Appendix 8.7.A – Claim WSX03 – Number of non-infrastructure water supply assets

Wessex Water

September 2018

Wessex Water
YTL GROUP

Contents

1. Summary

This cost adjustment claim relates to our large number of small non-infrastructure water supply assets resulting in higher base operating costs which are not reflected in the econometric modelling. The table below provides a summary of the claim and the following sections provide more detail for each of the headings

Heading	Summary
Brief description	Number of non-infrastructure water supply assets giving rise to additional maintenance and operational costs
Claim value (totex)	£42m
Price control	Water network plus
Need for cost adjustment	We have a comparatively large number of small water treatment works, service reservoirs and pumping stations for the number of customers and volume of water that we supply. These are activities that benefit to a material extent from economies of scale. We consider that the initial Ofwat models for water supply botex do not adequately cover the factors driving the cost of maintaining and operating our water supply system.
Management control	The need for the number of non-infrastructure assets is driven by the characteristics of the environment that we operate in. These characteristics are out of the control of management and not the result of inefficiency. Whilst we have reduced the number of work over the years, the cost of further rationalisation so that our average size is closer to the industry average is disproportionate; it would not be affordable or beneficial for customers.
Need for investment	We need to continue to maintain and operate our non-infrastructure assets in order to provide the agreed levels of service with regard to: • drinking water quality • capacity • resilience.
Best option for customers	The best option for customers is for us to continue to maintain and operate our non-infrastructure assets in order to provide the agreed levels of service, rather than reduce the number through rationalisation. This approach provides better resilience. One of the reasons for the Integrated Grid project was to provide the ability to supply our customers from more than one works. Customer research for PR19 highlighted again that customers value the ability to be served by more than one works.

Heading	Summary
Robust and efficient costs	We have challenged our base maintenance and operating costs going forwards and have set ourselves stretching catch up and frontier shift efficiency targets.
Customer protection	Customers will be protected through the suite of performance commitments and ODIs, including: • customer service measures • asset health measures • resilience measures.
Affordability	The programme of work outlined in the Cost Adjustment Claim was included in our draft business plan that was tested with customers between January and June 2018. The acceptability testing was designed to test customers' acceptance of our overall package of service improvements and bill impacts. Testing has shown that 96% of our customers find our business plan acceptable. Acceptability is above 90% across all demographic subgroups.
Board assurance	The proposals have been subject to our board assurance process, which is described in detail in section 12 of the main business plan narrative and supporting documents 12.1 to 12.8

2. Background

Our asset configuration has been driven to a large degree by the underlying geology in our area and the historical development of the water industry. Whilst in other areas, increasing urbanisation and industrialisation in the late 19th and early 20th centuries led to development of large-scale water sources that was not the case in our area. Wessex Water's rural nature, evenly spread population, a lack of large urban areas and the suitable geology in its supply area meant that the water supply was able to rely on smaller local groundwater sources.

At privatisation Wessex inherited this asset base. Whilst some rationalisation has occurred, our evenly distributed rural population has meant that the scope for reducing the number of non-infrastructure assets has been limited.

2.1 Water treatment works

Smaller non-infrastructure assets have higher unit costs because they suffer from diseconomies of scale. They require a higher level of input (costs) per level of output. There are some common reasons across all non-infrastructure assets that support diseconomies of scale. These include any costs that are incurred on a "per site" basis (as opposed to costs that are proportional to the level of output produced at each site) for example security costs, monitoring and sampling costs etc.

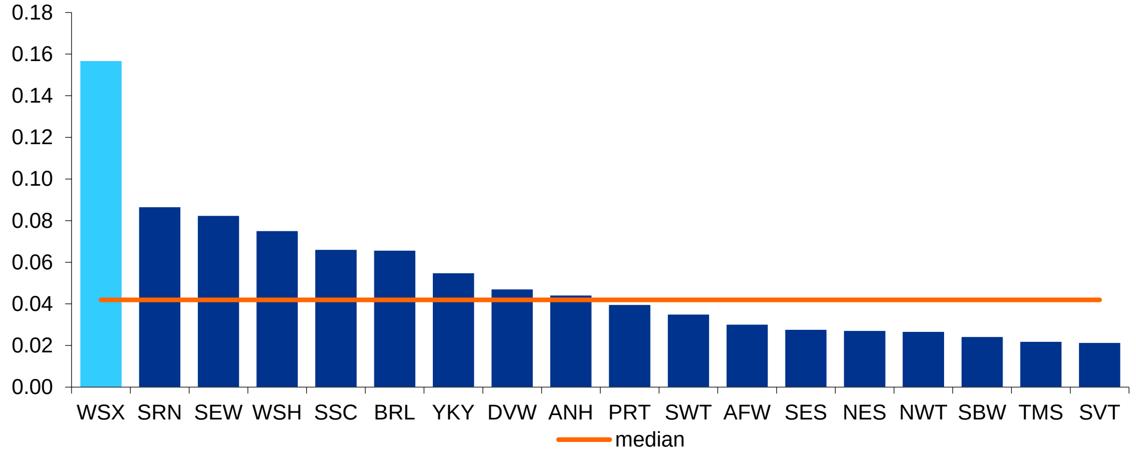
We have a comparatively large number of small-scale water treatment works. Water treatment is an activity that benefits to a material extent from economies of scale.

While we could fundamentally reconfigure our network, rationalise the size and number of treatment works we have, this would have two major draw backs. First, it would require a large and uneconomic degree of capital expenditure. Second, it would reduce our overall level of resilience, as customers would be more dependent on the performance of a few large works.

Comparing the size of our works (and the associated costs of treating water at different sized works) to the rest of the sector, we estimate that the cost adjustment required is between £37m – £47m over the control period.

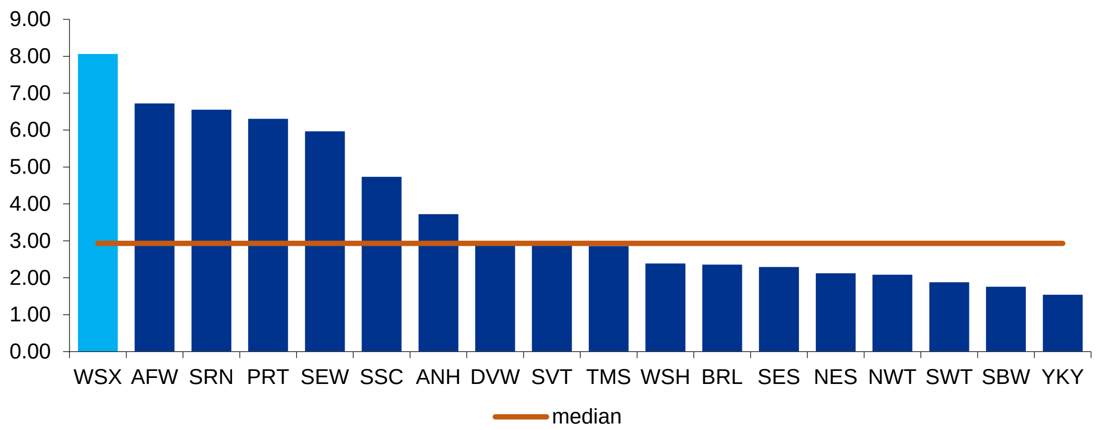
As can be seen from Figure 1 and Figure 2 below, after controlling for company size through length of mains and number of properties served, we are a clear outlier in terms of the number of water treatment works (WTWs) we own and operate.

Figure 1 - Number of WTWs per 1,000 properties (2016-17)



Source: Company cost assessment data share, 2017

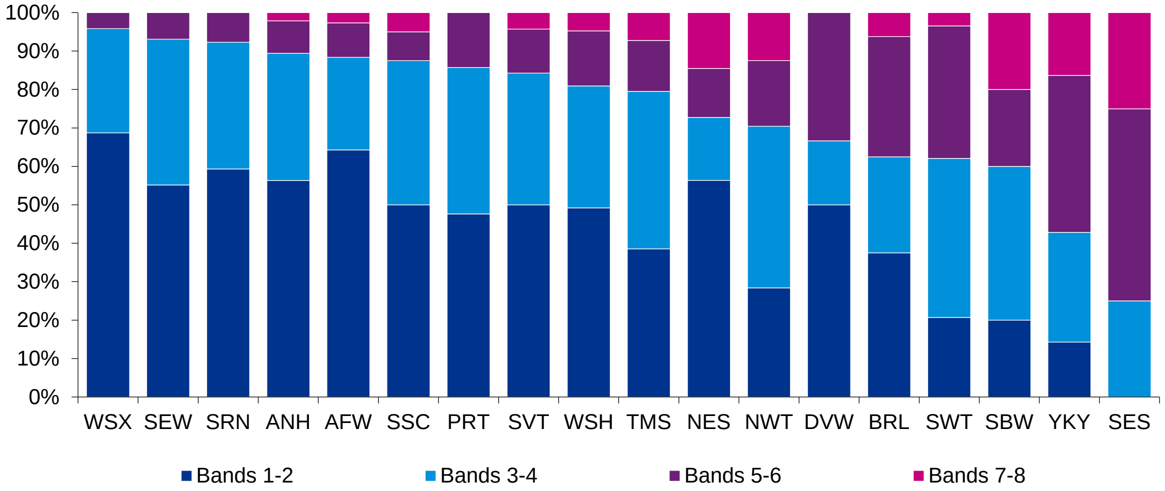
Figure 2 - Number of WTWs per length of main (1000 km)



Source: Company cost assessment data share, 2017

As well as having a larger number of water treatment for a company of our size, we have a higher proportion of smaller water treatment works relative to the sector. As seen in Figure 3, we have the largest proportion of smaller treatment works (bands 1-4) relative to the industry – c. 95% of our plants lie in size bands 1-4. We have no water treatment works in size bands 7 and 8.

Figure 3 - Proportion of water treatment works by size band



Source: Company cost assessment data share, 2017

2.2 Non – infrastructure distribution assets

In the same way, smaller non-infrastructure water distribution assets have higher unit costs because they suffer from diseconomies of scale. They require a higher level of input (costs) per level of output. There are some common reasons across all non-infrastructure assets that support diseconomies of scale. These include any costs that are incurred on a "per site" basis (as opposed to costs that are proportional to the level of output produced at each site)

Examples of where cost is based upon the site rather than capacity include:

- Monitoring and control equipment
- Communications equipment
- Instrumentation
- Sampling points
- Welfare facilities
- Security equipment.

The concept of economies of scale applies to operating and capital maintenance costs of non-infrastructure assets and it is significantly the number of assets that drive the much of the operational cost of maintaining the asset not the size of the asset.

In addition, there is a specific cost category that is directly related to the number of non-infrastructure assets: scientific services. Scientific services capture the expenditure required to test the quality of water to satisfy the DWI's legal requirements. The more assets a company operates, the more water quality tests are required. As the cost of collecting a sample and testing the sample is relatively fixed, it is clear that a higher number of assets leads to a larger number of tests and therefore cost.

We have a comparatively large number of small potable water service reservoirs and booster stations which result higher costs simply due to the nature of the distribution system.

Wessex Water is very different from the rest of the industry with respect to its proportion of small service reservoirs, as highlighted in the figures below. We have the smallest average reservoir and tower size and the largest number per km of main or customer connection.

Figure 4 - Number of service reservoirs per 1000 connections

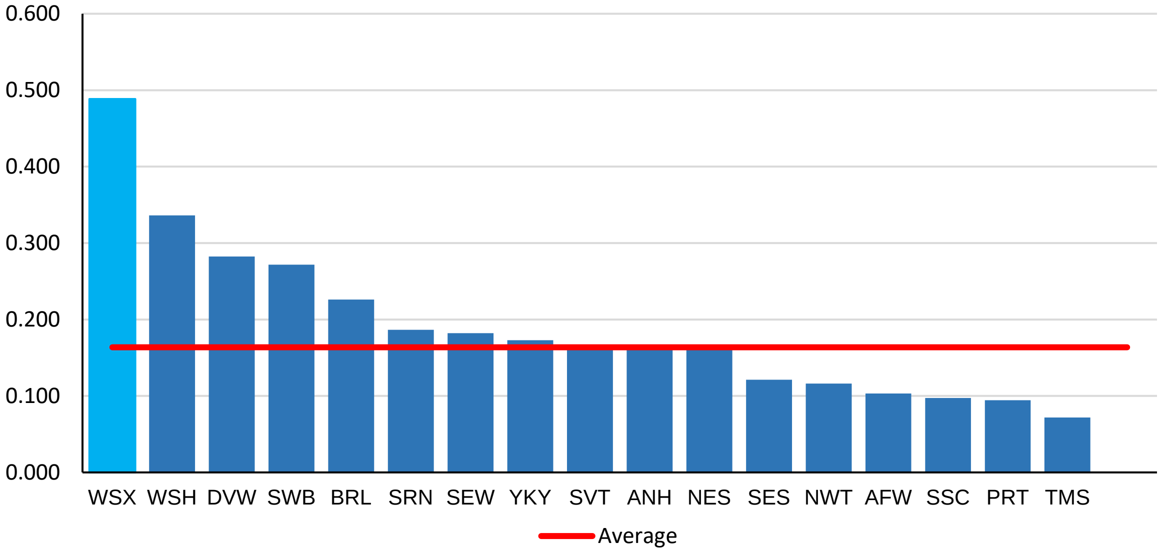


Figure 5 - Number of service reservoirs per 1000 km of main

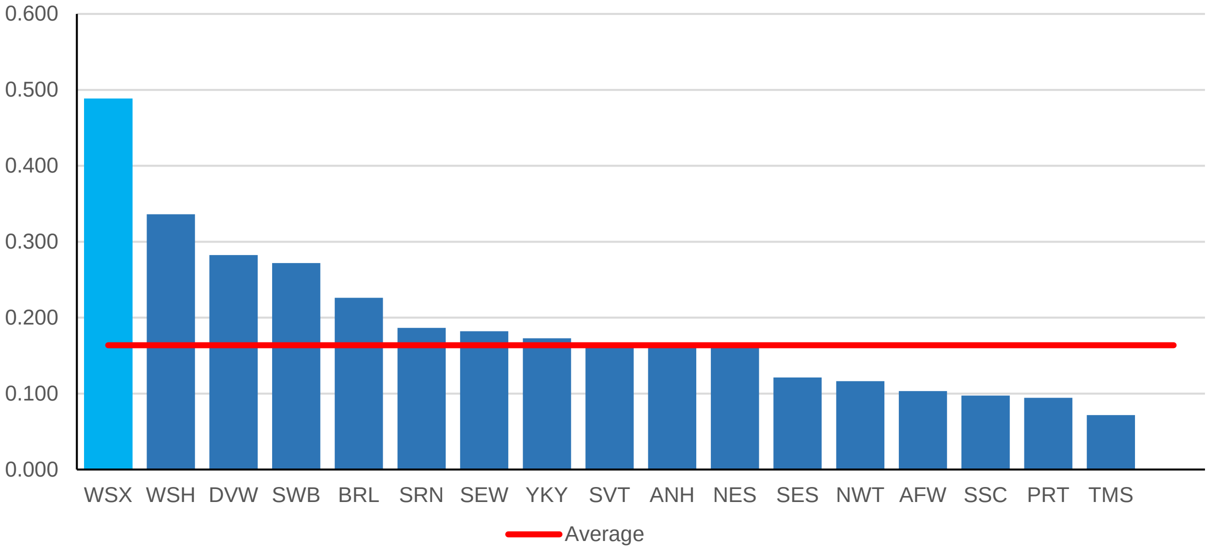
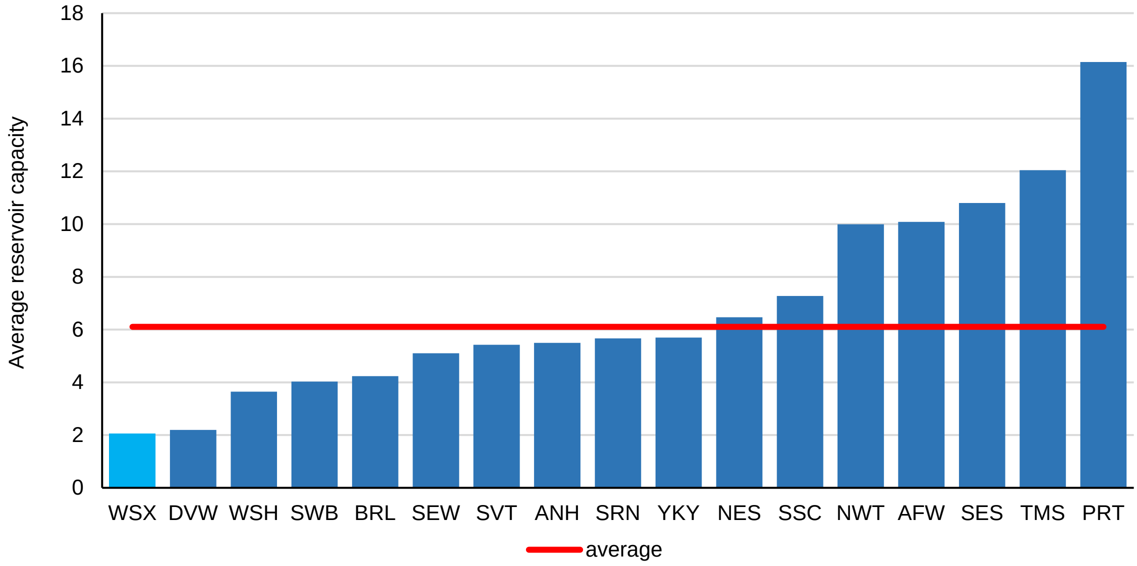


Figure 6 – Average size of service reservoir



We also have a larger number of small distribution assets and with Welsh Water have significantly more booster pumping stations per 1000 connections than the rest of the industry and ours are significantly smaller than the average.

Figure 7 – No of boosters per 1000 connections

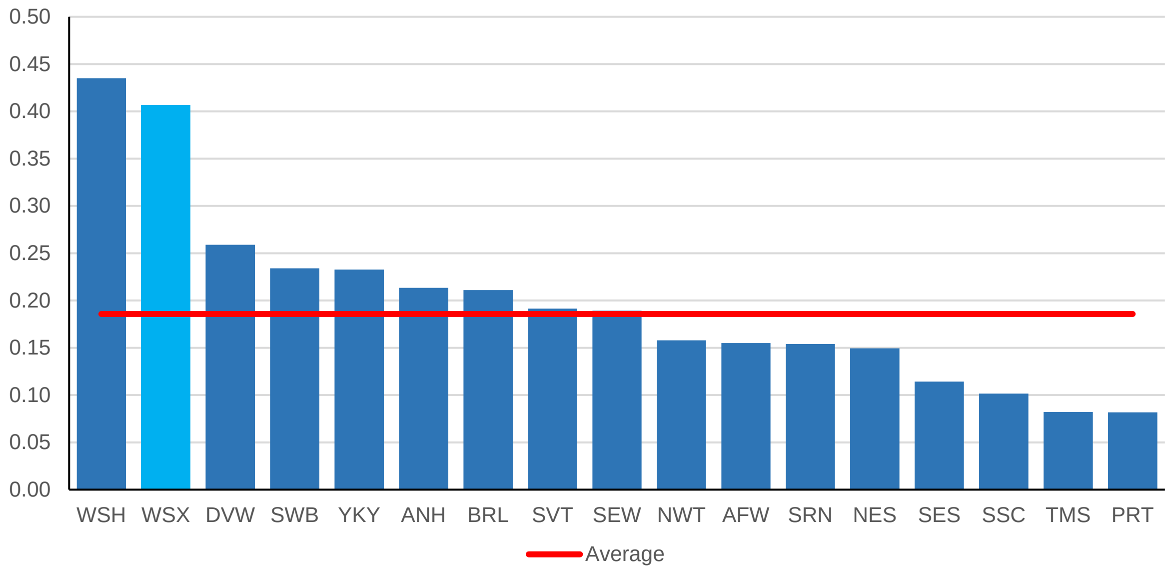
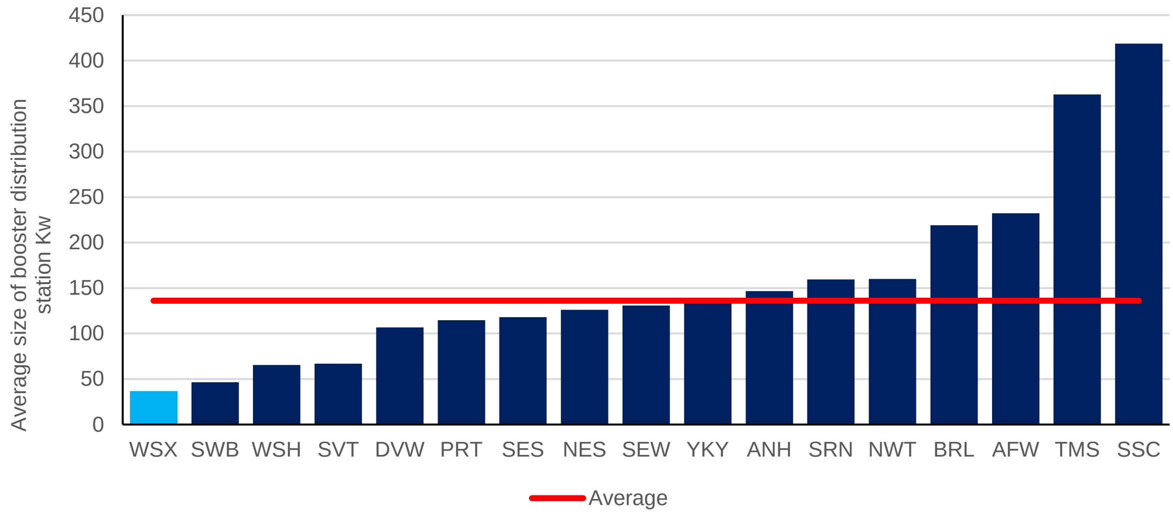


Figure 8 – Average size of booster pumping stations



3. Need for cost adjustment

In this section we provide evidence that the cost claim is not included in Ofwat's modelled baseline; and, that the allowances would, in the round, be insufficient to accommodate special factors without a claim.

The modelling variables of mains length, property density and population density do not reflect whether a company is operating in a particularly rural or urban area and do not reflect the size and number of non-infrastructure assets:

- Mains length – only reflects the average non-infrastructure asset per mains length not the specific level of Wessex Water. It also does not capture company area or size, and the distribution of large towns and cities
- Property density – The modelled measure is properties per km of mains and it does not to capture rurality
- Population density – the cost driver is not related to the number of non-infrastructure assets. It is also independent of the hydrogeology of a supply area and it does not capture whether urban areas are together or dispersed.

3.1 Water treatment works

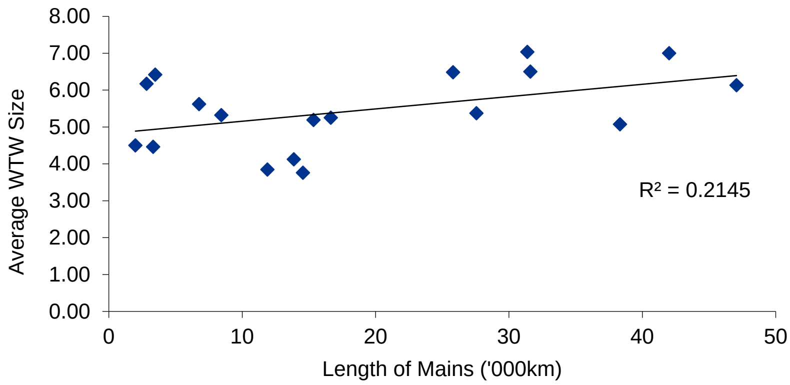
We estimate that the effect of having a higher proportion of smaller water treatment works is material, and the claim value exceeds Ofwat's materiality threshold. We discuss these points in turn.

The cost claim is not included in Ofwat's models

One of the key drivers of average water treatment costs is the 'size mix' of WTWs operated and maintained by each company. At this stage, Ofwat has not published the PR19 econometric models; however, we have no reason to believe that the core scale variables considered in Ofwat's totex modelling will be significantly different from those used in PR14. In PR14, the main scale variable considered was length of main. Property density was also included within the modelling.

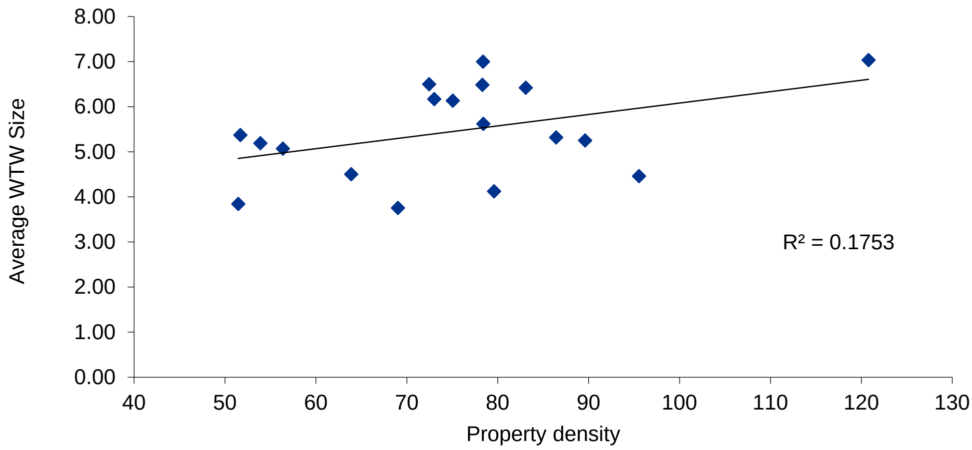
Critically, it appears that companies' choice of WTW 'size-mix' is not captured by these variables. The figures below show that there is no particular relationship between Ofwat's core variables and the observed size of treatment works.

Figure 9 - Average WTW size[1] against length of main ('000km), 2016-17



Source: Company cost assessment data share, 2017

Figure 10 - Average WTW size against property density, 2016-17



Source: Company cost assessment data share, 2017

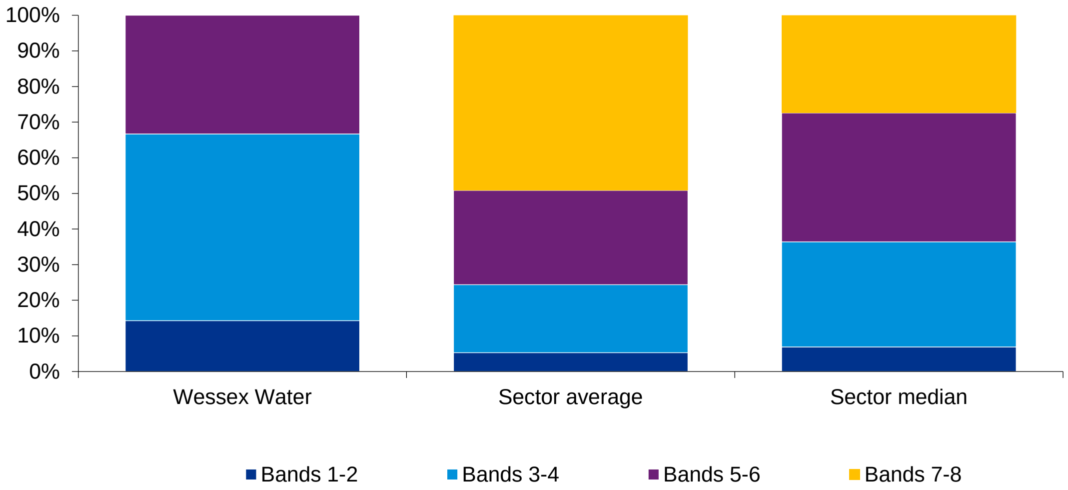
As can be seen from the above, Ofwat's model variables are not meaningfully correlated with this key cost driver.

Estimating the relevant claim

As discussed in the background to this claim, we are a significant outlier in terms of the number of smaller water treatment works we own and operate. Critically, we treat a larger proportion of our distribution input at smaller works, as shown as shown in the Figure below. About 70% of our distribution input is treated at smaller WTWs (size bands 1-4). This is a stark contrast to the rest of the sector; overall, companies in the sector treat roughly 25%-50% of their distribution input at their largest plants (bands 7-8). We have no treatment works in size bands 7 and 8.

[1] Average WTW size has been derived by weighting each site by its flow.

Figure 11 - Distribution input, by WTW size band



In analysing our cost data in relation to water treatment, we found strong evidence in relation to economies of scale in water treatment. Our water treatment unit costs are shown in Table 1 below. The table shows that plants in band 1 are approximately eight times more expensive than plants in band 6 per Ml of water treated.

Table 1 - Wessex Water treatment unit costs (£/Ml), by size band

Size band	Wessex average unit cost (£/Ml)
1 (<2Ml/d)	394
2 (2-4Ml/d)	237
3 (4-8Ml/d)	246
4 (8-16Ml/d)	111
5 (16-32Ml/d)	60
6 (32-64Ml/d)	49

Note: These unit costs are defined as capital maintenance and direct operational costs of our water treatment works (such as power and material costs).

As we treat a larger proportion of our distribution input at smaller plants, which have a higher unit cost, we have a higher overall cost of water treatment relative to the rest of the sector.

We consider that the cost impact of having a different 'size mix' of treatment works can be estimated by comparing our weighted average unit cost of water treatment relative to the rest of the sector.

The sector mean and median distribution input by size band, as well as our distribution input by size band, are shown in Table 2 below.

Table 2 - Water treatment, proportion of distribution input by size band over AMP6 (%)

Size band	Wessex water	Industry mean	Industry median
1 (<2Ml/d)	6%	2%	2%
2 (2-4Ml/d)	9%	3%	5%
3 (4-8Ml/d)	32%	8%	12%
4 (8-16Ml/d)	20%	11%	18%
5 (16-32Ml/d)	16%	13%	20%
6 (32-64Ml/d)	17%	14%	16%
7 (64-128Ml/d)	0%	18%	27%
8 (>128Ml/d)	0%	31%	0%

By using the industry average distributions, we estimate weighted unit costs of treatment if our distribution of treatment works was not atypical.[2] The claim value is simply the difference between our weighted average unit costs and the estimated weighted average unit cost calculated on the mean and median distribution input in each size band for the sector. This is shown in Table 3 below.

Table 3 - Estimates of weighted average unit costs of water treatment (£/Ml)

Size band	Wessex water	Industry mean	Industry median
Total weighted average unit cost	162	86	101
Difference per Ml treated (£)		77	61

We estimate the impact of having a larger number of smaller WTWs relative to the sector is between £61/Ml and £77/Ml of water treated. Based on our average distribution input over from 2012-2017 of 121,000 Ml per year, the impact is between £7.4m - £9.3m per year, i.e. between £37m – £47m over the control period. Our claim is based on the central estimate of £42m.

Our total water network plus totex for AMP7 is forecast to be £590m, of which base maintenance and operating costs are circa £550m. The special cost factor as a proportion of totex is circa 5% to 7% - i.e. greater than the 1% materiality threshold that Ofwat set out in its final methodology.

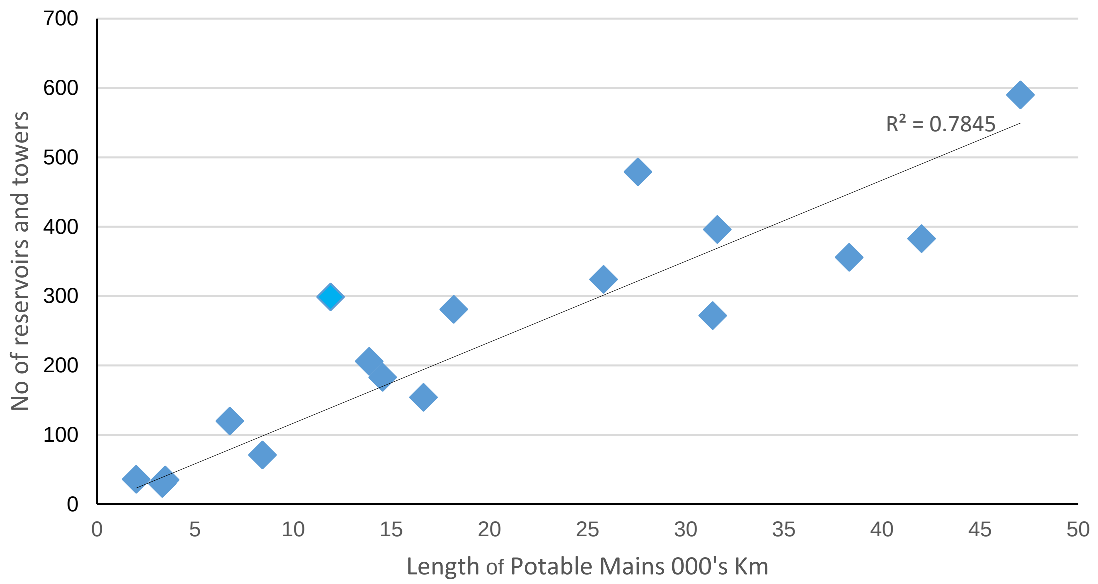
3.2 Non-infrastructure distribution assets

We estimate that the effect of having a higher number of small non-infrastructure distribution assets is material, and the claim value exceeds Ofwat's materiality threshold.

[2] We do not have plants in band 7 and 8 therefore we have assumed that they have the same unit cost as our plants in band 6 as a simplifying assumption. This is a conservative assumption, as the plants in bands 7 and 8 are likely to have a lower unit cost.

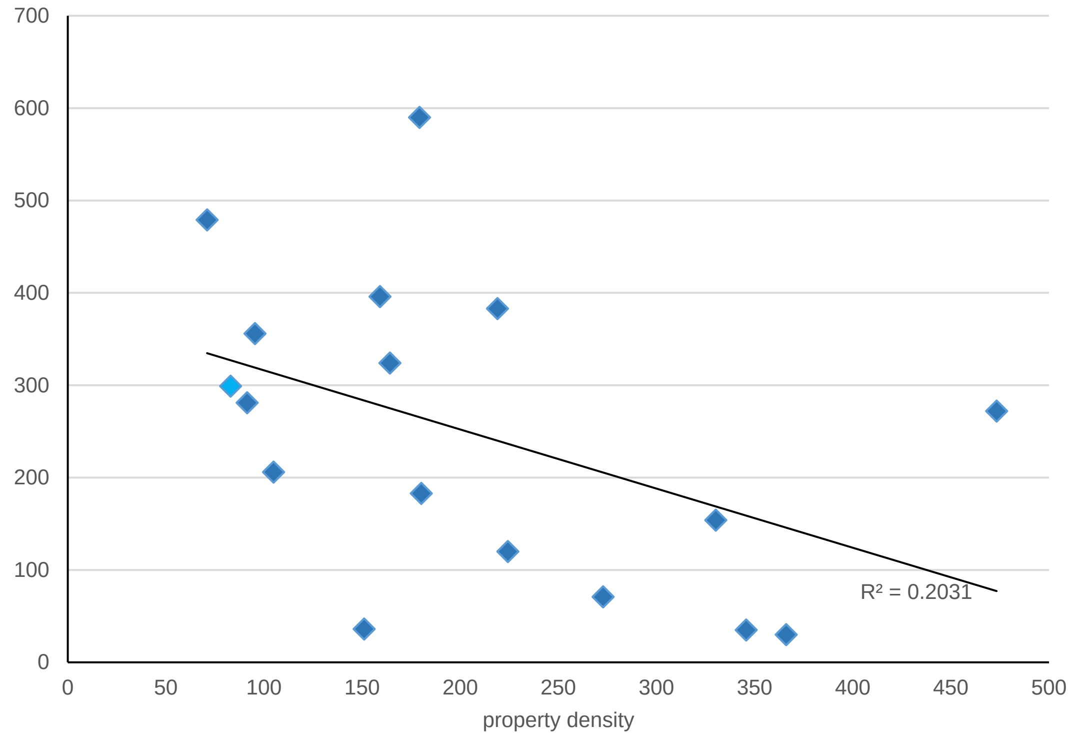
The cost claim is not included in Ofwat's models

Figure 12 - Average number of reservoirs and towers per 1000km of main



This would suggest that the number of non-infrastructure distribution assets has a reasonable correlation to the length of potable mains and therefore maybe partially reflected in the econometric models

Figure 13 - Average number of reservoirs and towers per property density



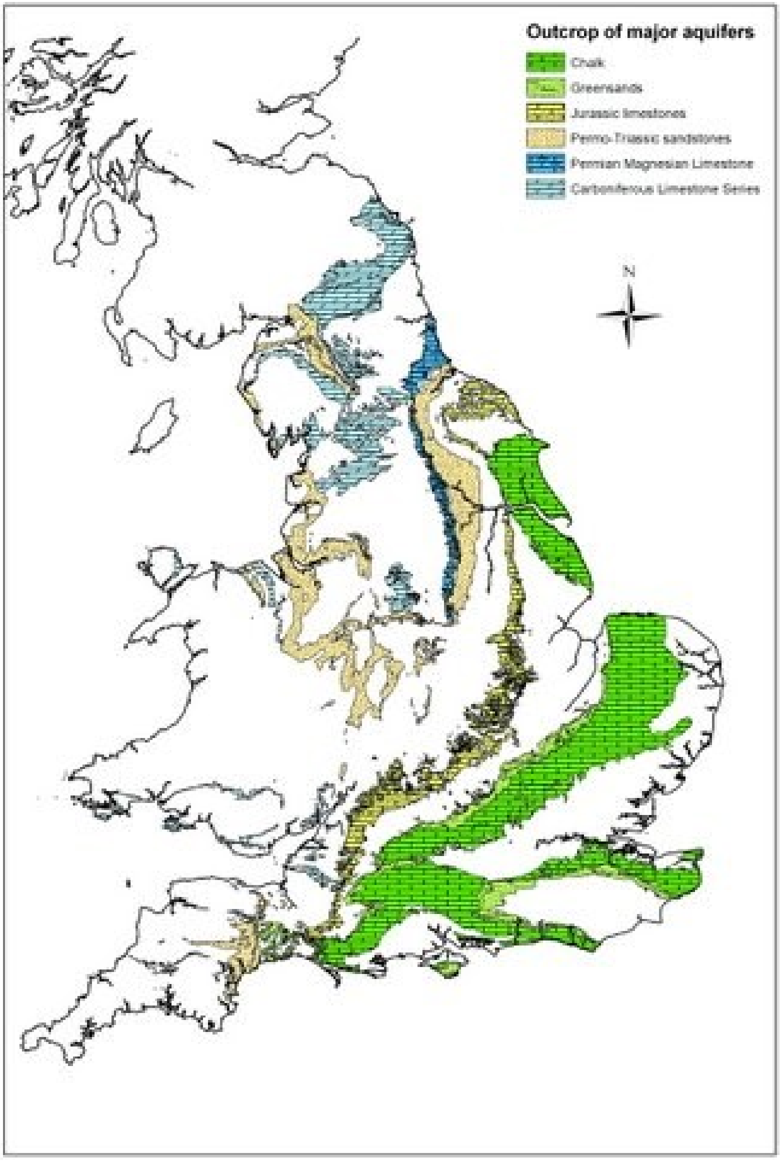
4. Management control

In this section we demonstrate that the cost is driven by factors beyond management control; and, that we have taken all reasonable steps to control the cost.

The disproportionate number of smaller water treatment assets is specific to our region. This was historically driven by the underlying geology of the region and the lack of large industrialised urban areas and the development of Wessex Water from a large number of relatively small rural district water boards.

Figure 14 below shows the major aquifers of England and Wales highlighting the fact that most of our supply area is characterised by the existence of aquifers. The hydrogeology of the vast majority of Dorset and Wiltshire comprises chalk and Oolitic limestone aquifers suitable for providing public water supply via groundwater boreholes. This is why historically this method of water abstraction has been widely applied in Wessex Water's supply area.

Figure 14 – Major aquifers in England and Wales



Historically, companies with large metropolitan areas had to develop much bigger water resource schemes in order to meet growing demand for water. These large water resource schemes comprised sources of water often located some distance away, and the economies of scale of these types of development subsequently allowed companies to connect their more rural areas in between without the need to maintain or develop small local sources.

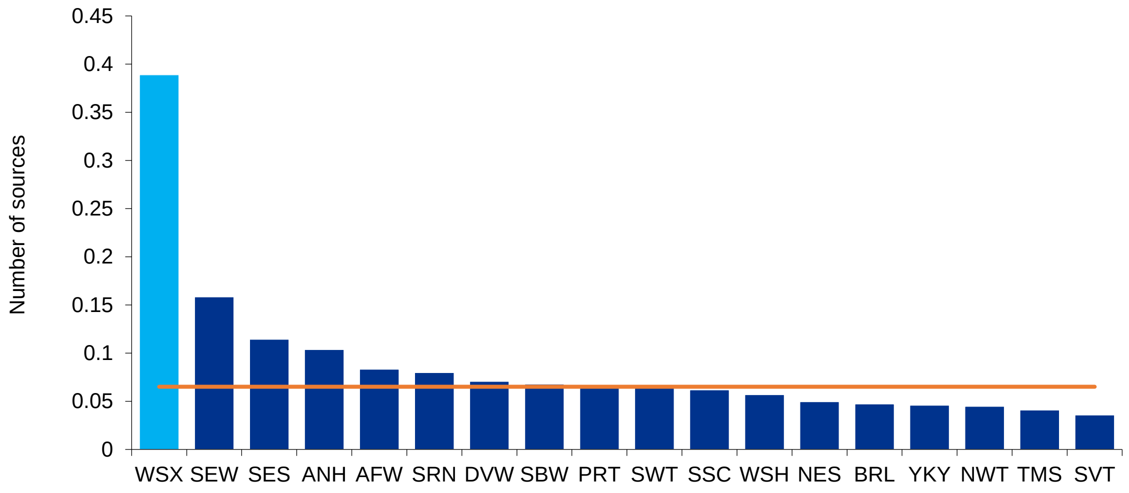
We are also the only water company with no large centres of population – the largest urban areas we serve is the Poole (with a population of circa 140,000), where we gain some economies of scale. A higher proportion of our customers are situated in more rural areas, and therefore the need for larger numbers of smaller water treatment works to effectively serve them is greater.

Our predecessor company, Wessex Water Authority, was created in 1974, from the merger of number of local authority boards shown below as well a number of smaller private undertakings derived from historical estates such as the West Lulworth Water Undertaking:

- Bath Corporation
- Dorset Water Board
- North Wilts Water Board
- South Wilts Water Board
- Wessex Water Board
- West Somerset Water Board
- West Wilts Water Board.

Today Wessex's supply area it is still characterised by the use of nearly 100 sources of water with a large number of very small capacity sources and therefore we have an exceptionally large number of water sources per customer served, as can be seen from the figure below.

Figure 15 - Number of sources per customer



To summarise, our water supply network configuration is borne from the legacy of our business as well as the geological characteristics of our supply area. These factors, which affect our water supply network configuration, are outside our control. We discuss the options for rationalising our supply system in section 6.

5. Need for investment

In this section we set out the incremental improvement that the proposal will deliver; provide the evidence that the investment is required; and show how we have engaged with customers and our customer challenge group.

As described below in section 6, we consider that it would not be efficient to undertake major investment to rationalise our water supply system. Therefore we are not proposing any additional investment, but we are requesting that the additional costs are recognised through this cost adjustment claim.

Our customer research on resilience and future proofing, highlighted that customers place a high value on the ability to be supplied from more than one works. This was one of the reasons for developing our integrated grid project, which has just been completed.

6. Best option for customers

In this section we demonstrate how we have selected the best option for customers, including how the proposal delivers outcomes that reflect customers' priorities, identified through customer engagement; and the assurance from our customer challenge group. We also describe the optioneering process that we have followed including consideration of alternative options, risk and impact on the environment.

We accept that in principle we would be able to reconfigure our network to take advantage of the economies of scale in water treatment in the long-run and in recent years we have mothballed or abandoned a number of smaller treatment works where it has not been cost efficient to maintain them as a source.

Given our geographical spread and nature of our sources which are characterised by a large number of small borehole and spring sources reducing the number of our treatment works involves transporting raw water from the dispersed sources to one site, building new larger treatment works and reconfiguring the network to redistribute the treated water. In essence the raw water sources cannot be moved and therefore rationalisation would involve relocating water treatment works only.

While this is technically possible, we do not consider that a large scale, network reconfiguration project is a viable strategy in response to our higher average unit costs. It would result in higher bills, as well as reducing overall system resilience, as customers would be more dependent on the performance of a few large works.

We have assessed the potential cost of reconfiguring our system so that it more closely resembles the sector in general. The detailed assessment is provided in Annex A.

In summary we estimate that such a strategy would involve:

- capital costs in the region of £400m
- additional pumping costs of around £3.2m per year
- a programme of work that would take 10 to 15 years to deliver.

It is estimated that a project of this scale would result in a cost impact equivalent to around £24m a year and a bill impact of an additional £42 per household.

It could also reduce the overall resilience of our network, as customers would be more dependent on the performance of a fewer large works with a more complex network.

In conclusion, a network reconfiguration capital project would result in an unfavourable bill impact for our customers, as well as a reduction in overall resilience. As such, we consider that a cost adjustment claim is the appropriate approach for addressing our cost differences as it avoids the need for uneconomic investment.

7. Robustness and efficiency of costs

We did not pursue this claim at the previous price review due to the limitations in the industry data at the time.

We received feedback from Ofwat that the data considered in our PR14 cost claim was not sufficiently granular to demonstrate differences in the nature of our water supply network relative to the sector to justify a claim.

We consider that the quality of the data has improved significantly at this price review through the cost assessment data share, allowing us to justify the grounds for a cost adjustment claim in a systematic and robust way.

First, the cost assessment data share has allowed us to clearly highlight key differences in our portfolio of water treatment works relative to the sector. Second, it has allowed us to demonstrate that the core variables in the econometric models may not fully explain our costs in water treatment, as we have an outlying number of smaller treatment works.

Finally, we consider that our internal cost reporting has improved significantly over the last AMP. Relative to AMP5, we are now able to track our water treatment costs at a significantly more granular level, providing robust cost data for the estimation of the claim.

8. Customer protection

In this section we set out how customers are protected if the investment is cancelled, delayed or reduced in scope; and how this is linked to outcomes and a suitable outcome delivery incentive in our business plan.

No additional customer protection measures are required, as this special factor claim relates to the day-to-day running of the business. We have not included proposals for a major network reconfiguration schemes within our plan, therefore, customers will not be exposed to the costs of this uneconomic counterfactual.

We have set our incentive rates for CRI on the incremental costs of this claim (£42m) along with the strategic investment and enhancements we are making to address water quality (£30m).

This ensures that we are holding ourselves accountable to continued delivery of industry leading performance on CRI, and refunds the customers in case we do not continue to maintain our high standards by reducing investment.

9. Affordability

This section outlines the measures we have undertaken to consider the impact of the proposed programme on customer affordability and bills in PR19.

The claim amount is significantly less than the cost of reconfiguring the network, which would be the relevant counterfactual in this case.

The outcome of the costs described in this supporting document was included in our draft business plan that was tested with customers between January and June 2018.

The customer research is designed to test whether customers find the plan acceptable and affordable. The stimulus material covered our overall package of service improvements, statutory enhancements and bill impacts. We tested our plan with household customers, business customers, retailers, those in vulnerable circumstances and industry stakeholders. Results were triangulated across a variety of qualitative and quantitative methodologies to maximise the robustness of both the sample and conclusions.

Testing has shown that 96% of our customers find our business plan acceptable. Acceptability is above 80% across all demographic subgroups. Those in vulnerable circumstances were slightly less accepting of the plan than other groups, but still at a very high level.

A large majority of household customers (92%) consider our plans are affordable for them. Affordability amongst business customers was also very high at 96%. Vulnerable customers also found the plan acceptable and affordable, and were positive about the assistance that we provide to this group.

Full details of our acceptability testing can be found in supporting document 1.1 and details of how we address affordability and vulnerability are in included in supporting document 2.1.

10. Board assurance

The proposals have been subject to our board assurance process, which is described in detail in section 12 of the main business plan narrative and supporting documents 12.1 to 12.8.

Section 12 of the main business plan narrative includes the following statements that are relevant to this supporting document:

> The full Board confirms that, in our view, the proposals within the Business Plan are consistent with and should allow the company to deliver against its statutory obligations, now and up to 2025.
>
> We, the Board of Wessex Water, understand our accountability for this Business Plan. We are unequivocal in our assurance that the Plan is both high-quality and deliverable. We also confirm that it is consistent with our long-term vision for the company and our strategy.
>
> The Board assures that this plan is informed by customer engagement and the views of the Wessex Water Partnership (WWP), and that the performance commitments contained within it reflect customer priorities, are stretching and reporting is robust.
>
> The Board confirms that the expenditure projections contained within this Business Plan are robust and efficient, and that large investments are deliverable and best for customers.

11. Annex A - WTW Rationalisation

The purpose of this annex is to present a high level assessment of the work required and cost of rationalising our network – in order to demonstrate that this would not be in customers' best interests.

11.1 Background

The majority of our sources are groundwater borehole or spring sources which by their nature tend to be more dispersed and smaller than surface water treatment works.

Historically we have been abandoning a number of smaller treatment works and sources where the cost of improving the treatment quality and in particular in relation to cryptosporidium risk has outweighed the benefit of keeping the resource. In the last 5 years we have reduced the number of water treatment works from 107 to 96.

Table 4 - Number of sources per customer

Company	Total Water treated at Works Ml/d	No of works	Average output of works Ml/d
ANH	1,100	142	7.7
NES	1,111	55	20.2
NWT	2,142	88	24.3
SRN	537	91	5.9
SVT	1,891	140	13.5
SWB	580	34	17.1
TMS	2,692	83	32.4
WSH	804	63	12.8
WSX	337	96	3.5
YKY	1,274	49	26.0
AFW	907	112	8.1
BRL	274	16	17.2
DVW	66	6	11.0
PRT	177	21	8.4
SES	163	8	20.4
SEW	496	87	5.7
SSC	375	40	9.4
Total	**14,927**	**1131**	**13.2**

From the 2016/17 data the industry average works output is estimated at 13.2 Ml/d whilst the average output from Wessex water is around 3.5 Ml/d

To achieve an average industry WTW size we would need to amalgamate sources such that we end up with around 25 treatment works. Given our geographical spread and nature of our sources which are characterised by a large number of borehole and spring sources it is unrealistic that this would be a significant challenge.

To answer the question about the costs of rationalising our system such that it was closer to the industry average size, we have considered:

- Conceptually the work that would be required
- Potential groups of raw water sources that could be treated at a single new water treatment works
- The capital cost and increased operating cost of such an approach
- The bill impact of the strategy.

These are set out in the following sections.

11.2 Concept

The raw water sources cannot be moved as the abstraction licences specify the location of the abstraction and our sources are the basis for water resources planning etc.

Therefore in concept the new arrangements would comprise:

- retaining the existing raw water source (groundwater boreholes)
- new raw water transfer mains from the source to the new or expanded water treatment works, together with new or upgraded raw water pumping stations
- new or increased water treatment capacity
- the treated water would then need to be transferred back to the service reservoirs that serve the local demand, using
  - new / upgraded potable water distribution boosters
  - new treated water trunk mains.

11.3 Grouping of raw water sources and treatment works

We have undertaken a cluster analysis of sources that are reasonably geographically located to reduce the number of treatment works by 42 by grouping 57 treatment works into 15 larger treatment works. Although this would still result in Wessex Water having a larger number of smaller works than the industry average giving an average output of 6.1Ml/d and no large works in band 7 or band 8, we would no longer be a significant outlier. To achieve even fewer treatment works to achieve an approximate industry average size further clustering of the sources would be prohibitively expensive.

The 57 sources were grouped in 15 clusters as shown in the table below.

Ref	Area	Sources that would be treated at a new treatment works
1	Devizes Area	Shepherds Shore Yatesbury Cherhill Bourton Bishops Cannings
2	South Chippenham	Goodshill Lacock Holt Ivyfields

Ref	Area	Sources that would be treated at a new treatment works
3	North Dorset Area	Alton Pancras Hooke Cattistock Forston Maiden Newton Burton
4	Wylye Valley	Wylye Codford Chitterne Fonthill Bishop Heytesbury Shrewton
5	South Dorset	Sutton Poyntz Friar Waddon Empool Belhuish Portesham Litton Cheney Winterbourne Abbas
6	Stour Valley	Black Lane Corfe Mullen (incl Admiralty) Sturminster Marshall (incl. Shapwick)
7	Salisbury and the Nadder Valley	Clarendon Deans Farm Bulbridge Fovant
8	Westbury Area	Chirton Market Lavington (from Easterton source) Upton Scudamore Arn Hill
9	Malmesbury	Rodbourne (incl. Cowbridge) Milbourne Charlton
10	Mere and Whitesheets Downs	Brixton Deverill Mere Dunkerton
11	Upper Avon	Durrington Newton Toney Compton
12	Piddle Valley	Milborne St. Andrew Dewlish Briantspuddle
13	Sherborne	Bristol Road (from Castleton source)

Ref	Area	Sources that would be treated at a new treatment works
		Lake
14	South Petherton	Waterloo Farm Compton Durville
15	Chard	Tatworth Pole Rue

11.4 Costs

The capital costs of combining sources are the construction of:

- new raw water transfer mains
- new / upgraded pumping stations
- increased water treatment capacity
- new / upgraded potable water distribution boosters
- new treated water trunk mains.

With increasing size there is a reduction in operational treatment costs but an increase in additional pumping costs from the raw water sources to the treatment works and from the treatment works to the service reservoirs.

Estimated capital and operational costs

The size and length of new mains were estimated from the existing source licences, actual average daily supply delivery and distances measured from the GIS data base. The costs were estimated using high level budget unit rates for pumping stations, pipes and treatment works. The pipe costs were estimated using Wessex Water's current estimated pipe laying rates and treatment works costs estimated using the TR61 data base.

An allowance of 20% was added for unmeasured items such as design, supervision, planning, environmental impact assessment, land purchase, corporate overheads, centralised control and automation etc.

There is significant uncertainty in the costs and an error bound has been added.

The costs for six clusters are estimated as follows:

Area	Distribution input 16/17 Ml/d	Capital cost £m	High estimate £m	Low estimate £m	Additional pumping opex cost £k/ year
Devizes	3.6	15	18	12	80
Chippenham	19.6	32	39	26	300

North Dorset	11.7	37	44	29	500
Wylye Valley	29.9	46	56	37	500
Stour Valley	35.9	47	57	38	200
Malmesbury	27.1	16	19	13	200

The estimated capital cost of the six schemes is £155m to £233m, with a central estimate of £193m.

Using the average cost for combining a treatment works across the whole of the suggested treatment rationalisation we would be looking at a capital investment cost of around £400m for the rationalisation of treatment works.

The estimated additional pumping costs for the six schemes is £1.8m and therefore the additional estimated pumping costs following the rationalisation of the sources is around £3.2m / year on a water in to supply basis.

Estimated equivalent bill impact costs

The estimated operational savings by increasing the treatment works size are offset by the additional capital investment needed to rationalise the treatment process and the additional pumping costs of moving raw water to the centralised treatment works and then redistributing the treated water

The additional cost for having a large number of works compared to the industry average water supply company has been estimated as between £7.4m - £9.3m / Year

The capital investment increases the RCV giving a return on the investment assuming a WAC of 3.3% of £13.2m / year

The run-off rate of the investment is estimated at £7.3m / year

The estimated additional pumping costs is of the order of £3.2m / year

This gives an additional cost of approximately £24m / year

11.5 Diagrams of potential rationalisation of treatment works