to that provided to support the data contained in Appointee Tables 24 and 24a.[3] Given this, there is a need for companies to provide high quality evidence as to the IPP they will face in respect to HH retail. Given Ofwat's position, this analysis and evidence could be used in various ways, including:

- First, an analysis of retail IPP is, in any case, necessary to assist companies with deriving their retail cost baselines and, relatedly, as *supporting evidence* for Appointee Tables 24 and 24a.
- Second, the development of robust analysis, may: (i) help provide evidence to Ofwat that it should, indeed, include retail IPP in forward-looking totex allowances; and relatedly (ii) assist Ofwat in determining a consistent method that can be applied for all companies.
- Third, should Ofwat not apply an allowance for all companies, it could form the basis for a cost adjustment claim for Affinity.

The aim of our work for Affinity has been to provide robust evidence regarding the retail IPP that will arise over PR19. This evidence can be used for any of the above purposes – and so, where appropriate, we explain what our findings imply for each of the above.

1.2 Our conceptual approach and method

1.2.1 Conceptual approach

Consistent with our conceptual approach that was accepted by Ofwat at PR14, the analyses contained within this report are all based on established economic theory and evidence. This starts from the observation that all firms face IPP – and that, in a competitive market, efficient firms would be expected to pass that IPP onto their customers. Firms that are not perfectly efficient, however, would only be able to pass on the 'net' impact of IPP and their inefficiency.

Therefore, our report starts from the proposition that, ultimately, the various elements of the regulatory framework should (collectively) ensure that the net amount of IPP is allowed for, taking account of:

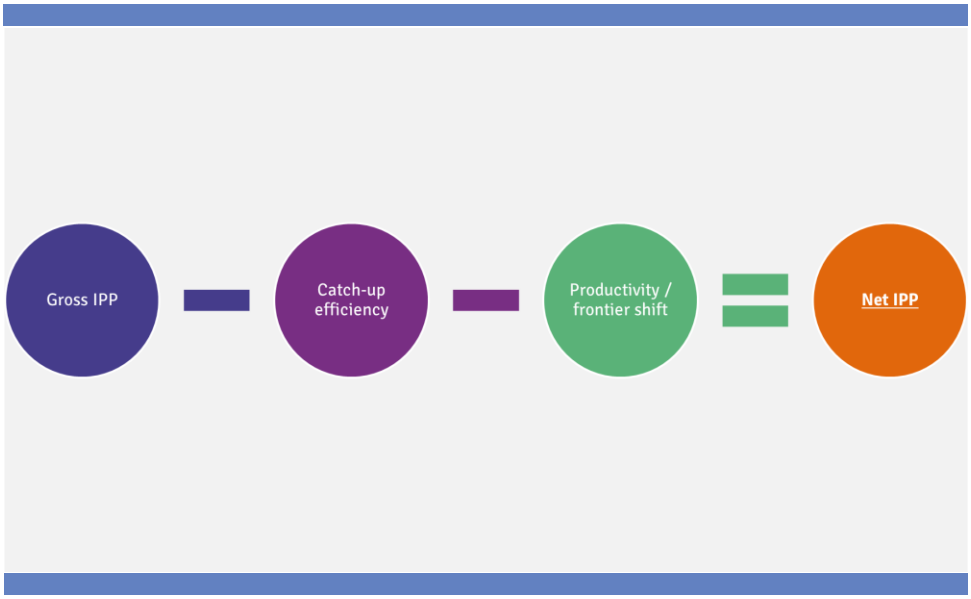
- underlying gross IPP;
- the productivity gains that even an efficient firm could make (i.e. productivity / frontier shift); and
- any further efficiency savings that could be made, as a result of catching up to a defined efficiency frontier (i.e. catch-up efficiency).

[2] *'Delivering Water 2020: Our final methodology for the 2019 price review.' Ofwat (December 2017), Appendix 11: Securing cost efficiency, page 24.*

[3] *'Delivering Water 2020: Our final methodology for the 2019 price review.' Ofwat (December 2017), Appendix 11: Securing cost efficiency, page 24.*

The above matters, because it is intended to ensure that only cost pressure that is outside of (efficient) management control is included within the price control. Our framework is illustrated in the following figure.

Figure 1: Our framework



Source: Economic Insight

1.2.2 Our method

Applying our method in practice required us to develop a wide range of detailed analyses, including:

- Forecasting underlying gross input inflation, where we have used three approaches:
  - *Approach 1: Economic fundamentals.* This is based on the analysis of the relationship between input costs and key economic indicators.
    - » Some methods are based on the 'wedge' between input costs and other inflation indicators, such as the Consumer Prices Index (CPI).
    - » Other methods are based on statistical analysis of the relationship between input costs and variables relating to the UK's wider economic performance, such as Gross Domestic Product (GDP).
  - *Approach 2: Extrapolations.* Here, we extrapolate existing trends in input costs forward. This approach was widely used by companies at PR14. However, our view is that Ofwat may place less emphasis on it at PR19 (relative to technically superior analytical methods).[4]
  - *Approach 3: Independent third-party forecasts.* There are independent third-party forecasts for *certain* input costs, such as labour – which we review and take into consideration, where appropriate.

[4] *See: 'Delivering Water 2020: Our final methodology for the 2019 price review.' Ofwat (December 2017), page 143.*

- Determining the scope for productivity / frontier shift, where we have analysed a range of publicly available data – including EU KLEMS.

- Estimating the scope for retail 'catch-up' efficiency, which here we have based on the average percentage efficiency gap to the upper quartile across Ofwat's own retail cost assessment models.[5]

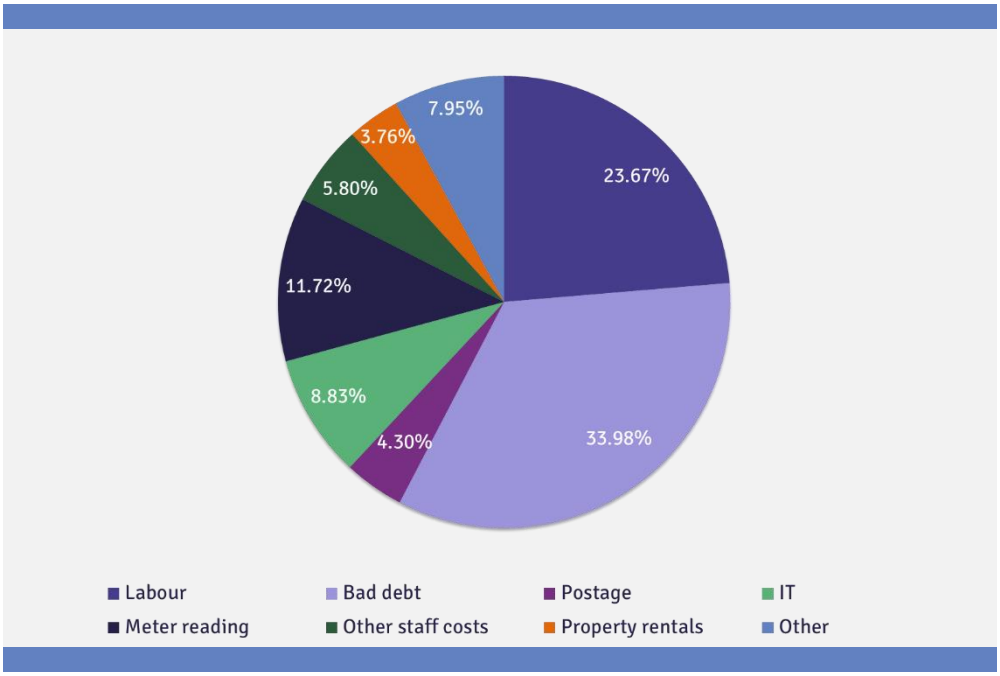
1.3 Key findings – a summary

1.3.1 Gross IPP evidence

Our analysis suggests a gross IPP for HH retail of between 1.86% to 2.38% per annum for Affinity Water over the period 2020/21 to 2024/25.

Affinity's data shows that most of its opex HH retail costs relate to either staff or bad debt, as the following chart illustrates.

Figure 2: Split of Affinity Water's opex HH retail costs, 2016/17 (reconciled to regulatory accounts)[6]



Source: Economic Insight analysis of Affinity Water cost data

Our gross inflation forecasts began from a detailed mapping of the key categories of retail costs incurred by Affinity (as above) to independent inflation data. For example, in relation to labour costs, we asked Affinity to provide us with a full list of household retail roles, including associated costs and headcounts. We then mapped individual roles to occupational level wage inflation data from the ONS by Standard Occupational Classification (SOC) codes, to create an Affinity specific retail wage index. For the

5 *See Ofwat's consultation: Cost assessment for PR19: a consultation on econometric cost modelling, March 2018.*

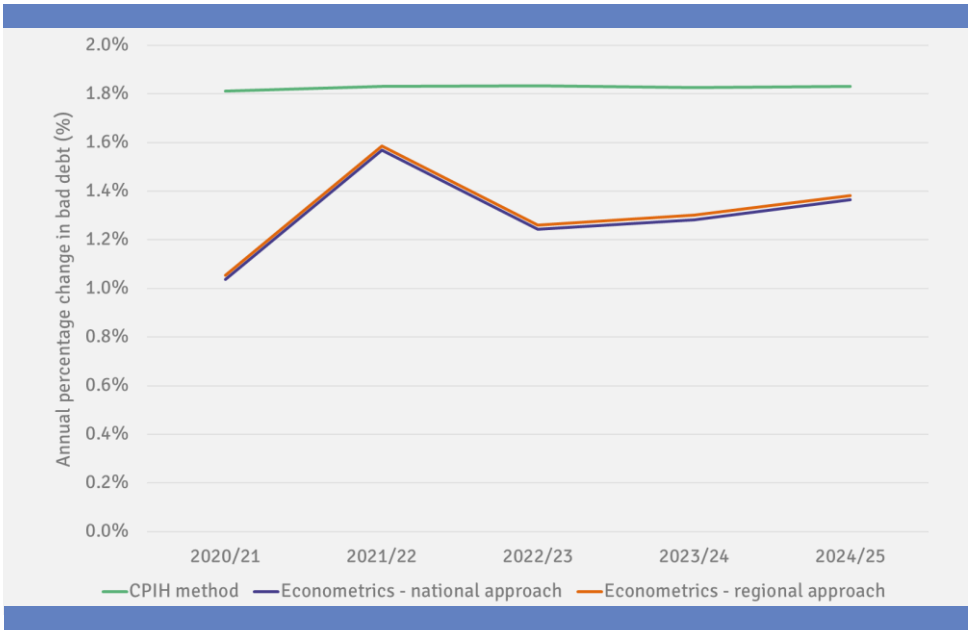
6 *To ensure consistency with the company's published regulatory accounts, we used the 'other' category as a balancing item, calculated as 'opex' (as per regulatory accounts) minus the sum of granular opex costs by category (e.g. labour, bad debt, postage, IT, property rentals, and meter reading) provided by the company.*

other key retail cost categories, we also identified the most relevant historical data from the ONS and other credible sources at a granular level. Here, our aim was to avoid basing forecasts on the 'actual' costs incurred by Affinity, because this could embed a degree of inefficiency. Rather, for each cost category, we have created a bespoke inflation 'index', which avoids any conflation of inefficiency.

Having developed our inflation indices, we project IPP over the price control period (2020/21 to 2024/25). We have used various methods to achieve this, as summarised above. These included undertaking econometric analysis, as well as extrapolating historical data forward, by assuming that the relationship between individual price pressure measures and more aggregate measures (for which there are official forecasts, such wage inflation, or CPI etc) hold over time.

Regarding bad debt, the simplest approach would have been to assume IPP equivalent to CPIH[7] (as CPIH is included within the wholesale controls, which, by definition, flows through to debt related costs in retail, due to the impact this has on 'bill size'). However, this ignores the fact that both deprivation (i.e. socio-economic factors) and average wholesale bill size, will also impact bad debt costs over time. Given this, we used an econometric model to project Affinity's *underlying* bad debt inflation, which incorporates both potential changes in bill size and macroeconomic factors.[8] As shown below, this approach results in lower bad debt inflation forecasts relative to a simple CPIH method. This is, therefore, 'conservative' from a company perspective, but we consider it to be a more credible approach.

Figure 3: Bad debt IPP implied by econometrics versus CPIH



Source: Economic Insight analysis

[7] *The CPIH is the consumer price index including owner occupiers' housing costs.*

[8] *As we explain in the relevant chapter and annex to this report, it is important to note that forecasting models can be fundamentally different from cost efficiency benchmarking models – and the econometric analysis contained here is strictly for the purpose of forecasting.*

Drawing our various approaches together, the following table summarises our forecasts of overall gross retail IPP over the period.

Table 1: Summary of forecast gross retail IPP

	2020/21	2021/22	2022/23	2023/24	2024/25	Average
High	2.20%	2.31%	2.39%	2.39%	2.39%	2.34%
Medium	1.68%	1.95%	1.91%	1.93%	1.96%	1.88%
Low	1.59%	1.88%	1.85%	1.86%	1.89%	1.81%

Source: Economic Insight analysis

1.3.2 Frontier shift (productivity)

Analysis indicates that Affinity could make HH retail productivity savings of between -0.42% (i.e. negative) and +1.10% pa in relation to opex (which is most relevant to retail). This is based on an analysis of EU KLEMS data.

Further to gross IPP, we also considered the scope for productivity improvements (i.e. the savings an efficient firm could make) for Affinity Water. Our approach was based mainly on an analysis of EU KLEMS data, where we:

- developed a composite index of comparators, based on an analysis of their underlying characteristics; and then
- evaluated the TFP trend of the index over differing time-periods.

Here, a critical issue for PR19 is how to reflect the UK's weak productivity performance since the financial crisis (which data shows is the longest period of flatlining productivity performance in history). Therefore, we developed three scenarios:

- **Central case – covering the 16-year period from 1999 and 2015.** It therefore includes 8 years post-crisis and 8 years pre-crisis (when productivity was nearer its long-term average). This scenario attaches equal weight to both periods, and so implicitly assumes that productivity will somewhat improve over PR19 back towards its long-term position. We consider this to be a neutral interpretation of the data.

- **Low case - focusing on the post-crisis period (2007 to 2015).** This assumes that the current flatline performance will continue. Given the current outlook for the UK, this is also plausible.

- **High case - uses the period from 1999-2008.** The high scenario effectively 'ignores' the post crisis period and the UK's decade long low productivity performance. Under this scenario, one implicitly assumes that the UK quickly returns to its long-term productivity trend. In our view, this is less plausible than our central and low scenarios – but is included to help provide a 'reasonable range' for future productivity.

Our results for HH retail are summarised overleaf.

Table 2: Summary of frontier-shift

Scenario / cost type		Low	Central	High
Time-period data based on		2007-2015	1999-2015	1999-2008
Retail	Opex	-0.42%	0.42%	1.10%
	Capex	-0.31%	0.28%	0.56%

Source: Economic Insight analysis

1.3.3 Catch-up efficiency

We have replicated Ofwat's recently published retail efficiency models. Using an average from the regulator's totex models, this implies that Affinity could make catch-up related efficiency savings over PR19 of 24% (equivalent to 4.7% pa), based on the efficiency gap to upper quartile. Note, these figures do not represent our, or Affinity's own views, on relative efficiency. Rather, they are used here to show what Ofwat's own models would imply for net IPP once catch-up gains are deducted from gross IPP.

The analysis of catch-up efficiency is based on the efficiency gaps to the upper quartile as of Ofwat's retail cost assessment models published for consultation on March 29, 2018.[9] The table below shows the level of efficiency catch-up for Affinity (to the upper quartile) implied by Ofwat's totex models.

Table 3: Catch-up efficiency challenge (% total over PR19)

Parameter / scenario	Assumption / output
Model weights	Equal weights
Residual adjustment	None
Benchmark	Upper quartile
Glide path	None
Total efficiency challenge over PR19 %)	24%
Average catch-up efficiency challenge pa (%)	4.8%

Source: Economic Insight analysis

For the purpose of setting a cost efficiency challenge for HH retail, Ofwat is not proposing to set a 'glide path' (the implication being that the entirety of the above efficiency challenge would need to be delivered by the first year of the control).

[9] *For more details please refer to Annex D.*

1.5 Conclusions

Bringing all of the evidence together, our view is that Affinity could face net IPP in its HH retail business of between -3.41% and -2.88% per annum on average over the period 2020/21 to 2024/25, with a central case of -3.34% pa. For clarity, this simply implies that the sum of total efficiency savings set by Ofwat is likely to exceed gross IPP - it does not mean that the company does not face inflationary pressures. Indeed, as we explain elsewhere, **because the regulatory framework separately makes deductions for catch-up efficiency and productivity, it is important that all companies are set allowed baselines that properly reflect the gross IPP they face.**

The details of our assessment are summarised in the table below, year-by-year. In recognition of the uncertainty regarding forecasts for key parameters (particularly in any individual year), we believe it would be reasonable to:

- Use either of the low, medium, or high estimates from our forecasts, depending on how much Affinity wants to challenge itself over PR19.[10]
- Use either the projected annual profile, or apply the annual averages, depending on the company's preference for smoothing bill impacts.

Table 4: Summary of key IPP forecasts

Calculation step	Scenario	2020 / 21	2021 / 22	2022 / 23	2023 / 24	2024 / 25	Average over PR19
Gross IPP (%)	High	2.20%	2.31%	2.39%	2.39%	2.39%	2.34%
	Medium	1.68%	1.95%	1.91%	1.93%	1.96%	1.88%
	Low	1.59%	1.88%	1.85%	1.86%	1.89%	1.81%
Catch-up efficiency savings (%)	Upper quartile	24%	0%	0%	0%	0%	4.80%
Productivity savings (%)	Medium	0.42%	0.42%	0.42%	0.42%	0.42%	0.42%
Affinity Water net IPP (%)[11]	High	-22.2%	1.89%	1.97%	1.97%	1.97%	-2.88%
	Medium	-22.7%	1.53%	1.49%	1.51%	1.54%	-3.34%
	Low	-22.8%	1.46%	1.43%	1.44%	1.47%	-3.41%

Source: Economic Insight analysis

[10] *Note that in our estimates for gross IPP we always use the wedge to CPI estimates for the IT, postage, and property rentals IPP estimates, as well as the independent forecasts for the other IPP estimates, as the other methods did not produce robust estimates. The high, medium and low estimates are arrived at by using the following methods for labour and bad debt.* ***High*** *estimates: labour – independent forecasts; bad debt – CPIH.* ***Medium*** *estimates: labour – wage econometrics, levels (2 digit SOC); bad debt – regional.* ***Low*** *estimates: labour – wedge to UK wages (2 digit SOC); bad debt – national.*

[11] *Note that in our estimates for net IPP we have always deducted the catch-up efficiency to the upper quartile (as implied by Ofwat's own models) and medium productivity savings from the* ***high***, ***medium***, *and* ***low*** *gross IPP.*

In the remaining subsections of this executive summary, we explain in more detail what the above findings imply for:

- supporting evidence for relevant Ofwat data tables;
- developing robust analysis, which may: (i) help provide evidence to Ofwat that it should, indeed, include retail IPP in forward-looking totex allowances; and relatedly (ii) assist Ofwat in determining a consistent method that can be applied for all companies – as referenced above; and
- forming the basis for a retail cost adjustment claim, should Ofwat not apply an allowance for all companies.

1.5.1 Using the analysis as supporting evidence for Ofwat data tables

The evidence set out in this report provides supporting evidence that can assist in the population of Ofwat data tables – as follows.

1.5.1.1 Appointee Table 24a

Section F of Appointee Table 24a asks for **IPP** included in residential retail – and section L asks for the **assumed efficiency gains** in residential retail. In both cases, separate lines are shown for 'operating expenditure' and 'depreciation.' All figures are asked for on a % pa basis.

Section F: underlying IPP for residential retail

In relation to Section F, Ofwat specifically states: *"For retail services, companies should provide the forecast of IPI (input price inflation) for each cost category, rather than the RPE. This is because we do not index the retail control to the CPIH or any other inflation index. "*[12]

Following from the above, for HH retail, we consider that the appropriate figures to use in Table App24a are the **gross** IPP numbers set out above (repeated below for ease of reference). Affinity could choose either the 'high', 'medium' or 'low' case, depending on 'how challenging' it wanted to be. It should use these numbers to populate the 'opex' related IPP line.

Table 5: Summary of forecast gross retail IPP (use for completing opex line)

	2020/21	2021/22	2022/23	2023/24	2024/25	**Average**
High	2.20%	2.31%	2.39%	2.39%	2.39%	2.34%
Medium	1.68%	1.95%	1.91%	1.93%	1.96%	1.88%
Low	1.59%	1.88%	1.85%	1.86%	1.89%	1.81%

Source: Economic Insight analysis

In relation to populating the IPP line for **depreciation** for HH retail, there is some discretion as to what the appropriate approach should be. Given that HH retail is relatively asset light, we consider it credible to use the same assumptions as per opex above. Alternatively, as the majority of retail related capital expenditure will relate to

[12] *'Delivering Water 2020: Our methodology for the 2019 price review Final guidance on business plan data tables.' Ofwat (2017), page 32.*

IT and billing related systems, we consider that using the gross IPP figures for "IT", as set out in the main body of this report, would also be credible. For summary purposes, these are shown below.

Table 6: Summary of gross IPP for retail IT (alternative to depreciation IPP line)

	2020/21	2021/22	2022/23	2023/24	2024/25	Average
IT gross IPP (%)	0.72%	0.73%	0.74%	0.74%	0.74%	0.73%

Source: Economic Insight analysis

Section L: assumed efficiency gains for residential retail

As noted above, Section L of Table App24a requires companies to enter the assumed efficiency gains for residential retail, in % pa. We assume that the total efficiency gain required includes **both** the **'catch-up'** element (which for the purposes of this report we have derived from Ofwat's econometric models) and the scope for **'frontier shift'**). However, we note that Ofwat's Final Methodology is not explicit on this matter; and so Affinity may wish to seek clarification from the regulator before populating the data table.

For 'frontier' (productivity) savings, we have identified 'low', 'medium' and 'high' case projections, and for 'catch-up' savings we identified catch-up to upper quartile (from Ofwat's totex models). As such, the **total** % efficiency savings that should be used in Section L of Table App24a will depend on which assumptions Affinity elects to use. Again, for ease of reference, the relevant figures are set out below. Ultimately, **in practice, Affinity should populate 24a based on its own views regarding the scope for catch-up and productivity efficiency savings** – which clearly might differ from those implied below.[13]

Table 7: Figures relevant to Section L of table App24a

Variable	Scenario	2020 / 21	2021 / 22	2022 / 23	2023 / 24	2024 / 25	Average over PR19
Catch-up efficiency savings (%)	Upper quartile	24%	0%	0%	0%	0%	4.8%
Productivity savings (%)	High	1.10%	1.10%	1.10%	1.10%	1.10%	1.10%
	Medium	0.42%	0.42%	0.42%	0.42%	0.42%	0.42%
	Low	-0.42%	-0.42%	-0.42%	-0.42%	-0.42%	-0.42%

Source: Economic Insight analysis

[13] *For example, Affinity may have developed its own retail cost assessment models, or may have had separate external consultancy work commissioned on these issues.*

1.5.1.3 Reconciliation to Appointee Table 24

Section E of Appointee Table 24 relates specifically to residential retail. Ofwat's guidance in relation to this states that: *"Table App 24 should be reported as percentages on the basis of total expenditure, including both operating expenditure and capital expenditure. The reported proportions of all input price categories should add up to 100%."*[14]

Consequently, to assist in ensuring internal consistency, the following table (overleaf) shows how the cost splits we have used in deriving our inflation forecasts translate to the required *totex* cost splits of Table 24. Here, the key points to note are as follows:

- We have created a row for each of the relevant residential retail opex input costs, as well as an additional row for capital related costs.
- The opex related percentages are based on the same absolute values used in our inflation forecasts, but are rebased over totex (as per the company's latest regulatory accounts).
- We have ensured that overall totex is consistent with that reported in the company's latest regulatory accounts – and all percentage splits are therefore consistent with this.
- As Appointee Table 24 further requires the above percentage totex splits to be forecast over PR19, overleaf we set out our projections for this, consistent with our inflation forecasts. Note, Affinity should not necessarily populate Table 24 with these figures. Rather, the company should: (i) clarify with Ofwat exactly how the regulator wishes Table 24 to be populated; and then (ii) use our evidence in a manner consistent with this. Specifically:
  - The splits below reflect our 'central case' inflation forecasts (which are set out in the relevant sections of chapter 2). If Affinity were to apply different inflation assumptions, it would need to revise the projected cost splits over time accordingly.
  - Similarly, we have based these projections **solely** on the effect of input price inflation over time. In practice, Affinity's Plan may include changes in cost 'mix' over time that are unrelated to inflation (e.g. hiring additional employees, or the timing of capital spend etc).

[14] *'Delivering Water 2020: Our methodology for the 2019 price review Final guidance on business plan data tables.' Ofwat (2017), page 32.*

Table 8: Projected percentage cost splits over PR19 by type of cost – consistent with our inflation forecasts

Retail cost item	2020/21	2021/22	2022/23	2023/24	2024/25
Labour	22.33%	22.42%	22.56%	22.69%	22.82%
Doubtful debts	32.05%	31.96%	31.77%	31.59%	31.42%
IT	4.05%	4.25%	4.45%	4.66%	4.88%
Postage	8.33%	8.23%	8.14%	8.05%	7.96%
Property rentals	11.06%	11.05%	11.05%	11.05%	11.05%
Meter reading	5.47%	5.49%	5.53%	5.56%	5.59%
Other staff costs	3.55%	3.50%	3.45%	3.40%	3.35%
Other	7.50%	7.51%	7.52%	7.52%	7.53%
Capex[15]	5.66%	5.60%	5.54%	5.48%	5.41%
Total	100.00%	100.00%	100.00%	100.00%	100.00%

Source: Economic Insight analysis of Affinity Water data

1.5.2 Implications for applying a common approach to IPP across companies

It is demonstrably the case that all companies (regardless of their relative or absolute efficiency) face underlying IPP. In a competitive market, for firms that were assumed to be efficient, economic theory states that this would be passed through to end prices. Firms that were less than perfectly efficient, whilst still facing this IPP, would only be able to 'pass on' the net impact of inflation and their inefficiency.

Applying the above to the water sector, where price control regulation is in place, and firms cannot be assumed to be efficient – again it is important to emphasise that all firms will face underlying inflationary pressure, regardless of whether they are efficient or not. With this in mind, we should highlight that, at PR19, Ofwat will separately apply an efficiency challenge in HH retail, which by definition results in allowed revenues and prices being 'lower' for less efficient firms than more efficient ones. Consequently, as the impact of the efficiency of firms on prices is already being controlled for elsewhere, it logically follows that gross retail IPP should be included in totex for all companies.

This is the only method that:

- ensures that the appropriate 'net' effect of inflation and efficiency is reflected in the price limits;
- accords with economic theory; and
- is consistent with outcomes that one would expect to arise in a competitive market.

The above strongly point to it being essential for Ofwat to allow for HH retail IPP in allowed totex for all companies. In addition, we consider that the range of evidence and analytical approaches set out here provide a good basis from which Ofwat could adopt a 'common method' for making such allowances for firms, as suggested in the regulator's Final Methodology.

[15] *Capex line reflects depreciation and amortisation costs, to which IT IPP forecasts are applied.*

1.5.3 Implications for any HH retail IPP cost adjustment claim

Given Ofwat's Final Methodology, there are two circumstances under which it could be appropriate for Affinity to use the evidence and analysis set out here as the basis for a cost adjustment claim:

- Firstly, in the event that Ofwat does not, as a matter of course, include an allowance for HH retail IPP for all companies on a consistent basis in forward-looking totex, then clearly (as a matter of principle) such costs could only be allowed for through a cost adjustment claim.

- Secondly, if Ofwat did apply a common method for allowing for HH retail IPP for all companies, but where that amount was below the gross IPP figures for Affinity set out here, again a claim could be appropriate. In this case, the appropriate size of the claim would need to reflect the 'difference' between the figures in this report and those allowed for by Ofwat.

Focusing on the first possibility (as the second cannot be known in advance), to translate our analysis into a £m cost adjustment claim the appropriate approach is to:

- Forecast HH retail costs over PR19, assuming no allowance for underlying IPP.

- Then apply our 'gross' retail IPP % figures in each year, compounding up the amount in £s terms.

- Calculate the difference between the two, then check that this meets Ofwat's new, increased materiality threshold of 4% of retail totex over 5 years for HH retail.

Following from the above, the table overleaf sets out the quantification of the implied cost adjustment claim for Affinity, should one be appropriate. You will see that **this implies a total cost adjustment claim of £7.7 for PR19, which clears the materiality threshold.**

Table 9: Quantification of implied cost adjustment claim – using central assumptions

	2020 / 21	2021 / 22	2022 / 23	2023 / 24	2024 / 25	Total
Retail costs with no IPP allowance						
Retail totex (opening value)	£31.9	£24.1	£24.0	£23.9	£23.8	£127.7
Less assumed efficiency	24.4%	0.4%	0.4%	0.4%	0.4%	
Retail totex (closing value)	£24.1	£24.0	£23.9	£23.8	£23.7	£119.5
Retail costs with IPP allowance included						
Retail totex (opening value)	£31.9	£24.7	£25.1	£25.4	£25.8	£132.9
Less assumed efficiency	24.4%	0.4%	0.4%	0.4%	0.4%	
Plus gross IPP	1.88%	1.88%	1.88%	1.88%	1.88%	
Retail totex (closing value)	£24.7	£25.1	£25.4	£25.8	£26.2	£127.2
Implied value of cost adjustment claim - difference between above (£m)						**£7.7**
As a % of HH retail costs over 5 years						**6.4%**

Source: Economic Insight analysis

With regards to how Ofwat will assess any claim, the regulator has been explicit that a 'high evidence bar' will apply. Ofwat states that any such claims should be '*convincing*' and '*well-evidenced*'.[16] We are confident that, in totality, the extensive range of analysis set out here is sufficient to meet these tests.

Based on the above figures, a claim would also seem likely to meet the (higher) materiality threshold. However, Affinity would need to reassess the above amounts relative to its finalised HH retail totex included in its PR19 Plan.

[16] *'Delivering Water 2020: Our final methodology for the 2019 price review.' Ofwat (December 2017).*

2. Introduction and framework

This chapter briefly described the context to our work for Affinity Water, and sets out the analytical framework we have used to provide evidence as to the IPP the company will face in respect to household retail over the PR19 period.

2.1 Introduction

Ofwat has confirmed that it does not intend to automatically index for inflation in relation to the HH retail control. In its Final Methodology, the regulator explained its position as follows: "*We will not index the retail controls to a general measure of inflation. We consider that this approach is most appropriate for the retail controls, and provides appropriate incentives for companies to manage input costs. This is consistent with the incentives for businesses in more competitive markets.*"[17]

However, Ofwat further confirmed that it may still consider allowing for retail inflation within its forward-looking totex allowances – as set out below:

"We will review evidence on forecast IPP in retail for the duration of the price control. If appropriate, we will make a cost allowance for inflation as part of totex. This approach ensures companies stay incentivised to manage the risk of IPP.

We will consider evidence on IPP submitted by companies. We will also consider independent data sources and forecasts, such as data from the Office for National Statistics on wage growth rates. Given that our PR19 approach involves setting an efficient cost allowance for all companies, we intend to apply a common method for determining an inflation allowance for all companies, if we consider that such an allowance is appropriate."[18]

The regulator further states that the evidence it will review from companies (as referred to above) relates to that provided to support the data contained in Appointee tables 24 and 24a.[19]

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17 *'Delivering Water 2020: Our final methodology for the 2019 price review.' Ofwat (December 2017), Appendix 11: Securing cost efficiency, page 23.*

18 *'Delivering Water 2020: Our final methodology for the 2019 price review.' Ofwat (December 2017), Appendix 11: Securing cost efficiency, page 24.*

19 *'Delivering Water 2020: Our final methodology for the 2019 price review.' Ofwat (December 2017), Appendix 11: Securing cost efficiency, page 24.*

Consequently, at PR19 there is a need for companies to provide high quality evidence regarding the IPP they will face in respect to HH retail. Given Ofwat's position, as set out in its Final Methodology, this analysis and evidence may, ultimately, be used in the following ways:

- First, an analysis of HH retail IPP is, in any case, necessary to assist companies with deriving their retail cost baselines and, relatedly, as *supporting evidence for* Appointee Data Tables 24 and 24a.
- Second, the development of robust analysis, may: (i) help provide evidence to Ofwat that it should, indeed, include retail IPP in forward-looking totex allowances; and relatedly (ii) assist Ofwat in determining a consistent method that can be applied for all companies.
- Third, should Ofwat not apply an allowance for all companies, it could form the basis for a cost adjustment claim.

The main purpose of the various analyses set out in this report is to provide robust evidence as to the retail IPP the company will face over PR19. In practice, such analysis can be used for any of the above purposes.

Our report is structured as follows:

- The remainder of this chapter provides additional background information as to Ofwat's overall approach to the HH retail control and cost allowances, as well as setting out in more detail the analytical framework we have used.
- Chapter 3 sets out our quantification of the gross IPP Affinity faces in relation to HH retail.
- Chapter 4 contains our assessment of the potential frontier shift (productivity) savings that companies could achieve over PR19. This is based on a review of regulatory precedent and publicly available data on productivity.
- Chapter 5 briefly summarises the scope for catch-up efficiency for Affinity in retail, as implied by Ofwat's recently published models.
- Finally, the appendices set out in more detail the econometric models used for forecasting bad debt, as well as other input costs.

2.2 The regulatory framework for the HH retail control

The following table summarises the parameters of the regulatory framework for HH retail at PR19 and how these differ from the PR14 approach. In several respects, the PR19 approach is similar to that adopted at the prior control. However, the approach to setting *allowed costs* is materially different in certain respects: (i) econometric benchmarking, rather than a unit cost method, is being used; (ii) the extent of the cost efficiency challenge is greater; and (iii) there is no longer any glide-path for achieving cost efficiencies.

Of relevance to this report, at PR19 there will continue to be no automatic allowance for inflation. However, as above, Ofwat has raised the possibility of allowing for retail IPP in forward-looking totex; applying a common method across the industry. Should this not occur, the framework would also seem to leave open the possibility of retail IPP being dealt with through cost adjustment claims.

Table 10: Summary of key parameters of the HH retail regulatory framework and changes relative to PR14

Parameter	PR14 approach	PR19 approach
Form of control	Average revenue	Average revenue
Length of control	5 years	5 Years
Allowed returns	1.0% EBIT	1.0% EBIT
Method for setting efficient costs	Unit cost with adjustment	Econometric benchmarking
Nature of cost challenge	Average cost	Efficient companies
Glide path to achieve cost benchmark	3 years	None
Approach to inflation	Not automatically allowed for (special factor cost claims only)	Not automatically allowed for (potential for common method in totex, or cost adjustment claims)
Special cost factor materiality threshold	2.25% (totex)	4.00% (totex)

Source: Ofwat

2.3 Framework analysing the impact of IPP

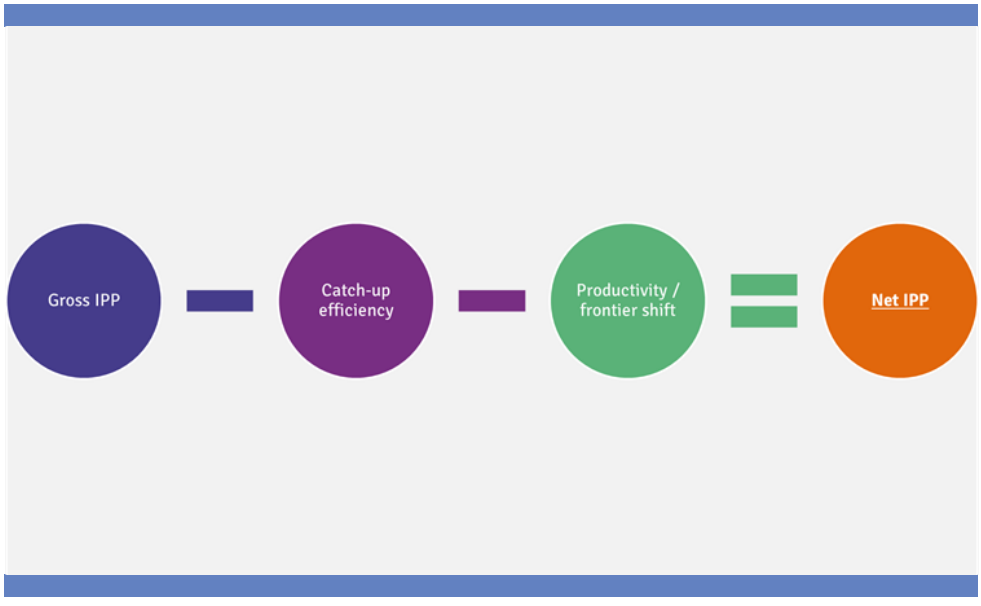
Our approach to this work builds on our existing analytical framework, which was accepted by Ofwat at PR14, and which we consider to be robust from an economics perspective. The underlying rationale for our approach is that all firms experience IPP – and that, in a competitive market, efficient firms would be expected to pass that IPP onto their customers. Conversely, firms that are not perfectly efficient would only be able to pass on the 'net' impact of IPP and their inefficiency.

With this context in mind, our framework starts from the proposition that, ultimately, the various elements of the regulatory framework should (collectively) ensure that the net amount of IPP allowed for takes account of:

- underlying gross IPP;
- the productivity gains that could be made across the industry as a whole that even an efficient firm could make (i.e. productivity / frontier shift); and
- any further efficiency savings that Affinity could make as a result of catching up to a defined efficient frontier (i.e. catch-up efficiency).

The above matters, because it is intended to ensure that only cost pressure that is outside of (efficient) management control is included within the price control. Our framework is illustrated in the following figure.

Figure 4: Illustration of our framework



Source: Economic Insight

Our methodology is based around developing detailed evidence that 'applies' the above framework in practice. This is to ensure that our work meets the '*high evidence bar*' set out by Ofwat. We describe our method in further detail, where appropriate, within the relevant analytical sections of our report.

3. Gross IPP analysis in HH retail

In this chapter, we quantify the expected gross IPP faced by Affinity Water, using a range of forecasting techniques. Our approach is based on developing 'indices' of Affinity's input costs, which avoids the problem of potentially including historical inefficiency in our forecasts.

The key points relating to our gross HH retail IPP analysis for Affinity are as follows:

- **We have used a range of approaches to forecasting IPP for Affinity.** These all start from mapping historical inflation metrics to individual Affinity retail cost items, to create indices of underlying inflation.
- **For staff costs, this process was highly detailed** - and we have mapped specific staff roles to individual occupational level inflation data.
- **We have forecasted individual historical data forward based on its relationship with aggregate inflation measures,** such as CPI. The projections are then linked to official Office for Budget Responsibility (OBR) forecasts to ensure consistency, robustness and transparency.
- **We have used econometric models** (where feasible) to allow for the effects of the general UK economy on our inflationary measures.
- **Our analysis suggests that Affinity will face gross IPP of between 1.81% to 2.34% pa,** on average between 2020/21 and 2024/25.

3.1 Our approach to IPP analysis

Here, we set out evidence and analysis relating to the *'gross'* IPP Affinity will face from 2020/21 to 2024/25. The approach we have followed to derive gross IPP is as follows:

- We have identified the most relevant historical inflation data for each of Affinity's key HH retail cost categories; and have examined this over time (typically ten years).

- Specifically, in relation to staff costs, the above step was based on a detailed review of the functional roles within Affinity's HH retail business where, for each role, we identified historical data based on mapping the role to a specific occupation using the Annual Survey of Hours and Earnings (ASHE) data, as published by the ONS.

- As we need to project IPP over PR19, we have then employed three approaches to forecasting, namely:

  - Economic fundamentals. This is generally our preferred methodology, which is based on the analysis of the relationship between input costs and key economic indicators.

    - Some methods are based on the 'wedge' between input costs and other inflation indicators, such as the CPI.
    - Other methods are based on statistical analysis of the relationship between input costs and wider measures of UK economic performance, such as GDP growth.

  - Extrapolations. Here, we extrapolate existing trends in input costs forward. This approach was widely used by companies at PR14. However, we consider that Ofwat may place less emphasis on it at PR19 (relative to other, analytically superior, methods).[20]
  - Independent third-party forecasts. There are independent third-party forecasts for certain input costs, such as labour – which we review and draw inferences from, there appropriate.

- Finally, to derive Affinity's *overall* gross forecast IPP for the price control period, we weight our individual projections by the company's cost split by category.

It should be noted that, where possible, when forecasting gross IPP in the remainder of this chapter, we have applied all of the above three methods to arrive at more robust forecasts. However, due to data limitations, we were unable to use all of the above methods for all input cost types. The following figure (see overleaf) summarises our forecasting approaches across Affinity's different retail input costs.

[20] *See: 'Delivering Water 2020: Our final methodology for the 2019 price review.' Ofwat (December 2017), page 143.*

Figure 5: Our forecasting approaches

Source: Economic Insight

The above framework represents a robust method for forecasting Affinity's gross IPP. Specifically, we believe that our linking of detailed historical data to independent third-party forecasts to be particularly important, given that:

- we need to estimate *projected* IPP – and historical inflationary pressures may not proxy this;
- that, at the level of detail we have sought to undertake our analysis, reliable independent forecasts for individual retail cost items are not available;
- the OBR's forecasts for wider economic variables are generally considered to be robust and are often relied upon in regulatory and competition law determinations; and
- by avoiding basing forecasts on Affinity's actual historical costs, our approach ensures we do not inadvertently embed a degree of inefficiency.

The rest of this chapter is structured as follows:

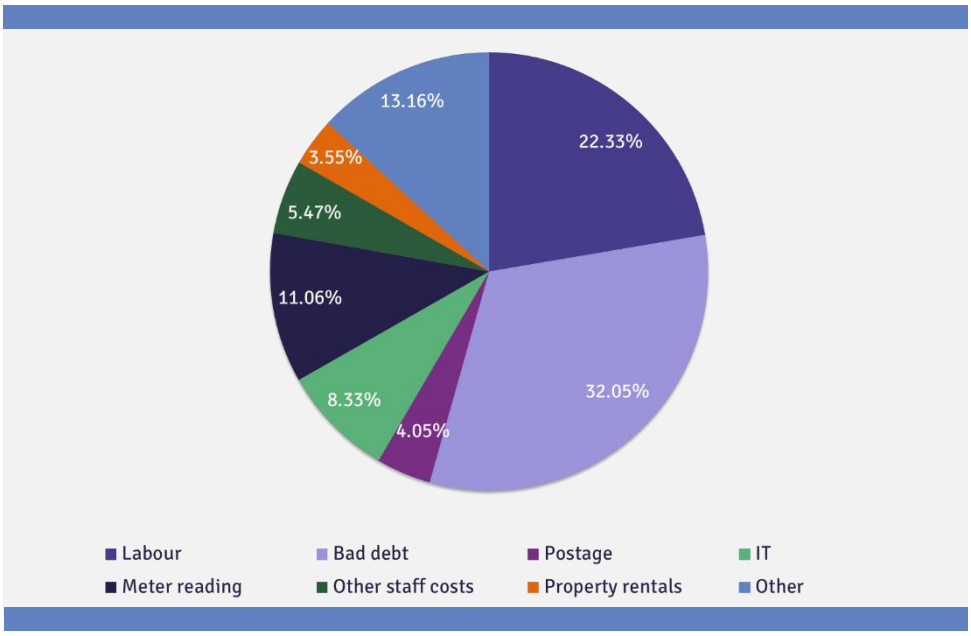
- First, we set out Affinity's historical split of HH retail costs by key cost category.
- Second, we set out our assessment of Affinity's gross projected IPP for each of the individual retail cost categories.
- Finally, we provide our assessment of the total gross IPP Affinity will face over the period 2020/21 to 2024/25 in relation to HH retail.

3.3 Affinity Water's HH retail cost split

Affinity provided us with a detailed breakdown of its HH retail costs into the following input cost categories (illustrated in the following pie chart):

- labour;
- doubtful debts;
- postage;
- IT;
- property rental;
- meter reading;
- other staff costs; and
- other.

Figure 6: Split of Affinity Water's opex HH retail costs, 2016/17 (reconciled to regulatory accounts)[21]



Source: Economic Insight analysis of Affinity Water's cost data

The above indicates that the overall IPP forecast for Affinity will mainly be driven by what we assume about future staff and doubtful debt inflation.

3.4 Labour costs

This section explains how we forecasted IPP in relation to labour costs / wages for Affinity. The analysis is also applied to the cost category 'other staff costs', which comprises of (i) national insurance expenses; (ii) pension costs; and (iii) overtime costs.[22]

[21] *To ensure consistency with the company's published regulatory accounts, we used the 'other' category as a balancing item, calculated as 'opex' (as per regulatory accounts) minus the sum of granular opex costs by category (e.g. labour, bad debt, postage and IT) provided by the company.*

[22] *There are other staff costs incurred to the back office based in India, however, these costs only comprise around 2% of total labour costs.*

OUR APPROACH TO FORECASTING UNDERLYING INFLATION ENSURES WE AVOID CONFLATING ANY INEFFICIENCY THAT MIGHT BE INCLUDED IN AFFINITY'S ACTUAL HISTORICAL LABOUR COSTS.

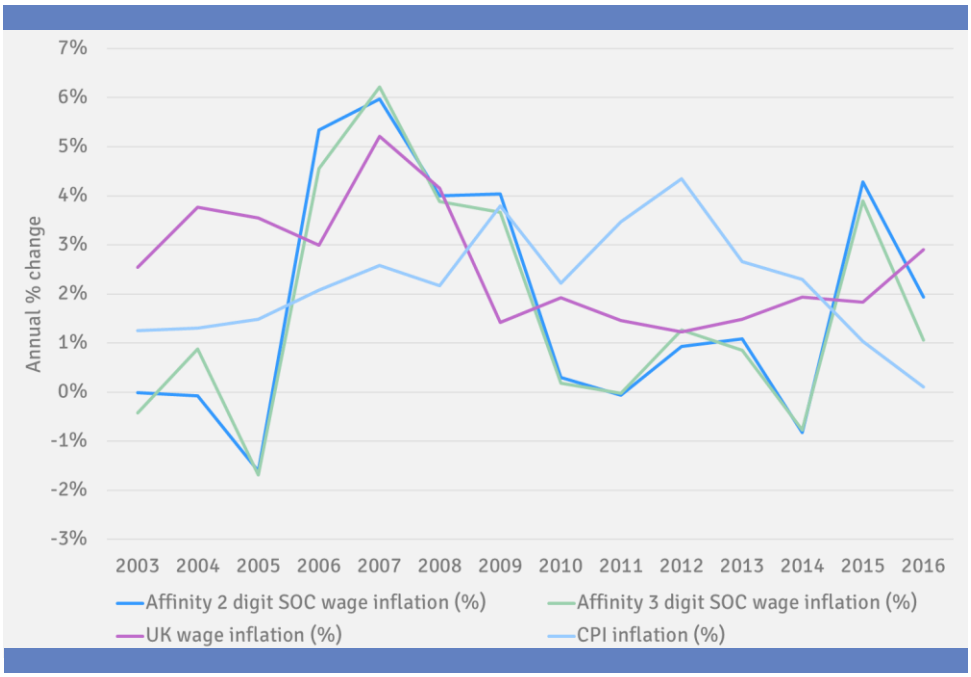
To forecast IPP relating to staff costs, Affinity provided us with a detailed breakdown of its HH retail staff costs by function / role. This, therefore, gives us Affinity's actual mix of employees. For each role, we then matched Affinity's employee data to specific jobs and occupations, as defined using Standard Occupation Classification (SOC) 2010 codes. This data is published by the ONS within its ASHE survey. The mappings are shown separately in Annex B to this report.

The ASHE data contains detailed information on wages by SOC code. So, by matching Affinity's employee roles to SOC codes, we could create a HH retail specific index of underlying wage inflation over time. Critically, this allows us to create a measure of underlying historical inflationary pressure for the company, without conflating any inefficiency inherent in Affinity's actual labour costs incurred in the past.

In creating our index, an important consideration is the level of disaggregation applied in matching job roles to SOC codes. Within the ASHE, SOC codes range from 1 digit (which are general occupation types, but have reliable wage inflation estimates due to a larger sample size) to 4 digit SOC codes (which are very specific, but are subject to greater uncertainty in their estimation, due to small sample size). Therefore, there is a trade-off between using codes that are most relevant to Affinity's actual roles, and the precision of the estimates of wage inflation for each role. We therefore created wage inflation indices using both 2 and 3 digit SOC codes, which we consider are most likely to strike the appropriate balance between these two considerations.

The following figure shows how Affinity's HH retail labour cost index compares to CPI and overall UK average wage inflation over time, as reported by the ONS. To be consistent with the Office of Budget Responsibility (OBR) forecasts (on which we subsequently base our projections), UK average wage inflation is calculated from wages and salaries data in the National Accounts and employee numbers from the Labour Force Survey (LFS).

Figure 7: Historical wage inflation



Source: Economic Insight analysis of ONS ASHE and Affinity Water data

As can be seen from the chart above, our calculated Affinity 2 digit (3 digit) SOC code wage inflation was 1.81% (1.68%), which is – on average – lower than CPI and overall UK wage inflation – albeit all measures follow a broadly similar trend.

The remaining subsections set out our projections using the three forecasting methodologies described above:

- first, we set out forecasts derived from economy-based estimates of wage inflation, including both wedge and econometric methodologies;
- second, we provide forecasts based on an analysis of past trends in the wage index;
- third, we discuss independent third-party estimates of future UK wage inflation; and
- finally, we summarise the evidence we have analysed and provide our overall forecasts of underlying HH retail wage inflation for 2020/21 to 2024/25.

The relevant appendices provide additional detail on our method and results.

3.4.1 Economy based estimates

In developing economy-based estimates of labour cost inflation, our approach was based on two key steps:

- First, we used data from Affinity's labour cost index (calculated as above) to explore relationships between wider measures of the UK's economic performance. We used two approaches for this step:

  (a) we identified a historical '*wedge*' between our index for Affinity's labour cost inflation and more general inflation measures (in particular, UK average wage inflation and CPI); and

  (b) we used econometrics to identify a *statistical relationship* between Affinity's wage inflation (again, as measured by our index) and GDP and average UK wage growth.

- We then assumed that the identified relationships hold in the future – and developed forecasts for Affinity HH retail labour cost inflation on the basis of official forecast for GDP and average wage growth and general inflation in the UK economy.

In the following we set out our forecasts.

3.4.1.1 Wedge estimates

Here, we calculated the wedge between inflation in our Affinity HH retail labour cost index and both: (i) average UK wages; and (ii) CPI inflation. Overall, we consider that deriving forecast using the *wedge to average UK wage inflation* should be preferred over the *wedge to CPI inflation*. This is because we expect that there will be more commonality between the drivers of UK wage inflation and Affinity labour cost inflation than is the case for CPI. CPI inflation is based on a basket of goods and services; and will be driven by supply and demand *across the economy*. Wage inflation is driven by supply and demand in the *labour market specifically.*

The following table shows the size of these wedges for the whole period for which data is available, from 2003 to 2016. In general, Affinity's underlying wage inflation (as measured by our index) is below UK average wage inflation (i.e. the wedges are negative), although the difference is slightly less pronounced based on 2 digit SOC codes, rather than 3 digit ones. Affinity's underlying wage inflation also tends to be below CPI, although the wedges are smaller in this case.

Table 11: Historical wedge between Affinity Water HH retail labour cost index and: (i) average UK wage inflation; and (ii) CPI

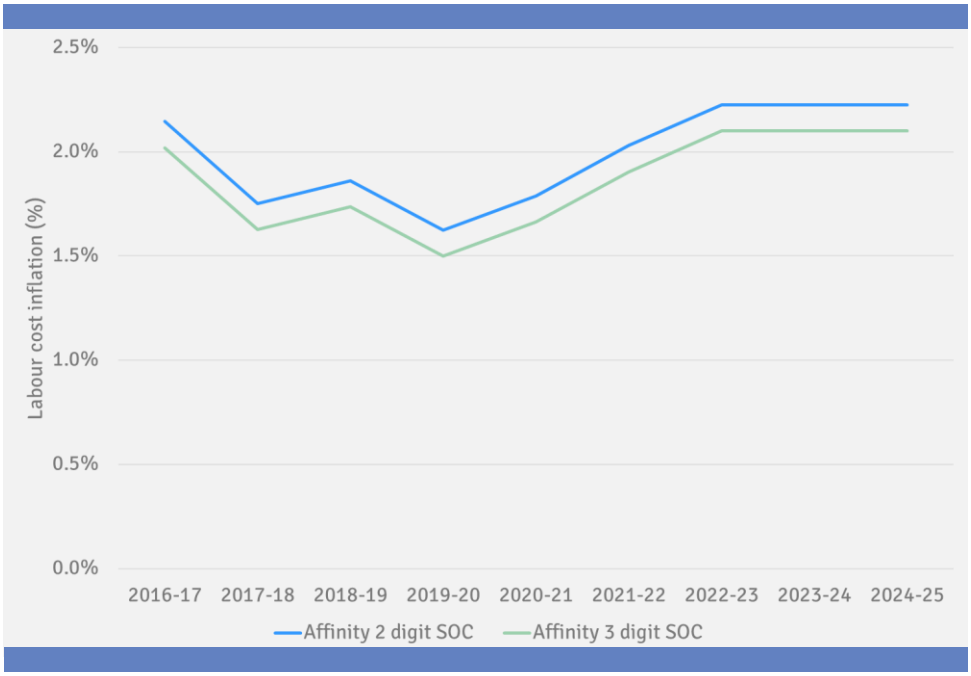
Wedge	2 digit SOC codes	3 digit SOC codes
Wedge to average UK wage inflation	-0.79%	-0.92%
Wedge to CPI inflation	-0.39%	-0.52%

Source: Economic Insight analysis

To derive forecast underlying HH retail labour input cost inflation for Affinity, we combined these 'wedges' with the most recent projections for both wage and CPI growth, taken from the OBR. These are available up to the year 2022/23 and are shown in the appendix. For years beyond 2022, we assumed that wage and CPI growth continue at the level forecast for 2022.

Our forecasts using this methodology, with respect to UK wage inflation are shown in the following figures. Estimates based on 2 digit SOC codes are generally higher than those based on 3 digit SOC codes. Further, estimates based on wage inflation are usually higher than those based on CPI (which are set out in the appendix). This is mostly driven by the fact that the OBR forecasts wage inflation to be materially higher than CPI by the early 2020s (i.e. it forecasts real wage growth).

Figure 8: Forecast labour cost inflation – based on wage inflation wedge



Source: Economic Insight analysis of ONS ASHE and Affinity Water data

As can be seen, forecasts based on the 'wedge' with national wage growth are reasonably consistent across the 2 and 3 digit SOC code indices.

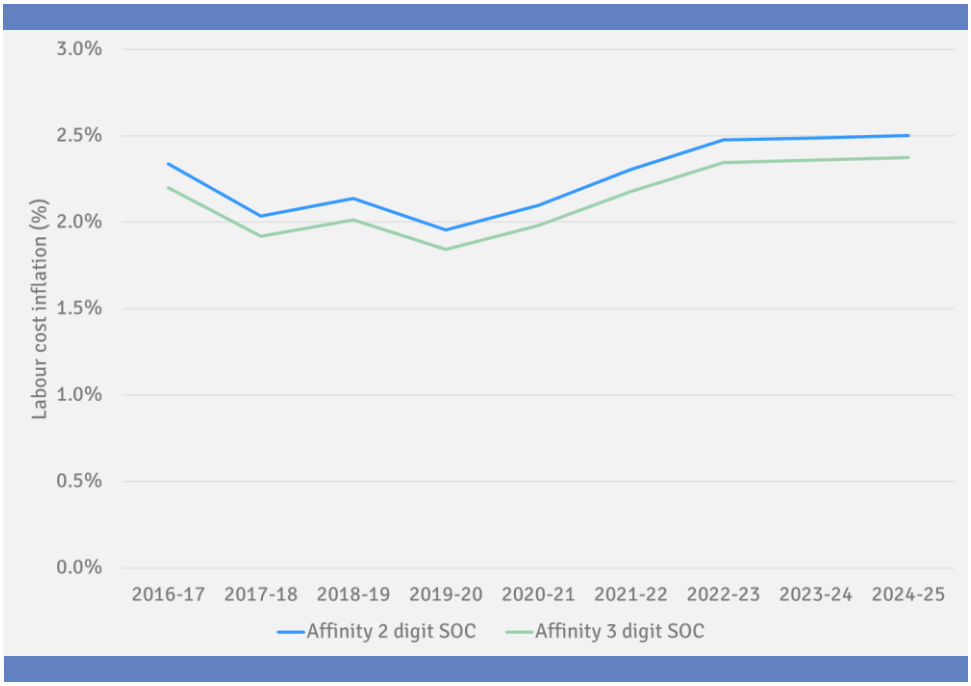
3.4.1.2 Econometric estimates

We explored the relationship between the Affinity HH retail labour cost index and: (i) UK GDP; and (ii) average UK wages – using econometrics. Variables such as GDP and wages are generally *non-stationary*, meaning that simple regressions of wage levels on GDP can lead to spurious findings of relationships. We addressed this in two ways:

- First, we developed regressions of the *percentage changes* in the Affinity HH retail labour cost index on changes in nominal GDP / average UK wages.
- Second, we regressed levels of the Affinity HH retail labour cost index on the level of nominal GDP / average UK wages (both expressed as an index) *and lagged values of the Affinity Water HH retail labour cost index.*

The following figure shows projected HH retail labour cost inflation, based on the wage regression in levels (using lags). It suggests HH retail labour cost inflation for 2020 to 2025 of around 2.37% for 2 digit SOC codes and around 2.25% for 3 digit ones.

Figure 9: Forecast labour cost inflation – based on average UK wage (levels)



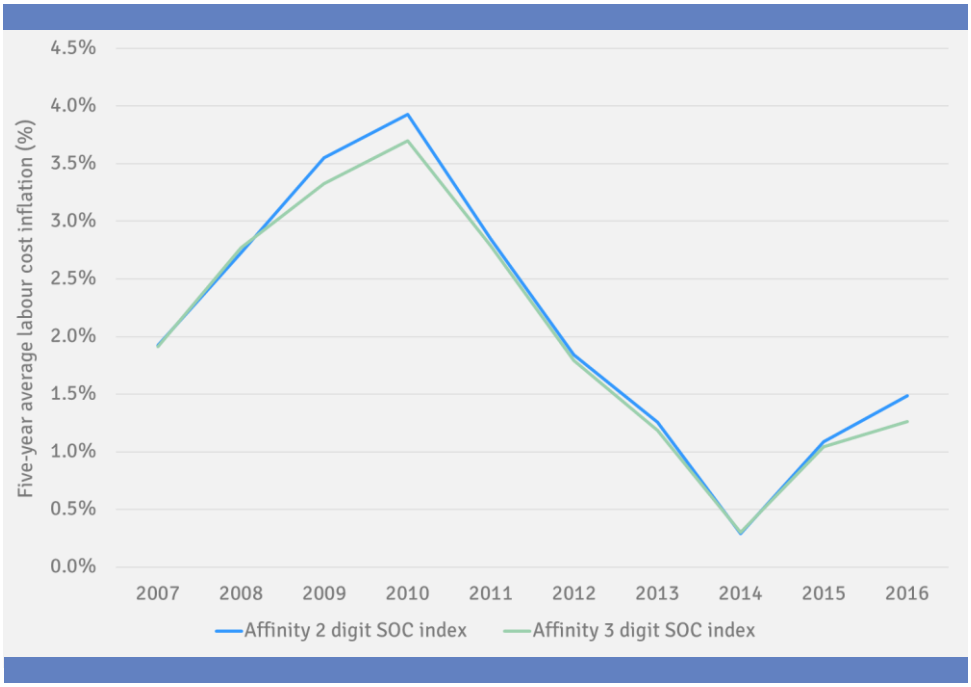
Source: Economic Insight analysis of ONS ASHE and Affinity Water data

3.4.2 Extrapolating trends

The second method for forecasting wage inflation for PR19 is to extrapolate forward existing trends in our Affinity HH retail labour cost index. We place less weight on this approach than on approaches based on economic fundamentals. This is because, clearly, a limitation of an extrapolation approach is that the implied forecast is *simply a continuation of the past*. Consequently, this method implies relatively low future labour cost inflation. In practice, and as explained elsewhere, it is well established that labour market performance and inflation are, in fact, closely linked to the wider macroeconomic environment. In this case, therefore, extrapolations ignore the OBR's expected upturn in the UK's performance in general, and its projections for real wage growth in particular, between now and 2020.

The following figure below show five-year rolling averages of the Affinity HH retail labour cost index at both the 2 and 3 digit SOC code level. Both show a prominent downward trend and an increase around 2014.

Figure 10: Affinity Water HH retail wage inflation index – 5 year rolling average



Source: Economic Insight analysis of ONS ASHE and Affinity Water data

Alongside five-year windows for calculating average inflation, we have also examined average inflation over the whole period for which data are available (2003 to 2016). This is shown in the following table.

Table 12: Existing trends in Affinity Water HH retail labour cost index inflation

Trend	2 digit SOC code	3 digit SOC code
Whole period	1.81%	1.68%
Last 5 years	1.48%	1.26%

Source: Economic Insight analysis of ONS ASHE and Affinity Water data

Whilst any extrapolation (by definition) does not take into account the OBR's expected upturn in UK wage growth between now and 2020, clearly this issue will be more acute in relation to extrapolations based on shorter time-periods (as these are less likely to be representative of long-run economic conditions). Consequently, if one were to use an extrapolation approach, we would advocate placing more weight on data using the whole time-period, which would suggest a wage inflation in the range of 1.68% to 1.81% per annum.

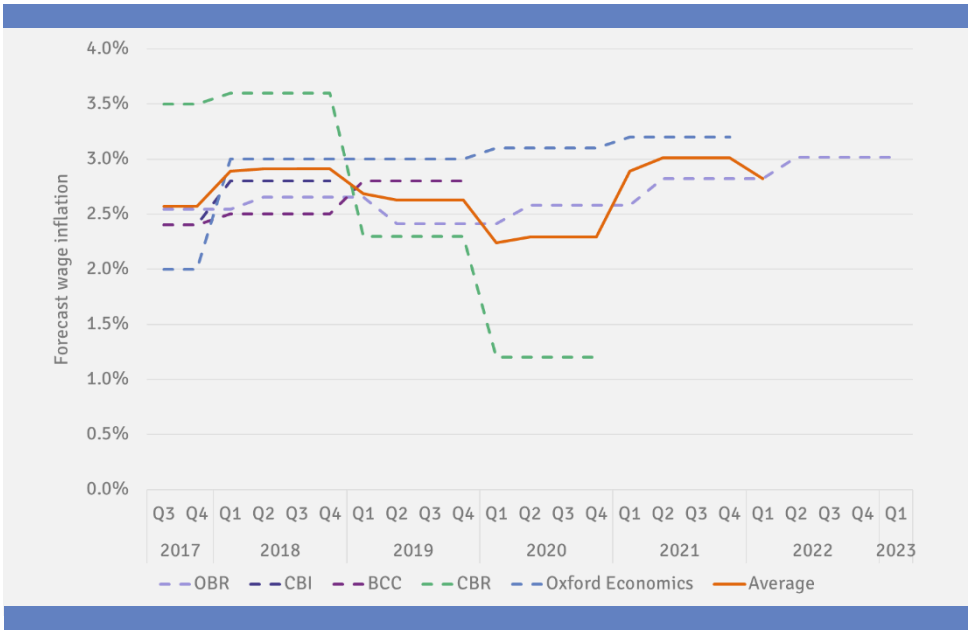
3.4.3 Independent wage growth forecasts

Finally, we examined a range of independent forecasts of future wage growth in the UK from government bodies and other forecasters, namely: the OBR; the Confederation of British Industry (CBI); the British Chambers of Commerce (BCC); the Centre for Business Research (CBR); and Oxford Economics. These are shown in the subsequent figure. We highlight the following:

- None of the forecasts provides projections for the whole of 2020 to 2025; and only the OBR's and Oxford Economics' forecasts extend beyond 2020.
- Forecasts for 2018/19 are in the range of 2.3% to 3.6% per annum. Most forecasts are relatively stable, although the CBR's suggests a material fall in wages between 2018 and 2019.
- There are differences in forecast wage growth in 2020. Whereas the OBR's and Oxford Economics' forecasts are in the range of 2.6% to 3.1% per annum, CBR forecasts wage growth to be 1.2%.
- Across the independent forecasts we have reviewed, the average expected UK wage inflation rate is estimated to be in the range of 2.4% to 2.9% per annum (note, as above, this refers to the period up to 2020, as only the OBR and Oxford Economics provide longer-term forecasts).

'Across the independent forecasts we have reviewed, the average expected UK wage inflation rate is estimated to be in the range of 2.4% to 2.9% per annum.'

Figure 11: Forecast UK wage inflation



Source: OBR, CBI, BCC, CBR and Oxford Economics

While these results are inherently uncertain, we place most weight on the OBR's forecasts, which are used for official purposes. Moreover, they are towards the 'middle' of the range of available nearer-term forecasts.

3.4.4 Summary of labour inflation forecasts over PR19

As described in the preceding subsections, we have used a range of methods to forecast Affinity's underlying HH retail labour cost inflation, covering the period 2020/21 to 2024/25. The next two tables set these out in full.

Table 13: Affinity Water HH retail labour cost inflation forecasts, 2020/21 - 2024/25 – 2 digit SOC – **preferred results**

Methodology	Wage inflation forecasts (%)	2020/21	2021/22	2022/23	2023/24	2024/25	Average
Economy-based	GDP econometrics – levels	1.77%	1.91%	2.04%	2.07%	2.09%	1.98%
	GDP econometrics – changes	1.70%	1.73%	1.75%	1.75%	1.75%	1.74%
	Wage econometrics – levels	**2.10%**	**2.30%**	**2.48%**	**2.49%**	**2.50%**	**2.37%**
	Wage econometrics – changes	1.79%	2.03%	2.09%	2.09%	2.09%	2.00%
	Wedge to UK wage inflation	**1.79%**	**2.03%**	**2.22%**	**2.22%**	**2.22%**	**2.10%**
	Wedge to CPI inflation	1.59%	1.61%	1.61%	1.61%	1.61%	1.60%
Extrapolation	Whole period trend	1.81%	1.81%	1.81%	1.81%	1.81%	1.81%
Third-party	**Independent forecasts**	**2.58%**	**2.82%**	**3.02%**	**3.02%**	**3.02%**	**2.89%**

Source: Economic Insight analysis

Table 14: Affinity Water HH retail labour cost inflation forecasts, 2020/21 - 2024/25 – 3 digit SOC

Methodology	Wage inflation forecasts (%)	2020/21	2021/22	2022/23	2023/24	2024/25	Average
Economy-based	GDP econometrics – levels	1.65%	1.78%	1.90%	1.93%	1.95%	1.84%
	GDP econometrics – changes	1.55%	1.58%	1.61%	1.61%	1.61%	1.60%
	Wage econometrics – levels	1.98%	2.18%	2.35%	2.36%	2.38%	2.25%
	Wage econometrics – changes	1.67%	1.85%	2.00%	2.00%	2.00%	1.90%
	Wedge to UK wage inflation	1.66%	1.90%	2.10%	2.10%	2.10%	1.97%
	Wedge to CPI inflation	1.46%	1.48%	1.48%	1.48%	1.48%	1.48%
Extrapolation	Whole period trend	1.68%	1.68%	1.68%	1.68%	1.68%	1.68%
Third-party	Independent forecasts	2.58%	2.82%	3.02%	3.02%	3.02%	2.89%

Source: Economic Insight analysis

Drawing the above together, our 'high', 'central' and 'low' forecasts are shown below. All are based on the 2 digit SOC code HH retail index, as we consider this one to be superior.

OUR ANALYSIS SUGGESTS UNDERLYING LABOUR INFLATION FOR AFFINITIY OF BETWEEN 2.1% TO 2.9% PA.

Table 15: Summary of final labour inflation forecasts used

Scenario		2020 / 21	2021 / 22	2022 / 23	2023 / 24	2024 / 25	Average
High	Independent forecasts	2.58%	2.82%	3.02%	3.02%	3.02%	2.89%
Central	Wage econometrics – levels	2.10%	2.30%	2.48%	2.49%	2.50%	2.37%
Low	Wedge to UK wage inflation	1.79%	2.03%	2.22%	2.22%	2.22%	2.10%

Source: Economic Insight analysis

Doubtful debt

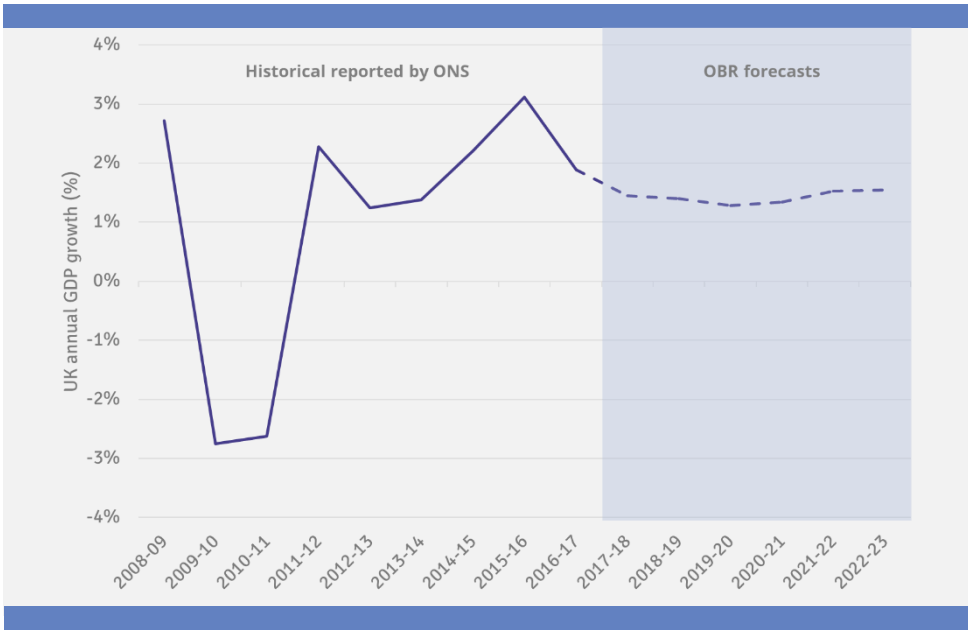
It is widely acknowledged that two key cost drivers of debt costs in the water industry are: (i) bill size; and (ii) socioeconomic factors (such as deprivation – and thus, relatedly, the wider macroeconomic environment).

From a retail perspective, clearly bill size is primarily driven by whatever regulated prices are set at the wholesale level. This, in turn, implies that the IPP relating to bad debt in the retail part of the supply chain is, to a large degree, determined by the 'K factors' Ofwat sets for the water and wastewater wholesale elements of the PR19 price control.

It is not possible to determine, in advance, what these will be (as they are a function of allowed operating costs, efficiency, capex and the cost of capital). Given this, one approach for projecting bad debt gross IPP would be to project these costs based on CPIH.[23] The rationale for this is that CPIH is allowed for in the regulatory approach for wholesale. Therefore, by definition, it is an inflationary pressure that flows through to retail.

Nonetheless, the risk of simply assuming CPIH as the basis for projecting doubtful debt IPP is that it ignores the likely impact of changes to the UK's macroeconomic environment during PR19 (including, of course, any impacts of Brexit). To illustrate this, the following chart shows the OBR's forecasts for UK GDP growth.

Figure 12: Historical and projected GDP



Source: ONS and OBR data

As can be seen, GDP growth in the UK is expected to reduce slightly in comparison to the recent past, starting to rise again slowly from 2020 onwards.

Therefore, we have constructed forecast bad debt cost pressure for Affinity based on an econometric modelling analysis, which uses historic data (between 2010/11 – 2016/17) to estimate the relationship between bad debt per property, average wholesale bill size per unique customer and an indicator of the health of regional

[23] *Which is consumer price inflation including a measure of owner occupiers' housing.*

economies – benefits expenditure. We then use publicly available information to forecast bills and benefits expenditure and, with our econometric model, predict the annual growth in bad debt per property over PR19. Further details to our econometric model and method are set out in Annex A to this report.[24]

The doubtful debt IPP projected by our modelling is set out in Table 16 below. We find that, on average, Affinity is likely to face gross IPP of between 1.30% to 1.83% per annum in relation to doubtful debts.

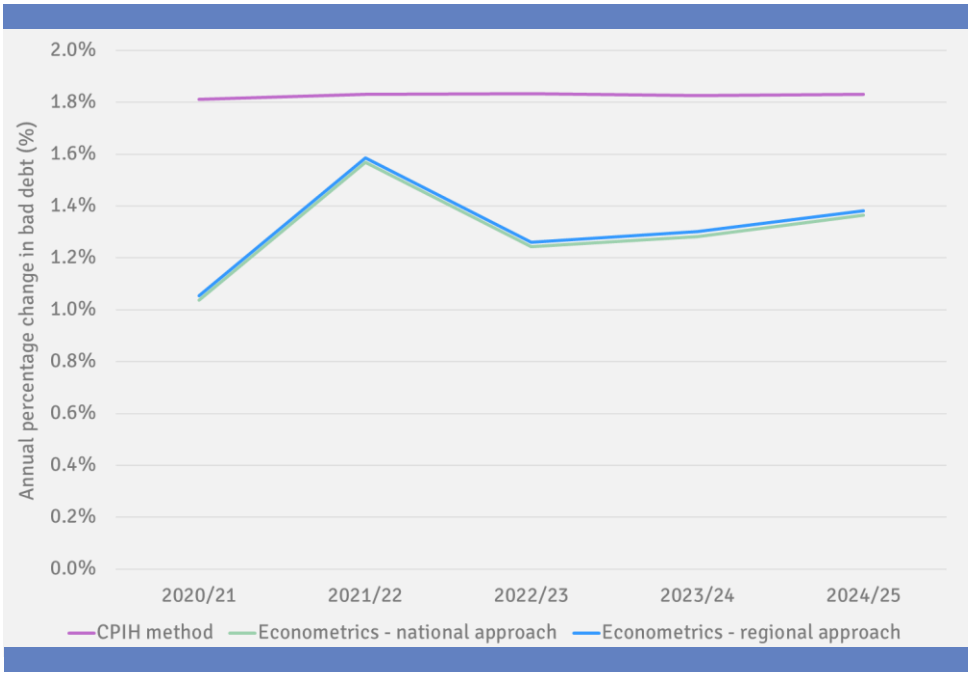
Table 16: Bad debt forecasts using different methodologies

Method	2020/21	2021/22	2022/23	2023/24	2024/25	Average
CPIH	1.81%	1.83%	1.83%	1.83%	1.83%	1.83%
Econometric forecast (national)	1.04%	1.57%	1.24%	1.28%	1.37%	1.30%
Econometric forecast (regional)	1.05%	1.59%	1.26%	1.30%	1.38%	1.32%

Source: Economic Insight analysis of ONS and water companies' data

The following figure shows how our econometric approaches, based on economic fundamentals, compare to a, more simple, CPIH approach. Our modelling reflects the OBR's expected (modest) GDP growth, which of course mitigates bad debt costs for companies over time. This, then, explains why our statistical forecasts are somewhat below the CPIH method.

Figure 13: Doubtful debt IPP implied by econometrics versus CPIH



Source: Economic Insight analysis of ONS data

[24] *Note, as we explain further in the Annex, the model we have developed is intended for forecasting use, rather than for the benchmarking of efficiency. Specifically, variable selection has in part been determined by needing to use explanatory variables for which forecasts can be obtained (rather than basing selection primarily on the extent to which they explain costs, as would be the case for benchmarking models).*

Drawing the above together, our 'high', 'central' and 'low' forecasts for bad debt are shown below.

Table 17: Summary of final bad debt inflation forecasts used

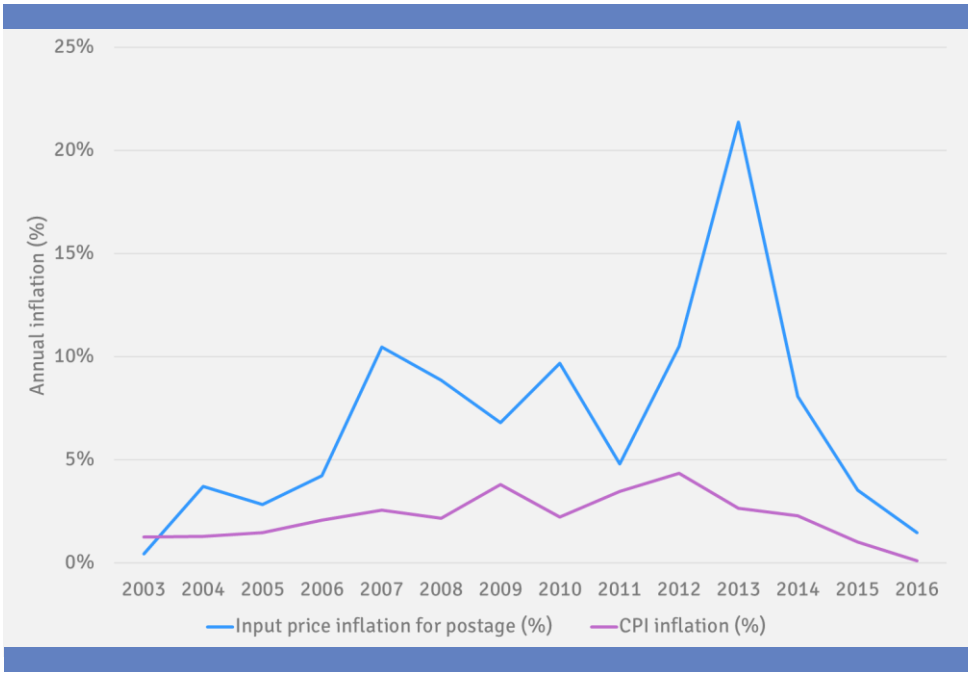
Scenario		2020 / 21	2021 / 22	2022 / 23	2023 / 24	2024 / 25	Average
High	CPIH	1.81%	1.83%	1.83%	1.83%	1.83%	1.83%
Central	Econometrics - regional	1.05%	1.59%	1.26%	1.30%	1.38%	1.32%
Low	Econometrics - national	1.04%	1.57%	1.24%	1.28%	1.37%	1.30%

Source: Economic Insight analysis

3.5 Postage

The ONS publishes detailed breakdowns of inflation by individual items within its Retail Price Index (RPI) and CPI measures – one of them being postage costs. We therefore examined historical postage inflation back over 13 years to 2003, which is compared to CPI in the following figure.

Figure 14: Historical postage inflation



Source: Economic Insight analysis of ONS data

Postage inflation has been significantly higher than CPI, particularly in the earlier years. This is not surprising, given that Royal Mail Group (which still has a monopoly position with regard to the wholesale element of its network) was effectively freed from price cap regulation in 2011 by Ofcom; and privatised in 2013.

Consistent with the 'wedge' methodology summarised previously, to project postage IPP forward over time, we:

- examined the historic wedge between postage inflation and CPI (which was 4.7% over the 13 years);
- obtained the OBR's forecasts for CPI; and
- then assumed the historical wedge over CPI would hold in order to generate expected postal IPPs.

These are summarised in the following table, which also incorporates the forecasts on postage inflation extrapolating the whole period trend of annual post inflation (6.9%) forward.

Our approach is likely to be *conservative* in relation to postage costs. This is because there is a reasonable prospect that Royal Mail Group will continue to put in price increases that are materially above the longer-term historic average (13 years) that we have used as the basis for our analysis. Here, it is worth noting that Royal Mail Group remains subject to a safeguard price cap with respect to 2nd class stamps, but that this is not linked – in any way – to the likely price profile large business users of post will face.

Table 18: Affinity Water postage cost inflation forecasts, 2020/21 - 2024/25

Methodology	Postage inflation forecasts (%)	2020/21	2021/22	2022/23	2023/24	2024/25	Average
Economy-based	Wedge to CPI inflation	6.69%	6.71%	6.72%	6.72%	6.72%	6.71%
Extrapolation	Whole period trend	6.92%	6.92%	6.92%	6.92%	6.92%	6.92%

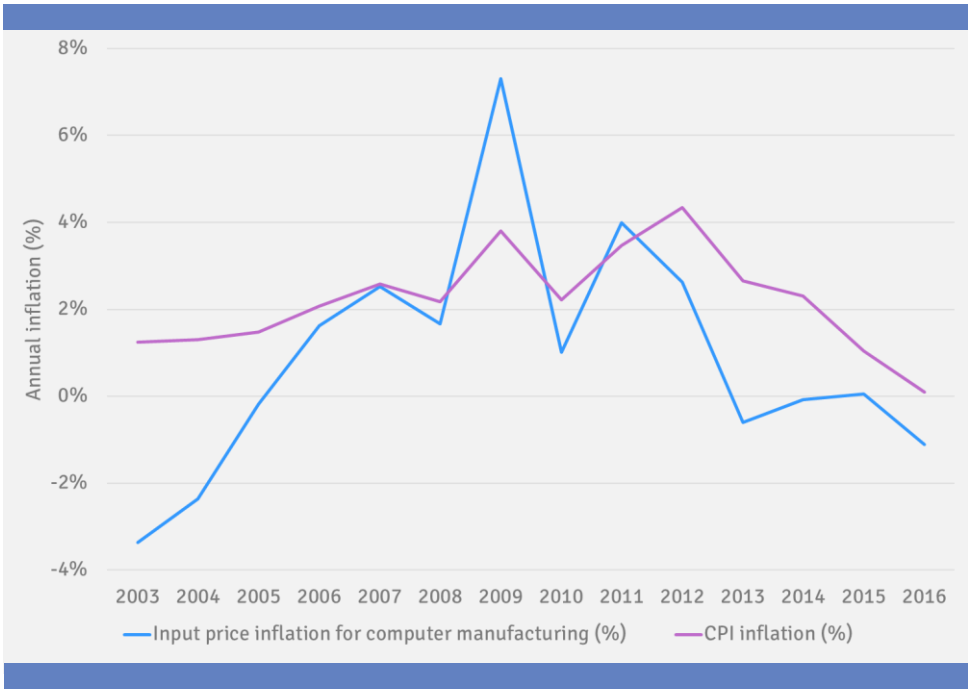
Source: Economic Insight analysis

3.6 IT

In relation to IT related costs, there is more limited 'output price' related information available. We have, therefore, applied the same approaches set out above, but instead have utilised the producer price index, published by the ONS, in relation to '*inputs for the manufacturing of computers*'. We consider this to be the index most relevant to IT.

The following chart shows the historical IPP for the manufacturing of computers compared to CPI inflation.

Figure 15: Historical IT input cost inflation



Source: Economic Insight analysis of ONS data

Over the last 13 years, input cost inflation for computer manufacturing has averaged 0.9%, which is below the average for the same period for CPI of 2.2%.

To project IT related IPP forward we have applied the historical wedge between our measure and CPI (-1.3%) to the OBR's CPI forecast, in a manner consistent with the methodology described elsewhere in this report. The projected figures are included in table below, as well as the results from (i) our econometrics methodology; and (ii) a simple extrapolation approach.

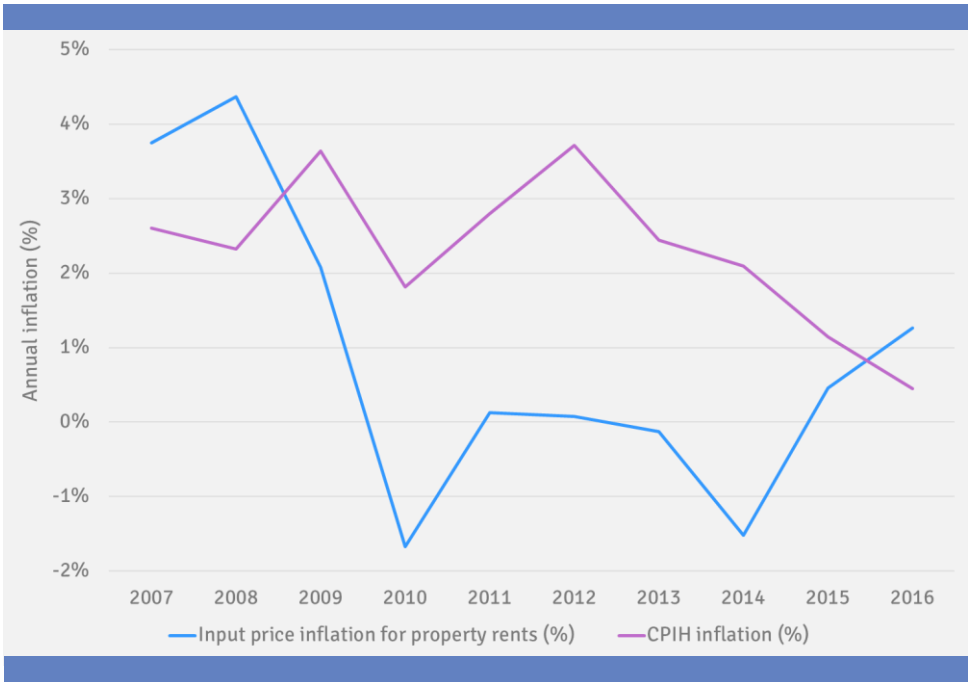
Table 19: Affinity Water IT cost inflation forecasts, 2020/21 - 2024/25

Methodology	IT inflation forecasts (%)	2020 / 21	2021 / 22	2022 / 23	2023 / 24	2024 / 25	Avg
Economy-based	Wedge to CPI inflation	0.72%	0.73%	0.74%	0.74%	0.74%	0.73%
	GDP econometrics – levels	1.56%	1.68%	1.80%	1.83%	1.86%	1.74%
Extrapolation	Whole period trend	0.94%	0.94%	0.94%	0.94%	0.94%	0.94%

Source: Economic Insight analysis

3.8 Property rentals

To forecast IPP in relation to rents we use the property rental index published as part of the services producer price inflation (SPPI) by the ONS, which details price changes of services provided by selected UK industries to other UK businesses. In the following figure, we show the historical inflation of property rentals (back to 2007) compared with CPIH Inflation.



Source: Economic Insight analysis of ONS data

Inflation of property rentals has been higher than CPIH up until the financial crisis where property rental inflation drops below CPIH inflation levels.

To project property rentals IPP forward over time, we applied the historical wedge between the property rental index and CPIH (-1.42%) to the OBR's commercial property prices inflation forecasts. The figures are included in the table below along with whole period extrapolation estimates.

Table 20: Affinity Water property rental cost inflation forecasts, 2020/21 - 2024/25

Methodology	Postage inflation forecasts (%)	2020/21	2021/22	2022/23	2023/24	2024/25	Avg
Economy-based	Wedge to CPIH inflation	0.24%	0.32%	0.42%	0.42%	0.42%	0.36%
Extrapolation	Whole period trend	1.71%	1.71%	1.71%	1.71%	1.71%	1.71%

Source: Economic Insight analysis

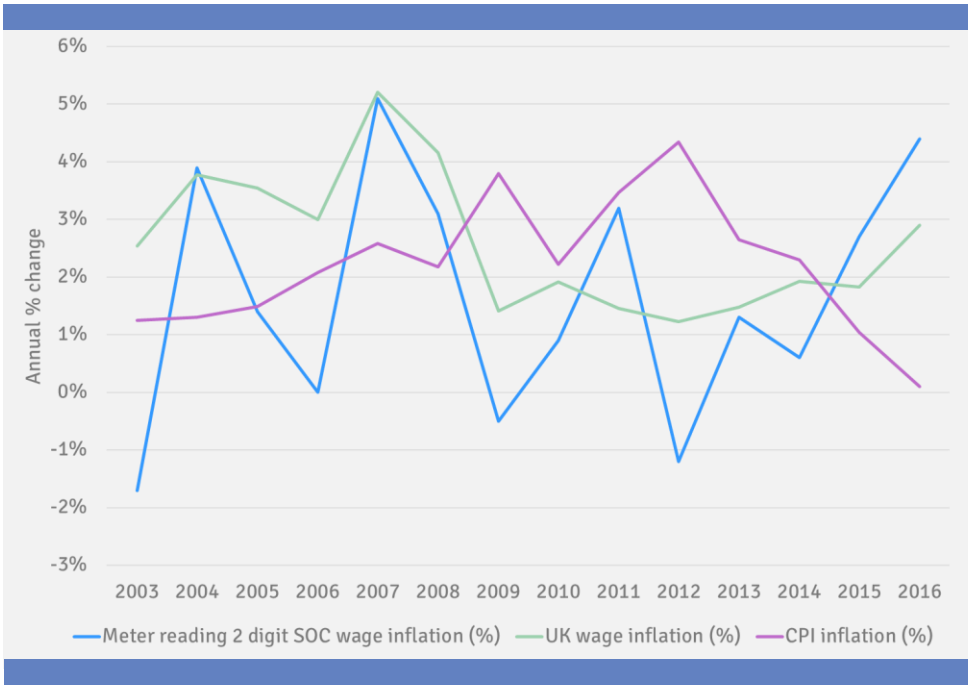
3.10 Meter reading

Affinity Water outsources its meter reading services, and accordingly we do not have a breakdown of the resources utilised to provide the service. It is, however, reasonable to assume that it is a labour-intensive service and that labour comprises the largest cost component. Additional costs to providing the service include transportation and fuel and the costs of meter reading equipment – which are largely classified as sunk costs.

Assuming that labour costs is the largest component of the total costs incurred to provide the meter reading service, we use the ASHE data on wages by the 2 digit[25] 71 SOC code for Sales Occupations to create an index of wage inflation over time.

The following figure shows wage inflation for sales occupations in comparison to CPI and overall UK average wage inflation over time, as published by the ONS.

Figure 16: Historical inflation for sales occupations wages



Source: Economic Insight analysis of ONS AHSE and Affinity Water data

Average inflation over the period 2003 – 2016 for sales occupations was 1.66% which is lower than the average CPI and overall UK wage inflation, 2.2% and 2.6%, respectively – which follows the trend of other costs measures presented earlier.

Similar to the methodology used for projecting labour related IPP, we present the summary results of the methods used to forecast inflation related to sales occupations for the period 2020/21 to 2024/25 in the following table.

[25] *The 2 digit SOC code is used for the analysis because it is based on a larger sample size, and given that is includes a wider range of sales related occupations, compared to basing the analysis on 3 or 4 digit SOC codes.*

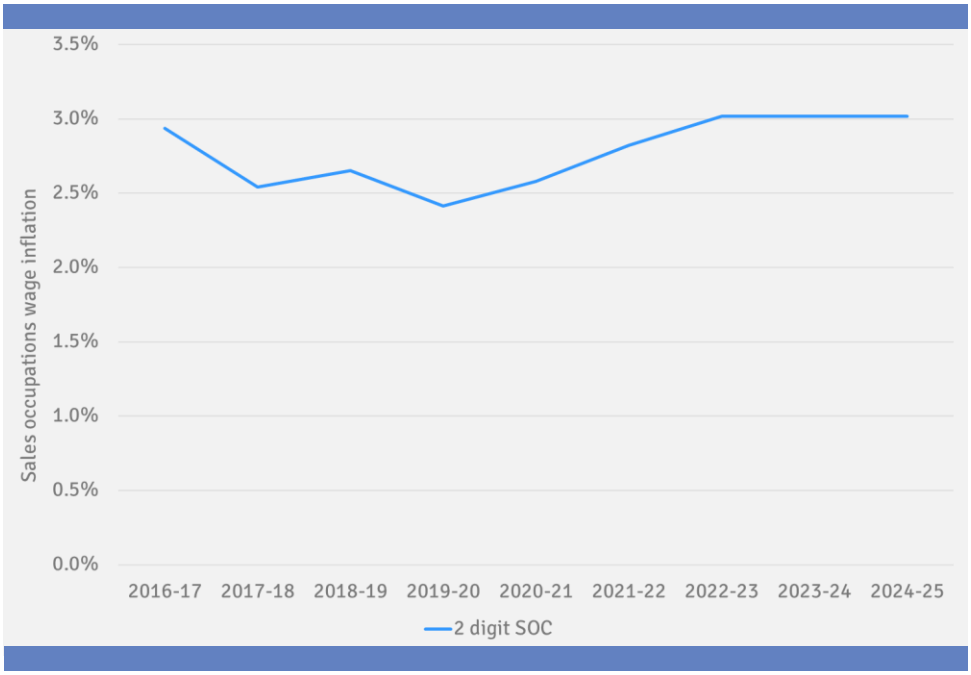
Table 21: Sales occupations wage inflation forecasts, 2020/21 - 2024/25 - 2 digit SOC

Methodology	Wage inflation forecasts (%)	2020/21	2021/22	2022/23	2023/24	2024/25	Average
Economy-based	GDP econometrics – levels	1.34%	1.44%	1.55%	1.58%	1.61%	1.50%
	GDP econometrics – changes	1.45%	1.50%	1.55%	1.55%	1.55%	1.52%
	Wage econometrics – levels	**1.58%**	**1.75%**	**1.89%**	**1.91%**	**1.93%**	**1.81%**
	Wage econometrics – changes	1.64%	1.88%	2.08%	2.08%	2.08%	1.95%
	Wedge to UK wage inflation	**1.64%**	**1.88%**	**2.07%**	**2.07%**	**2.07%**	**1.95%**
	Wedge to CPI inflation	1.44%	1.46%	1.46%	1.46%	1.46%	1.45%
Extrapolation	Whole period trend	1.66%	1.66%	1.66%	1.66%	1.66%	1.66%
Third-party	**Independent forecasts**	**2.58%**	**2.82%**	**3.02%**	**3.02%**	**3.02%**	**2.89%**

Source: Economic Insight analysis

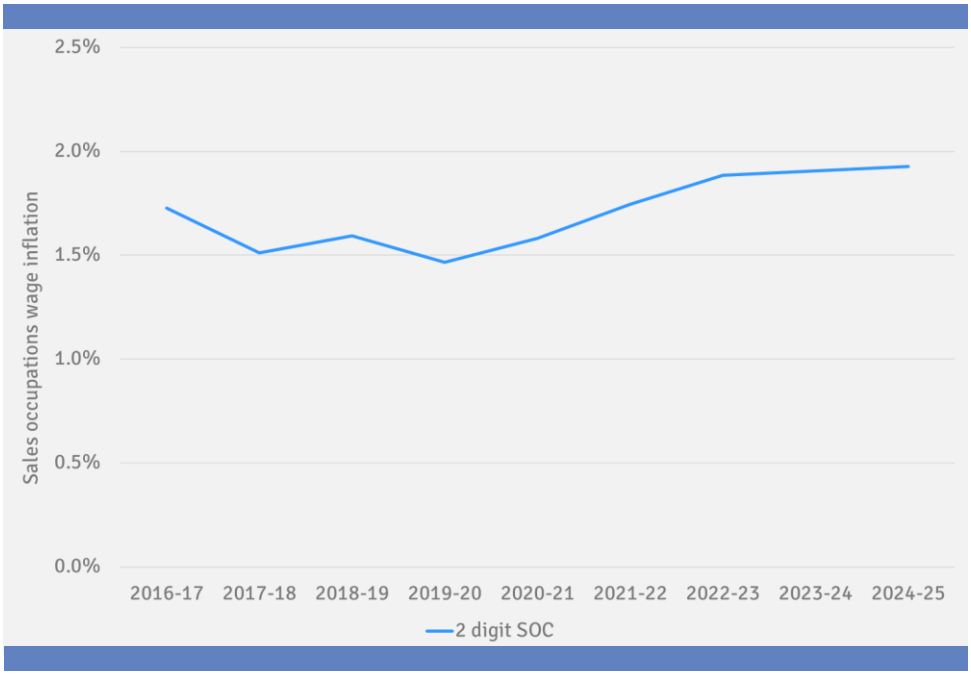
The inflation forecasts used in the analysis of gross IPP are set out in the following figures.

Figure 17: Forecast sales occupations wage inflation - based on independent forecasts – **used in high case scenario**



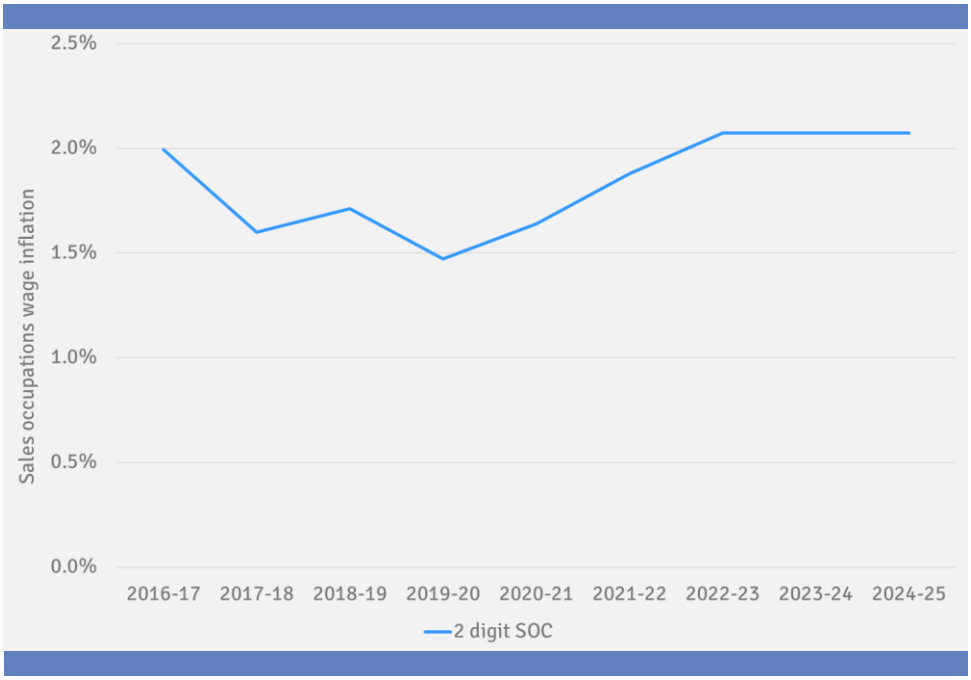
Source: Economic Insight analysis of ONS AHSE and Affinity Water data

Figure 18: Forecast sales occupations wage inflation - based on econometrics using average UK wage (levels) – **used for the central case scenario**



Source: Economic Insight analysis of ONS AHSE and Affinity Water data

Figure 19: Forecast sales occupations wage inflation - based on wage inflation wedge – **used in the low case scenario**



Source: Economic Insight analysis of ONS AHSE and Affinity Water data

3.11 'Other' IPP

The 'other' category includes costs in relation to various office expenses, travel expenses, and membership charges that amount to approximately 13.16% of total costs, as shown previously in Figure 2. Given the relative immateriality of this category to the overall IPP index we are seeking to calculate (compared to for example staff or bad debt related costs), and that the items within this category would largely follow the overall inflation in the economy - we think it is reasonable to suppose that forecast CPI inflation represents the most appropriate proxy.

The following table illustrates the OBR's forecast CPI inflation.

Table 22: OBR CPI projections

Year	OBR projected CPI
2017/18	2.9%
2018/19	2.2%
2019/20	1.8%
2020/21	2.0%
2021/22	2.0%
2022/23	2.0%

Source: OBR

3.12 Summary of our projected gross IPP for Affinity Water

Once our projections for each of Affinity's individual cost categories has been developed, the final step is to weight these by Affinity's mix of cost, to arrive at our final projected gross IPP for PR19.

Based on this, we find that, **over the period 2020/21 to 2024/25, we estimate that Affinity's gross IPP in HH retail will be between 1.81% - 2.34% per annum** on average. This is based on our following low, medium and high estimates:

- our **central** estimates derive from:
  - » staff costs (including meter reading and other staff costs) being forecast based on the wage econometrics approach in levels (2 digit SOC code);
  - » doubtful debts being forecast based on the regional econometrics approach;
  - » IT, postage, and (property rentals) costs being forecast based on the wedge to CPI (CPIH) method; and
  - » other costs being forecast based on independent forecasts (CPI).
- our **high** estimates derive from:
  - » staff costs (including meter reading and other staff costs) being forecast based on independent forecasts (OBR);

- doubtful debts being forecast based on the CPIH approach;
- IT, postage, and (property rentals) costs being forecast based on the wedge to CPI (CPIH) method; and
- other costs being forecast based on independent forecasts (CPI).

– our **low** estimates derive from:

- staff costs (including meter reading and other staff costs) being forecast based on the wedge to average UK wages (2 digit SOC) approach;
- doubtful debts being forecast based on the national econometrics approach;
- IT, postage, and (property rentals) costs being forecast based on the wedge to CPI (CPIH) method; and
- other costs being forecast based on independent forecasts (CPI).

The tables below set out the results for **gross IPP** based on these assumptions.

Table 23: Summary of gross input price assumptions – **central case**

	2020/21	2021/22	2022/23	2023/24	2024/25	Cost mix
Labour	2.10%	2.30%	2.48%	2.49%	2.50%	**23.67%**
Doubtful debts	1.05%	1.59%	1.26%	1.30%	1.38%	**33.98%**
IT	0.72%	0.73%	0.74%	0.74%	0.74%	**8.83%**
Postage	6.69%	6.71%	6.72%	6.72%	6.72%	**4.30%**
Meter reading	1.58%	1.75%	1.89%	1.91%	1.93%	**11.72%**
Property rentals	0.24%	0.32%	0.42%	0.42%	0.42%	**3.76%**
Other staff costs	2.10%	2.30%	2.48%	2.49%	2.50%	**5.80%**
Other	1.98%	2.00%	2.00%	2.00%	2.00%	**7.95%**
Gross IPP (%)	**1.68%**	**1.95%**	**1.91%**	**1.93%**	**1.96%**	**1.88%**

Source: Economic Insight analysis

Table 24: Summary of gross input price assumptions – **high case**

	2020/21	2021/22	2022/23	2023/24	2024/25	Cost mix
Labour	2.58%	2.82%	3.02%	3.02%	3.02%	**23.67%**
Doubtful debts	1.81%	1.83%	1.83%	1.83%	1.83%	**33.98%**
IT	0.72%	0.73%	0.74%	0.74%	0.74%	**8.83%**
Postage	6.69%	6.71%	6.72%	6.72%	6.72%	**4.30%**
Meter reading	2.58%	2.82%	3.02%	3.02%	3.02%	**11.72%**
Property rentals	0.24%	0.32%	0.42%	0.42%	0.42%	**3.76%**
Other staff costs	2.58%	2.82%	3.02%	3.02%	3.02%	**5.80%**
Other	1.98%	2.00%	2.00%	2.00%	2.00%	**7.95%**
Gross IPP (%)	**2.20%**	**2.31%**	**2.39%**	**2.39%**	**2.39%**	**2.34%**

Source: Economic Insight analysis

Table 25: Summary of gross input price assumptions – low case

	2020/21	2021/22	2022/23	2023/24	2024/25	Cost mix
Labour	1.79%	2.03%	2.22%	2.22%	2.22%	**23.67%**
Doubtful debts	1.04%	1.57%	1.24%	1.28%	1.37%	**33.98%**
IT	0.72%	0.73%	0.74%	0.74%	0.74%	**8.83%**
Postage	6.69%	6.71%	6.72%	6.72%	6.72%	**4.30%**
Meter reading	1.64%	1.88%	2.07%	2.07%	2.07%	**11.72%**
Property rentals	0.24%	0.32%	0.42%	0.42%	0.42%	**3.76%**
Other staff costs	1.79%	2.03%	2.22%	2.22%	2.22%	**5.80%**
Other	1.98%	2.00%	2.00%	2.00%	2.00%	**7.95%**
Gross IPP (%)	**1.64%**	**1.92%**	**1.89%**	**1.90%**	**1.93%**	**1.81%**

Source: Economic Insight analysis

4. Frontier shift

Here, we assess the scope for Affinity Water to make 'frontier-shift' related productivity savings in HH retail. This is based on both a review of regulatory precedent, as well as analysis of EU KLEMS data.

Our findings with regards to productivity / frontier shift are as follows.

- **The scope for frontier shift in HH retail, based on an analysis of EU KLEMS data, is 0.42% pa** (central case) with an upper bound of 1.10% pa.
- When assessing frontier shift potential, **the critical issue is the UK's low recent productivity performance.** The UK's current flat productivity performance extends back to the financial crisis, making this the longest such period in history. This complicates forecasting for PR19. In our view, however, this means that more weight should be placed on 'central' and 'low' case scenarios than on 'high' case scenarios (which omit the post crisis period).
- More recent regulatory precedent is broadly consistent with a frontier shift assumption of 1.0% pa (i.e. the upper bound of our analysis). However, decisions within the last decade are consistent with much lower numbers.

To determine the net amount of IPP that will arise in HH retail over PR19, it is also necessary to reach a view on the extent of 'frontier shift' efficiency improvement that can be achieved. By this we mean the efficiency savings that even a perfectly efficient firm could make, due to assumed productivity gains. In this chapter, we therefore set out our views as to what a reasonable forecast for frontier shift potential might be, where we address in turn:

- the UK's overall productivity performance;
- an overview of the EU KLEMs TFP dataset and how this can be used to inform frontier shift;
- our analysis of the scope for frontier efficiency gains in HH retail, based on a composite index analysis using EU KLEMS; and
- an overview of relevant regulatory precedent.

4.1 The UK's productivity performance

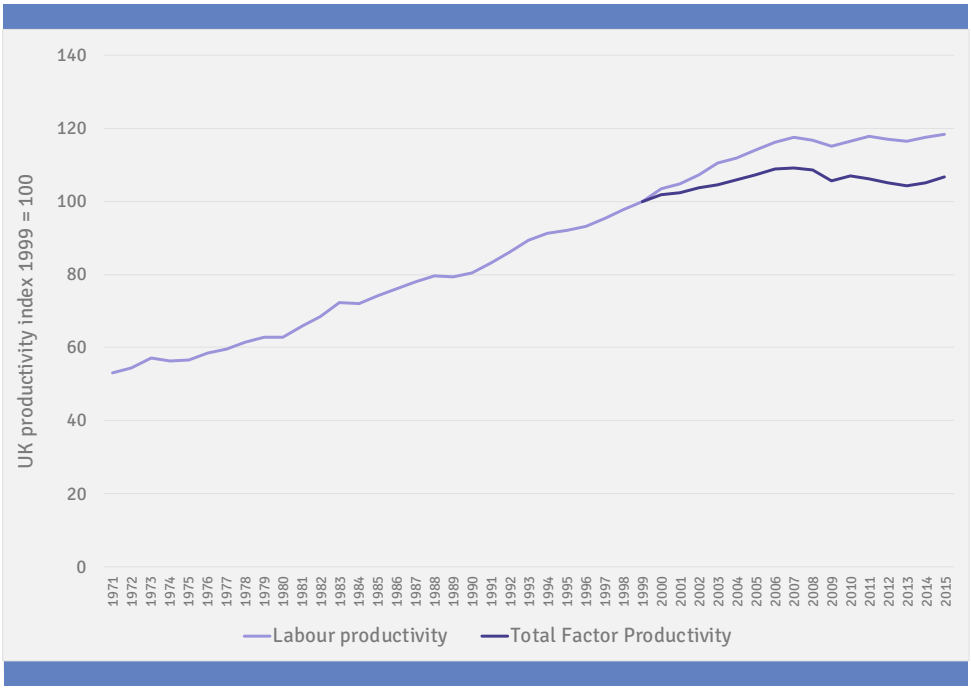
In reaching a view on the potential scope for frontier shift gains in HH retail, it is important to understand the UK's historical productivity performance.

4.1.1 The UK's productivity performance

The figure below shows both the UK's TFP and labour productivity (measured in output per hour worked) over time. A longer time series is available for the latter. This shows that, in the decade prior to the financial crisis, labour productivity was growing in line with its long-term average, of around 2% pa. However, since then, productivity has flat-lined, or slightly fallen:

- Labour productivity has averaged just 0.1% pa since 2008.
- TFP has averaged -0.3% pa since 2008.

Figure 20: UK productivity levels – annual index



Source: ONS and EU KLEMS

The fact that productivity has not increased for a period of time (or slightly fallen) is not particularly unusual. Indeed, the chart shows that it has fallen or flattened in the past. What is unusual, though, is the duration of the 'flat line', which is longer than any other period previously experienced, including the heavy recessions of the late 1980s and early 1990s.

The UK's weak productivity performance since 2008 is well documented – and has become a key policy issue in the recent past – as highlighted in the following:

- In November 2017, the OBR downgraded its GDP forecasts for the UK. This, in turn, was driven by the authority reaching a more pessimistic view regarding the outlook for productivity. *"The main reason for lowering our GDP forecast since March is a significant downward revision to potential productivity growth, reflecting a reassessment of the post-crisis weakness and the hypotheses to explain it."*[26]

- The IFS notes: *"Productivity growth has been weak in almost all sectors of the [UK] economy, and negative in some. The lack of productivity growth in the finance sector has been important, but cannot explain the majority of the recent weakness."*[27]

- The Financial Times' survey of economists in January 2018 reported that: *"more than half of all respondents said there was unlikely to be any pick-up in productivity this year."*[28]

The cyclical nature of the UK's economy – coupled with its flatlining productivity performance since the financial crisis – has important implications for any analysis used to set expected 'frontier shift' efficiency in future. The key considerations are as follows:

- Firstly, to the extent that expected frontier shift must draw on historical data, the time-period over which any such analysis is undertaken will clearly materially impact the conclusions one reaches.

- Secondly, determining 'which' time-period is appropriate thus turns the purpose for which any forecast frontier shift analysis is being used. Most obviously:

  - If the primary purpose is to inform frontier shift potential over the relative near-term (e.g. say the 5-year period of a price control) then one should most likely attach more weight to the recent past.
  - If, on the other hand, one wanted a view of longer-term frontier shift potential, so in turn, one should use longer-term historical data to inform that analysis.

[26] *'Economic and fiscal outlook – November 2017 .' OBR (2017).*
[27] *https://www.ifs.org.uk/publications/7821*
[28] *'UK productivity performance will be sluggish, say economists.' The FT, January 1st 2018.*

4.2 EU KLEMS composite index analysis

In this section, we set out an analysis of TFP, as reported in the EU KLEMS data (a commonly used source by regulators in setting price determinations). Here, our methodology is as follows:

- We identify sectors within EU KLEMS that we consider to be 'comparable' to HH retail (reflecting our views on 'input mix' and 'activities' in particular).
- We then develop a composite TFP index for HH retail, based on weighting the individual comparators.
- Finally, we estimate the scope for future frontier shift for HH retail, based on the historical trends implied by our indices. Here, and with reference to the previous discussion of the UK's historical productivity performance, a range of time periods are tested.

4.2.1 The EU KLEMS data

The EU KLEMS is the most comprehensive data source relating to TFP estimates. It includes measures of TFP growth at both an overall economy level, as well as disaggregated down to individual sectors or industries by country (including within the UK). The most recent 2017 EU KLEMS databases retain the standard EU KLEMS structure of previous rounds. However, the number of years for which growth accounting data is available is slightly reduced. For example, whereas the 2011 EU KLEMS release allowed one to calculate TFP growth since the 1970s, the current release only goes back to 1998 for the UK.

The EU KLEMS database contains information on 34 industries and 8 more aggregate categories. These are set out in the following table.

Table 26: EU KLEMS industries, based on NACE Rev.2 / ISIC Rev.4

No	Description	Code
Agg	**Total industries** (all industries excluding T and U)	**TOT**
Agg	**Market economy** (all industries excluding L, O, P, Q, T and U)	**MARKT**
1	Agriculture, forestry and fishing	A
2	Mining and quarrying	B
Agg	**Total manufacturing**	**C**
3	Food products, beverages and tobacco	10-12
4	Textiles, wearing apparel, leather and related products	13-15
5	Wood and paper products, printing and reproduction of recorded media	16-18
6	Coke and refined petroleum products	19
7	Chemicals and chemical products	20-21
8	Rubber and plastics product, other non-metallic mineral products	22-23
9	Basic metals and fabricated metal products, except machinery and equipment	24-25
10	Electrical and optical equipment	26-27
11	Machinery and equipment n.e.c.	28
12	Transport equipment	29-30
13	Other manufacturing; repair and installation of machinery and equipment	31-33
14	Electricity, gas and water supply	D-E
15	Construction	F
Agg	**Wholesale and retail trade; repair of motor vehicles and motorcycles**	**G**
16	Wholesale and retail trade and repair of motor vehicles and motorcycles	45
17	Wholesale trade, except of motor vehicles and motorcycles	46
18	Retail trade, except of motor vehicles and motorcycles	47
Agg	**Transportation and storage**	**H**
19	Transport and storage	49-52

No	Description	Code
20	Postal and courier activities	53
21	Accommodation and food service activities	I
Agg	**Information and communication**	**J**
22	Publishing, audio-visual and broadcasting activities	58-60
23	Telecommunications	61
24	IT and other information services	62-63
25	Financial and insurance activities	K
26	Real estate activities	L
27	Professional, scientific, technical, administrative and support service activities	M-N
Agg	**Community social and personal services** (O-U excluding T and U)	**O-U**
28	Public administration and defence; compulsory social security	O
29	Education	P
30	Health and social work	Q
Agg	**Arts, entertainment, recreation and other service activities**	**R-S**
31	Arts, entertainment and recreation	R
32	Other service activities	S
33	Activities of households as employers; undifferentiated goods-and-services producing activities of households for won use	T
34	Activities of extraterritorial organisations and bodies	U

Source: 'EU KLEMS Growth and Productivity Accounts 2017 Release, Statistical Module.' Kirsten Jaeger (2017).

4.2.3 Composite index assumption

Following from the above, the next step in our analysis was to consider 'which' elements of the EU KLEMS data to include as comparators for HH retail – and 'how much' weight to attach to each. Consistent with economic theory, when determining which components of the EU KLEMS data to include, we considered:

- the relative mix of labour and capital as inputs into production;
- the activities undertaken within the sector / industry; and
- the likely competitiveness of the sector / industry.

Having applied these criteria, we arrived at the weightings set out in the following table.

Table 27: Weightings used in composite EU KLEMS index – for use in opex HH retail

Sectors used for composite opex index and % weightings	HH Retail weighting (%)
Total industries (whole UK)	75%
Financial and insurance activities	12.5%
Retail trade, except of motor vehicles and motorcycles	12.5%

Source: Economic Insight analysis

With reference to the above, we should highlight that:

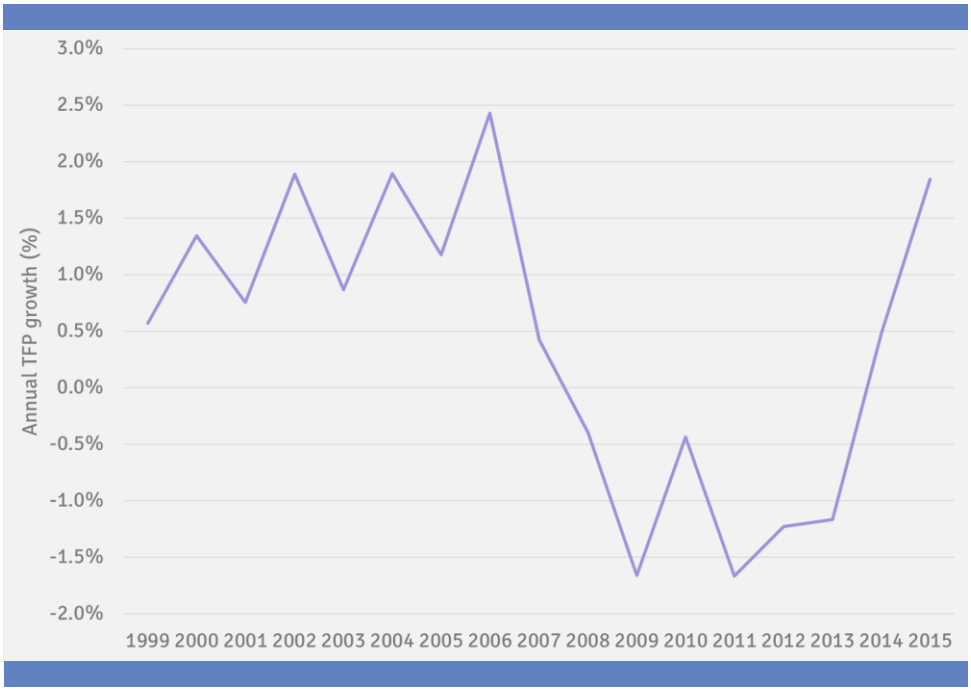
- Our index includes a 75% weighting on the UK's 'all industries' TFP performance. This reflects: (i) the fact – even with the use of evaluation criteria - the selection of individual sectors remains subjective, and so we did not want our results to be overly sensitive to our choices; and (ii) there are good reasons to suppose the retail element of the value chain in particular should perform broadly in line with overall UK productivity.

- Financial and insurance activities have a very similar input mix of labour and capital to HH retail – and furthermore, involve similar activities – making them a credible comparator.

- Retail trade also involves similar activities to HH retail – and also is widely considered to be highly competitive.

Following from the above, the following chart shows the historical performance of our opex composite index for HH retail.

Figure 21: Historical TFP performance – composite opex index for HH retail



Source: Economic Insight analysis

4.2.4 Results

Based on the evidence set in the preceding sections, the following table shows our forecasts for the scope for frontier shift efficiency savings for HH retail. Given the asset light nature of retail, we have focused on opex.

We further present figures based on a 'central case'; a 'high case' and a 'low case'. In all cases, the makeup of the composite index is the same. What varies is the time-period from which the data is drawn. Specifically:

- Our central case is based on the last 16 years from 1999 to 2015. We have chosen this period as our central estimate because it attaches an equal balance of weight to the 8-year period of low productivity growth since the financial crisis and the 8 preceding years. As the EU KLEMS data does not contain a 'whole' business cycle (and because one cannot be certain when the next one will occur) we consider this to be a neutral and balanced interpretation of the data. Implicit in this assumption is that the UK's productivity will improve over PR19 relative to current performance.

- Our high case is based on the 9 years from 1999 – 2008. This includes the period of growth since the early 90s recession (albeit not the whole period), and the start of the 2007 recession. This is our high scenario, because it effectively 'ignores' the last decade of low productivity performance. As such, this scenario implicitly assumes that the UK quickly returns to its longer-term productivity growth trend.

- Our low case is based on the last 8 years from 2007 to 2015. Our low scenario assumes that the UK's productivity performance since 2007 persists in the near-term. Given the unusual length of the current 'flat-lining' productivity

performance, and the uncertainty arising from Brexit, we also consider this to be a plausible basis for forecasting frontier-shift over PR19.

The following table sets out the results of our analysis in relation to HH retail. As noted above, given the capex light nature of retail, one may wish only to make use of the opex figures alone.

Table 28: HH retail frontier shift forecasts (opex)

Scenario / cost type	Low	Central	High
Time-period data based on	**2007-2015**	**1999-2015**	**1999-2008**
Retail	-0.42%	0.42%	1.10%

Source: Economic Insight analysis

4.3 Review of regulatory precedent (opex frontier shift)

Our view is that Affinity should base its Plan assumptions on our analysis of EU KLEMS data, as set out above. However, as a further source of information, we undertook a review of regulatory precedent. Accordingly, the following table sets out a summary of our findings relating to opex (which is most relevant to retail).

Table 29: Opex productivity assumptions (frontier shift) in other price control reviews

Regulator - price control	% reduction in opex per annum	What is being measured	Notes on adjustments
ORR – Network Rail, opex (CP4)[29]	0.2%	*Ongoing productivity improvements* ('frontier-shift') that even the best performing companies would be expected to achieve, above that reflected in general inflation. Measured as *TFP (net of economy TFP)* based on Oxera (2007) study on the scope for CP4 efficiency improvement.	Lowered amount for maintenance and renewals (60%) of Oxera's estimate as a prudent value, to account for the possibility of double counting productivity improvements in the TFP estimates and in the input price estimates produced by LEK for Network Rail.
ORR – Network Rail, maintenance (CP4)[30]	0.7%		
Ofwat – water and sewerage (PR09)[31]	0.25%	*Continuing efficiency* - a continuing improvement factor linked to the improvement that can be expected from the leading or frontier companies.	N/A

[29] *'Periodic Review 2008: Determination of Network Rail's outputs and funding for 2009-14.' Office of Rail and Road (October 2008).*
[30] *'Periodic Review 2008: Determination of Network Rail's outputs and funding for 2009-14.' Office of Rail and Road (October 2008).*
[31] *'Future water and sewerage charges 2010-15: Final determinations.' Ofwat (2009)*

Regulator - price control	% reduction in opex per annum	What is being measured	Notes on adjustments
CC - Bristol Water PR09[32]	0.9%	*Productivity improvement*	Marginally lower than the 1 per cent figure, which appeared to be the consensus view. This downward adjustment reflected the CC's view of the balance between two offsetting factors: (i) the scale of the industry capital investment programme, which at £22 billion was higher than in any other previous five year period, presenting an opportunity for continuing efficiency improvements for the water sector; and (ii) the fact that some of the forecasts of productivity improvements reviewed were based in part on historic averages that incorporate the catch-up element of improvement in productivity which needs to be netted out from our estimate.
PPP Arbiter – underground infracos, central costs (2010)[33]	0.7%	unclear	unclear
PPP Arbiter – underground infracos, opex (2010)[34]	0.9%	unclear	unclear
UR – water and sewerage (PC13)[35]	0.9%	*Productivity improvement* measured by EU KLEMS TFP growth rates in comparator sectors.	Adjustments for capital substitution and catch-up efficiency cancel each other out.
Ofgem – electricity and gas transmission (T1)[36]	1.0%	The *ongoing efficiency assumption* is a measure of the *productivity improvements* that are expected to be made by the network companies over the price control period. EU KLEMS sector comparators on total factor productivity (TFP) measures and partial factor productivity (PFP) measures.	Excluded industries (namely, utilities) from EU KLEMS comparator set where systematic catch-up was expected, i.e. where the historic productivity improvements for these industries will reflect a material element of movement to the efficiency frontier (which Ofgem's comparative efficiency assessment addresses), as well as movement of the efficiency frontier (which is the element Ofgem needs to identify).
Ofgem – gas distribution (GD1)[38]	1.0%		

32 *'Bristol Water plc: A reference under section 12(3)(a) of the Water Industry Act 1991 Report.' Competition Commission (4 August 2010).*

33 *'Northern Ireland Electricity Limited price determination A reference under Article 15 of the Electricity (Northern Ireland) Order 1992 – Final Determination.' Competition Commission (26 March 2014) Table 11.1.*

34 *'Northern Ireland Electricity Limited price determination A reference under Article 15 of the Electricity (Northern Ireland) Order 1992 – Final Determination.' Competition Commission (26 March 2014) Table 11.1.*

35 *'PC13 Annex D The Rate of Frontier Shift Affecting Water Industry Costs.' First Economics (December 2012).*

36 *'RIIO-T1/GD1: Real price effects and ongoing efficiency appendix.' Ofgem (17 December 2012).*

38 *'RIIO-GD1: Final Proposals – Supporting document - Cost efficiency.' Ofgem (17 December 2012).*

Regulator - price control	% reduction in opex per annum	What is being measured	Notes on adjustments
		Review of recent regulatory reports, including a report by Reckon commissioned by the ORR in May 2011.[37]	
UR – gas distribution (GD14)[39]	1.0%	The move of the frontier – or frontier shift – describes the *efficiency gains* resulting from companies becoming more efficient over time, e.g. through technological progress. The frontier shift in real terms can be measured as follows: *input price inflation – forecast RPI (measured inflation) – productivity increase.*	This 1.0% is the estimated average annual productivity increase.
CC – NIE (RP5)[40]	1.0%	*Annual productivity growth* based on the following evidence: (i) review of regulatory precedent; (ii) EU KLEMS growth and productivity accounts based on comparator analysis; and (iii) recent business plans submitted by GB DNOs.	
Ofgem – electricity distribution (ED1)[41]	1.0% (midpoint of 0.8% and 1.1%)	*Ongoing efficiency assumption*, whereby even the most efficient DNO should make *productivity improvements* over the price control period, such as by employing new technologies. These improvements are captured by the ongoing efficiency assumption which represents the potential reduction in input volumes that can be achieved while delivering the same outputs.	
UR – water and sewerage (PC15)[42]	0.9%	*Productivity gains* which the frontier companies are expected to deliver over the price control period.	

[37] *'Productivity and unit cost change in UK regulated network industries and other UK sectors: initial analysis for Network Rail's periodic review.' Reckon (May 2011).*

[39] *'GD14 Price Control for northern Ireland's Gas Distribution Networks for 2014-2016 Final Determination.' Utility Regulator (20 December 2013).*

[40] *'Northern Ireland Electricity Limited price determination A reference under Article 15 of the Electricity (Northern Ireland) Order 1992 – Final Determination.' Competition Commission (26 March 2014).*

[41] *'RIIO-ED1: Final determinations for the slowtrack electricity distribution companies.' Ofgem (28 November 2014).*

[42] *'Water & Sewerage Services Price Control 2015-21 Final Determination – Main Report.' Utility Regulator (December 2014).*

Regulator - price control	% reduction in opex per annum	What is being measured	Notes on adjustments
CMA - Bristol Water PR14 (totex)[43]	1.0%	*Productivity improvements*	
UR – gas distribution (GD17)[44]	1.0% (midpoint of 0.5% and 1.5%)	*Productivity growth*: it is necessary to apply a productivity assumption to both opex and capex so as to take account of continuing efficiencies which the industry can achieve over the price control period. This is a base level of efficiency which even frontier companies would be expected to achieve as they continually improve their business over time (with new technologies and working practices for example).	
UR – electricity networks (RP6)[45]	1.0% (midpoint of 0.5% and 1.5%)	*Productivity assumption* applied to opex and capex so as to take account of continuing efficiencies which the industry can achieve over the price control period. This is a base level of efficiency which even frontier companies would be expected to achieve as they continually improve their business over time. For example with the use of new technologies, new working practices or other means to enable their businesses to run more efficiently.	

Source: various, see footnotes

In relation to the precedent set out in the above table, some key points to note include:

- The average frontier shift assumed by regulators across all the decisions relating to opex is 0.85%.
- There seems to be a general pattern of decisions settling on figures of around 1.0% pa (i.e. consistent with the upper bound of our forecast). However, decisions have also included lower assumptions (for example, opex frontier shift as low as 0.2% pa has been assumed by regulators during the last decade).

[43] *'Bristol Water plc: A reference under section 12(3)(1) of the Water Industry Act 1991 Report.' Competition and Markets Authority (6 October 2015).*
[44] *'Annex 6: Real Price Effects & Frontier Shift GD17 Final Determination.' Utility Regulator (15 September 2016).*
[45] *'Annex C Frontier Shift: Real Price Effects & Productivity RP6 Final Determination.' Utility Regulator (30 June 2017).*

- In hindsight, the decisions have systematically overshot the UK's actual delivered productivity performance. As even the UK's overall productivity performance (measured in TFP terms) may overestimate true 'frontier' shift, the overestimation of productivity potential by regulators may be even greater than what this implies.

5. Catch-up efficiency

This chapter contains a summary of Affinity's potential for catch-up efficiency in relation to HH retail, based on Ofwat's recently published retail cost assessment models.

The key messages and findings for Affinity Water with respect to catch-up efficiency are as follows.

- **Ofwat's cost assessment models are consistent with Affinity having the potential to make large efficiency improvements** over PR19.
- Specifically, **Ofwat's totex models imply that Affinity faces an efficiency gap of 24% to upper quartile.**
- This is equivalent to making annual efficiency savings of 4.8% (although we note Ofwat is not proposing to apply a glide-path at PR19).

5.1 Overview of catch-up efficiency potential for Affinity

To provide Affinity with a view of the 'net' IPP implied by our forecasting, it is also necessary to deduct catch-up efficiency. The scope of our work has not included developing retail efficiency models for Affinity. Therefore, to provide a view on this, our approach has been to replicate Ofwat's totex retail cost assessment models, as published for consultation on March 29, 2018.

The following tables show key summary statistics of our replication of Ofwat's models, compared to those reported in Ofwat's consultation document. As can be seen, the regressions we ran using the Ofwat Masterfile were able to closely replicate the regulator's reported results.

Table 30: Replication of Ofwat's retail cost assessment totex models

Ofwat model identifier	ORTC3		ORTC4	
Version	Ofwat reported	EI replication	Ofwat reported	EI replication
Ln(number of households)			-0.119** (0.012)	-0.116** (0.015)
% metered households	0.004 (0.420)	0.004 (0.442)	0.004 (0.376)	0.003 {0.403}
Ln(bill size)	0.468*** (0.000)	0.471*** (0.000)	0.641*** (0.000)	0.640*** (0.000)
% households with default (Eq_lpcf62)	0.026 (0.173)	0.025 (0.196)	0.042** (0.014)	0.041** (0.020)
2015 dummy	0.024 (0.344)	0.024 (0.332)	0.024 (0.372)	0.024 (0.360)
2016 dummy	-0.043 (0.265)	-0.042 (0.270)	-0.029 (0.446)	-0.029 (0.452)
2017 dummy	-0.096** (0.012)	-0.113** (0.011)	-0.064* (0.094)	-0.093** (0.021)
Constant	-0.14	-0.124	0.117	0.126

Source: Economic Insight analysis

Using our replication of Ofwat's models, we calculated the efficiency gaps they implied for Affinity. Assuming the regulator attaches equal weights to these models, we find that they would imply a catch-up efficiency saving of 24% over PR19 (equivalent to 4.8% pa – as shown in the following table).

Table 31: Catch-up efficiency challenge (% total over PR19)

Parameter / scenario	Central
Model weights	Equal weights
Residual adjustment	None
Benchmark	Upper quartile
Glide path	None
Total efficiency challenge over PR19 %)	24%
Average catch-up efficiency challenge pa (%)	4.8%

Source: Economic Insight

For the purpose of setting a cost efficiency challenge for HH retail, Ofwat is not proposing to set a 'glide path' (the implication being that the entirety of the above efficiency challenge would need to be delivered by the first year of the control).

Note, it is important to emphasise that the above does not represent our, or Affinity's, view of its relative efficiency in retail. Rather, it is included solely for the purpose of

providing the company with information as to what 'net IPP' might be implied if efficiency deductions consistent with Ofwat's models are applied to our 'gross IPP' forecasts.

5.2 Examples of Affinity Water's approach to cost management

We are aware that Affinity employs a range of processes in order to help minimise its HH retail costs. Key aspects of the company's cost management include the following:

- Affinity provides customers with the flexibility to pay their bills through various methods, including payment by mobile devices (PINGIT), which provides customers with the ability to perform transactions quickly, and in ways that are most convenient to them. In addition, Affinity recognises that customers living in more remote areas may be limited in *where* they can pay their bill. With high street bank branches reducing in numbers, the Post Office is often the most accessible option to make a payment; and so Affinity has accordingly arranged for payments to be made through the Post Office.

- With regard to receiving payments from temporary tenants in Affinity's supply regions, Affinity has made arrangements with certain local authorities and landlords, such that they become responsible for charging the tenants for their water expenses.

- Affinity has also made arrangements for their customers that are moving homes within and outside of their supply areas. The customers can fill an online application, which is easily accessible and clearly constructed on the website, to notify Affinity that they are moving homes, and Affinity follows-up with any outstanding balances or refunds both by email and post within a couple of days.

6. Conclusions and finalised IPP forecasts

In this chapter we bring together summary results of our IPP forecasts for Affinity Water over PR19.

The key messages and findings for Affinity Water with respect to IPP forecasts over PR19 are as follows.

- Our estimates show that, on average, Affinity will face a **gross IPP** of between **1.81%** and **2.34%** with a **central case of 1.88% (pa)** over **PR19.**
- Based on the analysis of the EU KLEMS data, the scope for productivity gains (**frontier shift**) that even an efficient firm can make are in the range of **-0.42%** and **1.10%**, with a central case of **0.42% pa**.
- **Ofwat's retail totex models imply a catch-up efficiency gap for Affinity of 24% to the upper quartile.**
- After deducting potential catch-up efficiency gains and productivity savings, our estimates show that, on average, Affinity will face a **net IPP** of between **-3.41%** and **-2.88%** with a central case of **-3.34% (pa)** over PR19.

The following tables summarise the key analytical results set out over the preceding chapters of our report, showing in turn:

- projected gross IPP;
- frontier shift potential for retail;
- catch-up efficiency implied by Ofwat's models; and
- the net IPP implied by the above.

6.1 Gross IPP estimates for Affinity over PR19

Table 32: Summary of forecast gross retail IPP

	2020/21	2021/22	2022/23	2023/24	2024/25	Average
High	2.20%	2.31%	2.39%	2.39%	2.39%	2.34%
Medium	1.68%	1.95%	1.91%	1.93%	1.96%	1.88%
Low	1.59%	1.88%	1.85%	1.86%	1.89%	1.81%

Source: Economic Insight analysis

6.2 Frontier shift efficiency savings based on analysis of EU KLEMS data

Table 33: Summary of frontier-shift

Scenario / cost type		Low	Central	High
Time-period data based on		2007-2015	1999-2015	1999-2008
Retail	Opex	-0.42%	0.42%	1.10%

Source: Economic Insight analysis

6.3 Catch-up efficiency challenge based on Ofwat's totex models

Table 34: Catch-up efficiency challenge (% total over PR19)

Parameter / scenario	Central
Model weights	Equal weights
Residual adjustment	None
Benchmark	Upper quartile
Glide path	None
Total efficiency challenge over PR19 %)	24%
Average catch-up efficiency challenge pa (%)	4.8%

Source: Economic Insight analysis

6.4 Net IPP estimates for Affinity over PR19

Table 35: Summary of key IPP forecasts

Calculation step	Scenario	2020 / 21	2021 / 22	2022 / 23	2023 / 24	2024 / 25	Average over PR19
Gross IPP (%)	High	2.20%	2.31%	2.39%	2.39%	2.39%	2.34%
	Medium	1.68%	1.95%	1.91%	1.93%	1.96%	1.88%
	Low	1.59%	1.88%	1.85%	1.86%	1.89%	1.81%
Catch-up efficiency savings (%)	Upper quartile	24%	0%	0%	0%	0%	4.80%
Productivity savings (%)	Medium	0.42%	0.42%	0.42%	0.42%	0.42%	0.42%
Affinity Water net IPP (%)[46]	High	-22.2%	1.89%	1.97%	1.97%	1.97%	-2.88%
	Medium	-22.7%	1.53%	1.49%	1.51%	1.54%	-3.34%
	Low	-22.8%	1.46%	1.43%	1.44%	1.47%	-3.41%

Source: Economic Insight analysis

6.5 Concluding remarks

As set out previously, it is important that the PR19 regulatory framework appropriately allows for gross IPP in retail, to ensure that (in total) allowed revenues and prices properly reflect the outcomes that would occur in a competitive market. Here, of course, the important to point to note is that the regulatory framework already ensures that allowed revenues across companies reflect differences in relative efficiency and overall productivity gains. Consequently, unless gross IPP is included in totex, allowed revenues will be set below the levels that would arise in a competitive market.

We are confident that the range of analyses and evidence contained here provide a robust basis for informing Affinity's retail IPP at PR19. This can be used in a number of ways, including in order to help the company derive its retail cost baselines. The overall range of gross IPP we identify (which ranges from 1.81% to 2.34% pa) is below the ranges we estimated for companies at PR14. This is consistent with lower inflationary environment now faced by the UK, and further demonstrates the plausibility of our results.

[46] *Note that in our estimates for net IPP we have always deducted the catch-up efficiency to the upper quartile (as implied by Ofwat's own models) and medium productivity savings from the **high**, **medium**, and **low** gross IPP.*

7. Annex A: econometrics for forecasting bad debt costs

This annex provides further detail of our approach for forecasting bad debt costs.

In summary, there are three main parts to our approach:

- First, we use historical data (between 2010/11 and 2016/17) to estimate the relationship between bad debt per unique customer, bill size and an indicator of the health of regional economies – benefits expenditure.
- Second, we use publicly available information to forecast bills and benefits expenditure.
- Third, using the estimated relationship and the forecasts, we predict the annual growth in bad debt per unique customer over PR19.

Data in relation to debt costs and the number of (unique) connected properties was source from the company datashare (i.e. is regulatory accounting data). We then collected information at the regional level from the ONS on benefits expenditure (£m, nominal).

In order to forecast Affinity's bill size, we have assumed that bill size would move in line with CPIH inflation, as well as adjusting for any K-factors that Ofwat allows in its wholesale controls. We have further used forecasts from the OBR on CPI; and the Department for Work & Pensions (DWP) on benefits expenditure (£m, nominal).

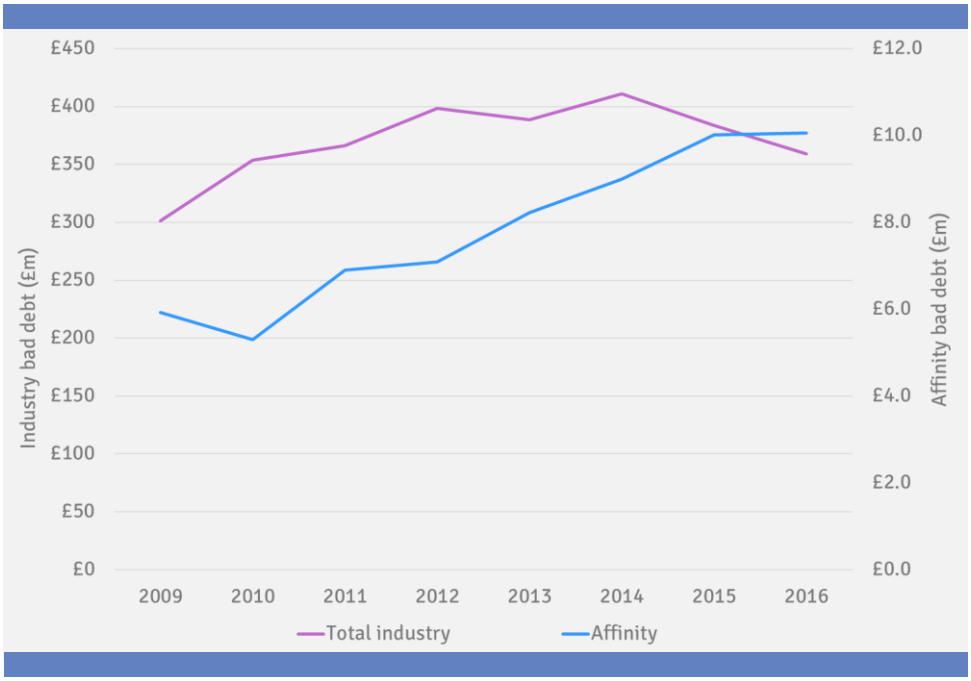
In the following we provide some background trends, followed by a more detailed description of our analysis.

7.2 Background trends

The figure below shows how total bad debt and debt management charges across both the water and sewerage (WaSCs) and the water only companies (WoCs) evolved between 2009 and 2016. As can be seen, bad debt increased steadily across the industry until 2012 and has been on a declining path since 2014.

It also illustrates that Affinity's bad debt costs have moved in line with the total industry but continued to increase in 2014 to then flatten around 2015 onwards.

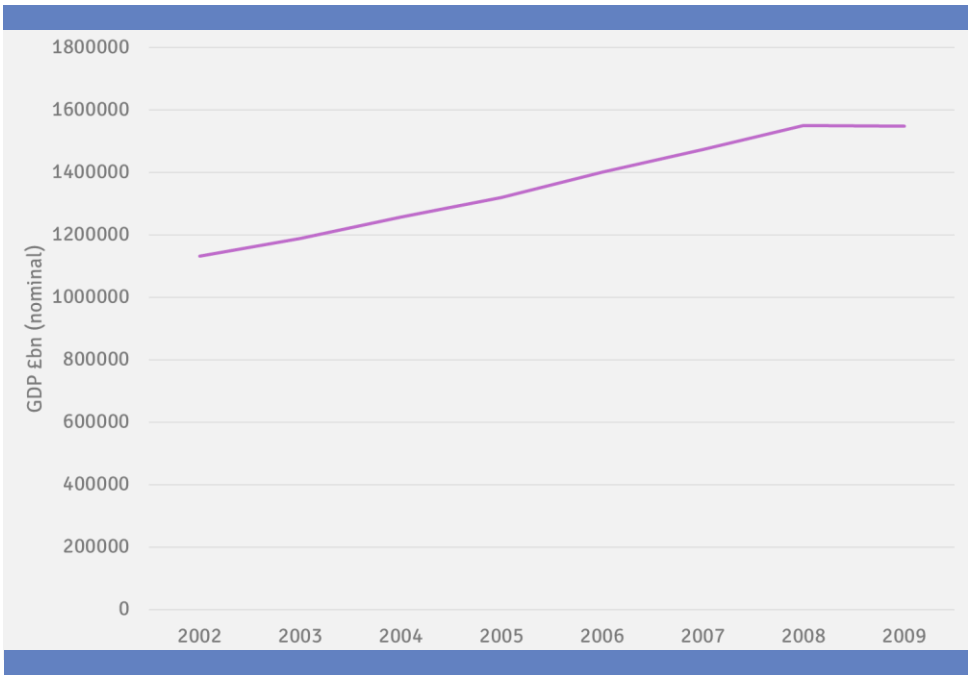
Figure 22: Evolution of bad debt from 2009 to 2016, total industry and Affinity Water



Source: Regulatory accounts data

The following figure shows nominal UK GDP has been rising at a steady rate from 2009 onwards. This upward trend in the national economy, compared to the total bad debt figure demonstrates that the relationship between the health of the economy and bad debt is not straightforward. For example, it shows that at times of economic growth – between 2009 and 2012 - bad debt continued to rise. This suggests that other factors also affect bad debt. Our subsequent analysis – consistent with previous studies – suggests that bill size and other metrics of the (socioeconomic) health of the economy – especially benefits expenditure – also influence overall bad debt levels.

Figure 23: Evolution of GDP from 2009 to 2016



Source: ONS

7.3 Econometric modelling

As mentioned previously, we use historical data (between 2010/11 and 2016/17) to estimate the relationship between bad debt per unique customer, bill size and benefits expenditure:

- **Bad debt per unique customer** is estimated by dividing the sum of debt management and doubtful debts by the number of unique customers. Both were obtained from companies' regulatory accounts and the company Datashare.
- **Average wholesale bill size** is estimated by diving the total wholesale bill size by the number of unique customers for each company. The source is the same as above.
- **Benefits expenditure** is obtained from the ONS / DWP. For each company, we have applied a regional weight that most closely matches with its supply area in order to obtain regional benefits expenditure.

Regarding the above, it is important to emphasise that the approach to modelling for forecasting purposes is intentionally different from that one would use for efficiency benchmarking. Specifically, when developing models for forecasting, variable selection must be governed (in part) by the extent to which one can derive robust forecasts for the explanatory variables themselves. Whereas, in the case of efficiency benchmarking, variable selection is mainly driven by ones' views on the extent to which a variable 'best' explains variation in cost (either measured statistically, or with reference to engineering intuition). Consequently, (i) one should not infer that the models we have used for forecasting necessarily represent reasonable models for cost benchmarking; nor (ii) that existing models for cost benchmarking should be used for forecasting.

In terms of the detail of our model, we have selected a double-log functional form, as this appears to fit the data well, helps account for any non-linearities in the data and, also, allows for coefficients to be directly interpreted as elasticities. Rather than using Ordinary Least Squares (OLS) to estimate the coefficients, we use the '*random effects*' model, which recognises the panel structure of our dataset and helps to account for unobserved differences between the companies that, if not controlled for, could bias the coefficients on bill size and regional benefits expenditure.

The following table shows the results of our preferred model.

Table 36: Preferred model results

Variable	Coefficient	Standard error	z-statistic	p-value
Average wholesale bill size	0.358	0.120	2.98	0.003
Benefits expenditure	0.249	0.076	3.29	0.001

R^2: 0.60, constant not shown

The coefficients have economically intuitive signs and are of sensible order of magnitude. For example, the above suggests that – other things being equal – a 1% increase in average wholesale bill size leads to a 0.4% increase in bad debt; and a 1% increase in benefits expenditure leads to a 0.3% increase in bad debt.

7.4 Forecasts of average wholesale bill size and regional benefits expenditure

The subsequent step in our analysis was to forecast average wholesale bill size and regional benefits expenditure over PR19.

7.4.1 Wholesale bill size

As wholesale water will be indexed to CPIH, in the following we have assumed that Ofwat would set a 0 K-factor for wholesale water, and that the wholesale water bill would rise in line with CPIH inflation.

In order to project CPIH inflation forward, we have applied the historical wedge between CPI and CPIH (-0.2% over the last ten years) to the OBR's CPI projections. The table below sets out our projections for Affinity's bill size over PR19 (assuming a 0 K-factor).

Table 37: Bill size projections (nominal) in PR19

	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Bill size projections	2.7%	2.0%	1.7%	1.8%	1.8%	1.8%	1.8%	1.8%

Source: Economic Insight analysis of ONS and OBR data

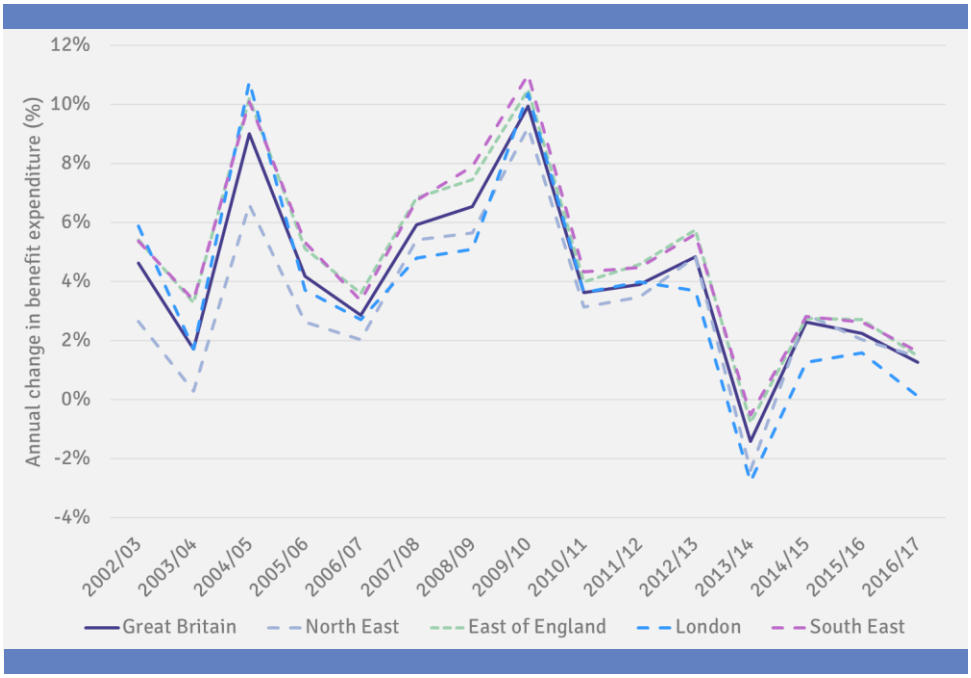
7.4.3 Benefits expenditure

We have used two methods for forecasting Affinity's regional benefits expenditure increases in PR19.

- The first is to assume it rises in line with DWP *national* benefits forecasts, shown in the first row of the table overleaf. This is our **national approach**.
- The second is to assume that the average historic percentage point gap between national benefits expenditure and Affinity's regions of supply benefits expenditure persists into PR19 (latest 15 years of data available), shown in the second row of the table below. The percentage point gap is taken between national benefits expenditure and benefit expenditures of East of England; London; North East; and South East, and then a weighted average is calculated based on the number of Affinity's bad debt clients in each of these regions. This is our **regional approach**. We have selected the wedge to the weighted average of East of England; London; and South East, based on the data of the number of bad debt customers provided to us by Affinity.

The figure below shows the average annual percentage change in benefits expenditure (nominal) for Great Britain, East of England, London, North East and South East. It shows that they are highly correlated over time, and East of England and the South East have higher rates of growth than Great Britain on the whole, while London has lower rate of growth in general, compared to Great Britain. The difference between national benefit expenditures and the weighted average of expenditures in Affinity's supply regions is 0.4% - on average - over the entire period. Accordingly, we use this figure to reduce the UK projections.

Figure 24: Evolution of benefits expenditure from 2002/03 to 2016/17



Source: Economic Insight analysis of DWP data

The results of these two approaches are shown in the following table. There are advantages and disadvantages to both. For example, we note that the regional approach generally results in *fractionally* higher forecast bad debt inflation for Affinity than the national approach. This is primarily driven by an expectation that benefits expenditure will be higher in the Affinity's supply regions than for the UK overall.

Table 38: Benefits expenditure projections (nominal) in PR19

	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
National benefits expenditure projections (GB)	2.0%	2.3%	1.9%	1.6%	3.7%	2.4%	2.5%	2.8%
Regional benefits expenditure projections (AFW supply regions)	2.1%	2.3%	1.9%	1.6%	3.7%	2.4%	2.6%	2.9%

Source: Economic Insight analysis of DWP data

7.5 Forecasting bad debt

The final step is to combine the econometric results and the forecasts above to project the '*gross IPP*' associated with bad debt over PR19. To estimate the impact of bill size and benefits expenditure we do the following:

- First, multiply each of the forecasts in the tables set out above by the coefficients from the econometric model (Table 36). For example, the impact of a 1.6% increase in national benefits expenditure on bad debt is estimated to be 1.6% x 0.249 = 0.4%. This provides an estimate of the effect of a change in an individual factor on bad debt – and so on.

- Second, we then add up each of the effects of changes in all of the factors, to estimate the combined effect of changes in average wholesale bill size and benefits expenditure on bad debt. This, then, gives us our projected bad debt gross IPP forecast, based on our preferred econometric model.

The table below set out our projections, using both the UK-level and the regional-level forecasts for benefits expenditure.

Table 39: Bad debt gross IPP for PR19, UK- and regional-level forecasts

	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	Avg
National econometrics approach									
Average bill size	1.0%	0.7%	0.6%	0.6%	0.7%	0.7%	0.7%	0.7%	0.65%
Benefits expenditure	0.5%	0.6%	0.5%	0.4%	0.9%	0.6%	0.6%	0.7%	0.65%
Total bad debt inflation	**1.5%**	**1.3%**	**1.1%**	**1.0%**	**1.6%**	**1.2%**	**1.3%**	**1.4%**	**1.30%**
Regional econometrics approach									
Average bill size	1.0%	0.7%	0.6%	0.6%	0.7%	0.7%	0.7%	0.7%	0.65%
Benefits expenditure	0.5%	0.6%	0.5%	0.4%	0.9%	0.6%	0.6%	0.7%	0.66%
Total bad debt inflation	**1.5%**	**1.3%**	**1.1%**	**1.1%**	**1.6%**	**1.3%**	**1.3%**	**1.4%**	**1.32%**

Source: Economic Insight calculations

7.6 Conclusions

REGIONAL FORECASTS ARE MARGINALLY MORE CHALLENGING FOR COMPANIES.

On the basis of the analysis set out above, we conclude that Affinity's bad debt will increase over PR19 – albeit by a rate that is less than CPIH inflation. Our analysis suggests that an estimate between 1.3% and 1.4% per annum is reasonable. For the purpose of our gross IPP analysis, we therefore suggest using the estimate based on the regional analysis if companies want to challenge themselves more, whereas the use of the national estimate would be less challenging overall, although by a very marginal amount.

8. Annex B: labour cost index

This annex explains how our labour cost indices were derived for Affinity

Our approach was as follows:

- We first 'mapped' Affinity's specific job roles to the most relevant SOC code, as recorded by the ONS in the ASHE. SOC code are available at different levels of disaggregation. As set out in the main report, we focused our analysis on 2 and 3 digit SOC codes.

- We collected wage inflation data from 2003 to 2016, using historical publications from the ASHE for each relevant SOC code. While ASHE data is available for years before 2003, changes in the structure of SOC codes mean that it is not possible to align these early data with the 2003 – 2016 data to produce a consistent index over time.

- To construct a retail labour cost index for Affinity, we calculated the weighted averages of the SOC code-level inflation at both 2 and 3 digits. Weights are calculated based on 2016 average wages for each SOC.

The following table shows the **2 digit** SOC codes that were used in the construction of Affinity's HH retail labour cost index.

Table 40: SOC codes used in Affinity Water's labour cost index - 2 digit

SOC	SOC 2010	SOC 2000	Affinity
Customer service occupations	**72**	**72**	235
Administrative occupations	**41**	**41**	37
Science, research, engineering and technology professionals	**21**	**21**	2
Business, media and public service professionals	**24**	**24**	3
Corporate managers and directors	**11**	**11**	4

Source: Economic Insight

The next table shows the **3 digit** SOC codes that were used in the construction of Affinity's HH retail labour cost index.

Table 41: SOC codes used in Affinity Water's labour cost index - 3 digit

SOC	SOC 2010	SOC 2000	Affinity
Customer service managers and supervisors	**722**	**114**	26.43
Administrative occupations: Office managers and supervisors	**416**	**415**	7.81
Other administrative occupations	**415**	**354**	29.674
Functional managers and directors	**113**	**113**	4
Customer service occupations	**721**	**721**	208.96
Conservation and environment professionals	**214**	**355**	2
Quality and regulatory professionals	**246**	**114**	3

Source: Economic Insight

9. Annex C: econometrics for forecasting other input costs

This annex explains our approaches for forecasting various other input costs (i.e. other than bad debt).

We have used econometric models to forecast other input costs, specifically:

- staff cost inflation;
- IT cost inflation;
- postage cost inflation;
- meter reading cost inflation; and
- property rental cost inflation.

9.1 Labour cost econometrics

We use historical data (between 2002 and 2016) to estimate the relationship between Affinity's labour cost index and (i) nominal GDP; (ii) and average UK wages:

- **Affinity's labour cost index** is estimated by matching Affinity's actual labour mix data with the ONS's ASHE data. More details on this are set out in the preceding Annex B.

- **Nominal GDP** is calculated from the ONS's series for nominal GDP (series YBHA PN2).

- **UK wage index** is calculated from the National Accounts. This is to ensure consistency between the data used to measure historical relationships and that used to derive forecasts (as the OBR bases its forecast of average earnings on the National Accounts).

Variables such as GDP and wages are generally *non-stationary*, meaning that simple regressions of wage levels on GDP can lead to spurious findings of relationships. We addressed this non-stationarity in two ways:

- First, we developed regression of the *percentage changes* in the Affinity HH retail labour cost index on changes in nominal GDP / average UK wages.
- Second, we regressed levels of the Affinity HH retail labour cost index on the level of nominal GDP / average UK wages (both expressed as an index) *and lagged values of the Affinity Water HH retail labour cost index.*

The results of our models in levels and in percentage changes are set out in the subsequent sections.

9.1.1 Regression in levels

The labour cost regression in levels had the following functional forms:

1) $\textit{Affinity Water labour cost index}_t = \textit{constant} + \beta \cdot \textit{UK nominal GDP index}_t + \gamma \cdot \textit{Affinity Water labour cost index}_{t-1} + \varepsilon_t$
2) $\textit{Affinity Water labour cost index}_t = \textit{constant} + \beta \cdot \textit{UK average wage index}_t + \gamma \cdot \textit{Affinity Water labour cost index}_{t-1} + \varepsilon_t$

The tables overleaf show estimation results for these models.

Table 42: Econometric estimates of the relationship between Affinity Water labour cost index and nominal GDP (levels) – 2 and 3 digit SOC

Model type	2 digit SOC	3 digit SOC
Constant	15.4599	17.3560
Standard error	7.9695	8.2997
P-value	0.0785	0.0605
Nominal GDP	0.2190	0.2008
Standard error	0.0768	0.0760
P-value	0.0158	0.0229
Lag	0.6132	0.6160
Standard error	0.1435	0.1474
P-value	0.0013	0.0015
R-squared	96%	96%
F statistic	134.8841	127.1729

Source: Economic Insight

Table 43: Econometric estimates of the relationship between Affinity Water labour cost index and average UK wage (levels) – 2 and 3 digit SOC

Model type	2 digit SOC	3 digit SOC
Constant	10.0292	13.7065
Standard error	6.5748	6.7009
P-value	0.1554	0.0655
Average UK wage	0.5008	0.4834
Standard error	0.1478	0.1438
P-value	0.0061	0.0063
Lag	0.3715	0.3548
Standard error	0.1892	0.1910
P-value	0.0754	0.0903
R-squared	97%	97%
F statistic	159.4679	159.1214

Source: Economic Insight

9.1.2 Regression in percentage changes

Our regressions in *percentage changes* had the following functional forms:

1) $\textit{Affinity Water nominal wage growth}_t = \textit{constant} + \beta \cdot \textit{UK nominal GDP growth}_t + \varepsilon_t$

2) $\textit{Affinity Water nominal wage growth}_t = \textit{constant} + \beta \cdot \textit{UK average nominal wage growth}_t + \varepsilon_t$

The tables overleaf show the estimation results for these models.

Table 44: Econometric estimates of the relationship between Affinity Water labour cost index and nominal GDP (percentage changes) – 2 and 3 digit SOC

Model type	2 digit SOC	3 digit SOC
Constant	0.0129	0.0104
Standard error	0.0139	0.0132
P-value	0.3723	0.4454
Nominal GDP	0.1400	0.1721
Standard error	0.3248	0.3087
P-value	0.6740	0.5874
R-squared	2%	3%
F statistic	0.1859	0.3109

Source: Economic Insight

Table 45: Econometric estimates of the relationship between Affinity Water labour cost index and average UK wage (percentage changes) – 2 and 3 digit SOC

Model type	2 digit SOC	3 digit SOC
Constant	0.0007	-0.0027
Standard error	0.0157	0.0147
P-value	0.9652	0.8596
Average UK wage	0.6687	0.7495
Standard error	0.5516	0.5148
P-value	0.2487	0.1711
R-squared	11%	15%
F statistic	1.4698	2.1196

Source: Economic Insight

9.3 Postage econometrics

We use historical data (between 2002 and 2016) to estimate the relationship between a postage cost index and nominal GDP:

- **Postage cost index** is calculated from the ONS's RPI series, specifically the series relating to the postage component of RPI (CDID: CZDK)
- **Nominal GDP** is calculated from the ONS's series for nominal GDP (DCID: YBHA PN2).

As per above, we addressed issues of non-stationarity of variables in the same way and we set out the regression results below.

9.3.1 Regression results

The postage cost regression in levels had the following functional form:

$$1) \quad \text{Postage cost index}_t = \text{constant} + \beta \cdot \text{UK nominal GDP index}_t + \gamma \cdot \text{postage cost index}_{t-1} + \varepsilon_t$$

Our postage costs regression in *percentage changes* had the following functional form:

$$2) \quad \text{Nominal postage cost growth}_t = \text{constant} + \beta \cdot \text{UK nominal GDP growth}_t + \varepsilon_t$$

The table below shows the estimation results for these two models.

Table 46: Econometric estimates of the relationship between the postage cost index and UK GDP – levels and percentage changes

Model type	Levels regression	Percentage changes regression
Constant	-47.9107	0.0915
Standard error	35.0930	0.0294
P-value	0.1994	0.0090
Nominal GDP	0.5797	-0.6004
Standard error	0.3978	0.6891
P-value	0.1730	0.4007
Lag	0.8657	
Standard error	0.1408	
P-value	0.0001	
R-squared	98%	6%
F statistic	234.2383	0.7592

Source: Economic Insight

9.5 IT econometrics

We use historical data (between 2002 and 2016) to estimate the relationship between an IT cost index and nominal GDP:

- **IT cost index** is calculated from the ONS's Producer Price Indices series, specifically the series relating to the inputs used in the manufacture of computer, electrical and optical products (CDID: MC3G)
- **Nominal GDP** is calculated from the ONS's series for nominal GDP (DCID: YBHA PN2).

As per above, we addressed issues of non-stationarity of variables in the same way and we set out the regression results below.

9.5.1 Regression results

The IT input cost regression in levels had the following functional form:

$$1) \quad IT\ cost\ index_t = constant + \beta \cdot UK\ nominal\ GDP\ index_t + \gamma \cdot IT\ cost\ index_{t-1} + \varepsilon_t$$

Our IT costs regression in *percentage changes* had the following functional form:

$$2) \quad Nominal\ IT\ cost\ growth_t = constant + \beta \cdot UK\ nominal\ GDP\ growth_t + \varepsilon_t$$

The table overleaf shows the estimation results for these two models.

Table 47: Econometric estimates of the relationship between Affinity Water IT cost index and UK GDP – levels and percentage changes

Model type	Levels regression	Percentage changes regression
Constant	10.9037	0.0292
Standard error	9.6288	0.0140
P-value	0.2815	0.0588
Nominal GDP	0.1308	-0.5313
Standard error	0.0712	0.3271
P-value	0.0934	0.1303
Lag	0.7344	
Standard error	0.1535	
P-value	0.0006	
R-squared	92%	18%
F statistic	67.1248	2.6379

Source: Economic Insight

9.7 Property rental econometrics

We use historical data (between 2002 and 2016) to estimate the relationship between a property rental cost index and nominal GDP:

- **Property rental cost index** is calculated from the ONS's Supplier Producer Price Inflation indices series, specifically the series relating to property rentals (CDID: K8VA)
- **Nominal GDP** is calculated from the ONS's series for nominal GDP (DCID: YBHA PN2).

As per above, we addressed issues of non-stationarity of variables in the same way and we set out the regression results below.

9.7.1 Regression results

The property rental input cost regression in levels had the following functional form:

$$1) \quad \textit{Property rental cost index}_t = \textit{constant} + \beta \cdot \textit{UK nominal GDP index}_t + \gamma \cdot \textit{property rental cost index}_{t-1} + \varepsilon_t$$

Our property rental costs regression in *percentage changes* had the following functional form:

$$2) \quad \textit{Nominal property rental cost growth}_t = \textit{constant} + \beta \cdot \textit{UK nominal GDP growth}_t + \varepsilon_t$$

The table overleaf shows the estimation results for these two models.

Table 48: Econometric estimates of the relationship between the property rental cost indec and UK GDP - levels and percentage changes

Model type	Levels regression	Percentage changes regression
Constant	25.1634	-0.0052
Standard error	7.1061	0.0099
P-value	0.0046	0.6070
Nominal GDP	0.0039	0.5983
Standard error	0.0513	0.2326
P-value	0.9415	0.0244
Lag	0.8002	
Standard error	0.1004	
P-value	0.0000	
R-squared	95%	36%
F statistic	113.8834	6.6183

Source: Economic Insight

9.9 Meter reading econometrics

We use historical data (between 2002 and 2016) to estimate the relationship between sales occupations wages and (i) nominal GDP; (ii) and average UK wages:

- **Sales occupations wage index** is estimated by matching the 2 digit SOC code 71 with wage data from the ASHE data.
- **Nominal GDP** is calculated from the ONS's series for nominal GDP (series YBHA PN2).
- **UK wage index** is calculated from the National Accounts. This is to ensure consistency between the data used to measure historical relationships and that used to derive forecasts (as the OBR bases its forecast of average earnings on the National Accounts).

Variables such as GDP and wages are generally *non-stationary*, meaning that simple regressions of wage levels on GDP can lead to spurious findings of relationships. We addressed this non-stationarity in two ways:

- First, we developed regression of the *percentage changes* in the sale occupations wage index on changes in nominal GDP / average UK wages.
- Second, we regressed levels of the sales occupation wage index on the level of nominal GDP / average UK wages (both expressed as an index) *and lagged values of the sales occupation wage index.*

The results of our models in levels and in percentage changes are set out in the subsequent sections.

9.9.1 Regression in levels

The sales occupation wage regression in levels had the following functional forms:

1) $\textit{Sales occupation wage index}_t = \textit{constant} + \beta \cdot \textit{UK nominal GDP index}_t + \gamma \cdot \textit{sales occupation wage index}_{t-1} + \varepsilon_t$
2) $\textit{Sales occupation wage index}_t = \textit{constant} + \beta \cdot \textit{UK average wage index}_t + \gamma \cdot \textit{sales occupation wage index}_{t-1} + \varepsilon_t$

The tables below show estimation results for these models.

Table 49: Econometric estimates of the relationship between sales occupation wage index and nominal GDP (levels)

Model type	2 digit SOC
Constant	41.8919
Standard error	13.1286
P-value	0.0086
Nominal GDP	0.3178
Standard error	0.0823
P-value	0.0027
Lag	0.2399
Standard error	0.2132
P-value	0.2845
R-squared	96%
F statistic	136.8383

Source: Economic Insight

Table 50: Econometric estimates of the relationship between sales occupation wage index and average UK wage (levels)

Model type	2 digit SOC
Constant	47.3841
Standard error	11.0042
P-value	0.0012
Average UK wage	0.7340
Standard error	0.1419
P-value	0.0003
Lag	-0.2482
Standard error	0.2518
P-value	0.3454
R-squared	97%
F statistic	201.9403

Source: Economic Insight

9.9.2 Regression in percentage changes

Our regressions in *percentage changes* had the following functional forms:

1) $Sales\ occupation\ nominal\ wage\ growth_t = constant + \beta \cdot UK\ nominal\ GDP\ growth_t + \varepsilon_t$

2) $Sales\ occupation\ nominal\ wage\ growth_t = constant + \beta \cdot UK\ average\ nominal\ wage\ growth_t + \varepsilon_t$

The tables below show the estimation results for these models.

Table 51: Econometric estimates of the relationship between sales occupation wage index and nominal GDP (percentage changes)

Model type	2 digit SOC
Constant	0.0066
Standard error	0.0116
P-value	0.5814
Nominal GDP	0.2674
Standard error	0.2726
P-value	0.3459
R-squared	7%
F statistic	0.9624

Source: Economic Insight

Table 52: Econometric estimates of the relationship between sales occupation wage index and average UK wage (percentage changes)

Model type	2 digit SOC
Constant	-0.0100
Standard error	0.0117
P-value	0.4117
Average UK wage	1.0211
Standard error	0.4112
P-value	0.0288
R-squared	34%
F statistic	6.1659

Source: Economic Insight

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10.8. Initial assessment of transience cost adjustment claim

The following documentation provides supporting information on the initial assessment of the transience cost adjustment claim performed by Economic Insight.

Economic Insight

INITIAL ASSESSMENT OF TRANSIENCE COST ADJUSTMENT CLAIM

Summary of claim for Affinity Water – Draft for comment

April 2018

SUMMARY ON ONE PAGE.

- **There are strong reasons to suppose that population transience is a driver of retail costs that is outside of efficient management control.** As Affinity has the second highest level of transience in the industry, there are, therefore, good prima facie reasons to suppose that it might be appropriate to submit a Cost Adjustment Claim (CAC) on this issue.

- **We have undertaken preliminary analysis, the main purpose of which is to inform the likely 'size' and credibility of any claim** (noting that a claim must exceed at least 4% of retail totex over PR19 to be allowed). This is so that Affinity can determine whether to proceed with developing a full CAC submission on transience as part of its PR19 Plan.

- While transience is outside of efficient management control and there is evidence that it impacts your retail costs, **in most of the approaches we examined the size of claim did not clear Ofwat's materiality threshold**. As such, the likelihood of success appears to be low (but is not implausible).

- **If you were to proceed, we would recommend doing so primarily using a more 'bottom up' approach, ideally utilising more robust data**. It may nonetheless remain challenging to establish materiality, as you would need to demonstrate that transient customers are almost twice as costly as other customers.

- In deciding whether to progress with developing a CAC for transience, **Affinity should also consider the likely value of this claim alongside other claims it is contemplating submitting to the regulator.** This is because Ofwat is strongly discouraging claims, and so you need to trade-off *'value'* and *'chances of success'* across the piece.

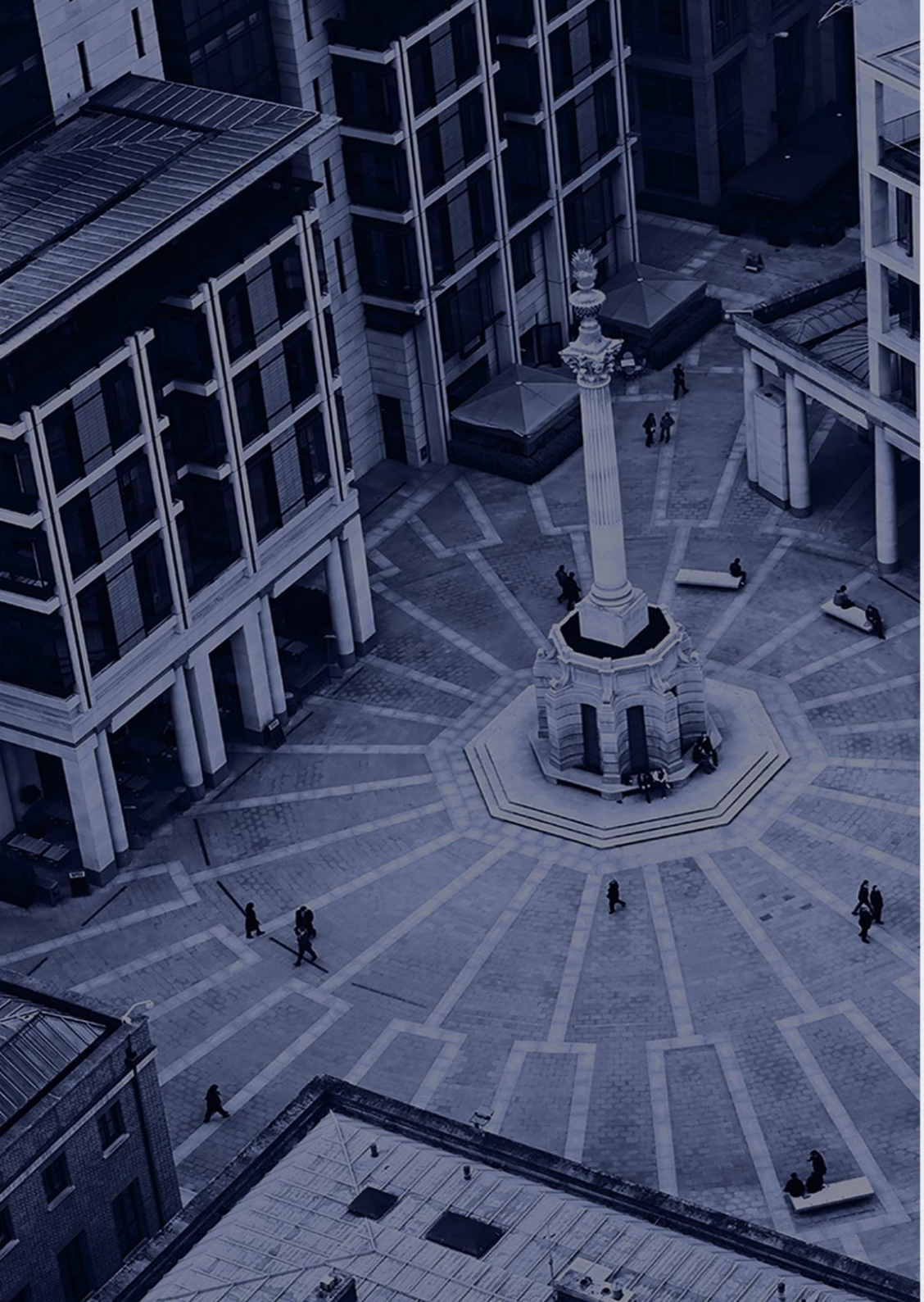
RECOMMENDATIONS.

- In view of the above, our recommendations are:

1. **If the data is available** to support a bottom-up analysis, Affinity could submit a CAC in relation to population transience in May, and reach a final decision as to whether it should be included in its September Plan submission, pending the results of the bottom-up analysis.

2. **However, given Ofwat's desire to limit CACs**, if Affinity has other credible CACs that are more likely to pass Ofwat's materiality thresholds, it could make strategic sense not to submit a CAC in May in relation to population transience.

3. **If the data will not be available** to support a bottom-up analysis, Affinity should not submit a CAC in relation to population transience in May, as we cannot show that the claim clears Ofwat's materiality threshold now and would be unlikely to by September. (Unless Affinity wished to challenge the materiality threshold itself).



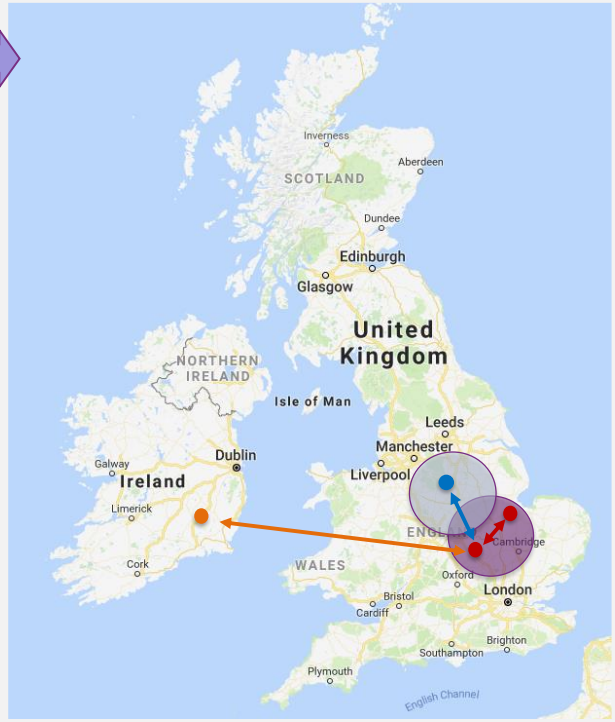
BACKGROUND TO TRANSIENCE

TRANSIENCE REFERS TO THE PROPENSITY OF PEOPLE TO MIGRATE (WITHIN REGIONS, ACROSS REGIONS, INTERNATIONALLY ETC).

- Population transience refers to the propensity of people to migrate. However, there are multiple types, or measures, of transience. It is helpful to think about these both in-terms of:
  - the 'direction' of the migration; and
  - the 'geography' across which the migration occurs.

Fig 1. Measures of transience

Direction of migration	Geography of migration
Inflow (movements into a defined geographic area)	Migration within defined domestic geographic areas
Outflow (movements out of a defined geographic area)	Migration between defined domestic geographic areas
Total flows (the sum of inflows and outflows)	International migration (migration to / from domestic geographic areas and other countries)



- In practice, ONS data allows us to measure transience at the Local Authority level – which can then be mapped to company supply areas.
- Therefore, we can calculate (and measure the cost impact of) both domestic and international transience by company.*

**Noting that this will exclude migration within local authority areas within a company's supply area*

THERE ARE STRONG REASONS TO SUPPOSE THAT POPULATION TRANSIENCE IS A DRIVER OF RETAIL COSTS.

- In principle, transience can affect retail costs in a number of ways (see figure below). However, intuitively, **the most material impact is likely to be on debt-related costs** (the combination of debt management and doubtful debt).
- Importantly, from the perspective of considering a CAC, **population transience is clearly outside of efficient management control.**

Fig 2. How transience effects retail costs

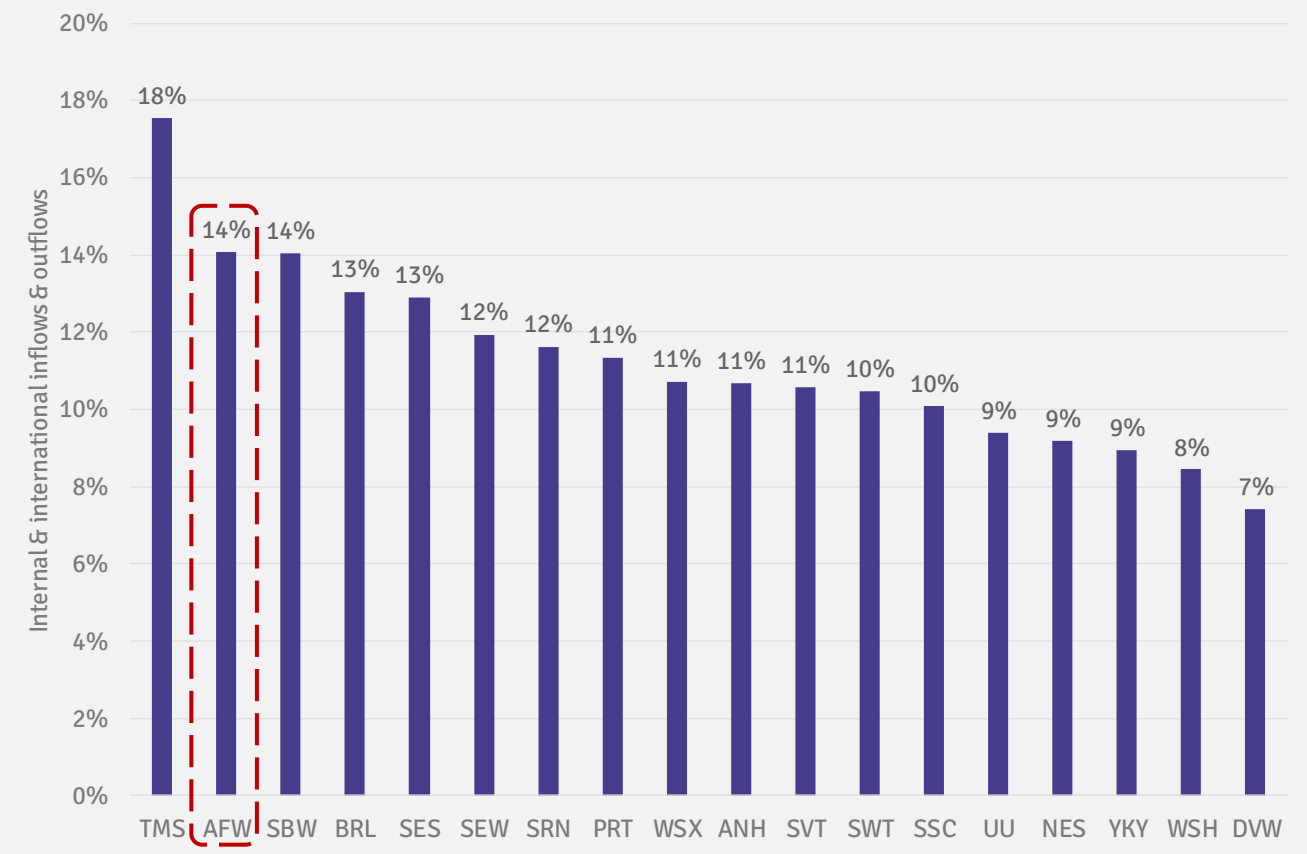
DEBT MANAGEMENT COSTS	Increased transience makes it more difficult and costly for companies to recover debt. Therefore, for a given level of debt management, doubtful debt costs will be higher, and vice versa.
DOUBTFUL DEBT COSTS	
ACCOUNT MANAGEMENT COSTS	Increased transience means companies incur additional costs relating to account opening / closing / transferring.
METER READING	In principle, increased transience *could* result in modest cost savings for companies, if (for example) it results in customers submitting more meter reads.

In its recent consultation on cost assessment, Ofwat has recognised that transience does drive debt-related retail costs.

AFFINITY HAS PARTICULARLY HIGH LEVELS OF POPULATION TRANSIENCE – SECOND ONLY TO THAMES IN THE WATER INDUSTRY.

- The figure below shows transience levels across companies. Overall, **Affinity has the second highest rate of total transience (sum of internal and international inflows and outflows) in the industry.**

Fig 3. Total transience rate – internal + international (as % of population)



BECAUSE TRANSIENCE IS LIKELY TO IMPACT YOUR COSTS, BUT IS NOT INCLUDED IN OFWAT'S MODELS, THERE IS PRIMA FACIE CASE FOR SUBMITTING A CAC.

- The CAC process exists because it is accepted that no efficiency cost benchmarking model is perfect – and so might omit factors that, objectively, do drive company costs. Consequently, **without separately making adjustments to allow for this, the cost baselines set by Ofwat could be below (or above) the efficient level.**

- On March 29th Ofwat published its cost benchmarking models for consultation. In relation to retail, Ofwat has developed 14 models in total, addressing: (i) total retail costs (totex); (ii) bad debt retail costs; and (iii) totex less bad debt related retail costs.

- Importantly for this work, Ofwat accepted the principle that transience drives retail costs, stating: *"High transience rates can result in reduced ability to recover unpaid bills."* However, Ofwat's models **include no specific control for population transience levels across companies.**

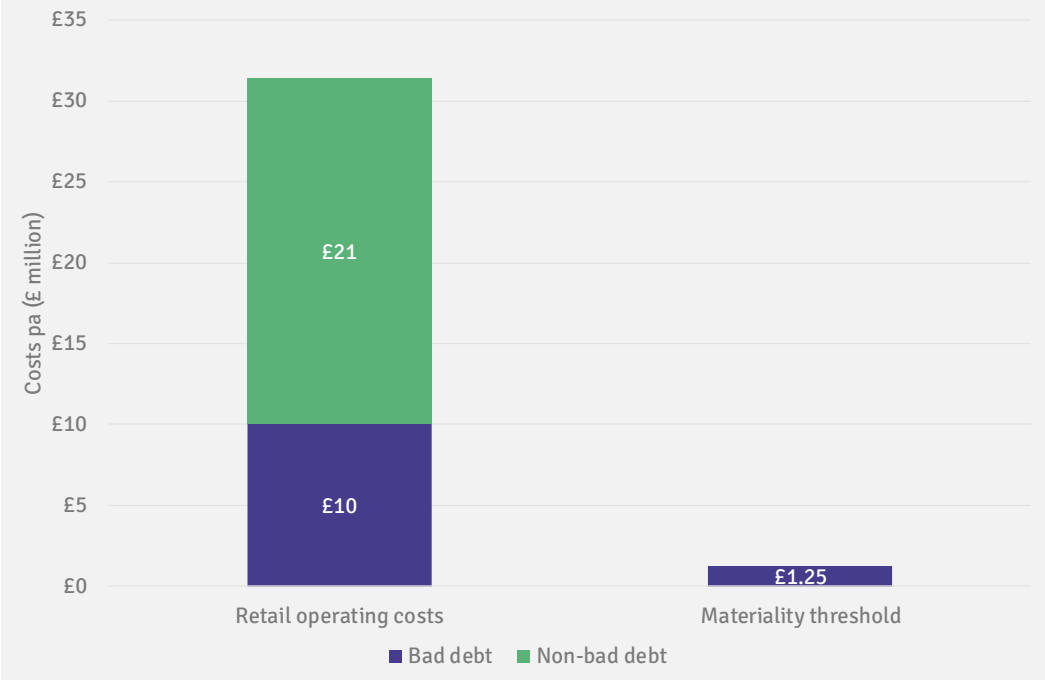
- As such, we can objectively say that, if one can establish that:
  - transience is a valid cost driver for Affinity; and that
  - it is outside of management control; then

  a CAC is appropriate – **subject to meeting Ofwat's criteria, including materiality**.

IT IS PLAUSIBLE THAT A COST ADJUSTMENT CLAIM MIGHT CLEAR MATERIALITY…

- Ofwat's materiality threshold requires CACs to exceed 4% of retail totex. This implies transience would have to add £1.25 million in *additional* costs per year, at Affinity's current levels (Affinity's current retail totex being C. £30m).
- Affinity's retail cost stack is weighted towards non-bad debt costs, so in practice the impact of transience must exceed 12.5% of bad debt costs.
- Data shows that the ratio of 'transient customers' to total household customers for Affinity is 14.1%, suggesting the 12.5% threshold relative to bad debt costs *could* plausibly be reached.

Fig 4. Affinity's retail cost stack



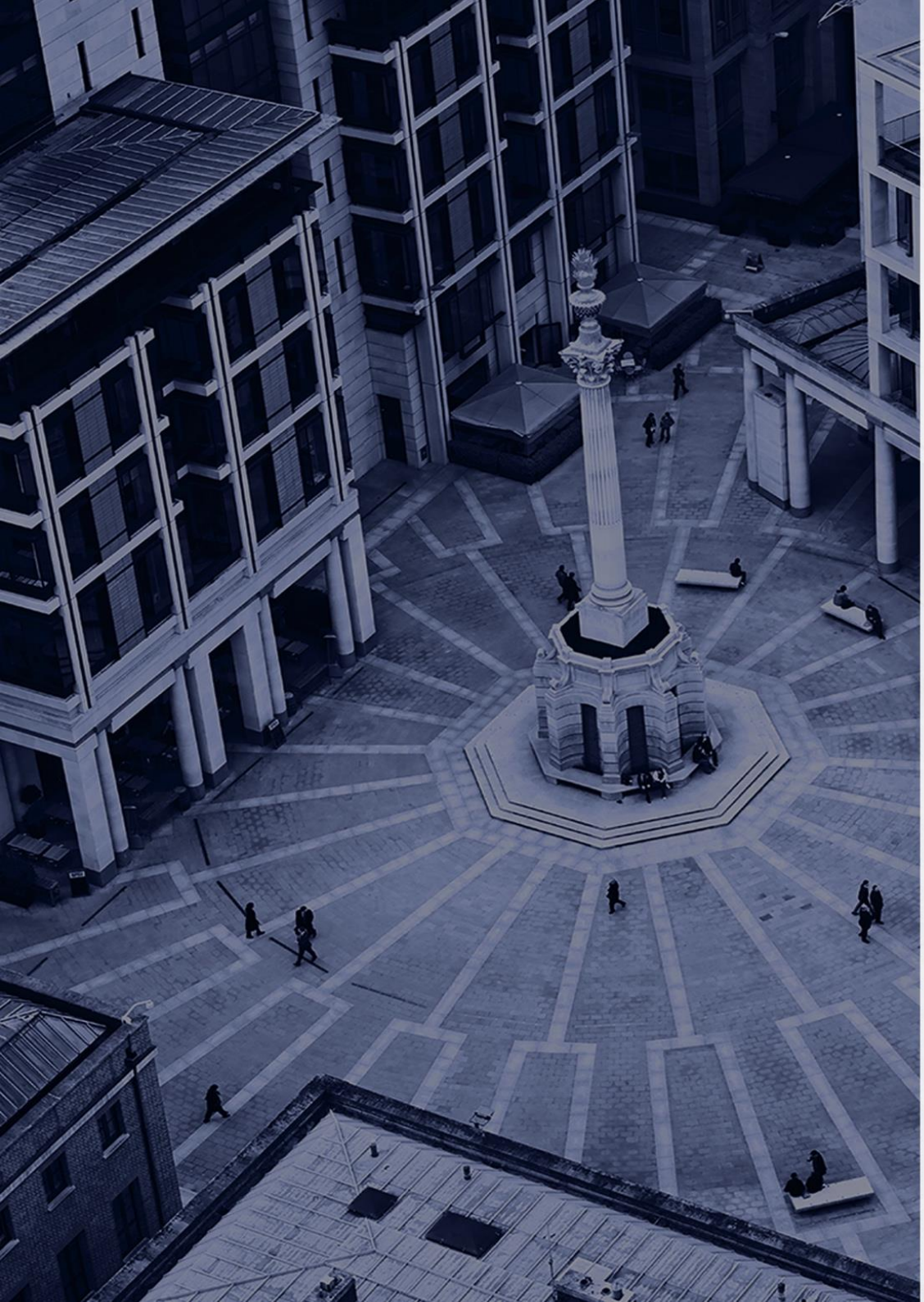
…HOWEVER, OFWAT'S STRINGENT MATERIALITY THRESHOLD SUGGESTS THIS WILL BE CHALLENING UNDER MOST METHODS.

- However, when Affinity's cost structure is considered alongside Ofwat's (stringent) materiality threshold, we find that the average "transient customer" would have cause roughly double the average bad debt cost of the "average customer" for a transience claim to pass materiality (see figure below).

- Though this is clearly possible, the uplift appears to be rather "high", taken at face value.

Fig 5. Illustration of implied average debt cost per transient customer, compared to overall population

	Description	Value
1	Affinity bad debt costs	£10m
2	% of customers that are transient	14%
3	"Transient customer" bad debt costs assuming average bad debt costs of the "average customer"	£10 x 14% = £1.4m
4	Amount allowed in Affinity's baseline if: (a) using a unit cost model; and if (b) Affinity is deemed efficient.	£1.4m
5	Amount over baseline required to pass materiality	£30m x 4% = £1.2m
6	"Transient customer" bad debt costs required to pass materiality	£2.6m = £1.4m (baseline) + £1.2m (materiality)
7	Ratio of average bad debt cost per "transient customer" to the average bad debt cost per "average customer" required to clear materiality	1.9 = £2.6/£1.4

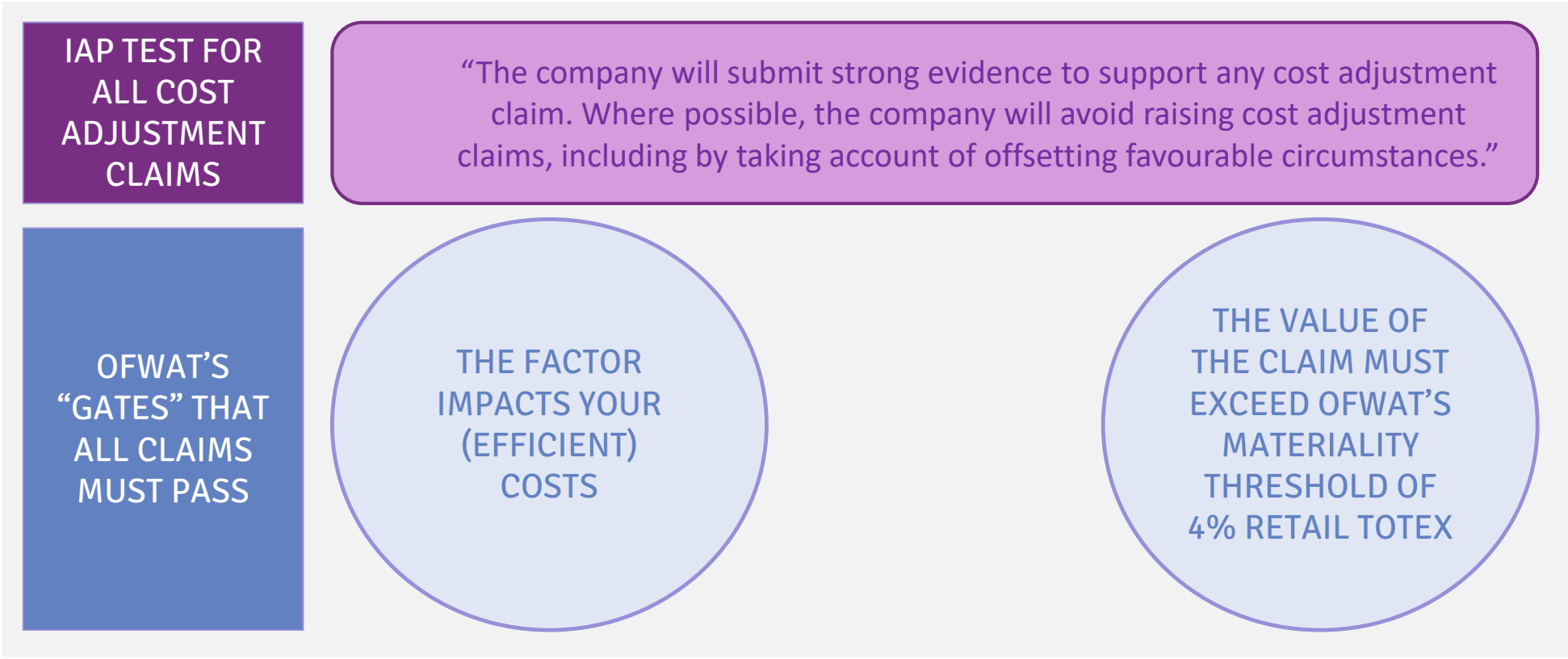


APPROACH TO ESTIMATING A CAC

OFWAT IS SETTING A HIGH BAR FOR COST ADJUSTMENT CLAIMS – AND ALL CLAIMS MUST, AS A MINIMUM, MEET ITS "MATERIALITY" THRESHOLD.

- Ofwat is setting a (very) high bar for CACs at PR19. This includes passing two "gates" below – as well as meeting a range of evaluation criteria (see later). **The purpose of our analysis, and this paper, is to establish whether a transience claim by Affinity would pass Ofwat's two key gates.** This will then allow you to decide whether to proceed with developing a full CAC.

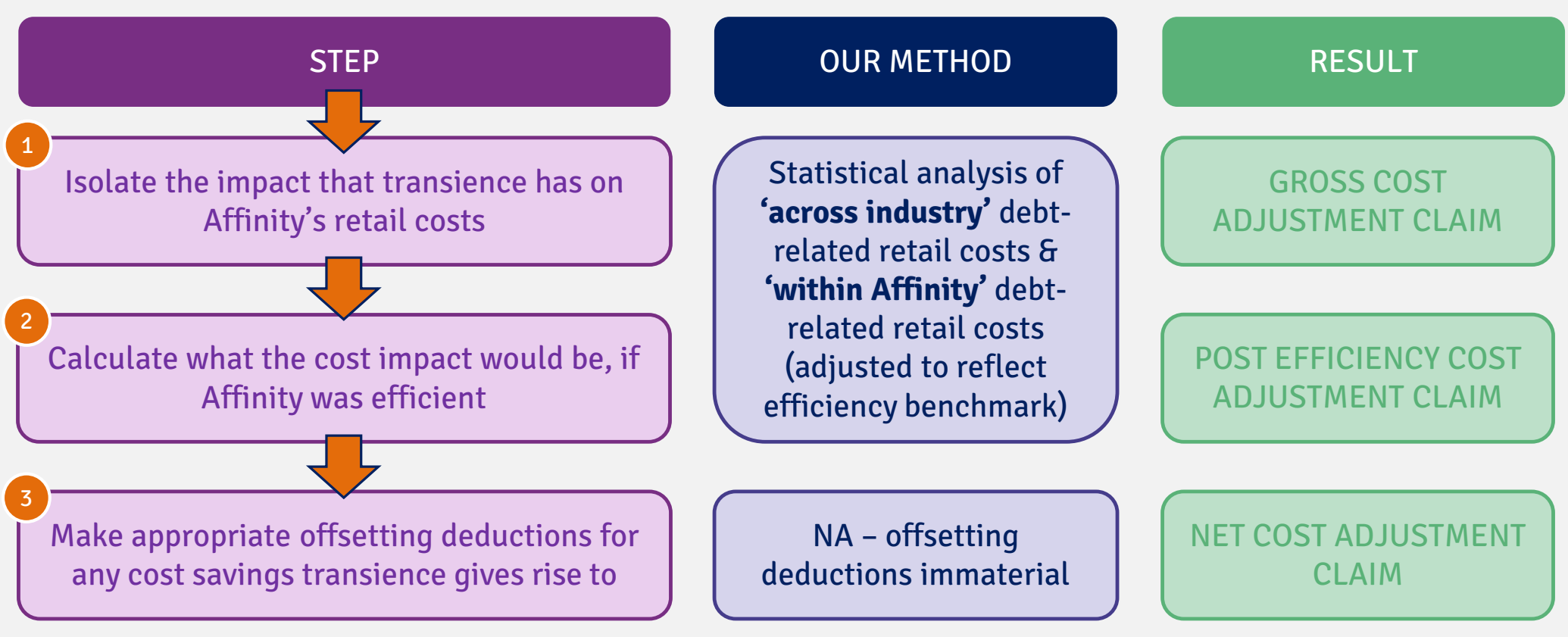
Fig 6. Ofwat's IAP test for CACs and related "gates" for approving claims



OUR APPROACH IS BASED ON ESTIMATING THE IMPACT TRANSIENCE HAS ON YOUR 'EFFICIENT' COSTS.

- The figure below summarises our approach for our initial assessment of your transience CAC. **Best practice includes making transparent deductions for efficiency to arrive at an appropriate 'net claim'.** We use three methods to apply this framework and further details are contained in the technical annex.

Fig 7. Our approach to calculating the CAC

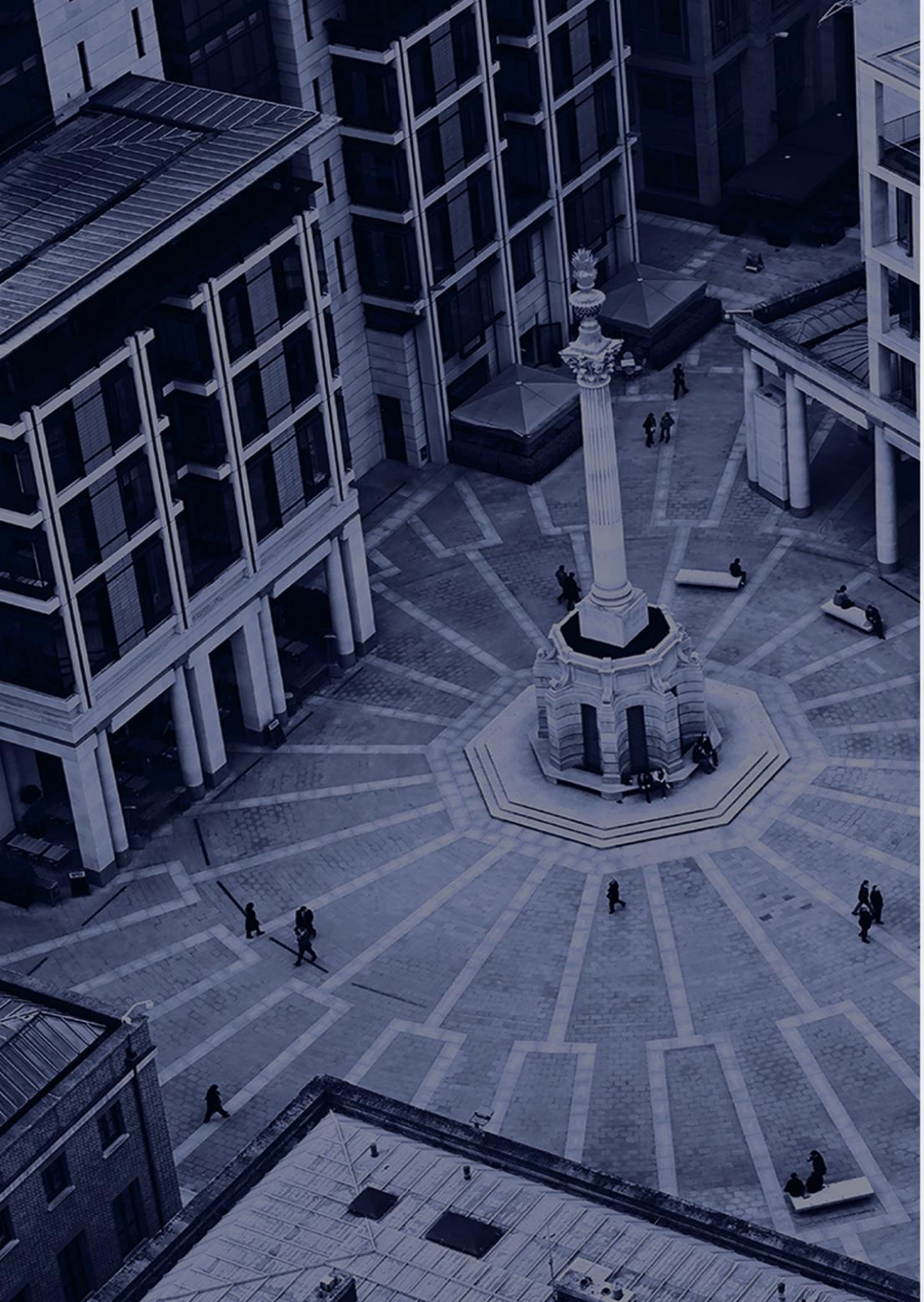


OUR ANALYSIS SUGGESTS THAT, IN PRACTICE, THE LIKELIHOOD OF SUCCESS OF ANY CLAIM IS LOW.

- We find that, **in only 1 of the 8 approaches we tested, is Ofwat's materiality threshold met** (although it is extremely marginal on one additional approach). This suggests that the likelihood of success is low. The size of CAC is highly sensitive to the methodology used – and could range from -£1.2 million to £9.2 million.
- If you were to proceed, our work points to relying on "within area" analysis (including using 'bottom-up' methods) based on more robust data. This is arguably most consistent with Ofwat's position (i.e. because if 'across industry' analysis was considered reliable by Ofwat, transience should be dealt with within the regulator's cost assessment models in the first place).

Fig 8. Our estimates of your transience CAC

Method	Method 1: across industry econometrics		Method 2: Marginal cost of transience		Method 3: within area econometrics			
	Version A	Version B	Version A	Version B	Version A excluding metering	Version B excluding metering	Version C including metering	Version D including metering
Gross CAC (£m over 5 years)	£1.4 m	£0.6 m	£1.5 m	£7.5 m	£13.7 m	£16.4 m	£1.8 m	£2.2 m
Deductions for efficiency (£m over 5 years)	£2.6 m	- £1.1	£0.3 m	£2.4 m	£7.4 m	£7.3 m	£1.0 m	£0.9 m
Net CAC (£m over 5 years)	- £1.2 m	£1.7 m	£1.2 m	£5.0 m	£6.2 m	£9.2 m	£0.8 m	£1.2 m
Net CAC as % of retail totex (%)	-0.8%	1.1%	0.8%	3.2%	4.0%	5.8%	0.5%	0.8%
Clears materiality?	No	No	No	No	No	Yes	No	No



IMPLICATIONS AND RECOMMENDATIONS

WE WOULD ONLY RECOMMEND MAKING A CLAIM IF YOU ARE CONFIDENT THAT A BOTTOM-UP ANALYSIS WITH MORE ROBUST DATA WOULD SHOW A HIGHER IMPACT ON COSTS.

Fig 9. The implications for our analysis

THERE IS ROBUST EVIDENCE THAT TRANSIENCE IMPACTS YOUR RESIDENTIAL RETAIL COSTS.

TRANSIENCE IS, BY DEFINITION, OUTSIDE OF EFFICIENT MANAGEMENT CONTROL.

IN MOST OF THE APPROACHES THAT WE EXAMINED, THE SIZE OF CLAIM DID NOT CLEAR OFWAT'S MATERIALITY THRESHOLD (BUT IT IS NOT IMPLAUSSIBLE THAT IT COULD DO SO).

THE LIKELIHOOD OF SUCCESS OF A CLAIM IS LOW. IF YOU WERE TO PROCEED, YOU WOULD NEED TO FOCUS ON 'WITHIN AREA' ANALYSIS, PRIMARILY BY BUILDING YOUR CLAIM 'BOTTUM UP', AND BASED ON MORE ROBUST DATA.

EVEN ON A BOTTOM-UP BASIS, YOU WOULD NEED TO DEMONSTRATE THAT TRANSIENT CUSTOMERS COST ALMOST TWICE AS MUCH AS OTHER CUSTOMERS.

WE WOULD ONLY RECOMMEND MAKING A CLAIM IF YOU BELIEVE MORE ROBUST DATA CAN SHOW TRANSIENT CUSTOMERS COST ALMOST TWICE AS MUCH AS OTHERS.

IN DECIDING WHETHER TO PROCEED, YOU WILL HAVE BROADER STRATEGIC CONSIDERATIONS TO WEIGH UP.

Fig 10. Broader strategic considerations

PROS OF SUBMITTING A CLAIM

WITHOUT AN ADJUSTMENT, YOU MAY GENUINELY BE UNDERFUNDED (I.E. YOU WILL NOT BE ALLOWED YOUR "TRUE" EFFICIENT COSTS).

GIVEN OFWAT'S 'AGGRESSIVE'ASSUMPTIONS ACROSS RETAIL MORE BROADLY, **THE VALUE UPSIDE FROM MAKING A CLAIM COULD BE MATERIAL.**

RISKS & UNCERTAINTIES

OFWAT IS **"ANTI CLAIMS"** AT PR19.

THE CLAIM IS "MODEL CONTINGENT". WHILST TRANSIENCE IS NOT INCLUDED IN OFWAT'S MODELS AT PRESENT, WE CANNOT RULE OUT IT BEING INCLUDED IN FINAL DETERMINATIONS.

SOME OF THE PARAMETERS ARE UNCERTAIN & WITHIN OFWAT'S DISCRETION. FOR EXAMPLE, OFWAT COULD CHOOSE A DIFFERENT EFFICIENCY BENCHMARK, OR COULD ASSERT THAT YOUR BASELINE COSTS ARE SUFFICIENT.

YOU SHOULD ALSO CONSIDER THE PROS & CONS IN THE CONTEXT OF OTHER CLAIMS YOU ARE CONSIDERING, AND THEIR RESPECTIVE VALUE AND CHANCES OF SUCCESS

IF YOU PROCEED, WE WOULD RECOMMEND DEVELOPING MORE DETAILED ANLAYSIS TO ENSURE YOUR CLAIM IS AS COMPELLING AS POSSIBLE.

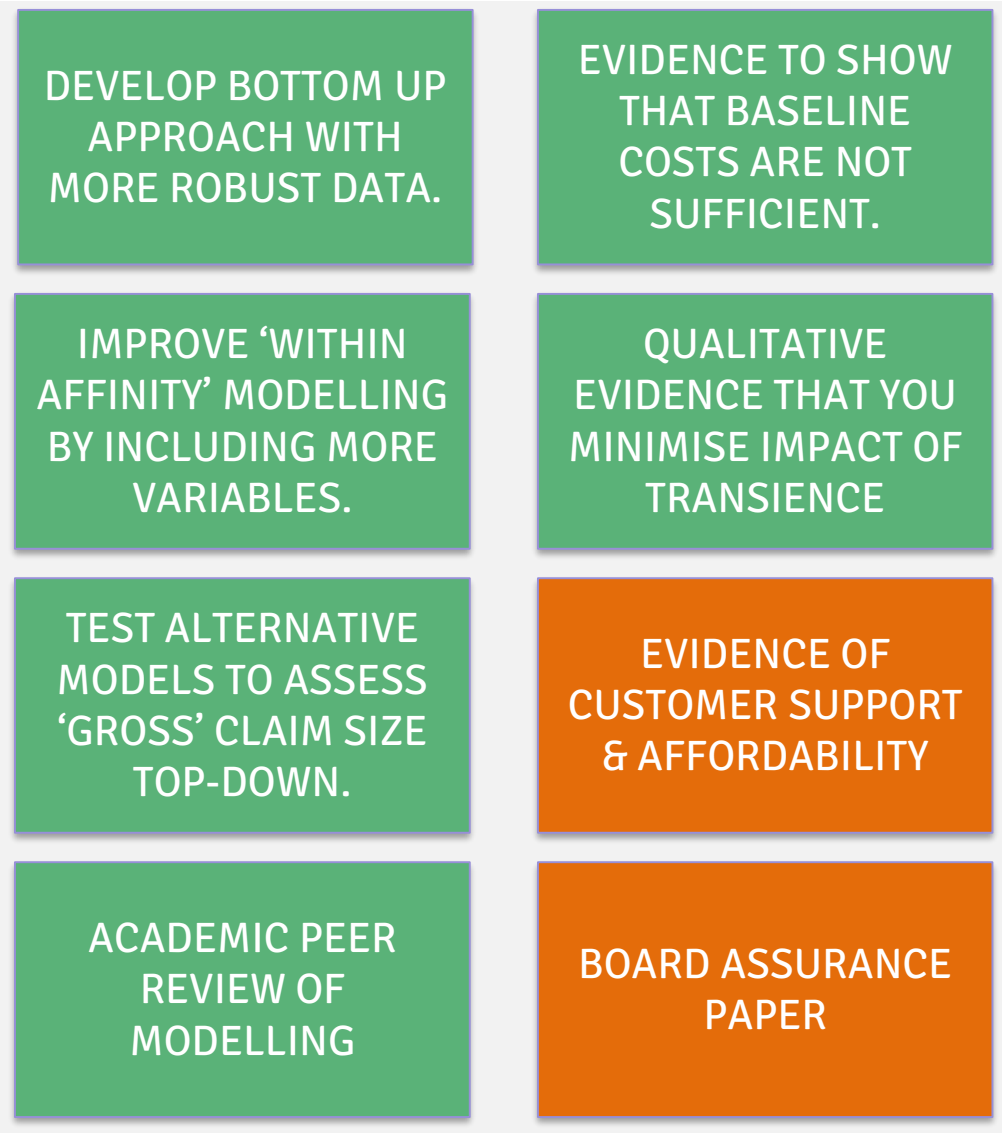
- Our initial work addresses criteria (1); (2); and (5) below. If Affinity were to proceed, we would develop more detailed evidence across these three areas – particularly with respect to a more robust bottom-up analysis.
- In addition, for an exceptionally high quality claim, evidence for criteria (4); (7); and (8) could also be developed.

Fig 11. Ofwat's CAC assessment criteria

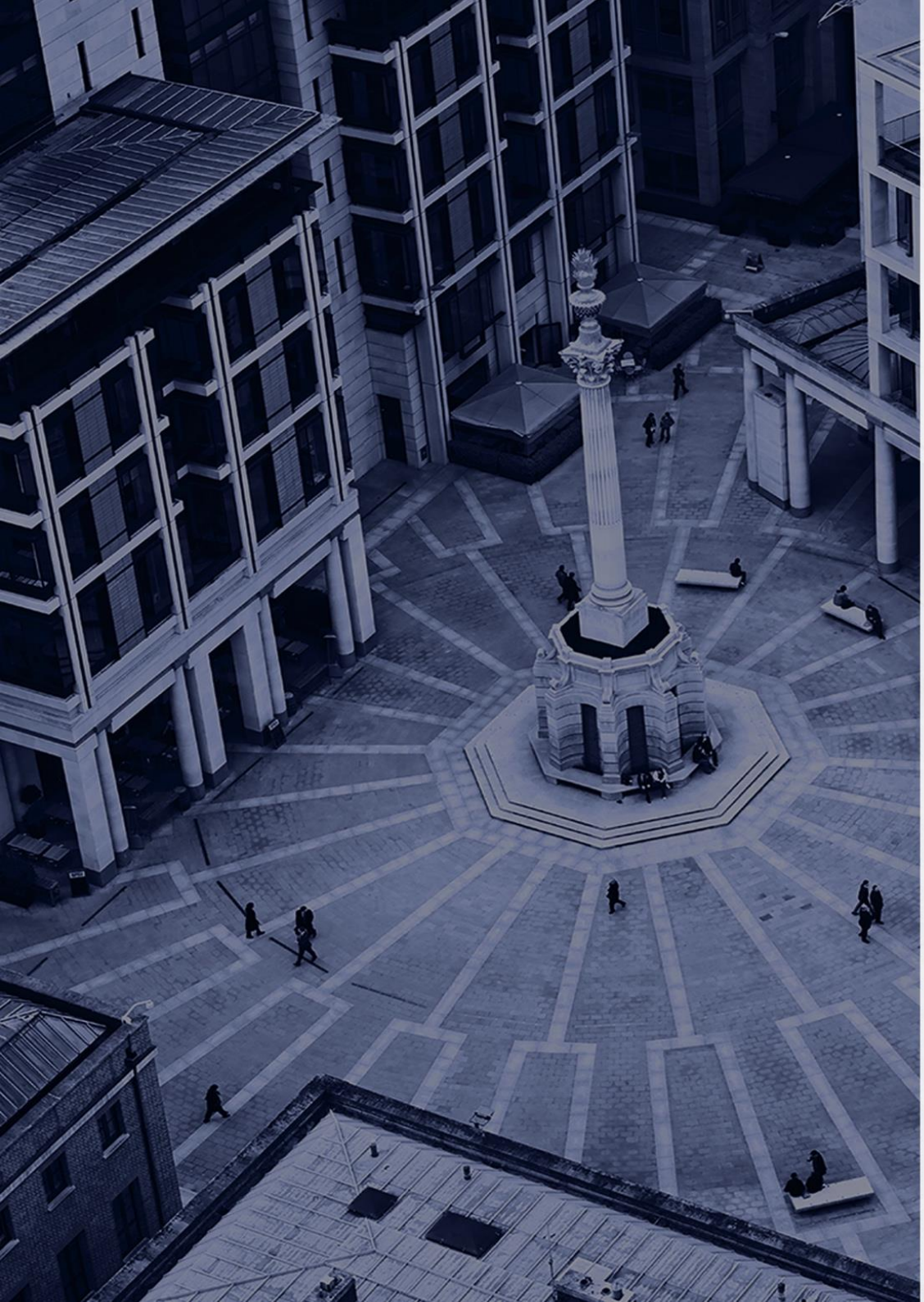
1 NEED FOR A CLAIM	• Factor not included in cost baselines. • Even if not included, evidence that baseline is insufficient "in the round".	5 ROBUSTNESS AND EFFICIENCY OF CLAIM	• Are the cost estimates efficient? • Is there third party assurance for the robustness of the cost estimates?
2 MANAGEMENT CONTROL	• Is the factor outside of efficient management control? • Has the company taken steps to control the cost?	6 CUSTOMER PROTECTION	• NA only relevant to enhancement claims
3 NEED FOR INVESTMENT	• NA only relevant to enhancement claims	7 AFFORDABILITY	• Mainly relevant to enhancement claims
4 BEST OPTION FOR CUSTOMERS	• Mainly relevant to enhancement claims	8 BOARD ASSURANCE	• Mainly relevant to enhancement claims

KEY ADDITIONAL ANALYSIS AND EVIDENCE WE WOULD RECOMMEND DEVELOPING.

Fig 12. Areas for further evidence



- If Affinity proceeded with a CAC, between now and September we would recommend / propose developing all of the evidence shown here.
- This will ensure that the claim you submit is comprehensive – and as robust as possible – making it "inarguable" that you have met Ofwat's tests.



TECHNICAL ANNEX

WE HAVE USED THREE COMPLEMENTARY METHODS TO APPLY OUR FRAMEWORK FOR QUANTIFYING YOUR TRANSIENCE CAC.

- Our overarching framework for quantifying a potential CAC for Affinity is set out in the main sections of this document. In practice, we explored three complementary approaches for applying this:
  - Method 1: across industry econometrics.
  - Method 2: estimating the marginal cost of transience.
  - Method 3: within-area econometrics.

- Methods 1 and 2 make use of our existing suite of econometric models, specifically by using two models of bad debt related operating costs. Method 3 uses data provided by Affinity.

- In this technical annex, we provide further details of these methods and how we arrived at our results.

METHODS 1 AND 2 MAKE USE OF OUR EXISTING SUITE OF ECONOMETRIC COST MODELS.

- Methods 1 and 2 use some of our existing suite of econometric retail cost models, specifically:
  - Model A2: A log-log pooled OLS model of bad debt related operating costs, which includes separate variables for the number of single and dual service customers.
  - Model B2: A log-log pooled OLS model of bad debt related operating costs, which includes a single variable for the total number of customers.

- We adapted the models by estimating versions including and excluding transience:
  - Model A2 including transience: $\ln(\textit{bad debt related operating costs}_{it}) = \beta_0 + \beta_1 \ln(\textit{single service customers}_{it}) + \beta_2 \ln(\textit{dual service customers}_{it}) + \beta_3 \textit{IMD income}_{it} + \beta_4 \ln(\textit{average wholesale bill}_{it}) + \beta_5 \textit{internal migration}_{it} + \varepsilon_{it}$
  - Model A2 excluding transience: $\ln(\textit{bad debt related operating costs}_{it}) = \beta_0 + \beta_1 \ln(\textit{single service customers}_{it}) + \beta_2 \ln(\textit{dual service customers}_{it}) + \beta_3 \textit{IMD income}_{it} + \beta_4 \ln(\textit{average wholesale bill}_{it}) + \varepsilon_{it}$
  - Model B2 including transience: $\ln(\textit{bad debt related operating costs}_{it}) = \beta_0 + \beta_1 \ln(\textit{total customers}_{it}) + \beta_2 \textit{IMD income}_{it} + \beta_3 \ln(\textit{average wholesale bill}_{it}) + \beta_4 \textit{internal migration}_{it} + \varepsilon_{it}$
  - Model B2 excluding transience: $\ln(\textit{bad debt related operating costs}_{it}) = \beta_0 + \beta_1 \ln(\textit{total customers}_{it}) + \beta_2 \textit{IMD income}_{it} + \beta_3 \ln(\textit{average wholesale bill}_{it}) + \varepsilon_{it}$

METHOD 1: ACROSS INDUSTRY ECONOMETRICS.

- In our own previous work on retail efficiency benchmarking, we developed models in which transience is identified as a robust and valid driver of costs (model A2 set out above). One method for quantifying your CAC is to compare the 'predicted costs' Affinity would receive under:
  - across industry econometric models **including transience**; with
  - across industry econometric models **excluding transience.**
- In practice, this approach is used less often than others because, if one can show (i) that a variable is a valid driver of costs; and (ii) that that it 'works' in cost models, then logically the regulator should capture it within cost assessment models (removing the need for a CAC at all).
- However, historically there are cases where regulators 'omit' valid cost drivers which can be shown as being robust within across-industry statistical models. For example, this was the case in relation to the impact of deprivation on retail debt costs at PR14 – therefore, companies' claims for deprivation were (in part) based on the difference in predicted costs between econometric models including and excluding deprivation measures.

METHOD 1: FULL METHODOLOGY.

- This method uses the same dataset as our industry-wide cost assessment models.
- To generate the gross cost adjustment claim, method 1 begins with Affinity's predicted costs from a model including transience $\hat{Y}_{INC}$ and subtracts from this predicted costs from a model that excludes transience, $\hat{Y}_{EXC}$.
- The **gross cost adjustment claim** is therefore equal to $\hat{Y}_{INC} - \hat{Y}_{EXC}$.
- As both of these estimates are at average levels of efficiency, to generate the net cost adjustment claim, we therefore need to scale back predicted costs by the gap between average and upper quartile efficiency in each model, which we call g_{INC}^{UQ} and g_{EXC}^{UQ} respectively, for models including and excluding transience.
- The **net cost adjustment claim** is therefore equal to $\left(1 - g_{INC}^{UQ}\right)\hat{Y}_{INC} - \left(1 - g_{EXC}^{UQ}\right)\hat{Y}_{EXC}$.

We applied the predicted cost method to our own bad debt related cost models (Models A2 and B2). The calculation involved in this methodology is as follows:

Fig 13. Application of method 1

Method	Model A2	Model B2
Predicted costs including transience	£6.0 million	£8.4 million
Predicted costs excluding transience	£5.7 million	£8.3 million
Gap to upper quartile including transience	27%	30%
Gap to upper quartile excluding transience	19%	33%
Gross CAC (£ per year)	£271,114	£114,701
Deductions for efficiency (£ per year)	£510,918	-£219,339
Net CAC (£ per year)	-£239,804	£334,040
Gross CAC (£m over 5 years)	£1.4 million	£0.6 million
Deductions for efficiency (£m over 5 years)	£2.6 million	-£1.1 million
Net CAC (£m over 5 years)	**-£1.2 million**	**£1.7 million**
Totex (£m over 5 years)	**£156.9 million**	**£156.9 million**
Net CAC (% totex over 5 years)	**-0.8%**	**1.1%**

METHOD 2: MARGINAL COST OF TRANSIENCE.

- Method 2 uses our previous work on retail efficiency benchmarking in a slightly different way to Method 1. Rather than comparing predicted costs, Method 2 focuses on the coefficient on transience from the model.
- Specifically, this method uses the coefficient on transience to estimate the **marginal cost of transience**. The cost adjustment claim can then be estimated by applying this marginal cost to the difference between Affinity's transience and the benchmark company's transience – and then adjusting for efficiency.
- In principle this method is similar to Method 1. In practice, however, it can produce different estimates of the cost adjustment claim:
  - Method 2 only uses the transience coefficient, whereas in method 1 coefficients on all of the other variables can change between models including and excluding transience.
  - In adjusting for efficiency, method 2 only uses the efficiency gap estimate from the model excluding transience, whereas method 1 incorporates estimates from models that both include and exclude it.
- Again, like Method 1, this approach is used less often – as if transience works as a valid driver within the models, then this suggests that the regulator should incorporate it within cost assessment.

METHOD 2: FULL METHODOLOGY.

- This method also uses the same dataset as our industry-wide cost assessment models.
- Method 2 begins by calculating the **marginal cost of transience**. Because our cost models are in logs, we calculated an estimate of marginal cost by multiplying the coefficient on transience by average bad debt related costs: $\mathrm{MC} = \overline{D} \cdot \hat{\beta}$.
- To determine the **gross cost adjustment claim**, we then multiplied the estimate of marginal cost by the difference between Affinity's transience level and the transience of the upper quartile company $MC\ (x_{AFW} - x_{UQ})$.
- Again, to generate the net claim, we need to adjust the gross claim down to reflect upper quartile levels of efficiency. This is done by multiplying the above by the gap between average and upper quartile efficiency from the model that excludes transience: g_{EXC}^{UQ}.
- The **net cost adjustment claim** is therefore: $(1 - g_{EXC}^{UQ})\ MC(x_{AFW} - x_{UQ})$.

- We apply the above methodology to our bad debt related cost models A2 and B2, in the table below.

Fig 14. Application of method 2

Method	Model A2	Model B2
Marginal cost of transience	£858,923	£285,271
AFW transience in excess of benchmark	0.34%	5.24%
Gap to upper quartile (model excluding transience)	19%	33%
Gross CAC (£m per year)	£294,174	£1.5 million
Deductions for efficiency (£m per year)	£56,654	£487,020
Net CAC (£m per year)	£237,519	£1.0 million
Gross CAC (£m over 5 years)	£1.5 million	£7.5 million
Deductions for efficiency (£m over 5 years)	£0.3 million	£2.4 million
Net CAC (£m over 5 years)	**£1.2 million**	**£5.0 million**
Totex (£m over 5 years)	**£156.9 million**	**£156.9 million**
Net CAC (% totex over 5 years)	**0.8%**	**3.2%**

METHOD 3: WITHIN AREA ECONOMETRICS.

- Method 3 uses data on differences in bad debt levels *within Affinity's supply area* to generate an estimate of the marginal cost of transience.
- In practice, it is very similar in substance to Method 2, with the exception that the estimate of the marginal cost of transience is based on within-area rather than cross-industry models.
- We use the within-area data to model total debt by LSOA as a function of net population outflows, and other controls. We focus on outflows as they are most likely to be associated with difficulties in debt management that affect the level of bad debt related costs.
- Our LSOA-level model expresses total bad debt in each LSOA as a function of customer numbers, transience and a control for deprivation – in this case IMD income. We explore models both including and excluding meter penetration as an explanatory variable.
- The coefficient from the model can then be used to calculate an estimate of the marginal cost of transience. The cost adjustment claim can then be estimated by applying this marginal cost to the difference between Affinity's transience and the benchmark company's transience – and then adjusting for efficiency.

METHOD 3: FULL METHODOLOGY.

- This method also uses data from Affinity Water on bad debt by LSOA, alongside publicly available data on population movements.
- The method begins by calculating the marginal cost of transience. As we show later, this is done by estimating an econometric model in levels, and is equal to the coefficient on population transience $\mathrm{MC} = \hat{\beta}$
- Beyond the estimate of the marginal cost of transience, this methodology is very similar to Method 2.
- To determine the **gross cost adjustment claim**, we then multiplied the estimate of marginal cost by the difference between Affinity's transience level and the transience of the upper quartile company *in the relevant model* $MC\ (x_{AFW} - x_{UQ})$.
- Again, to generate the net claim, we need to adjust the gross claim down to reflect upper quartile levels of efficiency. This is done by multiplying the above by the estimate of Affinity's efficiency gap *from the relevant model*.
- The **net cost adjustment claim** is therefore: $(1 - g_{AFW})\ MC(x_{AFW} - x_{UQ})$.

METHOD 3: CONSTRUCTING LSOA-LEVEL MIGRATION ESTIMATES.

- Method 3 uses data on total debt by LSOA, customer numbers, and meter penetration supplied by Affinity. IMD income score data are also available by LSOA.
- Affinity were unable to provide LSOA-level data on transience. We therefore constructed estimates of *net population movements* by LSOA. Due to limitations in available data, these estimates are for 2014. We constructed the estimates as follows:
  - We used mid-year population estimates by LSOA to estimate population levels in each LSOA for end 2013 and end 2014 – based on the averages of the mid-year estimates for 2013 and 2014 and 2014 and 2015.
  - We then matched these with calendar year estimates of the number of births and deaths by LSOA.
  - We then calculated the change in population in each LSOA that was not attributable to births and deaths. By construction this is equal to net migration to or from the LSOA, with negative numbers implying net migration out of the LSOA and positive ones imply net migration into the LSOA.
  - We used these to construct a separate net outflow variable. This equals zero if there is a net inflow to the LSOA, or a positive number if there is a net outflow.

METHOD 3: DATA LIMITATIONS.

- There are several limitations associated with the transience data described above, specifically:
  - Data are for the calendar year 2014, whereas data for other variables including total bad debt are for 2017.
  - Using net population flow variables is questionable, as what is relevant is the total number of population movements. Although one would expect total outflows to be somewhat correlated with net outflows, netting off population flows may obscure some aspects of transience. Most importantly, an area that has high levels of both inflows and outflows would have very high transience, but this would not be picked up on a net population flow measure.
  - We do not have equivalent LSOA level data for benchmark companies, and therefore have had to estimate net outflow figures for benchmark companies based on the ratio of the benchmark companies' total population outflows in their supply areas to Affinity's total outflows.

METHOD 3: WITHIN AREA ECONOMETRIC ANALYSIS – EXCLUDING METER PENETRATION.

- We explored two econometric models of the relationship between debt and transience. Our first uses the following model of total debt within each LSOA, *i*.

$$total\ debt_i = \beta_0 + \beta_1\ total\ customers_i + \beta_2\ IMD\ income_i + \beta_3\ net\ population\ outflow_i + \varepsilon_i$$

- The model diagnostics and estimates are as follows. Diagnostics show the model to be reasonably robust, and explains a large proportion of variation in debt by LSOA. The coefficient on population outflows is also statistically significant.

Fig 15. Coefficient estimates

Explanatory variable	Coefficient	P-value
Total customers	170	0.000
IMD income	144,870	0.000
Net population outflow	210	0.001
Constant	-16,294	0.000

Fig 16. Model diagnostics

Diagnostic	Value
Observations	2,103
R2	0.8123
Max VIF	1.02

METHOD 3: WITHIN AREA ECONOMETRIC ANALYSIS – INCLUDING METER PENETRATION.

- We also explored an additional model that also included the percentage of metered customers as an explanatory variable. This could be appropriate if meter penetration is a proxy for bill size. The model had the following form.

$$total\ debt_i = \beta_0 + \beta_1\ total\ customers_i + \beta_2\ \%\ metered\ customers_i + \beta_3\ IMD\ income_i + \beta_4\ net\ population\ outflow_i + \varepsilon_i$$

- The model diagnostics and estimates are as follows. While diagnostics suggest the model remains robust, the coefficient on population outflows is much smaller and is no longer statistically significant.

Fig 17. Coefficient estimates

Explanatory variable	Coefficient	P-value
Total customers	167	0.000
Proportion metered	-118,206	0.000
IMD income	142,044	0.000
Net population outflow	28	0.612
Constant	54235	0.000

Fig 18. Model diagnostics

Diagnostic	Value
Observations	2,103
R2	0.8464
Max VIF	1.02

METHOD 3: ESTIMATES.

- We apply Method 3 to LSOA-level bad debt models in the table below.

Fig 19. Application of method 3

Method	Model A2 (version A)	Model B2 (version B)	Model A2 (version C)	Model B2 (version D)
	Excluding meter penetration		Including meter penetration	
Marginal cost of transience	£210	£210	£28	£28
Gap to upper quartile transience in model	13,030	15,661	13,030	15,661
Gross CAC (£m per year)	£2.7 million	£3.3 million	£370,747	£445,597
Deductions for efficiency (£m per year)	£1.5 million	£1.5 million	£201,524	£197,329
Net CAC (£m per year)	£1.2 million	£1.8 million	£169,222	£248,268
Gross CAC (£m over 5 years)	£13.7 million	£16.4 million	£1.8 million	£2.2 million
Deductions for efficiency (£m over 5 years)	£7.4 million	£7.3 million	£1.0 million	£0.9 million
Net CAC (£m over 5 years)	**£6.2 million**	**£9.2 million**	**£0.8 million**	**£1.2 million**
Totex (£m over 5 years)	**£156.9 million**	**£156.9 million**	**£156.9 million**	**£156.9 million**
Net CAC (% totex over 5 years)	**4.0%**	**5.8%**	**0.5%**	**0.8%**

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10.9. Industry datashare – ACTS and bad debt

Industry average cost to serve (ACTS) by company:

The table below shows the average cost to serve for 2017/18 by company. Affinity Water's cost to serve is currently industry average: 77p per customer lower than the mean, and 75p per customer higher than the median.

Rank	Company	customers	2017-18 Average cost to serve (ACTS)	places moved	change on PY CTS/cust
1	Portsmouth Water	293	£ 16.74	-	£ 2.54
2	South East Water	854	£ 17.76	2	-£ 0.83
3	South Staffs & Cambridge Water	671	£ 18.90	3	-£ 0.79
4	Dee Valley Water	116	£ 18.94	6	-£ 2.91
5	Bristol Water	490	£ 19.07	3	£ 1.81
6	Severn Trent	4,020	£ 19.22	3	£ 1.51
7	Yorkshire Water	2,165	£ 20.96	2	£ 1.39
8	Wessex Water	1,191	£ 22.38	1	£ 1.59
9	NWL	1,878	£ 22.52	-	£ 1.55
10	Affinity Water	1,365	£ 23.26	1	£ 0.16
11	Anglian	2,773	£ 23.55	3	£ 2.60
12	Thames Water	5,410	£ 26.21	1	£ 1.37
13	Sutton & East Surrey Water	266	£ 27.05	1	£ 3.20
14	United Utilities	2,975	£ 29.53	-	-£ 0.25
15	Dwr Cymru	1,392	£ 33.76	-	£ 0.62
16	South West Water	760	£ 34.02	-	-£ 1.56
17	Southern Water	1,905	£ 34.70	-	-£ 5.06
	Upper quartile		£ 19.07		
	Mean average		£ 24.03		
	Mean of upper quartile		£ 18.28		

Bad debt as a percentage of revenue:

The table below shows the bad debt cost as a percentage of revenue for each of the companies. Whilst the overall costs for Affinity Water Retail are reported above as average, our bad debt performance is one of the lowest in the industry and clearly an area to be improved.

rank	Name	17-18 BD%	17-18 change on PY
1	Sutton & East Surrey Water	0.64%	-0.05%
2	South East Water	0.70%	0.11%
3	Severn Trent	2.16%	0.36%
4	NWL	2.46%	0.02%
5	Dee Valley Water	2.54%	0.52%
6	Yorkshire Water	2.55%	0.12%
7	Portsmouth Water	2.66%	1.22%
8	Wessex Water	2.75%	0.06%
9	Anglian	2.81%	-0.08%
10	South West Water	3.21%	0.00%
11	Thames Water	3.35%	0.27%
12	Bristol Water	3.36%	-0.01%
13	Southern Water	3.37%	-2.28%
14	South Staffs & Cambridge Water	3.45%	-0.03%
15	Affinity Water	3.53%	-0.09%
16	Dwr Cymru	3.86%	-0.25%
17	United Utilities	4.19%	-0.16%
	INDUSTRY AVERAGE		3.1%
	Upper quartile	2.54%	

10.10. Appointed company financial statements

International Financial Reporting Standards (IFRS)

The financial statements of Affinity Water Limited have been prepared under the historical cost convention and in accordance with the Companies Act 2006 and Financial Reporting Standard 101: 'Reduced disclosure framework' ('FRS 101') as issued by the Financial Reporting Council since 1 April 2015. Under FRS 101, the company applies the recognition and measurement requirements of EU-adopted International Financial Reporting Standards ('IFRS'), but makes amendments where necessary in order to comply with the Companies Act 2006 and The Large and Medium-sized Companies and Groups (Accounts and Reports) Regulations 2008 (SI 2008/410).

RCV

We have assumed an opening RCV of £1,181.8m as at 1 April 2020.

This is predicated on our assumptions for "midnight adjustments" (noting that these are ultimately dependent upon actual outturn figures), primarily driven by reconciliation items from AMP6, adjustments linked to the final year of AMP5, property disposals and the application of the PR09 correction for the Capital Incentive Scheme (CIS).

The table below details the projected evolution of the composite RCV over the course of AMP7, reflecting our assumptions around PAYG rates on Totex and RCV run down rates.

RCV in £m (nominal)	2020/21	2021/22	2022/23	2023/24	2024/25
Brought forward	1,181.8	1,266.4	1,356.3	1,433.0	1,488.0
Indexation	26.5	28.0	29.6	31.0	31.9
Additions	115.0	120.6	111.3	93.2	72.0
Run off	(52.9)	(58.8)	(64.4)	(69.3)	(73.3)
Carried forward	1,270.3	1,360.1	1,436.7	1,491.6	1,522.3
Apportionment					
Water Resources	149.3	170.0	187.4	201.8	206.2
Water Network	1,121.0	1,190.2	1,249.3	1,289.9	1,316.2

Legacy adjustments

The revenue adjustments in PR19 relating to Wholesale performance in AMP6 are assumed to be:

Revenue adjustments in £m (real)	2020/21
AMP6 ODI Adjustments	(4.2)
AMP6 Totex Reconciliation	(1.5)
Total	**(5.7)**

AMP6 ODI Adjustments – the product of our performance against the ODI targets set in PR14 for AMP6; the negative adjustment arises mainly due to the failure of the supply interruption target in several years partly offset by a reward for performance against the reduction in abstraction target in 2017/18.

AMP6 Totex Reconciliation – 3 years of actual Totex spend and two years of forecast spend have been reconciled to allowed amounts of Totex as determined in PR14 and the difference results in this adjustment after going through the Regulator's sharing mechanism with part being allocated to adjust revenue and the other side going to RCV.

Clearly, the final revenue computations will be subject to the actual outturn positions in the appropriate measurement year.

Our midnight adjustments have been calculated to be £41m with the detail of the adjustments listed in the table below. It is assumed that these are funded by holding distributable cash at the end of AMP6.

RCV Adjustments in £m (real)	1 April 2020 Midnight Adjustments
AMP5 Blind Year	(10.4)
PR09 CIS RCV Inflation Correction	(26.1)
Land Disposal Adjustment	(6.0)
AMP6 Totex Reconciliation	1.5
Total	**(41.0)**

AMP5 Blind Year – as part of the PR14 process it was necessary to rely on one year of forecast data to complete AMP5 to allow for the price setting process for AMP6 to be carried out; this adjustment is a result of a reconciliation of that one year forecast to actual performance.

PR09 CIS RCV Inflation Correction – within the PR14 process there was a reconciliation adjustment related to the CIS mechanism in PR09, after the PR14 determination was issued it was discovered that a modelling error by Ofwat resulted in this adjustment being incorrect for the all companies; this adjustment is intended to rectify this error.

Land Disposal Adjustment – any land sold during AMP6 would require a share being returned to customers, this adjustment is a result of the sales that have and been forecast to take place across AMP6.

AMP6 Totex Reconciliation – this is the RCV element of the reconciliation adjustment mentioned above for the associated revenue adjustment.

Capital allowances

We have provided details of our opening capital allowance pool balances and forecast capital allowance claims in data table App 29 split by Water resources and Water network plus.

The latest submitted tax return was for the year ended 31 March 2017 and the capital allowance pool balances have been rolled forward to 31 March 2020. There have been no previous capital allowance disclaimers.

We publish our tax strategy on our website and in our Regulatory Annual Performance Report. We are transparent in our dealings with government and regulators. We do not use artificial tax avoidance schemes or tax havens to reduce our tax liabilities, and we always comply with what we understand to be both the letter and the spirit of the law. All our customers are based in the UK and all our profits are taxed here.

By taking advantage of capital allowances available to all businesses to incentivise investment, we are able to defer, but not avoid, corporation tax. Our customers benefit from the use of capital allowances in the form of lower bills.

10.11. Financial Resilience

The following table summarises our approach to financial resilience themes and how these will be developed from now into the next AMP.

What we do today	Intentions for this AMP	Improvements into the next AMP
Pension Plan		
The defined benefit section of the pension plan is fully funded on a Technical Provisions basis and showing a £100m surplus on an accounting basis. We are also very close to being fully funded on a Self Sufficiency basis. This surplus can also be attributed to the ongoing support of the Sponsoring Employer, through the shareholders, with the level of contributions paid in the AMP to date significantly exceeding the deficit repair allowance from Ofwat at PR14 of £3.9m.	The company has agreed with the Pension Trustee to bring forward the next triennial valuation by 12 months from 31 December 2018 to 31 December 2017. It is hoped this will be completed by the end of September concluding that we have reached our Self Sufficiency target ahead of our original 2026 objective and generating cash savings from reduced contributions.	The investment strategy will continuously be looked at together with the Pension Trustee, with the attempt to crystallize gains as they arise.
Hedging was introduced at 70% on interest and inflation using Liability Driven Investment. This has recently been increased to 80%.	Given mortality rate assumptions being used in the 31 December 2017 valuation, options are being looked at to ensure we mitigate any future risk caused by reversing trends.	The investment strategy will continuously be looked at together with the Pension Trustee, with the attempt to crystallize gains as they arise.
The existing Schedule of Contributions put in place after the 31 December 2015 valuation put in a place an index linked mechanism applied to additional employer contributions.	The Schedule of Contributions to be entered into from September 2018 does not envisage a similar index linked arrangement. This could artificially lower the deficit and put greater reliance on the company.	The investment strategy will continuously be looked at together with the Pension Trustee, with the attempt to crystallize gains as they arise.
The company has just appointed an independent chair of the Trustee. This is in addition to having an independent Trustee director who also chairs the Investment and Funding Committee.	We intend to continue with the strong governance put in place.	We intend to continue with the strong governance put in place.
Financial Reporting		
Daily cashflow and gearing testing which is prepared by the Treasury Analyst, approved by the Treasurer and outputs sent to the CFO, CEO and Financial Controller.	We will continue this process but improve forecasting capabilities.	We will continue this process but improve forecasting capabilities.

What we do today	Intentions for this AMP	Improvements into the next AMP
Detailed treasury report reported monthly to the Board covering significant actions, liquidity analysis and forward looking covenant ratios.	This will be continued, even if the Board is less frequent the report will be produced.	This will be continued, even if the Board is less frequent the report will be produced.
All reporting required under the terms of the Whole Business Securitisation prepared and reported on a timely basis.	All reporting required under the terms of the Whole Business Securitisation prepared and reported on a timely basis.	All reporting required under the terms of the Whole Business Securitisation prepared and reported on a timely basis.
Monthly management accounts and Finance Board paper are prepared providing commentary of variances to budget and prior year and distributed to the EMT, Board and senior management team of the company. This now also incorporates quarterly reforecasting.	This will be continued, even if the Board is less frequent the report will be produced.	This will be continued, even if the Board is less frequent the report will be produced.
Long Term Viability		
Viability tests and stress test scenarios are run at least annually and reported in the annual report and financial statements. The scenarios selected are equal to or more stringent than those recommended by Ofwat. We have agreed a viability look out period of 5 years rolling with the Board for the purposes of the financial statements.	The look out period for Business Planning purposes will be 7 years to the end of AMP7.	Our objective will continue to be to maintain our lookout period at 5 years rolling even if this will take us into AMP 8 from 2022 with little guidance likely to be available at that time.
The company manages its risk from treasury activities by ensuring counterparties meet the minimum credit requirements approved by the Board, which include a maximum peak exposure limit and minimum credit rating. Credit exposure is monitored regularly by the company's treasury function and is reported monthly to the Board through the treasury report. Our current credit rating is Baa1 for 2017/18. During the year, we continued to maintain an investment grade corporate family credit rating in line with our peers in the water sector, being two notches above investment grade. Our Class A debt has a rating of A3 Moody's and A- S&P, which is 3 notches above investment grade. However, Moody's have	Our financing benefits, from the protections afforded from the securitised structure, which was implemented in February 2013. We will seek to maintain a family credit rating of BBB+/Baa1. We believe that our plan will allow us to maintain our current credit ratings on our A class debt of A-/A3.	

What we do today	Intentions for this AMP	Improvements into the next AMP
recently changed our outlook from Stable to Negative due to an increase in their Interest Cover ratio (ICR) threshold for Baa1 credits from 1.2 to 1.3 and gearing a target between 75%-80% instead of 80%. The primary S&P ratio (FFO/Debt) is at a sufficient level to maintain the current rating and they have not indicated any change in their methodology.		
Low appetite for refinancing risk.	No funding requirement in the operating company so this will continue.	Adapt financing policy to take advantage of lower cost and more flexible funding structure.
We have RCFs in place with one expiring in July 2020 and another July 2021.	We will look to renew the facilities at the beginning of 2019 with a tender offer to banks to achieve the best pricing and look to include new banks.	We should have arranged facilities that will be available for most of AMP 7 but will renew in advance.
Long Term Financial Planning		
We run a well-established corporate financial model for a period of 100 years. We have also developed a model with EY specifically for the Business Plan output requirements.	We are working with BDO on the development of a revised model to be reconciled to the bid-model, that will likely run for a period of 65 years.	
We have recently raised our first CPI linked bond, which was a successful transaction.	There is no requirement for funding for the remainder of the AMP but we will monitor the market.	Having transacted a CPI linked bond already we are in a good position to add more. Any debt raised in the operating company will have some element of CPI linkage to match the regulatory switch to CPI.
Energy Cost Management		
Currently energy hedging is transacted directly with our supplier SSE but can only fix our costs up to 3 years.	We are looking into hedging via a derivative with a number of counterparties. This can generally fix costs up to 5 years but once in place it can be rolled forward and fixed beyond 5 years. We aim to have ISDA contracts agreed this calendar year (2018) so the hedge can be put in place as and when required.	Energy hedging will be transacted via a derivative up to 5 years and Gas as well as Electricity will be hedged.

10.12. Dividend policy

The company's dividend policy is included below.

1. Policy Date and Review

This Dividend policy has been approved by the Board of Affinity Water Limited and is effective from 1 September 2018. All dividends must be declared and paid in accordance with this policy.

The policy will be reviewed by the Board at least annually. Any changes in the policy will be clearly signalled in the company's Annual Performance Report.

2. Dividend Policy Summary and Reporting

The dividend policy of Affinity Water Limited is to pay a dividend commensurate with the long-term returns and performance of the business and allowing shareholders to earn an appropriate return from an investment in the company, whilst not impairing the company's longer term financeability and taking into account commitments to its stakeholders and customers.

In determining the level of the dividend the financial performance of the appointed and non-appointed businesses are considered separately. The base dividend for the appointed business will be in reference to the company's internal business plan and will not exceed a nominal 5% annual yield on equity over the AMP, based on the company's actual financial structure. This is in line with the Ofwat's expectations and the allowance for the cost of equity in the RPI WACC for AMP7. This will apply for period from the effective date of this policy. Dividends can be increased or lowered from the base depending on the actual performance of the company.

An assessment will be completed by the Board to determine if the payment or part payment of the dividend reflects and/or would compromise the long-term social, financial and operational commitments made to stakeholders, which includes the following areas: customer service; operational commitments; community commitment; and employees and the health of the pension schemes.

Finally, the Board should test any proposed dividend payments against legal and regulatory requirements and restrictions, including the management of economic risk and compliance with financial covenants.

The dividends declared or paid in a year are to be reported in the Annual Performance Report of the company. This should include how they relate to the policy and any changes in the policy.

3. Calculating the Value of the Dividend

Dividends for the appointed business are declared after considering a holistic view of the company's performance. The Board should asses the value of the dividends to be paid for the appointed and non-appointed businesses separately. The value of the dividend declared will depend on the performance of each business.

Non-Appointed Dividend

The policy is to pay dividends in respect of the non-appointed business reflecting the profitability and performance of this business.

Appointed Dividends

The base dividend is set in line with the company's internal business plan approved by the Board following determination of the price controls for each asset management period and will not exceed a nominal 5% annual yield on equity over the AMP, based on the company's actual financial structure. This is in line with the Ofwat's expectations and the allowance for the cost of equity in the RPI WACC for AMP7. This will include any sharing mechanism within the price controls related to the financing structure of the company. The Board will assess the financial performance against this base dividend and accordingly increase or decrease the dividend to be paid as appropriate. This assessment will consider the whole asset management period.

4. Assessment of Service and Commitments to Stakeholders

The Board should consider if the payment or part payment of the dividend reflect or would compromise the long-term social, financial and operational commitments made to stakeholders, including customers, employees and pensioners. The Board should exercise judgement in four areas;

i. **Customer Service –** The company's performance in the round on customer delivery. This is assessed against the targets the company sets on its customer performance. This would include but is not limited to;
   - C-MEX (AMP7 only)
   - D-MEX (AMP7 only)
   - Complaints
   - SIM (AMP6 only)

ii. **Operational Commitments –** The company's performance in the round on the Performance Commitments levels set in the company's business plan. This includes but is not limited to;
   - Leakage
   - Consumption
   - Water Quality
   - Interruptions to Supply
   - Pressure (AMP7 only)

iii. **Community Commitments –** The company's performance in the round on the Performance Commitments levels set in the company's business plan. This includes but is not limited to;
   - Vulnerable customers
   - Sustainable abstraction
   - Community investment
   - Environmental innovation (AMP7 only)

iv. **Employees and Pensions –** The company's performance in respect of its employees. This will include but is not limited to;

- Safety
- The health of the pensions schemes

5. Financeability Considerations

In assessing the dividend to be paid, the Board is required to:

- to ensure that sufficient liquidity is maintained after a dividend payment to enable the business to, for at least 15 months, meet its financial obligations and finance its operations, including the payment of its creditors as they fall due.
- to make a reasonable judgment as to the amount of the distributable profits of the company when determining both whether a dividend should be declared and its value. This will consider the latest balance sheet position and forecast.
- to assess the long-term viability of the company. This is assessed through the viability tests maintained by the company, reviewing the cash facilities available to the company,
- ensure that the company maintains ratios that are in line with a credit rating equal to or above investment grade and to maintain the headroom target set for gearing as measured by the Regulated Asset Ratio covenant and the Interest Cover Ratio covenant over a two-year period.

6. Licence Condition Requirements

Licence Condition F provides that:

"The Appointee shall declare or pay dividends only in accordance with a dividend policy which, has been approved by the Board of the Appointee and which complies with the following principles;

(i) the dividends declared or paid will not impair the ability of the Appointee to finance the Appointed Business; and

(ii) under a system of incentive regulation dividends would be expected to reward efficiency and the management of economic risk."

Further, in assessing the dividend to be paid, directors are required to ensure that;

(a) *"The dividends declared or paid will not impair the ability of the Appointee to finance the Appointed Business; and under a system of incentive regulation dividends would be expected to reward efficiency and the management of economic risk"; and*

(b) *"no director of the Appointee should vote on any contract or arrangement or any other proposal in which he has an interest by virtue of other directorships."*

7. Legal Requirements

The company must comply with all legal requirements with respect to the declaration and payment of dividends including, but not limited to Part 23 of the Companies Act 2006.

In declaring and paying dividends, the directors must meet their duty under Section 172 of the Companies Act 2006 to act in the way they consider most likely to promote the success of the company for the benefit of the company's members as a whole, having regard to:

- the likely consequences of any decision in the long term
- the interests of the company's employees
- the need to foster the company's business relationships with suppliers, customers and others
- the impact of the company's operations on the community and the environment
- the desirability of the company maintaining a reputation for high standards of business conduct, and
- the need to act fairly as between members of the company

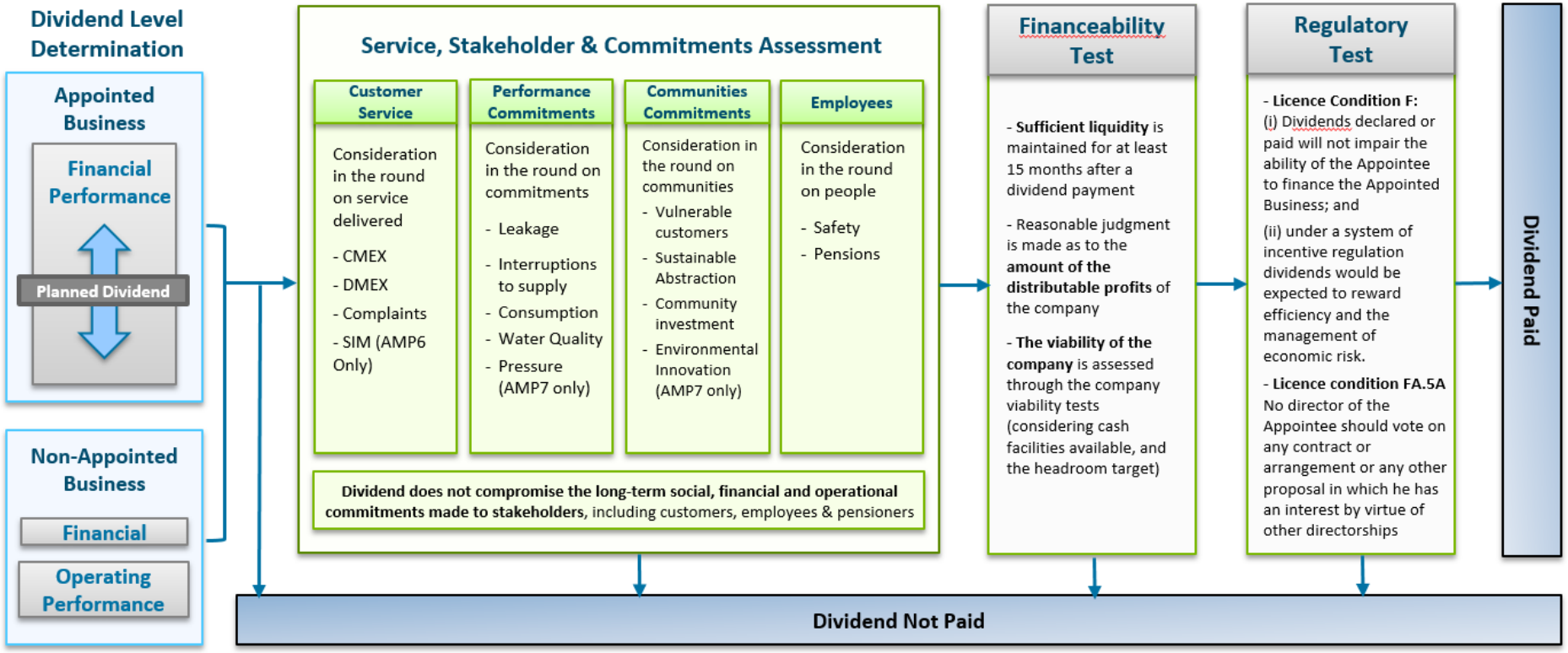
8. Dividend Frequency

A maximum of one dividend can be paid per quarter.

9. Special Dividend

A special dividend can be approved by the Board. This could for example relate to the sale of an asset or part of the business.

Dividend Policy



10.13. Executive remuneration policy

The company's executive remuneration policy is included below.

1. Aim of the Policy

To continue to align executive pay to the company's performance and strategy of delivering value through high quality customer and operational performance whilst ensuring the cost of water remains affordable for customers by incentivising financial efficiencies as well as the value created for shareholders.

2. The Remuneration Committee

The Remuneration Committee is responsible for determining the remuneration policy and terms and conditions of employment of the directors and senior executives. The Committee is chaired by an Independent Non-Executive Director. The Chief Executive Officer, the Chief Financial Officer and the People Director, may attend the meetings when requested by the Committee. Members of the Committee and attendees are excluded from discussions regarding their own remuneration and conditions of employment.

The Committee meets to review the performance of the business as well as the performance of executive directors and senior executives against planned targets. The Committee also meets to consider and apply an appropriate remuneration framework to retain high calibre management. Its focus is on ensuring that the company can attract, motivate and reward executives who can lead the business to achieve short and long-term targets and on ensuring those targets are closely linked to standards of performance which are of benefit to customers.

3. Reporting and Transparency

The company will continue to report remuneration in the Annual Report and Financial Statements in accordance with the Large and Medium-sized Companies and Groups (Accounts and Reports) Regulations 2008 (the 'Regulations'), which are applicable to companies whose equity shares are listed. The Regulations are not applicable to the company. The report will also continue to meet the relevant requirements of the Listing Rules of the Financial Conduct Authority and describe how the company has applied the principles relating to directors' remuneration in the Code.

The Regulations require the external Auditor to report to the members of a quoted company on certain parts of the directors' remuneration report and to state whether in their opinion those parts of the report have been properly prepared in accordance with the Accounting Regulations of the Act. The company will continue to ask its auditors to report on this basis notwithstanding the Regulations do not apply to the company.

A resolution to approve the report will be proposed at the Annual General Meeting ('AGM') of the company. The shareholders will have a single vote in the AGM to approve the remuneration policy report. An annual advisory vote to approve the remuneration implementation report, will also be required at the AGM.

Annual bonuses and Long Term Incentive Plan ('LTIP') awards are to be made in line with the maximum limits outlined in the prior year remuneration policy report.

From 2019, the company will produce a separate report published on its external website that provides a summary of the executive pay for the year.

A copy of this policy is to be published on the company's external website.

3.1. Non-Executive Directors

Each Independent Director has a written agreement relating to his or her services. They receive a fee for their services which is not related to company performance. They are not in receipt of share options or an LTIP. The fees for these directors are set taking into account the market rate for non-executive directors, with particular reference to the water industry in the United Kingdom. There are no specific termination payments applicable to these appointments. The appointment of the directors may be terminated by either the director or the company giving to the other three months' written notice.

Directors appointed by the shareholders do not receive any fees or other forms of remuneration from the company in respect of their services.

At each AGM any director appointed since the previous AGM, or any director appointed since the previous two AGMs without retiring or being re-elected, must retire and seek re-election.

3.2. Executive Directors

The remuneration framework is structured and appropriately balanced between fixed elements and incentive pay, to ensure that executives deliver a high standard of performance, whilst minimising risk. The Committee ensures that the performance measures are objective, easy to understand and motivational to the participants. The Committee also reviews and approves the senior managers' and selected managers', and company-wide bonus schemes.

The remuneration is designed to attract, retain and motivate executive directors of the calibre required to deliver the business strategy. Individual remuneration packages are structured to align rewards with the performance of the company for customers and stakeholders and the interests of shareholders.

The Committee takes into account, in arriving at a total remuneration package, the skills and experience of the candidate, the market rate for a candidate of that level of experience, as well as the importance of securing the best candidate.

The remuneration package for executive directors includes base salary, other taxable benefits, pension related benefits, annual bonus and an LTIP. These are explained further in the tables below and in appendix 1 and 2.

3.3. Executive Directors Fixed Pay and Other Benefits

Purpose and link to strategy	Policy and approach	Changes for 2018/19	Further Changes for AMP7
Base Salary			
To provide competitive fixed remuneration that will attract and retain key employees and reflect their experience and	To target around market median, dependent on experience in the role.	No changes were made to the policy for 2018/19.	No changes are made to the policy for AMP7.

Purpose and link to strategy	Policy and approach	Changes for 2018/19	Further Changes for AMP7
position in the company.			
Other taxable benefits			
To provide market competitive benefits.	Private health care insurance cover, life assurance and income protection are provided, together with a fully expensed company car or car allowance.	No changes were made to the policy for 2018/19.	No changes are made to the policy for AMP7.
Pension related benefits			
To provide competitive post-retirement benefits.	Executives joining the company after 2004 are invited to participate in the company's defined contribution pension scheme. No current executives joined prior to this date. Under the defined contribution scheme, the executive contributes at a rate of 7% of salary and the company contributes at 20%.	No changes were made to the policy for 2018/19.	No changes are made to the policy for AMP7.

3.4. Annual Bonus Plan

Purpose and link to strategy	Policy and approach	Changes for 2018/19	Further Changes for AMP7
Annual bonus plan			
The annual bonus plan is designed to provide a direct link between executive and company performance for customers, stakeholder and investors.	Maximum bonus potential is set at a market competitive level. The bonus is based on budgeted non-financial and financial targets aligned to the company's commitments for AMP6 and AMP7, plus individual targets (AMP6 only)	Increase in the weighting of customer service in the bonus. Removal of quarterly targets to avoid a bonus being awarded on a metric that is not met for the year and/or incurs an ODI penalty. Provide clear guidance on how the Committee can apply its discretion.	Reduction in the personal element of the bonus to 20% from 25%. Further improve the balance of the bonus with 40% relating to financial performance and 40% performance on customer service and stakeholder commitments. Reduce the discretion of the committee to

Purpose and link to strategy	Policy and approach	Changes for 2018/19	Further Changes for AMP7
			award outside of the performance delivery Achieving below target/plan no payment will be awarded on a metric. Introduction of a check that stops pay-out of the bonus if either the customer or the financial elements of the bonus fall below a set level.

3.5. LTIP

Purpose and link to strategy	Policy and approach	Changes for 2018/19	Further Changes for AMP7
LTIP			
To incentivise executives to achieve long-term shareholder value whilst achieving high levels of customer experience performance, although both award and payment are discretionary.	Base awards are granted as a percentage of salary and are paid out in cash at the end of a three-year performance period, subject to the achievement of performance conditions. There is therefore a deferral period of three years. Base awards include clawback and malus provisions, as detailed below * Awards vested in full on a change of control. The scheme operates on a rolling three year basis. The LTIP is aligned to the company's commitments for AMP6 and AMP7 and	Full review by Deloitte and shareholders. New scheme implemented with a focus on delivering the remainder of AMP6 and the start of AMP7. 50% award on financial performance and 50% on strategic outcomes, including service and performance commitments. 33% of the amount earned pays out at the end of year three, with 33% of the amount paying out the end of year four and 33% at the end of year five. Performance measures for 2018/19 and 2019/20 have been set and the performance conditions for 2020/21	Further balanced the scheme with 50% awarded available on service and commitments, 40% on financial targets and 10% on people and employee commitments. Removal of threshold performance and all targets linked to the stretching commitments in the AMP7 business plan. No award will be made for a metric if performance is below target/plan. Financial metrics are only included in the financial measures section of the LTIP.

	the company's internal business plan.	will be set on agreement of performance commitments in the AMP7 business plan. Introduction of a cap on the pay-out. Removed the automatic crystallisation on change of control.	

* Circumstances of malus include wilful or gross misconduct, acts of personal dishonesty or fraud, conviction of certain criminal offences, conduct which results in significant losses to the company, material failure of related management or business units, material misstatement in the audited financial statements, and reputational damage.

4. Additional Cash Awards

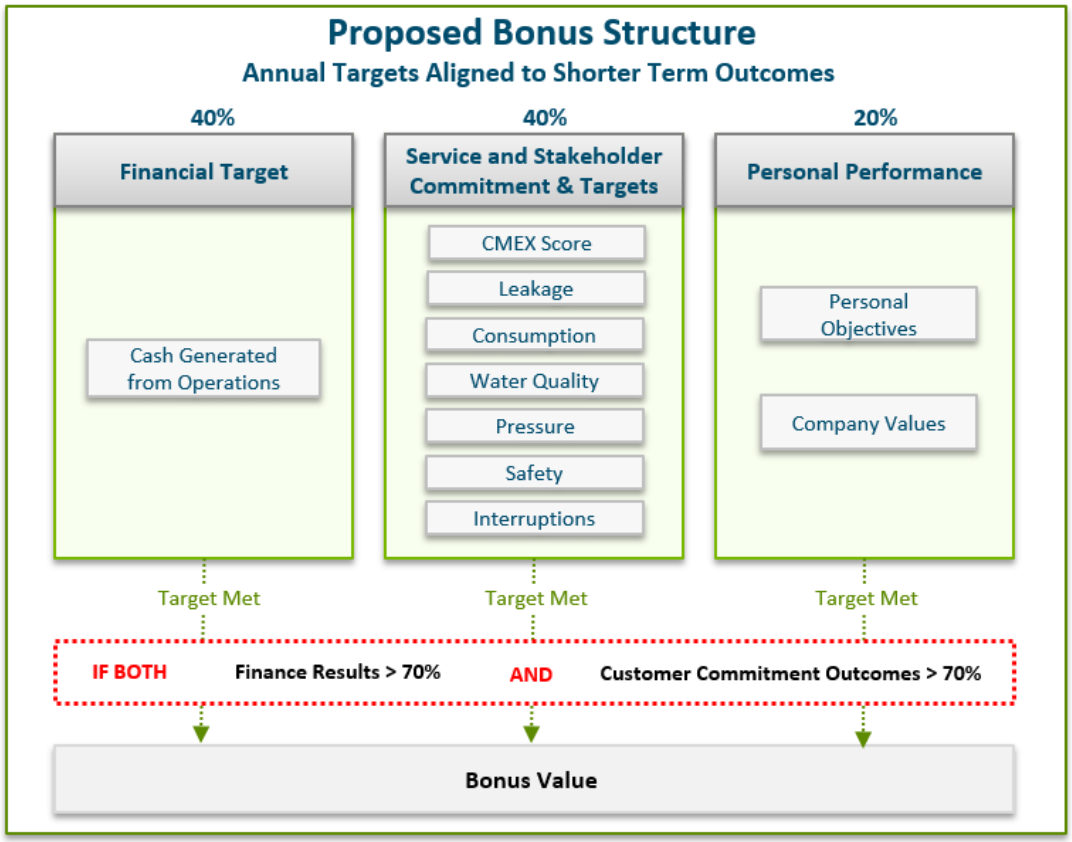
The Committee may make additional cash awards if deferred pay is forfeited by an executive director on leaving a previous employer. Such awards would take into account the nature of awards forfeited (i.e. cash or shares), time horizons, attributed expected value and performance conditions.

Other payments may be made in relation to relocation expenses and other incidental expenses as appropriate.

5. Review of the Pay and the Policy

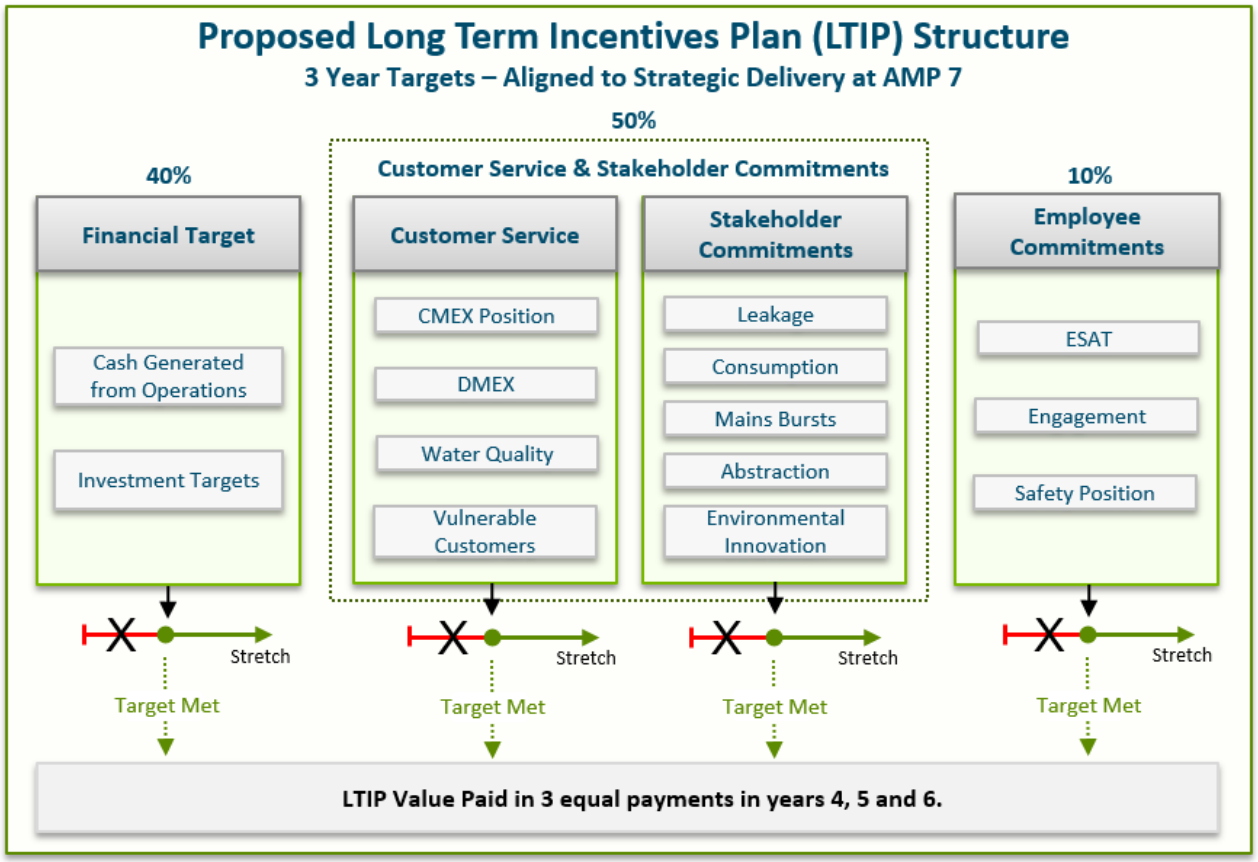
The policy will be reviewed every three years. Executive pay is to be reviewed annually.

Proposed Bonus Determination Process



Affinity Water

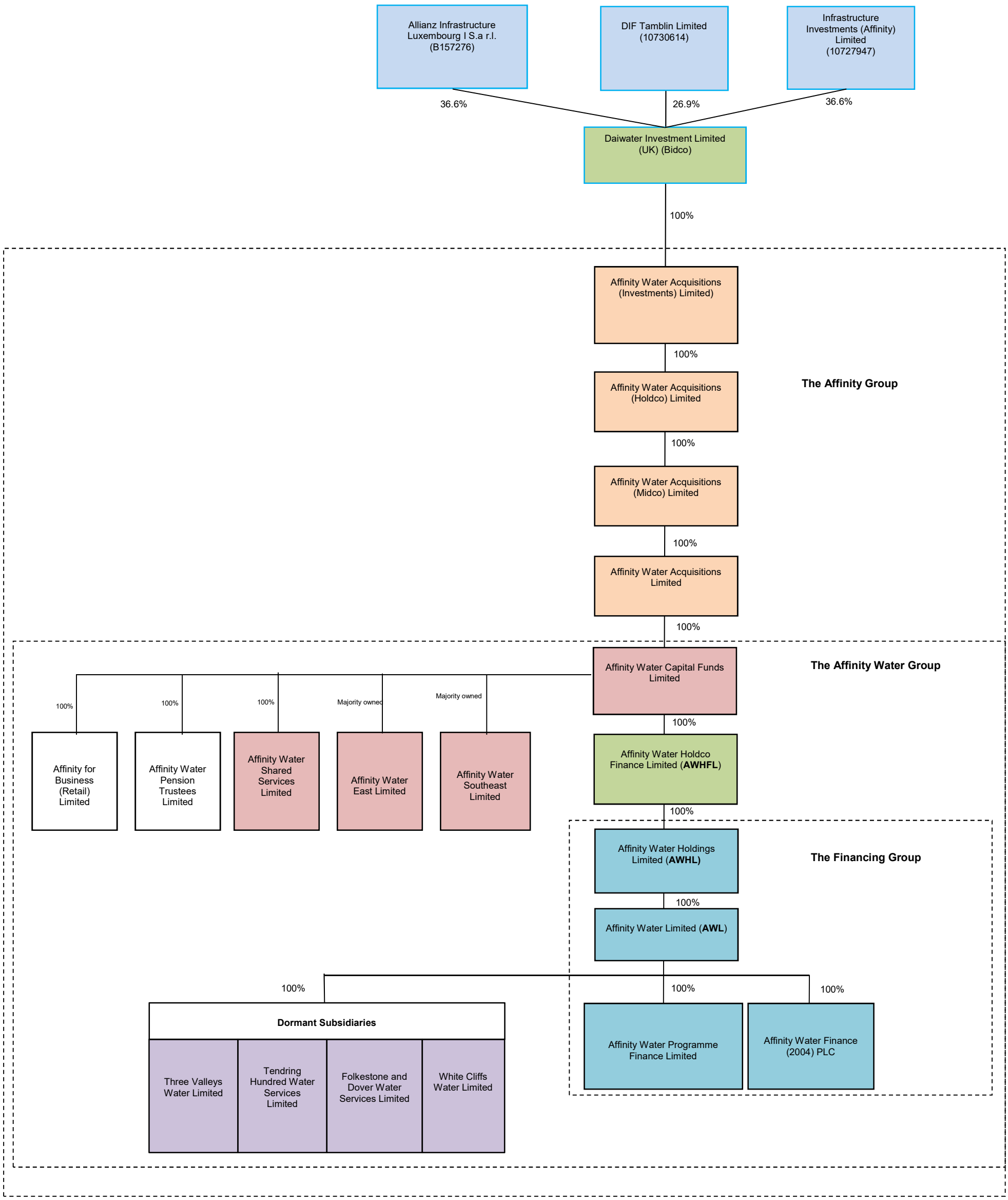
Proposed LTIP Determination Process



10.14. Group structure

The chart below illustrates our current group structure, with our proposed future structure following on the next page.

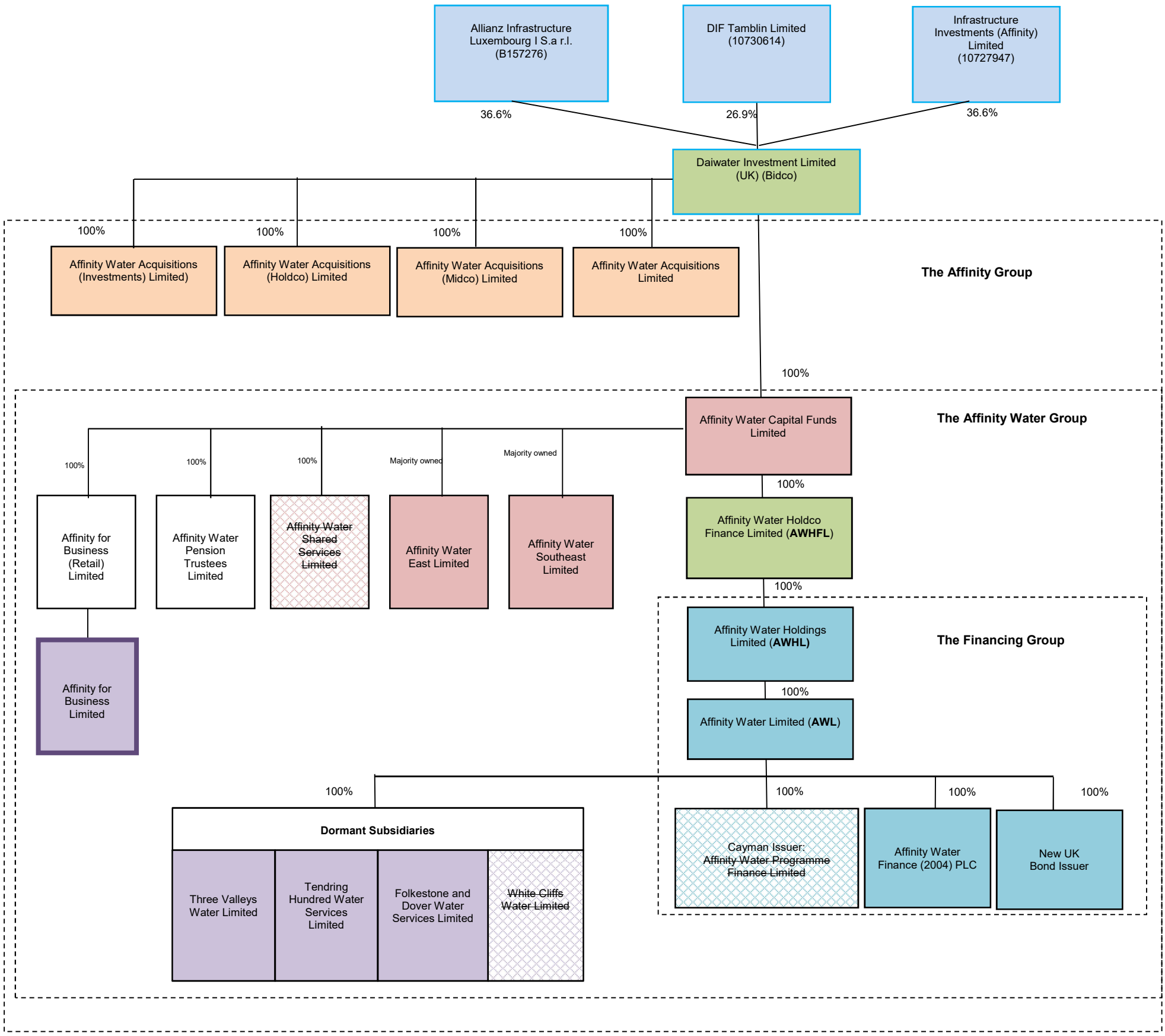
Affinity Water Group Chart – existing structure



KEY:

- Shareholder companies
- New companies incorporated in 2017/18
- Companies incorporated in 2012 acquisition
- Companies not included in restructuring scope
- Companies within securitised ringfence
- Former Veolia companies
- Dormant companies

Affinity Water Group Chart – proposed structure



KEY:

- Shareholder companies
- New companies incorporated in 2017/18
- Companies incorporated in 2012 acquisition
- Companies not included in restructuring scope
- Companies within securitised ringfence
- Former Veolia companies
- Dormant companies
- Identifies changes in the structure (new or eliminated companies)

10.15. Risk management exercise findings

Risk Assessment Outputs

10.15. Risk management exercise findings

Scope of assessment

In early June 2018, PwC facilitated an assessment of risk at programme, sub-portfolio and portfolio levels[1]. The purpose of the assessment was for subject matter experts and other stakeholders to:

(a) identify and assess key delivery risks associated with programmes in the portfolio; and

(b) identify appropriate mitigating actions before approval of the AMP7 Wholesale Investment Portfolio.

It should be noted that the risk assessment process did not consider risks relating to:

(a) customer acceptability of the investment programme in terms of impact on bill levels;

(b) totex required for the programme exceeding Ofwat's baseline totex assessment; or

(c) financeability of the AMP7 Wholesale Investment Portfolio.

Methodology

The methodology used was developed to reflect that we execute investment programmes in order to:

(a) help deliver one or more performance commitments; and/or

(b) help mitigate one or more strategic risks; and/or

(c) ensure we fulfil our legal and statutory obligations.

We adopted a three-step process.

Step 1: We determined the relative **impact** of the various planned programmes, by:

- determining relative weightings for each of the proposed AMP7 performance commitments, on a scale of 1 (low) to 25 (high); these weightings were largely determined on the basis of the financial rewards and penalties likely to be associated with outperformance or under-performance against the various performance commitments; the performance commitments and their weightings are shown as part of Appendix D

- using the existing gross risk scores as weightings for strategic risks, as held on the strategic risk register; these are already held on a scale of 1 to 25;

[1] *Capital expenditure and associated operational expenditure were both included in the assessment. Baseline department operational expenditure was taken into consideration but not assessed specifically.*

to recognise the importance of fulfilling our legal and statutory obligations, a weighting of 100 was assigned for risk #10 – "Failure to comply with laws, our instrument of appointment and other recognised standards"; the strategic risks and their gross risk scores are shown as part of Appendix D

- mapping each programme to (i) each performance commitment that the programme would support delivery of; and (ii) each strategic risk that delivery of the programme should help mitigate; these mappings were captured on a scale of 0 (no correlation) to 5 (very significant correlation)

- multiplying each mapping/correlation score by the weighting for that performance commitment or strategic risk

- adding all the weighted calculations to arrive at a total weighted impact score or index for the programme. It is important to note that the total weighted scores hold no particular relevance in their own right, they simply serve as a means to compare impact levels between programmes

The table in Appendix D shows the weightings for performance commitments and strategic risks; the mappings of individual programmes to them; and the aggregate weighted impact scores for each programme.

Step 2: Subject matter experts and stakeholders assessed the level of **deliverability risk** associated with each programme by:

- identifying, in a series of risk workshops, specific threats to successful delivery of that programme; we held one workshop per sub-portfolio, plus a strategic (portfolio) level workshop.

- identifying key risks across six delivery risk factors; taken together, these factors help to indicate the likelihood of a programme being successfully delivered. These risk factors are shown in the table below:

Delivery Risk Factors	Explanation
Supply Chain / Materials	Inability to secure reliable, cost-effective suppliers of required products and services given demands for those products and services from the industry as a whole as well as demand resulting from significant infrastructure projects in the south of England such as HS2, Thames Tideway Tunnel, Heathrow third runway, etc.
Outage	Inability to take production/network assets out of operation in order to carry out required works.
Environment / permits, etc.	Inability to obtain the necessary access to third party land, or to secure environmental or other permits in good time prior to commencement of programme works.
People	Lack of required internal project / programme management, technical and other skills, experience and

Delivery Risk Factors	Explanation
	knowledge to deliver programmes / projects in a cost-effective, timely and efficient manner.
Technical / Hardware / Software	Lack of required technology solutions to allow efficient, cost-effective delivery of programmes / projects; inability to effectively and efficiently utilize available technologies; failure of technologies used.
Project definition / scope	Inability to specify in sufficient detail the scope of individual programmes / projects due to for example, uncertain external circumstances; possible hangover from incomplete AMP6 projects; future changes in legislation, etc.

- scoring deliverability risks by factor for each programme and calculating the average of these to determine an overall deliverability risk score in the range 1 (significantly likely to succeed) to 5 (significantly unlikely to succeed).

Step 3: Subject matter experts and stakeholders identified mitigating actions to address individual risk factor scores of 4 or 5. Each of these risk factor scores was then re-assessed on the assumption that those mitigating actions are implemented, to determine a net or post-mitigation score.

Observations on the methodology

It should be noted that the various workshops were attended by individuals from different parts of the business and with different perspectives on risk. Also, whilst there was some consistency of attendees, for the most part, different individuals attended different sessions.

The outputs represent the subjective opinions of workshop attendees reflecting their knowledge and understanding at a point in time. It is also worth noting that the methodology described above was being used for the first time and there will be merit in further developing this methodology to support ongoing portfolio risk management and future business planning exercises.

Risk Assessment Outputs

Deliverability risk scores (gross and net) for each programme are represented on a bubble chart in Appendix A and shown in Appendix B.

Deliverability risks have been scored on a scale of 1 (programme is significantly likely to succeed) to 5 (significantly unlikely to succeed at delivering the associated performance commitment and/or mitigating the associated strategic risk). Please note that these scores do not directly take into account the value of the planned expenditure on each investment programme. the scores were based on ‘significantly likely/unlikely to succeed at delivering associated PC / mitigating the associated Stra risk

The bubble chart shows the performance commitment/strategic risk weighted impact scores (Y-axis) plotted against the average deliverability risk ratings (X-axis). It is important to note the following differences between this bubble chart and those which Audit Committee members are used to seeing in respect of Strategic and Directorate risks:

- Strategic/Directorate risk bubble charts reflect a general desire to mitigate risks towards the bottom-left, i.e. low likelihood and low impact. However, for this bubble chart the top-left represents the "best" part of the chart to be as it indicates programmes which are highly impactful (in a positive sense) but with low deliverability risk

- for the Strategic/Directorate risk bubble charts, the positioning of bubbles within boxes has no significance since all scores are recorded in whole numbers. However, for this bubble chart the position of the bubble on both Y and X axes reflects the precise scores determined for impact and deliverability risk likelihood. A small number of bubbles have been slightly repositioned to minimise the extent of cross-over of lines and aid readability

It should also be noted that the colours of the bubbles representing the post-mitigation risk assessments indicate costs of the planned investment as at the date of the workshops.

Highest Risk Programmes

The table below shows the seven highest-risk programmes pre-mitigation, i.e. on the basis of current processes and controls, and reflecting likely operating scenarios during AMP7; the main mitigating actions identified in the workshops are also shown, together with the resulting post-mitigation risk scores.

No.	Programme
1	National Environment
3	Sustainability Reductions
4	Treatment Investment
6	Storage
8	Sundon
13	Integrated Water Savings
15	Lead

Details of the risks and mitigating actions identified for these programmes are shown in Appendix C.

The various mitigations identified for these programmes bring them into or very close to the amber (medium risk) area. Notwithstanding the mitigation steps identified, these programmes will warrant particular management attention throughout AMP7, since successful delivery of performance commitments and mitigation of strategic risks are significantly dependent upon their successful execution.

Some of the identified mitigating actions for these (and other) programmes involved additional expenditure, mainly in AMP7. Where relevant, this additional expenditure has been included in subsequent iterations of the investment portfolio.

Deliverability Risks

Appendix B shows the average deliverability risk scores, pre- and post-mitigate, for each of the risk factors at overall portfolio level. The most significant areas of delivery risk and proposed mitigating actions at portfolio level are summarised below.

Assessed Deliverability Risks	Programmes impacted and further mitigation
Outage Inability to secure planned outages to deliver works. **Average Risk Scores:** **Pre-mitigation:** 2.0 **Post-mitigation:** 1.6	**Programmes most impacted** Sundon Lead CPs **Mitigation** More collaborative and long-term (proactive) planning is essential, with an issue still remaining over localised headroom.
Environment / permits, etc. Risk of inability to obtain planning permission for construction; inability to secure access from Anglian Water to Sundon site pipes; **Average Risk Scores:** **Pre-mitigation:** 2.2 **Post-mitigation:** 1.9	**Programmes most impacted** Sundon **Mitigation** Early commencement of work to obtain land and permissions; need right people from AWL engaging with right people from Anglian.
People Risk of inability to carry out technical tasks and functions due to current limitation in skilled staffing and difficulty in recruiting new staff with requisite technical knowledge. **Average Risk Scores:** **Pre-mitigation:** 2.8 **Post-mitigation:** 2.1	**Programmes most impacted** Sustainability Reductions Integrated Water Savings **Mitigation** We should enhance the people strategy in order to attract and retain talent, with greater focus on training of specialist skills needed, due to the diminishing pool of resources available. The People team is currently developing a people/workforce strategy.
Technical / Hardware / Software AWL has traditionally been quite conservative in its take-up of new technology, but the portfolio depends on the adoption of new technologies, some of which are new only to AWL, and some of which are newly developed. The degree to which AWL is able to adopt these technologies is uncertain. **Average Risk Scores:** **Pre-mitigation:** 2.2	**Programmes most impacted** Sustainability Reductions Sundon **Mitigation** More work needs to be done to influence culture around the adoption of new technologies. It is important that we submit a business plan which reflects a significant degree of innovation, given that this is one of Ofwat's four

Assessed Deliverability Risks	Programmes impacted and further mitigation
Post-mitigation: 1.7	themes. We have a particular obligation to stress the technological innovations we will be seeking to implement during AMP7.
Project definition / scope Risk of insufficiently defined project scopes due to, for example, vague Environment Agency requirements, inherent uncertainty in work to be performed until arrival on site, changing regulatory requirements, change in scope due to hangover from incomplete AMP6 projects. **Average Risk Scores:** **Pre-mitigation:** 3.3 **Post-mitigation:** 2.3	**Programmes most impacted** Catchment Management Sustainability Reductions Treatment Investment Ardleigh Storage Leakage Lead CPs **Mitigation** Early and robust stakeholder engagement; lobbying of regulators and other stakeholders; further investigation where relevant; workshops / deep-dives to firm up scope.

During the strategic (portfolio level) workshop the broader-impact risks and thematic programme risks emerging from the detailed sub-portfolio sessions were aggregated and reviewed. Stakeholders also identified and assessed some additional risks and identified mitigating actions at portfolio level.

Significant Portfolio Risks	Main Mitigating Actions Identified
Success of the Sundon scheme The entirety of the business plan rests on this being achieved on time but there are potential barriers to successful implementation of this programme as follows: (a) we do not own the land upon which construction is planned; and (b) the anticipated technology to be deployed is new to us and relatively untested.	The primary mitigating actions involve managing relationships (to ensure access), managing the budget and building a pilot plant as part of an early start approach.
Consumer Behaviour This is a significant success factor for a number of our planned programmes, representing an external risk of failure, since customer behaviour is difficult to influence as appropriate incentives are largely unavailable.	As a minimum, we need to continue with our existing initiatives designed to educate the customer base on water usage matters; we also need to continue to engage with other water industry experts to identify and implement other innovative courses of action.

The following programmes were assessed as having very high impact but low deliverability risk.

No.	Programme Name	Score Pre-mitigation	Score Post-mitigation
17	Ongoing Asset Management	1.5	1.5
20	IT Infrastructure	1.2	1.2
23	IT Strategy.	1.5	1.2

Notwithstanding their low deliverability risk scores, these programmes will also require significant ongoing management attention since their high impact scores reflect, in part, the dependency on them of numerous other programmes. It should be noted that, subsequent to the risk workshops, the scope of the IT programme has broadened to incorporate other technological or innovation strategy that provides business benefit and pay back.

Lastly, various other programmes were assessed as medium delivery risk, but mitigation actions have been identified which move them to or very close to the green (low risk) area. These programmes should be subject to the normal rigours of effective programme / project management throughout AMP7.

No.	Programme Name	Score Post-mitigation	Key Mitigations
2	Catchment Management	2.0	• lobbying of regulators with a view to influencing policy, e.g. new pollutant control requirements
9	Trunk Mains	2.7	• assess budget for further funding of emergency 24/7 operational model • evaluate shift-working model / staff skills to increase retention of managers
11	Leakage	2.3	• perform workshops to evaluate / deep-dive on implications of 15% target • enhance visibility of metering programme and obtain early start funding to have this in place before AMP7
16	Developer Services	2.2	• invest in IT support and suitable software / tools so that they are in place before AMP7
18	Business Planning.	1.8	• earlier and smarter sequencing (of PR24 business planning) • lobby regulators now for next plan creation during AMP7 • ensure full understanding of interdependencies between WRMP, DMP and DWI water quality submission

Conclusion

The risk assessment process we have undertaken has allowed us:

(a) to assess the extent to which each of our AMP7 investment programmes reviewed contribute towards

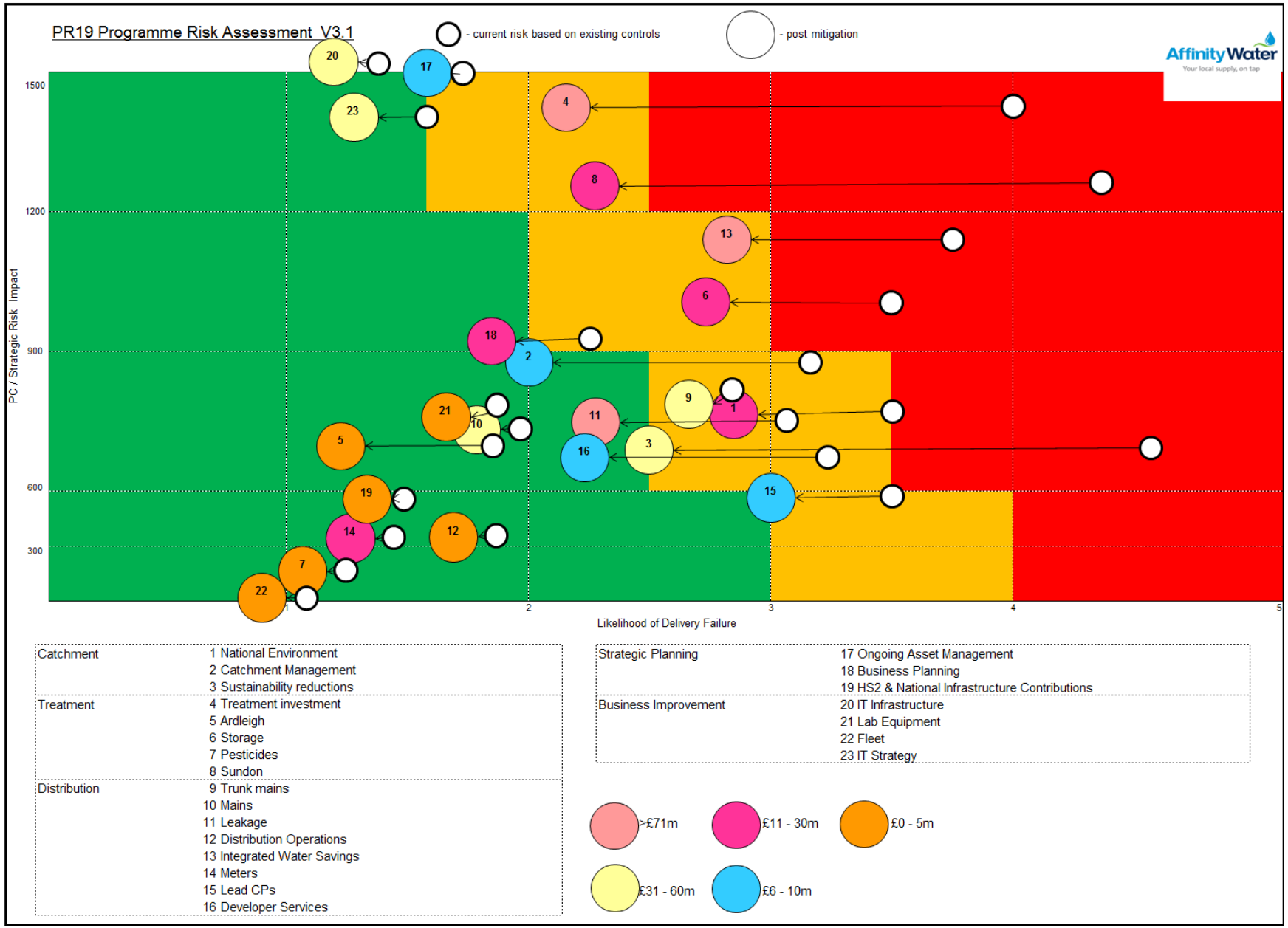
- fulfilling our legal and regulatory obligations;
- contributing to achieving one or more performance commitments; and
- assisting in the mitigation of our strategic risks.

(b) identify the investments with the highest deliverability risk and to identify appropriate mitigating actions for these and other programmes;

(c) identify the degree of stretch for each of the AMP7 investment programmes assessed; and

(d) confirm that the AMP7 investment programmes assessed are deliverable subject to implementation of identified mitigating actions.

Appendix A: Bubble Chart - Deliverability risk scores across sub-portfolios/programmes and risk categories



Appendix B: Deliverability risk scores across sub-portfolios/programmes and risk categories

	Gross: based on current processes / controls, etc.							Net: based on mitigating actions						
	Supply Chain / Materials	Outage	Environ't / permits, etc.	People	Technical/ Hardware / Software	Project definition/ scope	Average	Supply Chain / Materials	Outage	Environ't / permits, etc.	People	Technical/ Hardware / Software	Project definition/ scope	Average
Catchment														
National Environment	4	4	3	4	2	4	3.5	2	4	3	3	2	3	2.8
Catchment Management	4	1	4	4	1	5	3.2	2	1	2	3	1	3	2.0
Sustainability Reductions	5	4	3	5	5	5	4.5	3	2	2	3	2	3	2.5
Sub-portfolio averages	*4.3*	*3.0*	*3.3*	*4.3*	*2.7*	*4.7*	*3.7*	*2.3*	*2.3*	*2.3*	*3.0*	*1.7*	*3.0*	*2.4*
Treatment														
Treatment Investment	4	4	3	4	4	5	4.0	2	2	3	2	2	2	2.2
Ardleigh	2	1	1	1	1	5	1.8	1	1	1	1	1	3	1.3
Storage	4	4	3	4	1	5	3.5	2	4	2	3	1	4	2.7
Pesticides	3	1	1	1	1	1	1.3	2	1	1	1	1	1	1.2
Sundon	4	5	5	4	5	3	4.3	2	2	3	2	2	3	2.3
Sub-portfolio averages	*3.4*	*3.0*	*2.6*	*2.8*	*2.4*	*3.8*	*3.0*	*1.8*	*2.0*	*2.0*	*1.8*	*1.4*	*2.6*	*1.9*
Distribution														
Trunk Mains	3	2	2	4	3	3	2.8	3	2	2	3	3	3	2.7
Mains	2	1	2	1	1	4	1.8	2	1	2	1	1	3	1.7
Leakage	4	1	4	4	3	5	3.5	2	1	3	2	3	3	2.3
Distribution Operations	1	1	1	2	2	3	1.7	1	1	1	2	2	3	1.7
Integrated Water Savings	5	1	4	5	3	4	3.7	3	1	3	4	3	3	2.8
Meters	2	1	1	1	2	1	1.3	2	1	1	1	2	1	1.3
Lead CPs	3	5	2	3	3	5	3.5	3	4	2	3	3	3	3.0
Developer Services	3	1	3	4	4	4	3.2	3	1	3	2	2	2	2.2
Sub-portfolio averages	*2.9*	*1.6*	*2.4*	*3.0*	*2.6*	*3.6*	*2.7*	*2.4*	*1.5*	*2.1*	*2.3*	*2.4*	*2.6*	*2.2*
Strategic Planning														
Ongoing Asset Management	1	1	1	3	2	1	1.5	1	1	1	3	2	1	1.5
Business Planning	1	2	2	3	1	4	2.2	1	2	2	3	1	2	1.8
HS2 & Nat'l Infrastructure	1	1	2	1	1	2	1.3	1	1	2	1	1	2	1.3
Sub-portfolio averages	*1.0*	*1.3*	*1.7*	*2.3*	*1.3*	*2.3*	*1.7*	*1.0*	*1.3*	*1.7*	*2.3*	*1.3*	*1.7*	*1.5*
Business Improvement														
IT Infrastructure	1	1	1	1	2	1	1.2	1	1	1	1	2	1	1.2
Lab Equipment	2	1	1	3	1	2	1.7	2	1	1	3	1	2	1.7
Fleet	1	1	1	1	1	1	1.0	1	1	1	1	1	1	1.0
IT Strategy	1	1	1	1	1	4	1.5	1	1	1	1	1	2	1.2
Sub-portfolio averages	*1.3*	*1.0*	*1.0*	*1.5*	*1.3*	*2.0*	*1.4*	*1.3*	*1.0*	*1.0*	*1.5*	*1.3*	*1.5*	*1.3*
Portfolio averages	*2.7*	*2.0*	*2.2*	*2.8*	*2.2*	*3.3*	*2.5*	*1.9*	*1.6*	*1.9*	*2.1*	*1.7*	*2.3*	*1.9*

Appendix C - Highest risk programmes (pre-mitigation)

No.	Programme Name	Score Pre-mitigation	Drivers	Key Mitigations	Score Post-mitigation
1	National Environment	3.5	• failure to secure contractor services due to low level of contract values / margins and limited number of able contractors • inability to validate models due to insufficient redundancy in water facilities to enable outage of sites • insufficiently defined project definition due to vague EA requirements and inherent uncertainty in work to be performed until arrival on site	• analyse and revise procurement strategy • contingency financing for additional water imports and additional technical changes to infrastructure to provide ability to move water to areas where needed • early and robust stakeholder management to ensure project definition correct and agreed	2.8
3	Sustainability Reductions	4.5	• inability of key suppliers to deliver work and materials, caused by demand from other water companies on same supply chain • limitation in skilled staffing and difficulty recruiting new staff with technical knowledge • models used for planning may be inaccurate as numbers used have never been tested in a live environment • programme content may have been missed; significant areas may not have been considered – “unknown unknowns” • customer behaviours may not deliver required water savings	• analyse and revise procurement strategy • analyse and revise people strategy • checks required with Operations team to verify model numbers and modify agreed plan to reflect any changes • include local mitigations to reduce usage by 15mld	2.5
4	Treatment Investment	4.0	• unable to secure sufficient outages due to water supply restrictions and technical restrictions • new technologies may fail to deliver predicted results due to AWL’s inexperience in their use • uncertainty re. number of nitrate plants • capital maintenance model output uncertainty	• form Operational Performance Review group • implement outage management system • develop outage operational plan and agree sequencing • additional up-skilling in use of existing technologies not previously used by AWL • complete capital maintenance model and deep-dive with operational team	2.2
6	Storage	3.5	• risk of incomplete scope for reservoir work • risk of change in scope due to hangover from incomplete AMP6 works • inability to secure specific materials required – e.g. water tower lining • risk of reservoirs not being drained in a timely manner due to discharge permits not being obtainable	• further investigation required • procurement framework to be enhanced • stakeholder engagement of specialist manufacturer of water tower product • early planning / organisation of permits	2.7
8	Sundon	4.3	• unable to secure sufficient outages due to water supply restrictions and technical restrictions • inability to obtain planning permission for construction • inability to secure access from Anglian to Sundon site pipes • technology required to remove discolouration may fail	• creation of early engagement plan with Anglian • consideration of alternative method of construction that reduces outage time • early commencement of work to obtain land and relevant permissions • complete work with Brunel University to develop further knowledge and degree of confidence in solution • review other work required once Brunel work completed	2.3
13	Integrated Water Savings	3.7	• limited access to contractor services in supply chain due to AWL’s low contract pricing and margins • inability to secure street works permits in North London • customer behaviours may not deliver required water savings	• strengthen relationships with existing contractors • strengthen relationships with North London councils • collaborative working across projects to minimise permit requirements • lobbying of DEFRA/Government to drive more national approach to change customer behaviour	2.8
15	Lead	3.5	• failure to access customer properties due to customer refusal • current scope funding insufficient • risk of legislative change during AMP7 resulting in incorrect scope and requirements	• implement improved customer communication plan regarding benefits of carrying out the works and how AWL will address any inconvenience • restore funding to previous £13m level • create adaptive programme to mitigate risk of legislative change	3.0

Appendix D: Programme Mappings to Performance Commitments and Strategic Risks – programmes 1 - 16

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		National Environment	Catchment Management	Sustainability reductions	Treatment investment	Ardleigh	Storage	Pesticides	Sundon	Trunk mains	Mains	Leakage	Distribution Operations	Integrated Water Savings	Meters	Lead CPs	Developer Services
Performance Commitments	Weight	Mappings / Weighted Scores			Mappings / Weighted Scores					Mappings / Weighted Scores							
Leakage (Ml/d)	25									1 25	2 50	5 125		4 100	1 25		
Per Capita Consumption (PCC) (l/person/d)	20		2 40									2 40		5 100	4 80		
Risk of Severe Restrictions in a Drought (% of population at risk in a 1 in 200 year drought)	10				5 50	1 10	1 10		4 40								
Water Supply Interruptions >3hrs (average minutes lost per property per year)	25				3 75		4 100	1 25	4 100	5 125	4 100						
Unplanned Outage (flow rate)	20		3 60		5 100	3 60		1 20									
Mains Bursts (Per 1,000 km of pipe)	20				2 40					2 40	5 100	2 40					
Water Quality Compliance, Compliance Risk Index (CRI)	25		4 100		5 125	3 75	5 125	1 25	4 100			1 25				3 75	
Customer measure of experience (C-MeX) – will replace SIM	25								2 50	3 75	2 50	4 100	4 100	2 50	1 25		
Developer measure of experience (D-MeX)	10								1 10								5 50
Properties experiencing longer/repeated instances of low pressure	15				2 30								5 75				2 30
Customers in vulnerable circumstances satisfied with our service	5																
Customers in vulnerable circumstances who found us easy to deal with	5																
Sustainable Abstraction, average annual reduction (Ml/d)	20			5 100	5 100	3 60			5 100			3 60		3 60	1 20		
Abstraction Incentive Mechanism (AIM)	15								5 75								
Environmental innovation	10		5 50														
False voids and gap properties	15										2 30			2 30			1 15
River restoration	10	5 50															
Mean Zonal Compliance	5		4 20		5 25	3 15	4 20	1 5	4 20							3 15	
Performance Commitments Total		5 50	18 270	5 100	32 545	13 220	14 255	4 75	29 495	11 265	15 330	17 390	9 175	16 340	7 150	6 90	8 95
Strategic Risks	Gross Risk Score																
#1 Failure to prevent injuries and accidents to our people and the public	25	2 50			5 125	1 25	4 100			4 100						2 50	
#2 Failure to meet our water supply obligations	25	5 125	4 100	5 125	5 125	3 75	3 75	1 25	5 125	5 125	3 75	3 75	1 25	5 125	3 75		5 125
#3 Failure to supply high-quality drinking water	25	3 75	4 100		5 125	3 75	5 125	1 25	5 125	3 75						4 100	
#4 Unavailability of resources (people and materials)	16																
#5 Information security failure	25																
#6 Failure to adequately protect personal data	25																
#7 Failure to provide adequate levels of customer service	25												1 25	3 75	2 50		
#8 Adverse changes to the regulatory framework	12																
#9 Adverse change in the social and/or political climate	16																
#10 Failure to comply with laws, our instrument of appointment and other recognised standards	100	4 400	4 400	5 500	5 500	3 300	5 500	1 100	5 500	2 200	3 300	3 300	1 100	5 500		3 300	5 500
#11 Failure to deliver our business plan obligations	25													4 100			
#12 Failure to achieve a favourable PR19 outcome	25	3 75															
#13 Failure to secure appropriate financing for our business activities	20																
#14 Macro economic risk (interest rate, inflation and tax risks)	25																
#15 Revenue and debtor risk	25														2 50		1 25
Strategic Risks Total		17 725	12 600	10 625	20 875	10 475	17 800	3 150	15 750	14 500	6 375	6 375	3 150	17 800	7 175	9 450	11 650
Grand Total		22 775	30 870	15 725	52 1,420	23 695	31 1,055	7 225	44 1,245	25 765	21 705	23 765	12 325	33 1,140	14 325	15 540	19 745

Appendix D: Programme Mappings to Performance Commitments and Strategic Risks – programmes 17 - 23

		17		18		19		20		21		22		23	
		Ongoing Asset Management		Business Planning		HS2 & Natl Infrastructure		IT Infrastructure		Lab Equipment		Fleet		IT Strategy	
Performance Commitments	Weight	Mappings / Weighted Scores						Mappings / Weighted Scores							
Leakage (Ml/d)	25	3	75					3	75					3	75
Per Capita Consumption (PCC) (l/person/d)	20	3	60					3	60					3	60
Risk of Severe Restrictions in a Drought (% of population at risk in a 1 in 200 year drought)	10	2	20					3	30						
Water Supply Interruptions >3hrs (average minutes lost per property per year)	25	4	100					3	75	1	25			3	75
Unplanned Outage (flow rate)	20	4	80					3	60	2	40			3	60
Mains Bursts (Per 1,000 km of pipe)	20	3	60					3	60					3	60
Water Quality Compliance, Compliance Risk Index (CRI)	25	2	50					3	75	3	75			2	50
Customer measure of experience (C-MeX) – will replace SIM	25	1	25					3	75	1	25			3	75
Developer measure of experience (D-MeX)	10	3	30					3	30						
Properties experiencing longer/repeated instances of low pressure	15	3	45					3	45					3	45
Customers in vulnerable circumstances satisfied with our service	5													3	15
Customers in vulnerable circumstances who found us easy to deal with	5													3	15
Sustainable Abstraction, average annual reduction (Ml/d)	20	3	60					3	60					3	60
Abstraction Incentive Mechanism (AIM)	15							3	45					3	45
Environmental innovation	10							3	30					1	10
False voids and gap properties	15	4	60					3	45					2	30
River restoration	10							3	30						
Mean Zonal Compliance	5	2	10					3	15	3	15			3	15
Performance Commitments Total		37	675	0	0	0	0	48	810	10	180	0	0	41	690
Strategic Risks	Gross Risk Score														
#1 Failure to prevent injuries and accidents to our people and the public	25	3	75					3	75					2	50
#2 Failure to meet our water supply obligations	25	4	100	5	125	4	100	3	75	3	75			2	50
#3 Failure to supply high-quality drinking water	25	4	100	3	75	4	100	3	75	5	125			2	50
#4 Unavailability of resources (people and materials)	16							3	48	3	48	4	64	1	16
#5 Information security failure	25	2	50					4	100					4	100
#6 Failure to adequately protect personal data	25							4	100					4	100
#7 Failure to provide adequate levels of customer service	25	4	100					3	75	1	25			5	125
#8 Adverse changes to the regulatory framework	12	1	12	3	36										
#9 Adverse change in the social and/or political climate	16			3	48										
#10 Failure to comply with laws, our instrument of appointment and other recognised standards	100	4	400	5	500	3	300	3	300	3	300			2	200
#11 Failure to deliver our business plan obligations	25														
#12 Failure to achieve a favourable PR19 outcome	25														
#13 Failure to secure appropriate financing for our business activities	20	1	20	5	100										
#14 Macro economic risk (interest rate, inflation and tax risks)	25			2	50										
#15 Revenue and debtor risk	25													2	50
Strategic Risks Total		23	857	26	934	11	500	26	848	15	573	4	64	24	741
Grand Total		60	1,532	26	934	11	500	74	1,658	25	753	4	64	65	1,431

10.16. Return on regulated equity

General

Data table App 26 was completed in line with Ofwat's guidance contained within the published document 'Delivering Water 2020: Our methodology for the 2019 price review, Appendix 12: Aligning risk and return', within Section 3 titled 'Scenario analysis and risk assessment'. The pre-tax economic impact, in a 2017/18 CPIH year average price base, of an upside and downside case for each of the prescribed scenarios listed in the guidance has been assessed and modelled. We felt that the prescribed scenarios in the guidance covered the relevant attributes to our business so chose not to include any additional scenarios. The upside and downside scenarios applied to the base Business Plan submission for each of the variables below (references are to data table App 26 itself) were assessed to be within the P90/P10 probability range as per the guidance.

Tables A & B - Revenue

These sections were completed by using past data and expert opinion to derive the suitably probable economic impact of movements in review for each of the price controls while also considering the impact of water trading incentives. It was assessed that the supply/demand pressures driven by weather related activity would be the main area of impact and was suitably modelled for each of the price controls. This was applied through a 3% increase or decrease on the modelled revenue in the base business plan submission to represent the economic impact for an upside and downside scenario respectively.

Tables C & D – Totex

Within each Wholesale price control, the level of economic impact associated to the suitable probability of increased/decreased costs after a sharing mechanism has been modelled and represented. Using past data and expert opinion, the main factors considered within this modelling where the economic impact of asset failures and demand/supply pressures. The suitable level impact applied was an increase of 4% in all Totex for a downside scenario and a decrease of 4% for an upside scenario. A sharing rate of 50% was applied within in each period to ascertain the economic impact of this movement.

Tables E & F – Residential Retail Costs

The level of economic impact driven by the movement in costs within the residential retail price control has been modelled focusing on the movement in bad debt as the key contributing factor. A suitable downside scenario of an increase of 20% in total costs was applied to represent this factor. An upside scenario of a 6.5% decrease in total costs was used to represent the potential for improvement through the implementation of transformative technologies.

Tables G & H – Business Retail

No input required for AWL.

Tables I & J – ODI

The economic impact for penalties/rewards in each proposed ODI was modelled based on a suitable level of probability and assigned to the relevant price control. The table below shows the level of economic impact applied for an upside and downside scenario for each ODI and allocated to each price control:

Economic Impact £m	Water Network		Water Resources		Residential Retail		Total	
	Upside	Downside	Upside	Downside	Upside	Downside	Upside	Downside
Leakage	1.4	(3.8)					1.4	(3.8)
PCC					-	(3.7)	-	(3.7)
Drought							-	-
Supply Int.	(0.5)	(8.2)					(0.5)	(8.2)
Unplanned Outage	-	(3.7)					-	(3.7)
Mains Bursts	-	(2.7)					-	(2.7)
CRI	-	(1.0)					-	(1.0)
Low Pressure	0.2	(3.9)					0.2	(3.9)
PSR Sat.							-	-
PSR Ease							-	-
Env. Innovation			0.0	-			0.0	-
Voids & Gaps					0.7	(1.6)	0.7	(1.6)
River Rest.			0.6	(1.3)			0.6	(1.3)
SRs			0.6	(0.6)			0.6	(0.6)
AIM			0.7	0.5			0.7	0.5
MZC							-	-
Totals	1.1	(23.2)	2.0	(1.4)	0.7	(5.2)	3.8	(29.9)

Tables K & L – WaterworCX

This section examines the economic impact of a resulting reward/penalty within the C-Mex and D-Mex mechanics as per guidance issued by Ofwat. The impact from C-Mex was attached to the residential retail price control and the impact from D-Mex was attached to the Water Network price control. For C-Mex the level of reward/penalty was applied to modelled Residential Retail revenue within each period to ascertain the economic impact of an upside and downside scenario. The upside scenario applied 1.2% reward against modelled revenue of £29.4m while a downside scenario was assessed to be a 2.4% penalty. The economic impact of D-Mex was calculated using the level of reward/penalty applied to modelled Developer Services income within each period. The upside scenario of a 2.5% award was used while a downside scenario of a 5% penalty was applied.

Tables M & N – Financing

The use of forward curves for gilts and Libor were used to assess the suitable upside and downside scenarios to apply to the assumptions around new debt raised within the AMP. The economic impact was spread across the wholesale price controls using the RCV allocation amounts as shown in data table App 8. This was applied by increasing the interest rate assumption for all new debt raised in the AMP within our financial modelling by 2% for the downside scenario and reduced by 2% for the upside scenario.

Table O – Tax rate

Linked to input from data table App 29.

10.17. Scenarios and stress testing

The table below provides the results of the stress testing scenarios and performance of our financial indicators.

				Base Case		+10% Totex		Financial Penalty (3% Revenues)		ODI Penalty (3% RORE)		Bad Debt Increase 5%		Inflation High		Inflation Low		Cost of New Debt +2%		Combination - +10% Totex, Financial Penalty 1% Revenues & ODI Penalty 1.5% RORE	
			Measure	Actual	Notional	Actual	Notional	Actual	Notional	Actual	Notional	Actual	Notional	Actual	Notional	Actual	Notional	Actual	Notional	Actual	Notional
Covenents	*Trigger*	*Default*																			
Class A Adjusted ICR	*1.3*	*1*	*Min*	1.7	2.6	1.3	2.4	1.4	2.1	1.4	1.9	1.7	2.5	1.3	2.0	2.0	3.0	1.6	2.4	1.1	1.9
Senior Adjusted ICR	*1.1*	*n/a*	*Min*	1.5	2.4	1.2	2.2	1.3	2.0	1.3	1.8	1.5	2.3	1.1	1.8	1.8	2.8	1.5	2.2	1.0	1.8
Class A RAR	*75%*	*n/a*	*Max*	70%	52%	78%	52%	72%	52%	71%	52%	71%	52%	72%	52%	71%	52%	71%	52%	81%	55%
Senior RAR	*85%*	*95%*	*Max*	80%	60%	87%	61%	81%	60%	81%	61%	80%	60%	81%	60%	80%	60%	80%	60%	90%	63%
Ofwat's Metrics																					
Cash interest cover			*Avr*	3.6	5.6	3.1	5.4	3.4	5.2	3.4	5.1	3.6	5.6	3.3	5.1	3.8	5.9	3.6	5.5	2.9	5.0
Adjusted cash interest cover ratio (Ofwat)			*Avr*	2.1	3.2	1.6	3.0	1.8	2.8	1.9	2.6	2.1	3.2	1.8	2.7	2.3	3.5	2.0	3.2	1.4	2.6
Funds from operations / net debt (Ofwat)			*Min*	8%	13%	7%	13%	7%	12%	7%	11%	8%	13%	7%	12%	9%	14%	8%	13%	6%	11%
Return on capital employed (ROCE)			*Avr*	5%	4%	3%	4%	4%	4%	4%	3%	4%	4%	3%	3%	5%	5%	5%	4%	3%	3%
Return on capital employed (ROCE) (building blocks)			*Avr*	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	2%	2%	4%	4%	3%	3%	3%	3%
Return on regulatory equity (RoRE) (building blocks)			*Avr*	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	-3%	0%	7%	5%	3%	3%	3%	3%

10.18. Financial ratios

The table below provides the results of the analysis of our key financial ratios based on the actual debt structure and a notional debt structure.

Financial ratios (Actual Debt Structure)	2020/21	2021/22	2022/23	2023/24	2024/25
Gearing	79.20%	79.25%	79.23%	79.32%	79.33%
Interest cover	4.34	3.46	3.52	3.63	3.28
Adjusted cash interest cover	2.96	1.93	1.91	2.00	1.61
Adjusted cash interest cover (alternative calculation)	2.85	1.87	1.81	2.00	1.61
FFO/Net Debt	12.75%	8.79%	8.84%	9.43%	8.28%
FFO/Net Debt (alternative calculation)	11.73%	7.82%	7.90%	8.49%	7.34%
Dividend cover	2.38	6.01	3.28	0.78	0.58
RCF/Net Debt	11.65%	8.55%	8.36%	7.95%	6.94%
RCF/Capex	78.43%	60.01%	65.01%	75.52%	84.10%
Return on capital employed	4.35%	4.72%	4.78%	4.47%	4.20%
RORE	0.56%	3.65%	3.74%	3.77%	3.84%

Financial ratios (Notional Structure)	2020/21	2021/22	2022/23	2023/24	2024/25
Gearing	59.28%	59.33%	59.22%	59.34%	59.19%
Interest cover	6.65	5.34	5.47	5.66	5.06
Adjusted cash interest cover	4.54	2.98	2.97	3.11	2.48
Adjusted cash interest cover (alternative calculation)	4.37	2.88	2.82	3.11	2.48
FFO/Net Debt	18.80%	13.42%	13.52%	14.32%	12.82%
FFO/Net Debt (alternative calculation)	18.80%	13.42%	13.52%	14.32%	12.82%
Dividend cover	2.31	4.45	3.00	1.17	1.02
RCF/Net Debt	16.01%	12.34%	11.87%	10.58%	9.00%
RCF/Capex	80.65%	64.84%	68.95%	75.13%	81.38%
Return on capital employed	4.25%	4.65%	4.72%	4.41%	4.14%
RORE	1.72%	3.33%	3.38%	3.39%	3.42%

10.19. Uncertainty Mechanism

1. Environmental Uncertainty Mechanism

We have included the following unit cost adjustments to account for any discrepancy between the scale of assumed and confirmed programmes. These are linked to an outcome and a unit cost and are shown in the following table.

Environmental Uncertainty Mechanism	Linked Outcome	Unit	Unit Cost Adjustment (£m)
WINEP 3 "amber" sustainability reductions not required	Making sure you have enough water, while leaving more water in the environment	Ml/d of deployable output reduced	-3.710
WINEP 3 "amber" river morphology projects not required	Making sure you have enough water, while leaving more water in the environment	Project unit	-0.331

The unit cost adjustment for **'amber' sustainability reductions** not required in AMP7 has been calculated by determining the total cost of delivering all sustainability reductions, including the cost of asset changes and the cost of replacement water, and is shown in the table below.

Investment	Total cost (£m)	Volume (Ml/d)	Unit Cost (£m/Ml/d)
Supply / asset side – cost of changing our assets to address loss of resource			
Central – changes to zones where resources are lost	49.72	33.71	1.47
East – replace lead pipes to prevent discolouration allowing more use of Ardleigh water	8.70	2.60	3.35
Cost of adapting assets to address lost resource	**58.42**	**36.31**	**1.61**
Replacement water (demand side or strategic transfer)			
Baseline metering	69.35	26.06	2.66
Water efficiency and behavioural change	70.88	33.55	2.11
Leakage reduction	35.00	24.30	1.44
Strategic transfer of water	36.67	17.00	2.16

Total	**211.89**	**100.91**	**2.10**
Total			**3.71**

The unit cost adjustment for 'amber' morphology projects not required in AMP7 has been calculated by determining the total cost of the river morphology projects planned for AMP7 (including monitoring costs) and dividing by the number of projects.

Investment	Total cost (£m)	Number of projects	Unit Cost (£m)
River morphology projects	9.27	28	0.331

2. Bespoke Uncertainty Mechanism

We are including a bespoke uncertainty mechanism to address two specific uncertainties that we have identified.

2.1 Potential additional sustainability reduction in our Brett community

The EA has included as "amber" in WINEP3 a 2.6 Ml/d sustainability reduction in our Brett Community. It has subsequently indicated in correspondence that a sustainability change of up to 20 Ml/d may be required. The final volume is to be determined by an investigation and options appraisal project that is included in WINEP3. The EA has requested, and the Company has agreed to, an early start on this work to ensure its completion by 31 March 2021.

The EA has stated in correspondence that it will not include this potential additional sustainability change within WINEP3 but that the Company should nevertheless be prepared to implement a sustainability change during AMP7 should the EA require it to do so and they would expect this to be delivered by 2024 unless it was technically infeasible.

The indicative costs of implementing this potential additional sustainability change during AMP7 are shown in the following table.

Uncertainty	Linked Outcome	Unit	Indicative Unit Cost Adjustment (£m)	Indicative Total Cost (£m)
Sustainability reduction not on WINEP3 in Brett Region (from 2.6Ml/d to 3.7Ml/d)	Making sure you have enough water, while leaving more water in the environment	Ml/d of deployable output reduced	3.35	3.69
Sustainability reduction not on WINEP3 in Brett Region (from 3.7 Ml/d to 20.0 Ml/d)	Making sure you have enough water, while leaving more water in the environment	Ml/d of deployable output reduced	6.67	108.72

The indicative unit cost in respect of the additional volume between 2.6Ml/d and 3.7Ml/d is derived from the total cost of £8.7m to deliver the 2.6 Ml/d reduction

The indicative unit cost of £6.67m in respect of the additional volume between 3.7Ml/d and 20Ml/d is derived from our initial estimates of the costs of designing, building and operating the desalination plant we consider could be necessary to maintain supplies to the Brett community.

2.2 Metaldehyde Treatment

Defra sent a letter dated 26 January 2018 to water companies regarding Defra's proposal to consult on a targeted ban. However, because the consultation has not yet been published the realisation and effectiveness of the targeted ban is uncertain at this point in time.

This uncertainty has specific implications for:

- our plan to import more water from Grafham, treat the water at Sundon and supply it into areas not previously supplied. This is an investment of £13.34m but the scheme does not include metaldehyde treatment.

- our proposed strategic transfer schemes (an investment of £36.67m) to move water further north from our treatment works on the River Thames and supply it into areas not currently covered by a water quality undertaking – "Water 2040".

The presence of metaldehyde could also impact on our ability to use water from Ardleigh more widely in order to support delivery of sustainability reductions in the Brett community.

DWI's policy is that it will not accept undertakings in relation to supply of water containing metaldehyde to areas that have not received such water on the basis that there should be no deterioration in the quality of water supplied. Should a ban not be implemented or prove ineffective then metaldehyde treatment may need to be provided at Sundon and our River Thames water treatment works the costs of which are not included in this Business Plan.

The Company wrote to DWI on 7 August 2018 to explain the issue and to seek DWI's view regarding its willingness to review existing undertakings in relation to metaldehyde to extend the geographical area to which they relate. This is in essence a request for the DWI to flex its policy position in the light of uncertainty regarding the targeted metaldehyde ban and the specific investment risk the Company is facing. We are awaiting a reply to this letter at the time of this submission.

Defra and DWI have indicated to Water UK that there will be an announcement soon in relation to consultation on the targeted ban on metaldehyde but not prior to Business Plan submission.

We have assessed the totex we would incur in AMP7designing, building and operating the necessary treatment for 463 Ml/d as shown in the following table.

Site	Treatment	AMP7 Totex (£m)	Volume (Ml/d)
Iver	Option 5 - Upgrade Existing Actiflos, 2 new Actiflo-Carbs, RGFs	31.53	227
Egham	Option 4 - 2 new Actiflo Carbs (on site of sed plant)	22.203	145
Chertsey	Option 4 - 2 new Actiflo-Carb units to treat raw river water	18.279	in above
Walton	Option 4 - 2 new Actiflo-Carb units to treat raw river water	18.279	in above
Sundon Res	Option 4 - 2 new Actiflo-Carb units, chemical conditioning	46.663	91
TOTAL		**136.954**	**463**

The indicative unit costs of implementing metaldehyde treatment in respect of this uncertainty is shown in the following table.

Uncertainty	Linked Outcome	Unit	Indicative Unit Cost Adjustment (£m)	Indicative Total Cost (£m)
Metaldehyde treatment (for up to 463 Ml/d)	Supplying high quality water you can trust	Ml/d of deployable output treated	0.296	136.95

3. Notified Items

We propose that the following uncertainties are included as Notified Items in the PR19 Final Determination to the extent that the bespoke uncertainty mechanism proposed by us is not included in the Final Determination or does not recompense us fully for the efficient costs we incur during AMP7 in respect of these uncertainties.

Notified Items
Sustainability reduction not on WINEP3 in Brett Region (above 2.6 Ml/d)
Metaldehyde treatment – Iver, Egham, Chertsey, Walton, Sundon

10.20. Uncertainty Mechanism - Correspondents

Paul Hickey
Deputy Director - Water Resources
Environment Agency
Sapphire East
550 Streetsbrook Road
Solihull
West Midlands
B91 1QT

25th June 2018

Dear Paul,

AMP7 Brett Sustainability Reduction

At our joint meeting with Defra, Ofwat, DWI and Environment Agency in London on 8th June 2018, you offered to follow up on our concerns regarding the potential AMP7 sustainability reduction in the River Brett catchment. I thought it would be helpful to outline our understanding of this potential reduction, as we are seeking urgent clarification of these expectations.

WINEP1, issued March 2017, included a *red* sustainability change with no associated volume for our Higham, Lattinford, Shelley, Stoke-by-Nayland and East Bergholt sources. This was then revised to an *amber* sustainability change in WINEP2 (September 2017) of 2.597Ml/d against the daily peak licence for Higham, Lattinford, Shelley and Stoke-by-Nayland. East Bergholt remained with a *red* level of certainty with a sustainability change volume of 2.466Ml/d provided. This information was used in preparing our draft Water Resources Management Plan published on 16th March 2018. WINEP3 (29th March 2018) included the same *amber* change as WINEP2. East Bergholt was removed as a sustainability change from WINEP3 and is now included for investigation and options appraisal only.

Summary Table of East Region Sustainability Changes

WINEP	Level of Certainty	Sources	Sustainability Change (daily licence)
WINEP1 (31/03/2017)	Red	Higham, Lattinford, Shelley, Stoke-by-Nayland and East Bergholt	No value provided
WINEP2 (29/09/2017)	Amber	Higham, Lattinford, Shelley, Stoke-by-Nayland	2.597 Ml/d
	Red	East Bergholt	2.466 Ml/d
WINEP3 (29/03/2018)	Amber	Higham, Lattinford, Shelley, Stoke-by-Nayland	2.597 Ml/d

The River Brett has also been included on WINEP3 for investigation and options appraisal with a completion date of 31st March 2021 and for implementation of adaptive management scheme. This has been given an *amber* level of certainty.

We understand that the EA will be looking to implement AMP7 sustainability reductions through licence changes in 2021, with an effective date of 2024.

Draft Water Resources Management Plan

Our East Region (water resource zone 8) does not currently have a supply-demand deficit, having a small surplus.

Summary of Draft Water Resources Management Plan Surplus (WRZ8)

Year	DYAA (Ml/d)	DYCP (Ml/d)
2020/21	5.84	6.66
2024/25	5.62	6.39

Our draft Water Resources Management Plan (dWRMP) and associated technical report (1.4 Sustainability Reductions) included our approach to accommodating a sustainability reduction in WRZ8. This was based on the WINEP2 volume of 5.07Ml/d; utilising our surplus and reverting to a 50:50 share of Ardleigh Reservoir with Anglian Water from 2030. This agreement requires five years written notice to be given to allow Anglian Water time to adapt to the change in volumes.

Ardleigh Deployable Output based on different share with Anglian Water

Ardleigh	DYAA (Ml/d)	DYCP (Ml/d)
70:30	7.84	10.94
50:50	13.06	18.24

It should be noted that there are potential Larson-Skold corrosivity issues within our network of utilising greater volumes of Ardleigh derived water in WRZ8. Investment would be required to address this issue. Metaldehyde is also a key consideration in relation to transfer options. We are writing to Defra on this matter, as it would be very helpful to learn if targeted bans on the sale and/or use of metaldehyde are to go ahead before business plans are submitted.

Investigation and Options Appraisal

We recognise that the North Essex Chalk WFD groundwater body failed the 2015 cycle 2 assessment for Groundwater Balance Tests and that the surface waterbody does not support good status for hydrology. An investigation was completed in AMP3 with Anglian Water and Essex and Suffolk Water and we have been in discussions with them regarding AMP7 works. We are including funding in our PR19 submission for an investigation and options appraisal in AMP7, to revisit the conclusions of the AMP3 study and assess any new evidence relating to the impact of our abstraction. We consider that it is important to fully understand the impact of our abstraction to inform any decision making around the location and volume of any future reductions. The current deadline for the investigation and options appraisal of 2021 is likely to limit the level of detail that this project can achieve and may impact quality of the conclusions. We consider a longer period for completion of this work is needed to develop options that will deliver the most benefit for the River Brett. We believe that if any significant

reduction in abstraction is confirmed by this work as being required, then this would best be addressed through the regional Water Resources East project.

We note that the Environment Agency's response to our dWRMP does not include any comments or recommendations with regard to our approach to the River Brett sustainability reductions.

Revised Water Resources Management Plan and PR19 Submission

In preparing for our revised WRMP and costs for our business plan submission, we queried with the Ipswich office whether the 2.597Ml/d sustainability reduction on WINEP3 included the utilisation of river support from our Shelley source, as per the existing licence provision. Following this query, we were notified of an error on WINEP3 relating to the volume of sustainability change included for our sources. We have been advised (email dated 25th May 2018) that based on modelled scenarios utilising the Essex Groundwater Model, a reduction of between 15.09Ml/d and 20Ml/d may be required to address the flow deficit in this catchment. This is a significant reduction given our deployable output for WRZ8 is 38Ml/d (DYAA) and 52.75Ml/d (DYCP) and would result in us immediately going into a supply-demand deficit in 2024.

In view of the short notice we have had to consider the potential supply/demand deficit in our East Region we are currently proposing to include the costs in our draft Business Plan for a desalination plant, to be implemented in the event the sustainability reduction is confirmed. We also anticipate the need for an earlier cessation of our agreement with Anglian Water to revert to a 50:50 share of Ardleigh from 2025. At the joint meeting with Defra, EA, Thames and Anglian Water on 19th June 2018, Anglian Water indicated any transfer to the Brett or earlier cessation of the current Ardleigh agreement would also trigger a desalination plant for them. As this constitutes a material change in our WRMP we propose to further consult.

We would be grateful for your assistance in securing an urgent resolution to this issue, as it will have a material impact on our business plan and customer bills. To be clear we are seeking confirmation that the EA will not seek sustainability reductions other than those that were included in WINEP3 (2.6Ml/d) and an extension of the date for completion of the investigation and options appraisal for the River Brett to 2024.

I look forward to hearing from you regarding clarification of this sustainability change and investigation/options appraisal date.

Yours sincerely,

Ellie Powers
Senior Asset Manager – Water Resources

cc. David Howarth, Tom Nichols, Rudi Liu, Anna Mason (Environment Agency)

Ellie Powers
Senior Asset Manager - Water Resources
Affinity Water
Tamblin Way
Hatfield
Herts
AL10 9EZ

5th July 2018

Dear Ellie

AMP7 Brett Sustainability Reduction

Thank you very much for your letter of 25th June 2018. It was helpful to have the information collated.

You were seeking confirmation that the sustainability change for the River Brett will remain the same as included in WINEP3, and requesting an extension to the timescale for the investigation and options appraisal until 2024. After reviewing all available information, it is our view that the sustainability change requirements should remain the same as was included in WINEP3 (2.6 Ml/d), and that the investigation and options appraisal completion date should also remain the same as in WINEP3 (31st March 2021). I can confirm that requirements for the other water companies involved will also remain the same as in WINEP3.

As you are aware, the River Brett water body meets criteria for the impact of abstraction to be considered as causing serious damage, so actions need to be identified and implemented as soon as possible. Therefore, it is necessary to keep the current completion deadline of 31st March 2021.

I acknowledge that the timescale is limited. It is important for all the water companies involved to work together, and with the Environment Agency, to agree the best course of action required to achieve our common objectives for this catchment. This could be coordinated through the Water Resources East group, so long as the scale of discussion reflects the timescale set out in WINEP3.

Should the agreed outcomes of the investigation and options appraisal vary from the requirements in WINEP3, we can discuss whether they can be incorporated within AMP7 or whether they need to be planned for AMP8 with an early start on implementation.
I trust that this clarifies the EA's requirements for the Brett catchment, that sustainability change volume remains the same as in WINEP3, and that the completion date for the investigation and options appraisal remains 31st March 2021.

Please keep my colleagues informed of any emerging issues from your discussions with other water companies, and with Defra.

Yours sincerely

Paul Hickey CEnv FIWater
Deputy Director Water Resources

OFFICIAL SENSITIVE

Paul Hickey
Deputy Director - Water Resources
Environment Agency
Sapphire East
550 Streetsbrook Road
Solihull
West Midlands
B91 1QT

9th July 2018

Dear Paul,

AMP7 Brett Sustainability Reduction

Thank you for your letter dated 5th July confirming that the sustainability change volume for the Brett catchment will remain as WINEP3 (2.6Ml/d with an amber level of certainty) and that the completion date for the investigation and options appraisal will remain as 31st March 2021.

We remain unclear as to the position should the investigation and options appraisal conclude that greater sustainability reduction is required as referenced in the Environment Agency's e-mail dated 25 May 2018. Your letter states that action may be required in AMP7 even though the Agency does not intend to include the greater level of reduction in WINEP. The Agency's position appears to be a departure from the regulatory approach that WINEP is intended to support through the identification of amber and green measures to be included in companies' business plans[1].

As we have previously indicated, the delivery of a sustainability reduction of this level (between 15.09 Ml/d and 20 Ml/d) would have significant cost implications for our business and ultimately for our customers. We are therefore seeking confirmation from the Agency that delivery of any sustainability reduction greater than 2.6 Ml/d would only be considered for inclusion in our next water resources management plan, for delivery in AMP8.

If this cannot be immediately confirmed, we request, as a matter of urgency, a meeting with the EA, Defra and Ofwat to clarify the process, in order that we can finalise our customer consultation and business plan.

Yours sincerely,

Mike Pocock
Director of Asset Strategy

cc. David Howarth, Tom Nichols, Rudi Liu, Anna Mason (Environment Agency)
Sebastian Catovsky (Defra), Colin Green (Ofwat)

[1] Section 9.4.3 of *Ofwat's Final Methodology for the 2019 Price Review* and the Environment Agency's letter regarding WINEP dated 29 March 2018.

creating a better place
for people and wildlife

Environment Agency

Mike Pocock
Director of Asset Strategy
Affinity Water
Tamblin Way
Hatfield
Herts
AL10 9EZ

Date: 19th July 2018

Dear Mike

AMP7 Brett Sustainability Reduction

Thank you for your letter of 9th July 2018. I've set out below the positions that could arise depending on the outcomes of the investigations and options appraisal for achieving sustainable abstraction for the River Brett.

Firstly, I would like to stress that the immediate priority is the progression of the investigation and options appraisal with the other two water companies so there is an agreed catchment approach to the sustainability changes required and any other improvement/mitigation actions required.

Depending on the outcome of the investigation and options appraisal, there are three sustainability change positions. I've set them out below and how we expect them to be progressed.

1. Sustainability change value remains 2.6Ml/d. The action to achieve this will then be implemented in AMP7 as it is planned for in your WRMP.

2. Sustainability change value of greater than 2.6Ml/d but within the supply-demand surplus of the water resources zone. If the option to meet this level of sustainability change is technical feasibility and the knock on implications on deployable output can be managed then we would expect the sustainability change to be delivered in AMP7. The cost of doing so would be accommodated through the cost adjustment mechanism that Ofwat have requested each water company propose to handle uncertainty in PR19.

3. Sustainability change is greater than the supply-demand surplus of the water resources zone. The implications of this will obviously depend on how big the sustainability change is but it will be a material change to the WRMP. The options appraisal will have identified what is technically feasible and cost beneficial to deliver between the three water companies. All water companies need to take into account the objectives of the RBMP, which for the River

Brett is for flow to be supporting GES by 2021 so improvement actions need to be implemented as soon as possible. If the implementation of the whole sustainability change needs a longer timescale then an interim sustainability change and/or mitigation measures will be needed to demonstrate a 'pathway to good'.

The water body objectives will be reviewed for the next RBMP in 2021 so there is a possibility of extending the objective date to 2027 but to do this it needs to be demonstrated that everything possible has been done to achieve the original objective date of 2021. Therefore at this stage, we cannot guarantee a delay until AMP8 but if the agreed timescales for achieving a cost beneficial, technical feasible solution to unsustainable abstraction cause a delay into AMP8 that may not be unreasonable. Early start/transitional funding may also be available in PR24 to meet tighter timescales.

In summary, your customer consultation and business plan need to include the sustainability change and investigation/options appraisal requirements confirmed in my previous letter of 5th July but with the acknowledgement that there is some uncertainty on the sustainability change value which will be accommodated by a cost adjustment mechanism in AMP7 or by the agreement of an extended completion date for the delivery of the sustainability change and extension of the WFD objective.

My colleagues look forward to working with you on this catchment based approach to achieving sustainability in the River Brett, including working with the other two water companies involved, which I are understand are amenable to this way forward.

Yours Sincerely,

Paul Hickey CEnv FIWater
Deputy Director - Water Resources
Environment Agency

Paul Hickey
Deputy Director - Water Resources
Environment Agency
Horizon House
Deanery Road
Bristol BS1 5AH

9 August 2018

Dear Paul,

AMP7 Brett Sustainability Reductions

Thank you for your letter dated 19 July 2018 following our conference call with Nicola Poole on 12 July 2018 where we agreed it would be helpful to set out a clear position from which to go forward in AMP7.

We agree that the immediate priority must be to progress the investigation and options appraisal and we have already initiated this. We have contacted Anglian Water and Essex and Suffolk Water regarding this and we will explore a funding mechanism for the project as costs were not included in AMP6. The project will begin with a review of all previous studies and modelling. We are also undertaking some monitoring on the Brett associated with the current requirement to provide river support from our Shelley source. This information will be shared with the EA and the other companies in due course.

Your letter lists three sustainability change positions depending on the outcome of the investigation and options appraisal. We comment on these below and have added a fourth change position, being that if the appraisal concludes that there is no need for a sustainability reduction.

1. Sustainability change value remains 2.6 Ml/d. We confirm that our Business Plan provides for delivery of this during AMP7.

2. Sustainability change value of greater than 2.6 Ml/d but within the supply-demand surplus of the water resources zone. The supply-demand surplus is currently 5.84 Ml/d. We are required to make a compensation flow discharge of 2.16Ml/d at Shelley. We therefore believe that the maximum additional sustainability change value that could be achieved under this change position is 1.1 Ml/d. This is not included in WINEP3, which we believe places it outside of the cost adjustment requested by Ofwat. We will, however, include it in our Business Plan and will propose a bespoke cost adjustment mechanism for it.

3. Sustainability change is greater than the supply-demand surplus of the water resources zone. This would cause a supply deficit in a zone where consumption and leakage are already low. This would therefore represent a material change in our WRMP and will require consultation with stakeholders. If this is the conclusion of the investigation we will seek to agree technically feasible options and timescale for delivery as part of the options appraisal. As you are aware we have already been exploring options to secure additional water from our neighbouring water companies. Anglian Water has informed us that they would be unable to provide an additional transfer. We are still discussing with Essex & Suffolk Water a potential raw water transfer of up to 5Ml/d. As this would

still not address the potential full deficit indicated from the groundwater modelling and in the Agency's email of 25th May, there may still be a significant supply deficit requiring a desalination plant or similar located in the estuary. It would not be technically feasible to deliver such a solution within AMP7 but we note the comment in your letter that work would need to start during AMP7.

4. No change in deployable output although mitigation measures may be required. We have included costs for river restoration and habitat enhancement on the Brett based on the WINEP3 *amber* level of certainty and a cost adjustment mechanism should no sustainability reduction be required.

As we discussed during our call with Nicola the Environment Agency's decision not to make changes to WINEP3 to reflect all the potential sustainability change positions creates some risk and uncertainty for us and our customers. Ofwat's Final Methodology for PR19 is predicated on water companies including investment in their plans to deliver green and amber measures included in WINEP3 and requests an uncertainty mechanism is included for amber measures. Ofwat's Final Methodology does not envisage companies having to meet environmental requirements during AMP7 that are not identified on WINEP3.

As we have noted above, in relation to the second sustainability change position, which involves a relatively modest additional sustainability reduction, we will seek to include the costs of delivery in our Business Plan and will propose a bespoke uncertainty mechanism for these costs.

We have reached the conclusion, however, that we cannot include in our Business Plan the costs for delivery of a solution in relation to the third sustainability change position. These costs would be very significant and as such would impact significantly on our customers' bills. In the absence of any sustainability reduction being identified as required in WINEP3 we have not been able to carry out any customer consultation to verify support for bill changes to reflect this requirement and do not believe that Ofwat will allow us to include these costs. We will be explaining this position in our Business Plan submission.

I hope the above is helpful in explaining our approach to our Business Plan. I should be grateful if you would confirm you agree with our understanding of the possible sustainability change positions before we submit our plan to Ofwat.

We look forward to working with you and your colleagues on this project during AMP7.

Yours sincerely

Mike Pocock
Asset Strategy Director

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for people and wildlife

Environment Agency

Mike Pocock
Director of Asset Strategy
Affinity Water
Tamblin Way
Hatfield
Herts
AL10 9EZ

Our ref:
Your ref:
Date: 16th August 2018

Dear Mike

AMP7 Brett Sustainability Reduction

Thank you for your letter of 9th August 2018. I acknowledge your comments on the sustainability change positions and your addition of a fourth position in relation to mitigation measures.

I can confirm that we understand your position of not including costs for a greater sustainability change in your business plan and agree that this should be explained in your submission.

I'm very pleased to see priority given to the investigation work together with the other water companies.

I wish you all the best for your upcoming retirement.

Yours Sincerely,

R. Austen

Richard Austen
Acting Deputy Director - Water Resources
Environment Agency

Department for Environment Food & Rural Affairs

Dr Thérèse Coffey MP
Parliamentary Under Secretary of State
for the Environment

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Mr Simon Cocks
CEO
Affinity Water

26 January 2018

Dear Simon

I am writing to advise you that we intend to consult soon on a targeted ban on metaldehyde, to complement ongoing catchment management and voluntary stewardship.

We have amongst the highest drinking water standards in the world and maintaining public confidence in our water is paramount. So I would like to thank the water industry for its significant effort to date in tackling the issue of metaldehyde in our drinking water sources.

Whilst both water company catchment activity and voluntary stewardship schemes have helped to improve compliance with the drinking water legal standard, there remains a persistent gap to full compliance. So we are now considering developing a statutory restriction on slug pellets containing metaldehyde.

As you may be aware, the authorisations for all metaldehyde products are currently under review to determine the impact the use of metaldehyde has on birds and small mammals. We will await the outcome of that process before consulting on targeted restrictions for drinking water quality related reasons.

In the meantime the Drinking Water Inspectorate will be reviewing and revising existing water company undertakings to build on existing progress with catchment management solutions. We must allow this approach to realise its full potential. DWI will review water companies' progress against their undertakings annually, and advise on how best to make use of a statutory restriction alongside other catchment management tools to achieve compliance.

Regardless of any restrictions we impose around the use of metaldehyde, we expect catchment management to continue to form the predominant means for water companies to protect consumers and mitigate risks to wholesomeness of water supplies.

Yours sincerely,

DR THERESE COFFEY MP

DRINKING WATER INSPECTORATE
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17 Smith Square
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Enquiries: 030 0068 6400

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DWI Website: http://www.dwi.gov.uk

guardians of drinking water quality

6 March 2018

Eddie Lintott
Water Quality Manager
Affinity Water
Tamblin Way
Hatfield
Hertfordshire
AL10 9EZ

Dear Eddie

METALDEHYDE – CURRENT SITUATION AND FORWARD PLANS

This letter in to inform you of the current position with regards to the review of undertakings for metaldehyde.

As you are aware the Minister, in her letter dated 26 January 2018, informed stakeholders that Defra intends to consult on a targeted ban on metaldehyde use.

The consultation will take place after a review of authorisations for all metaldehyde products to determine the impact the use of metaldehyde has on birds and small mammals. This review may lead to further restrictions on use. In the meantime, I am writing to you to explain our position and plans going forward.

We intend to review the continuing fitness for purpose of the current undertakings for metaldehyde, with a view to enabling companies to include them within their PR19 planning provisions. Revised undertakings will:

- where necessary, extend completion in achieving compliance beyond the current end date of 2020, up to 2025;
- cover metaldehyde only – if the current undertaking includes other parameters (apart from total pesticides) revised undertakings up to 2020 or completion reports (as appropriate) for the other parameters will be requested in due course;

- cover the same water supply zones as the existing undertakings - any extension of the geographical area covered requires justification and individual discussion with the Inspectorate;
- include steps to manage metaldehyde levels in drinking water supplies in conjunction with other stakeholders through the processes required to implement the Ministerial decision (i.e. a targeted or other use ban) including monitoring and liaison with stakeholders throughout the period up to 2025;
- Include an annual progress reporting step each January starting in January 2019;

We will provide guidance regarding the submission of revised undertakings when Ministers have decided on the authorisation review and we know the extent of the use ban.

Also, **please note that the provision of annual progress reports,** which were originally due on 31 January 2018, and delayed to 31 March 2018, **are now postponed until the next reporting date of 31 January 2019,** to take account of the forthcoming revisions**.** Nevertheless, we would encourage companies to continue to share their catchment management good practices.

Please contact Caroline Knight (Caroline.Knight@defra.gsi.gov.uk or phone 07990 623355) if you have any queries on this letter.

Yours sincerely

Milo Purcell

Milo Purcell
Deputy Chief Inspector

Affinity Water

Milo Purcell
Deputy Chief Inspector
Drinking Water Inspectorate
Area 7E, 9 Millbank
c/o Nobel House
17 Smith Square
London
SW1P 3JR

7 August 2018

Dear Milo

Metaldehyde – PR19

I am writing to raise with you concerns we have regarding the apparent lack of progress on the proposed introduction of restrictions for metaldehyde and the implications we believe that this has for our water resources management plan, our business plan and our existing undertakings.

As you are aware we currently have three undertakings relating to supply of water containing metaldehyde above the PCV to specified water supply zones, which I have summarised for ease of reference in the attached table.

Our work on our water resources management plan has identified the need for us to be able to supply water from water treatment works covered by the undertakings into geographical areas not currently covered by the undertakings. Our strategy in the mid-term is to be able to move water around our supply area as freely as possible. This is essential to maintaining and improving our future resilience.

We are planning two key investments during AMP7 that will allow us to achieve this. As you are already aware, we will be investing in a treatment plant at Sundon to allow us to import more treated water from Grafham WTW and distribute it more widely throughout our supply area. We are also including strategic transfer schemes that will allow us to move water from our treatment works on the River Thames further north and into new parts of our supply area. It is also possible that we will need to be able to supply water from Ardleigh WTW more widely within our East region; this depends on the outcome of an investigation and options appraisal of the failure of the River Brett to meet the required environmental objectives under the Water Framework Directive.

We are encouraged by, and supportive of, Defra's proposal to consult soon on a targeted metaldehyde ban that the Minister advised us of in a letter dated 26 January 2018. In reliance on this assurance regarding consultation on a targeted ban, we have not currently provided in our business plan for metaldehyde treatment at any of our water treatment works including the new treatment plant at Sundon. We believe this approach to be consistent with the advice and guidance that has been provided to us by the DWI including your letter to me dated 6 March 2018.

We are, however, becoming very concerned that Defra has not yet published a consultation on targeted restrictions of metaldehyde meaning we do not know at this stage the scope, form or timing of any restrictions. This uncertainty is problematic for us from the point of view of finalising our investment proposals for our business plan.

Our reading of DWI's guidance[1] is that DWI's view is we would be unable to extend the geographical area of supply of water containing metaldehyde in excess of 0.1 µg/l. We remain fully committed to catchment management and are proposing an increase in scale and scope in our business plan for

[1] DWI, Guidance Note: Long term planning for the quality of drinking water supplies, September 2017

AMP7. However, we are concerned that catchment management alone is unlikely to be effective at reducing metaldehyde sufficiently to meet the standard at all times. There is a risk that if restrictions are either not implemented or are ineffective, we would be unable to supply water from our new treatment plant at Sundon and our River Thames based works into new areas. This creates a risk that we invest £48m in new assets that we are unable to use. It would also leave us unable to make sustainability reductions that the Environment Agency is seeking while at the same time keeping our customers supplied with water.

We therefore wish to seek the DWI's view at this stage regarding its willingness to review our existing undertakings in relation to metaldehyde to extend the geographical area to which they relate. I would be grateful for an early response to my letter because your response will inform finalisation of our business plan submission to Ofwat on 3 September 2018.

Yours sincerely

Eddie Lintott
Water Quality Manager (Compliance & Regulation)

Summary of Affinity Water Undertakings

Date	Water Treatment Works	Parameters	Water supply zones	
12 June 2014	Ardleigh	Metaldehyde, clopyralid and total pesticides	Z073 Mixed Zone	Z074 Surface Zone
7 July 2014	Chertsey	Individual pesticide, including metaldehyde, and total pesticides	Z066 Woking	Z069 Pirbright/Send
	Egham		Z063 Southall Z064 Bagshot / Sunninghill Z065 Ashford	Z084 Feltham Z086 Staines
	Iver		Z047 Ickenham/Denham Z048 Northwood/Ruislip Z050 Barnet Z051 East Barnet Z054 Finchley Z055 Rayners Lane Z056 Harrow Z057 Colindale/Kingsbury	Z059 Uxbridge Z060 Yeading Z061 Greenford/Northolt Z062 Wembley Z085 West Drayton Z087 Ruislip Z089 Sudbury Z090 Hayes
	Walton		Z067 Weybridge/Woodham	Z068 Walton
30 May 2014	Grafham (Anglian Bulk Supply)	Metaldehyde and total pesticides	Z014 Codicote Z015 Knebworth/Tewin	Z029 Luton North Z030 Luton East
	Hanningfield, Langham and Layer (Essex & Suffolk Water Bulk Supply)	Metaldehyde and total pesticides	Z071 Pilgrims Hatch	
	Ashford Common and Kempton Park (Thames Water Bulk Supply)	Metaldehyde and total pesticides	Z058 Hampstead Garden Suburb	